U.S. Department of the Interior
Bureau of Land Management

County of Riverside
Planning Department

Desert Quartzite Solar Project

DRAFT

Plan Amendment/ Environmental Impact Statement/ Environmental Impact Report

DOI-BLM-CA-D060-2017-0002
CA State Clearinghouse No. 2015031066

August 2018

Estimated Lead Agency Total Costs Associated with Developing and Producing This EIS

$1.1 million

Desert Quartzite Solar Project
Draft Plan Amendment
Environmental Impact Statement/ Environmental Impact Report

Lead Agencies:

Federal - U.S. Department of Interior, Bureau of Land Management (BLM)
State of California - Riverside County, California

BLM Proposed ROW Grant CACA-049397

State Clearinghouse Number 2015031066

August 2018

The BLM manages more land – 253 million acres – than any other Federal agency. This land, known as the National System of Public Lands, is primarily located in 12 Western States, including Alaska. The Bureau, with a budget of about $1 billion, also administers 700 million acres of subsurface mineral estate throughout the nation. The BLM's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

DOI-BLM-CA-D060-2017-0002

Palm Springs South Coast Field Office
Desert Quartzite Solar Project
Draft California Desert Conservation Area (CDCA) Plan Amendment/Environmental Impact Statement/Environmental Impact Report for the Desert Quartzite Solar Project
Proposed Right-of-Way (ROW) Grant CACA-049397

Lead Agency: Bureau of Land Management (BLM)
Palm Springs / South Coast Field Office
1201 Bird Center Drive, Palm Springs, CA 92262

ABSTRACT

The Palm Springs South Coast Field Office of the BLM has prepared this Draft Proposed Plan Amendment (PA) to the California Desert Conservation Area (CDCA) Plan/Environmental Impact Statement/Environmental Impact Report (Draft PA/EIS/EIR), which analyzes the environmental impacts of the proposed Desert Quartzite Solar Project (DQSP; the Project). The Project is described in right-of-way (ROW) grant application number CACA-049397 filed with the BLM by First Solar Development, LLC (the Applicant), a wholly-owned subsidiary of First Solar Development, Inc. The Project area under application for BLM approval is approximately 5,115 acres. In addition to the BLM ROW application, the Applicant submitted a Conditional Use Permit (CUP) Application to the County of Riverside on February 25, 2015 (Riverside County CUP No. 3721), for 160 acres of privately-owned land adjacent to the BLM-administered land. Within this application area, the Applicant has proposed a Project that would occupy approximately 3,770 acres. This includes 3,560 acres for the portion of the solar facility on BLM land; 54 acres for the proposed 230 kilovolt (kV) transmission line (generation interconnection [gen-tie] line) on BLM land, 2 acres for the offsite portion of a buried telecommunications line and possible above-ground electrical service line on BLM land, and 154 acres for the portion of the solar facility on private land. The larger acreage under application allows for the BLM and the County to consider various site layouts as Project alternatives for their environmental analysis. If approved, the final proposed ROW grant for the Project would be 3,616 acres of BLM land, and the County authorization for use of the private land would cover 154 acres.

The Draft PA/EIS/EIR evaluates the potential effects of the Proposed Action, two other action alternatives, and a No Action Alternative on BLM-administered lands and privately-owned lands under the County's jurisdiction. Following the public review period and consideration of public comments, BLM will develop a Final PA/EIS/EIR, which will be used by BLM to render a decision on whether to deny, grant, or grant with modifications the requested ROW, and by the County to render a decision on issuing a CUP. In addition to the decision on the ROW application, the BLM is considering associated amendments to the CDCA Plan to accommodate the Proposed Action. The PA decisions considered in the Draft PA/EIS are:

> PA1: The CDCA Plan would be amended to identify the development footprint as suitable for the proposed type of solar energy use. This would be adopted if a ROW were granted for the Project, the Resource Avoidance Alternative, or the Reduced Project Alternative.
>
> PA2: The CDCA Plan would be amended to authorize a portion of the gen-tie corridor that is located outside of BLM's Utility Corridor K and Section 368 Federal Energy Corridor 30-52. This would be adopted if a ROW were granted for the Project, the Resource Avoidance Alternative, or the Reduced Project Alternative.

If these two decisions are not taken, the CDCA Plan would not be amended. This would result if the No Action Alternative were selected.

The Field Manager of the Palm Springs South Coast Field Office has the authority for site management of future activities related to ROW Grant CACA-049397 and is the BLM Authorized Officer for this Draft PA/EIS/EIR.

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Palm Springs South Coast Field Office
1201 Bird Center Drive
Palm Springs, CA 92262
www.blm.gov/california

August 10, 2018

Dear Reader:

Attached for your review and comment is the Draft Proposed Plan Amendment (PA) to the California Desert Conservation Area (CDCA) Plan and Environmental Impact Statement/Environmental Impact Report (Draft PA/EIS/EIR), which analyzes environmental impacts of the proposed Desert Quartzite Solar Project (DQSP) for the Bureau of Land Management (BLM) Palm Springs South Coast Field Office and the County of Riverside. The BLM prepared this document in accordance with the National Environmental Policy Act of 1969, as amended; the Federal Land Policy and Management Act of 1976, as amended, and its implementing regulations; the BLM's Land Use Planning Handbook (H-1601-1); the California Environmental Quality Act of 1970; and other applicable law and policy.

The DQSP is described in right-of-way (ROW) grant application number CACA-049397 filed with the BLM by Desert Quartzite, LLC (the Applicant), a wholly-owned subsidiary of First Solar Development, Inc. on December 17, 2013. In addition to the BLM ROW application, the Applicant submitted a Conditional Use Permit (CUP) Application to the County of Riverside on February 25, 2015 (Riverside County CUP No. 3721), for 160 acres of privately-owned land adjacent to the BLM-administered land. Within these application areas, the Applicant has proposed the DSQP that would occupy approximately 3,770 acres.

The BLM encourages the public to provide information and comments about the Draft PA/EIS/EIR, including the adequacy and accuracy of proposed alternatives, analysis of respective management decisions, and any new information. In developing the PA/EIS/EIR, the BLM may select various management decisions from each of the analyzed alternatives for the purpose of creating a management strategy that best meets the needs of the resources and values in this area under the principals of multiple use and sustained-yield mandate. As a member of the public, your timely comments on the Draft PA/EIS/EIR for the DQSP will help the BLM formulate the Final PA/EIS/EIR. Comments will be accepted for 90 calendar days from August 10 to November 8, 2018 following the Environmental Protection Agency's (EPA) publication of its Notice of Availability in the Federal Register. The BLM can best use your comments and information if received within the review period. Comments may be submitted electronically at: blm_ca_desert_quartzite_solar_project@blm.gov

Comments may also be submitted by mail to: Erika Grace, AECOM, 10 Patewood Dr., Bldg VI, Suite 500, Greenville, SC 29615. We strongly encourage you to submit comments electronically.

If you choose to submit comments on the PA/EIS/EIR, we request that you make your comments as specific as possible. Comments will be more helpful if they include suggested changes, sources, or methodologies, and reference to a section or page number in the Draft PA/EIS/EIR. Comments containing only opinion or preferences will be considered and included as part of the decision making process, although they will not receive a formal response from the BLM.

Before including your address, phone number, email address, or other personal identifying information in your comment, be advised that your entire comment — including your personal identifying information — may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Public meetings will be announced by local media, website, and/or public mailings at least 15 days in advance.

Copies of the PA/EIS/EIR will be sent to affected Federal, tribal, state, and local government agencies. Copies of the PA/EIS/EIR are available for public review and comment on the BLM website at:

https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=renderDefaultPlanOrProjectSite&projectId=68211&dctmId=0b0003e880d8c579

Copies are also available for public review at the following BLM locations:

Palm Springs - South Coast Field Office
1201 Bird Center Drive
Palm Springs, CA 92262

California State Office
2800 Cottage Way, Suite W-1623
Sacramento, CA 95825

Thank you for your interest in the DQSP PA/EIS/EIR. We appreciate your contributions. For additional information or clarification regarding this document or the planning process, please contact Brandon G. Anderson, Project Manager, at (760) 833-7140 or bganderson@blm.gov.

Sincerely,

Herrema

Do as Herrema
Field Manager

TABLE OF CONTENTS

Page

EXECUTIVE SUMMARY ES-1
ES.1 Introduction and Background ES-1
ES.2 Purpose and Need ES-2
ES.2.1 BLM Purpose and Need ES-2
ES.2.2 CDCA Plan Amendment ES-2
ES.2.3 County and Applicant's Project Objectives ES-3
ES.3 Summary Description of the Proposed Action and Alternatives ES-4
ES.4 Public Involvement, Consultation, and Coordination ES-5
ES.4.1 Scoping ES-5
ES.4.2 Consultation and Coordination ES-6
ES.5 Environmental Consequences ES-6

CHAPTER 1 INTRODUCTION AND PURPOSE AND NEED 1-1
1.1 Introduction 1-1
1.2 Joint NEPA/CEQA Document 1-2
  1.2.1 NEPA Environmental Impact Statement 1-2
  1.2.2 CEQA Environmental Impact Report 1-2
1.3 Purpose and Need 1-3
  1.3.1 BLM Purpose and Need 1-3
  1.3.2 County and Applicant's Project Objectives 1-4
1.4 Project Location and Overview 1-7
1.5 Major Authorizing Laws and Regulations/Agency Roles and Authorizations 1-7
  1.5.1 BLM 1-7
  1.5.2 Riverside County 1-8
  1.5.3 U.S. Fish and Wildlife Service 1-8
  1.5.4 U.S. Army Corps of Engineers 1-9
  1.5.5 California Department of Fish and Wildlife 1-9
1.6 Policy Consistency and Land Use Conformance 1-10
  1.6.1 Relationship of the Proposed Action to the Western Solar Plan 1-10
  1.6.2 Relationship of the Proposed Action to the Desert Renewable Energy Conservation Plan 1-11
  1.6.3 Northern and Eastern Colorado Desert Coordinated Management Plan 1-12
  1.6.4 Land Use Plan Conformance 1-12
1.7 Document Organization 1-14
1.8 Scoping/Issues Addressed in the Analysis 1-17
  1.8.1 Scoping Process 1-17
  1.8.2 Resources Analyzed 1-18
1.9 Permits and Approvals 1-19
  1.9.1 Related Federal Review and Consultation Requirements 1-20
  1.9.2 Related State and Local Review and Consultation Requirements 1-21
1.10 Contact Persons 1-23

CHAPTER 2 PROPOSED ACTION AND ALTERNATIVES 2-1
2.1 Introduction 2-1
2.2 Alternatives 2-1
  2.2.1 NEPA and CEQA Requirements for Alternatives 2-1
  2.2.2 Alternatives Development and Screening Process 2-2

2.2.3 Proposed Land Use Plan Amendment Decisions.................................... 2-3
2.3 Features Common to all Action Alternatives, Including the Proposed Action.... 2-3
2.3.1 Overview.. 2-4
2.3.2 Site Description... 2-5
2.3.2.1 Location 2-5
2.3.2.2 Legal Description.. 2-5
2.3.2.3 Onsite and Adjacent Land Uses 2-6
2.3.3 Facilities... 2-6
2.3.3.1 Solar Panels and Arrays 2-6
2.3.3.2 Power Distribution 2-7
2.3.3.3 Access Roads 2-8
2.3.3.4 Operations and Maintenance Building.................................. 2-9
2.3.3.5 Meteorological Facilities... 2-9
2.3.3.6 Power and Telecommunications Utilities 2-9
2.3.3.7 Security and Fencing... 2-10
2.3.3.8 Water Supply.. 2-10
2.3.3.9 Sanitary Facilities.. 2-11
2.3.4 Construction... 2-11
2.3.4.1 Preconstruction Surveying and Staking 2-11
2.3.4.2 Temporary Construction Facilities....................................... 2-12
2.3.4.3 Site Preparation 2-13
2.3.4.4 Assembly and Installation of Solar Arrays 2-14
2.3.4.5 Power Distribution 2-15
2.3.4.6 Gen-Tie Line 2-15
2.3.4.7 Construction Schedule 2-16
2.3.4.8 Construction Equipment and Workforce 2-16
2.3.4.9 Construction Hazardous Materials and Wastes.................... 2-17
2.3.5 Operations and Maintenance... 2-19
2.3.6 Decommissioning 2-19
2.3.7 Applicant-Proposed Management Plans and Mitigation Measures....... 2-21
2.3.7.1 Hazardous Materials and Waste Management..................... 2-22
2.3.7.2 Vegetation Management 2-24
2.3.7.3 Fire Prevention and Control... 2-24
2.3.7.4 Health and Safety 2-25
2.3.7.5 Wildlife 2-25
2.3.7.6 Air Quality 2-26
2.3.7.7 Water Conservation.. 2-27
2.3.7.8 Traffic... 2-27
2.3.7.9 Stormwater Management 2-28
2.3.7.10 Visual Resources... 2-29
2.3.7.11 Cultural Resources 2-29
2.3.7.12 Paleontological Resources 2-29
2.3.7.13 Recreation 2-30
2.4 Alternative 1: Proposed Action.. 2-30
2.5 Alternative 2: Resource Avoidance Alternative 2-32
2.6 Alternative 3: Reduced Project Alternative 2-35
2.7 Alternative 4: No Action Alternative... 2-37
2.8 Preferred Alternative/Environmentally Superior Alternative 2-37
2.9 Alternatives Considered but Eliminated from Detailed Analysis...................... 2-38
2.9.1 Rationale for Eliminating Alternatives 2-38
2.9.2 Alternatives Considered but Eliminated from Detailed Analysis.......... 2-40
2.9.2.1 Site Alternatives 2-40

2.9.2.2 Alternative Construction Methods 2-43
2.9.2.3 Migratory Bird and Special Status Species Protection Alternative 2-44
2.9.2.4 Alternative Energy Projects 2-47

CHAPTER 3 AFFECTED ENVIRONMENT 2.9-1
3.1 Introduction 3.1-1
3.2 Air Resources 3.2-1
3.2.1 Environmental Setting 3.2-1
3.2.1.1 Regional Climate 3.2-1
3.2.1.2 Existing Air Quality 3.2-2
3.2.1.3 Criteria Air Pollutants 3.2-5
3.2.1.4 Toxic Air Contaminants 3.2-7
3.2.1.5 Sensitive Receptors 3.2-9
3.3 Biological Resources – Vegetation 3.3-1
3.3.1 Environmental Setting 3.3-1
3.3.1.1 Vegetation Alliances 3.3-2
3.3.1.2 Sand Dunes 3.3-4
3.3.1.3 Special-Status Plants 3.3-9
3.3.1.4 Jurisdictional Waters and Wetlands 3.3-16
3.3.1.5 Cacti 3.3-17
3.3.1.6 Invasive Weeds 3.3-17
3.4 Biological Resources – Wildlife 3.4-1
3.4.1 Environmental Setting 3.4-1
3.4.1.1 Special-Status Wildlife Species 3.4-2
3.4.1.2 Wildlife Movement 3.4-21
3.5 Cultural Resources 3.5-1
3.5.1 Environmental Setting 3.5-2
3.5.1.1 Geological Setting 3.5-2
3.5.1.2 Paleoclimate 3.5-3
3.5.1.3 Prehistoric Background 3.5-4
3.5.1.4 Ethnographic Background 3.5-8
3.5.1.5 Historical Background 3.5-22
3.5.1.6 Identified Cultural Resources 3.5-29
3.5.1.6.1 Previous Research 3.5-30
3.5.1.6.2 Prehistoric Site Types 3.5-31
3.5.1.6.3 Historic Site Types 3.5-33
3.5.1.6.4 Archival and Library Research 3.5-35
3.5.1.6.5 Native American Coordination 3.5-35
3.5.1.6.6 Field Inventory Investigations 3.5-36
3.6 Environmental Justice 3.6-1
3.6.1 Environmental Setting 3.6-1
3.6.1.1 Minority Populations 3.6-1
3.6.1.2 Low-Income Populations 3.6-5
3.7 Geology and Soil Resources 3.7-1
3.7.1 Environmental Setting 3.7-1
3.7.1.1 Regional Geology and Seismicity 3.7-1
3.7.1.2 Local Geology 3.7-1
3.7.1.3 Geologic Hazards 3.7-3
3.8 Greenhouse Gas Emissions and Global Climate Change 3.8-1
3.8.1 Environmental Setting 3.8-1
3.8.1.1 Characteristics and Definition 3.8-1

3.8.1.2 Greenhouse Gases 3.8-2
3.9 Hazards and Hazardous Materials 3.9-1
3.9.1 Environmental Setting 3.9-1
3.9.1.1 Hazardous Materials 3.9-1
3.9.1.2 Public Health 3.9-3
3.9.1.3 Transmission Line Safety and Nuisance 3.9-4
3.9.1.4 Emergency Response 3.9-4
3.9.1.5 Airport Operations 3.9-5
3.9.1.6 Intentionally Destructive Acts 3.9-6
3.9.1.7 Abandoned Mine Lands 3.9-7
3.10 Lands, Realty, and Agricultural and Forestry Resources 3.10-1
3.10.1 Environmental Setting 3.10-2
3.10.1.1 Regional Setting 3.10-2
3.10.1.2 General Characteristics 3.10-2
3.10.1.3 Land Ownership/Management 3.10-2
3.10.1.4 Existing Uses 3.10-4
3.11 Mineral Resources 3.11-1
3.11.1 Environmental Setting 3.11-1
3.12 Noise 3.12-1
3.12.1 Environmental Setting 3.12-1
3.12.1.1 General Information on Noise 3.12-1
3.12.1.2 Project Setting 3.12-3
3.13 Paleontological Resources 3.13-1
3.13.1 Environmental Setting 3.13-1
3.13.1.1 Geologic Setting 3.13-1
3.13.1.2 Paleontological Resource Classifications 3.13-3
3.13.1.3 Paleontological Resources Assessment 3.13-5
3.14 Recreation and Public Access 3.14-1
3.14.1 Environmental Setting 3.14-1
3.14.1.1 Recreation Resources on the Project Site 3.14-1
3.14.1.2 Recreation Resources In the Vicinity of the Project Site 3.14-1
3.14.1.3 Public Access 3.14-5
3.15 Social and Economic Setting 3.15-1
3.15.1 Environmental Setting 3.15-1
3.15.1.1 Population 3.15-2
3.15.1.2 Housing 3.15-5
3.15.1.3 Economic Conditions 3.15-8
3.15.1.4 Government Tax Revenues 3.15-11
3.15.1.5 Stakeholders 3.15-15
3.16 Special Designations and Lands with Wilderness Characteristics 3.16-1
3.16.1 Environmental Setting 3.16-1
3.16.1.1 Regional Setting 3.16-1
3.16.1.2 Project Setting 3.16-2
3.16.1.3 Wilderness Characteristics Review 3.16-2
3.16.1.4 Designated Wilderness Areas 3.16-2
3.16.1.5 Areas of Critical Environmental Concern 3.16-4
3.16.1.6 Back Country Byways 3.16-4
3.17 Transportation and Traffic 3.17-1
3.17.1 Environmental Setting 3.17-1
3.17.1.1 Regional and Local Roadway Facilities 3.17-1
3.17.1.2 Existing Traffic Volumes and Levels of Service 3.17-2
3.17.1.3 Project Access 3.17-4

3.17.1.4 Public Transportation within the Vicinity of the Project ... 3.17-4
3.18 Utilities and Public Services ... 3.18-1
3.18.1 Environmental Setting ... 3.18-1
3.18.1.1 Utilities ... 3.18-1
3.18.1.1.1 Water and Wastewater ... 3.18-1
3.18.1.1.2 Solid Waste Management ... 3.18-2
3.18.1.1.3 Natural Gas and Electricity ... 3.18-2
3.18.1.1.4 Stormwater ... 3.18-2
3.18.1.2 Public Services and Facilities ... 3.18-3
3.18.1.2.1 Education ... 3.18-3
3.18.1.2.2 Law Enforcement ... 3.18-3
3.18.1.2.3 Fire Protection ... 3.18-4
3.18.1.2.4 Hazardous Materials Emergency Response ... 3.18-4
3.18.1.2.5 Hospital Facilities and Emergency Response 3.18-5
3.19 Visual Resources ... 3.19-1
3.19.1 Environmental Setting ... 3.19-1
3.19.1.1 Regional Setting ... 3.19-1
3.19.1.2 Visual Character ... 3.19-1
3.19.1.3 Existing Light and Glare ... 3.19-2
3.19.1.4 Approach to Baseline Analysis ... 3.19-2
3.19.1.5 Visual Resource Inventory of the Project Area ... 3.19-5
3.19.1.6 Interim Visual Resource Management Class Recommendation ... 3.19-6
3.20 Water Resources ... 3.20-1
3.20.1 Environmental Setting ... 3.20-1
3.20.1.1 Groundwater ... 3.20-2
3.20.1.2 Surface Water Hydrology and Water Quality ... 3.20-9
3.21 Wildland Fire Ecology ... 3.21-1
3.21.1 Environmental Setting ... 3.21-1

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES ... 4.1-1
4.1 Introduction ... 4.1-1
4.1.1 Baseline ... 4.1-1
4.1.2 Analytical Assumptions ... 4.1-2
4.1.3 Types of Effects ... 4.1-2
4.1.4 Resources and Uses Not Affected or Present in the Action Area ... 4.1-2
4.1.5 Cumulative Scenario Approach ... 4.1-2
4.1.5.1 NEPA Requirements for Cumulative Impact Analysis ... 4.1-3
4.1.5.2 CEQA Requirements for Cumulative Impact Analysis ... 4.1-4
4.1.5.3 Known Actions and Activities in the Cumulative Scenario. 4.1-5
4.1.5.4 Renewable Energy Projects Included in the Cumulative Scenario ... 4.1-5
4.1.6 Mitigation Measures Included in the Analysis ... 4.1-19
4.1.7 Terms and Conditions found in FLPMA and BLM ROW Regulations ... 4.1-19
4.2 Air Resources ... 4.2-1
4.2.1 Methodology for Analysis ... 4.2-1
4.2.1.1 CEQA Significance Criteria ... 4.2-4
4.2.2 Applicant-Proposed Measures (APMs) ... 4.2-6
4.2.3 Direct and Indirect Impacts ... 4.2-6
4.2.3.1 Alternative 1: Proposed Action ... 4.2-6

4.2.3.2 Alternative 2: Resource Avoidance Alternative 4.2-10
4.2.3.3 Alternative 3: Reduced Project Alternative 4.2-12
4.2.4 Application of CEQA Significance Thresholds................................ 4.2-16
4.2.5 Alternative 4: No Action Alternative.. 4.2-19
4.2.6 Cumulative Impacts 4.2-19
4.2.7 Residual Impacts.. 4.2-24
4.3 Biological Resources – Vegetation... 4.3-1
4.3.1 Methodology for Analysis 4.3-1
4.3.1.1 CEQA Significance Criteria.. 4.3-1
4.3.2 Applicant-Proposed Measures 4.3-2
4.3.3 Direct and Indirect Impacts.. 4.3-5
4.3.3.1 Alternative 1: Proposed Action.. 4.3-5
4.3.3.2 Alternative 2: Resource Avoidance Alternative 4.3-13
4.3.3.3 Alternative 3: Reduced Project Alternative 4.3-14
4.3.4 Application of CEQA Significance Thresholds................................ 4.3-15
4.3.5 Alternative 4: No Action Alternative.. 4.3-18
4.3.6 Cumulative Impacts 4.3-18
4.3.7 Residual Impacts.. 4.3-22
4.4 Biological Resources - Wildlife.. 4.4-1
4.4.1 Methodology for Analysis 4.4-1
4.4.1.1 CEQA Significance Criteria.. 4.4-1
4.4.2 Applicant-Proposed Measures 4.4-2
4.4.3 Direct and Indirect Impacts.. 4.4-2
4.4.3.1 Alternative 1: Proposed Action.. 4.4-4
4.4.3.2 Alternative 2: Resource Avoidance Alternative 4.4-17
4.4.3.3 Alternative 3: Reduced Project Alternative 4.4-18
4.4.4 Application of CEQA Significance Thresholds................................ 4.4-19
4.4.5 Alternative 4: No Action Alternative.. 4.4-24
4.4.6 Cumulative Impacts 4.4-24
4.4.7 Residual Impacts.. 4.4-32
4.5 Cultural Resources.. 4.5-1
4.5.1 Methodology for Analysis 4.5-1
4.5.1.1 Introduction.. 4.5-1
4.5.1.2 Cultural Resources Evaluation of Historical Significance and Effects.. 4.5-2
4.5.1.3 CEQA Significance Criteria.. 4.5-4
4.5.2 Applicant-Proposed Measures 4.5-5
4.5.3 Direct and Indirect Impacts.. 4.5-5
4.5.3.1 Alternative 1: Proposed Action.. 4.5-5
4.5.3.2 Alternative 2: Resource Avoidance Alternative 4.5-8
4.5.3.3 Alternative 3: Reduced Project Alternative 4.5-8
4.5.4 Application of CEQA Significance Thresholds.................................. 4.5-9
4.5.5 Alternative 4: No Action Alternative.. 4.5-12
4.5.6 Cumulative Impacts 4.5-12
4.5.7 Residual Impacts.. 4.5-14
4.6 Environmental Justice.. 4.6-1
4.6.1 Methodology for Analysis 4.6-1
4.6.1.1 CEQA Significance Criteria.. 4.6-3
4.6.2 Applicant-Proposed Measures 4.6-3
4.6.3 Direct and Indirect Impacts.. 4.6-3
4.6.3.1 Alternative 1: Proposed Action.. 4.6-3

4.6.3.2 Alternative 2: Resource Avoidance Alternative 4.6-5
4.6.3.3 Alternative 3: Reduced Project Alternative 4.6-6
4.6.4 Alternative 4: No Action Alternative.. 4.6-6
4.6.5 Cumulative Impacts 4.6-6
4.6.6 Residual Impacts... 4.6-6
4.7 Geology and Soils 4.7-1
4.7.1 Methodology for Analysis 4.7-1
4.7.1.1 CEQA Significance Criteria... 4.7-1
4.7.2 Applicant-Proposed Measures 4.7-2
4.7.3 Direct and Indirect Impacts.. 4.7-3
4.7.3.1 Alternative 1: Proposed Action.. 4.7-3
4.7.3.2 Alternative 2: Resource Avoidance Alternative 4.7-8
4.7.3.3 Alternative 3: Reduced Project Alternative 4.7-9
4.7.4 Application of CEQA Significance Thresholds.................................. 4.7-9
4.7.5 Alternative 4: No Action Alternative.. 4.7-13
4.7.6 Cumulative Impacts 4.7-14
4.7.7 Residual Impacts.. 4.7-15
4.8 Global Climate Change 4.8-1
4.8.1 Methodology for Analysis 4.8-1
4.8.1.1 CEQA Significance Criteria... 4.8-1
4.8.1.2 Methodology for Estimating GHG Emissions 4.8-2
4.8.1.3 GHG Emissions Impact Analysis 4.8-2
4.8.1.4 Climate Change.. 4.8-2
4.8.2 Applicant-Proposed Measures 4.8-2
4.8.3 Direct and Indirect Impacts.. 4.8-2
4.8.3.1 Alternative 1: Proposed Action.. 4.8-2
4.8.3.2 Alternative 2: Resource Avoidance Alternative 4.8-6
4.8.3.3 Alternative 3: Reduced Project Alternative 4.8-6
4.8.4 Climate Change Effects on the Project 4.8-7
4.8.4.1 Alternative 1: Proposed Action.. 4.8-7
4.8.4.2 Alternative 2: Resource Avoidance Alternative 4.8-10
4.8.4.3 Alternative 3: Reduced Project Alternative 4.8-10
4.8.5 Application of CEQA Significance Thresholds................................ 4.8-10
4.8.6 Alternative 4: No Action Alternative.. 4.8-11
4.8.6.1 Direct and Indirect Impacts.. 4.8-11
4.8.7 Cumulative Impacts 4.8-11
4.8.8 Residual Impacts.. 4.8-12
4.9 Hazards and Hazardous Materials 4.9-1
4.9.1 Methodology for Analysis 4.9-1
4.9.1.1 CEQA Significance Criteria... 4.9-3
4.9.2 Applicant-Proposed Measures 4.9-4
4.9.3 Direct and Indirect Impacts.. 4.9-5
4.9.3.1 Alternative 1: Proposed Action.. 4.9-5
4.9.3.2 Alternative 2: Resource Avoidance Alternative 4.9-15
4.9.3.3 Alternative 3: Reduced Project Alternative 4.9-19
4.9.4 Application of CEQA Significance Thresholds................................ 4.9-23
4.9.5 Alternative 4: No Action Alternative.. 4.9-26
4.9.6 Cumulative Impacts 4.9-26
4.9.7 Residual Impacts.. 4.9-29
4.10 Lands, Realty, and Agricultural and Forestry Resources 4.10-1
4.10.1 Methodology for Analysis 4.10-1

4.10.1.1 NEPA Requirements 4.10-1
4.10.1.2 CEQA Significance Criteria 4.10-2
4.10.2 Applicant-Proposed Measures 4.10-3
4.10.3 Direct and Indirect Impacts 4.10-3
4.10.3.1 Alternative 1: Proposed Action 4.10-3
4.10.3.2 Alternative 2: Resource Avoidance Alternative 4.10-5
4.10.3.3 Alternative 3: Reduced Project Alternative 4.10-6
4.10.4 Application of CEQA Significance Thresholds 4.10-7
4.10.5 Alternative 4: No Action Alternative 4.10-10
4.10.6 Cumulative Impacts 4.10-11
4.10.7 Residual Impacts 4.10-13
4.11 Mineral Resources 4.11-1
4.11.1 Methodology for Analysis 4.11-1
4.11.1.1 CEQA Significance Criteria 4.11-1
4.11.2 Applicant-Proposed Measures 4.11-1
4.11.3 Direct and Indirect Impacts 4.11-1
4.11.3.1 Alternative 1: Proposed Action 4.11-1
4.11.3.2 Alternative 2: Resource Avoidance Alternative 4.11-2
4.11.3.3 Alternative 3: Reduced Project Alternative 4.11-2
4.11.4 Application of CEQA Significance Thresholds 4.11-2
4.11.5 Alternative 4: No Action Alternative 4.11-3
4.11.6 Cumulative Impacts 4.11-3
4.11.7 Residual Impacts 4.11-4
4.12 Noise 4.12-1
4.12.1 Methodology for Analysis 4.12-1
4.12.1.1 CEQA Significance Criteria 4.12-3
4.12.2 Applicant-Proposed Measures 4.12-4
4.12.3 Direct and Indirect Impacts 4.12-4
4.12.3.1 Alternative 1: Proposed Action 4.12-4
4.12.3.2 Alternative 2: Resource Avoidance Alternative 4.12-9
4.12.3.3 Alternative 3: Reduced Project Alternative 4.12-10
4.12.4 Application of CEQA Significance Thresholds 4.12-11
4.12.5 Alternative 4: No Action Alternative 4.12-13
4.12.6 Cumulative Impacts 4.12-13
4.12.7 Residual Impacts 4.12-15
4.13 Paleontological Resources 4.13-1
4.13.1 Methodology for Analysis 4.13-1
4.13.1.1 CEQA Significance Criteria 4.13-1
4.13.2 Applicant-Proposed Measures 4.13-1
4.13.3 Direct and Indirect Impacts 4.13-4
4.13.3.1 Alternative 1: Proposed Action 4.13-4
4.13.3.2 Alternative 2: Resource Avoidance Alternative 4.13-6
4.13.3.3 Alternative 3: Reduced Project Alternative 4.13-6
4.13.4 Application of CEQA Significance Thresholds 4.13-7
4.13.5 Alternative 4: No Action Alternative 4.13-7
4.13.6 Cumulative Impacts 4.13-8
4.13.7 Residual Impacts 4.13-9
4.14 Recreation and Public Access 4.14-1
4.14.1 Methodology for Analysis 4.14-1
4.14.1.1 CEQA Significance Criteria 4.14-1
4.14.2 Applicant-Proposed Measures 4.14-2

4.14.3 Direct and Indirect Impacts 4.14-2
4.14.3.1 Alternative 1: Proposed Action 4.14-2
4.14.3.2 Alternative 2: Resource Avoidance Alternative 4.14-5
4.14.3.3 Alternative 3: Reduced Project Alternative 4.14-6
4.14.4 Application of CEQA Significance Thresholds 4.14-6
4.14.5 Alternative 4: No Action Alternative 4.14-8
4.14.6 Cumulative Impacts 4.14-8
4.14.7 Residual Impacts 4.14-11
4.15 Social and Economic Effects 4.15-1
4.15.1 Methodology for Analysis 4.15-1
4.15.1.1 CEQA Significance Criteria 4.15-1
4.15.2 Applicant-Proposed Measures 4.15-2
4.15.3 Direct and Indirect Impacts 4.15-2
4.15.3.1 Alternative 1: Proposed Action 4.15-2
4.15.3.2 Alternative 2: Resource Avoidance Alternative 4.15-7
4.15.3.3 Alternative 3: Reduced Project Alternative 4.15-9
4.15.4 Application of CEQA Significance Thresholds 4.15-11
4.15.5 Alternative 4: No Action Alternative 4.15-12
4.15.6 Cumulative Impacts 4.15-12
4.15.6.1 Alternative 1 – Proposed Action 4.15-13
4.15.6.1.1 Economic 4.15-13
4.15.6.1.2 Social 4.15-18
4.15.6.2 Alternative 2 – Resource Avoidance Alternative 4.15-20
4.15.6.3 Alternative 3 – Reduced Project Alternative 4.15-20
4.15.6.4 Alternative 4 – No Action 4.15-20
4.15.7 Residual Impacts 4.15-20
4.16 Special Designations and Lands with Wilderness Characteristics 4.16-1
4.16.1 Methodology for Analysis 4.16-1
4.16.1.1 CEQA Significance Criteria 4.16-1
4.16.2 Applicant-Proposed Measures 4.16-1
4.16.3 Direct and Indirect Impacts 4.16-1
4.16.3.1 Alternative 1: Proposed Action 4.16-1
4.16.3.2 Alternative 2: Resource Avoidance Alternative 4.16-2
4.16.3.3 Alternative 3: Reduced Project Alternative 4.16-3
4.16.4 Application of CEQA Significance Thresholds 4.16-3
4.16.5 Alternative 4: No Action Alternative 4.16-3
4.16.6 Cumulative Impacts 4.16-3
4.16.7 Residual Impacts 4.16-3
4.17 Transportation and Traffic 4.17-1
4.17.1 Methodology for Analysis 4.17-1
4.17.1.1 CEQA Significance Criteria 4.17-1
4.17.2 Applicant-Proposed Measures 4.17-2
4.17.3 Direct and Indirect Impacts 4.17-4
4.17.3.1 Alternative 1: Proposed Action 4.17-4
4.17.3.2 Alternative 2: Resource Avoidance Alternative 4.17-9
4.17.3.3 Alternative 3: Reduced Project Alternative 4.17-9
4.17.4 Application of CEQA Significance Thresholds 4.17-9
4.17.5 Alternative 4: No Action Alternative 4.17-14
4.17.6 Cumulative Impacts 4.17-14
4.17.7 Residual Impacts 4.17-19
4.18 Utilities and Public Services 4.18-1

4.18.1 Methodology for Analysis 4.18-1
4.18.1.1 CEQA Significance Criteria 4.18-1
4.18.2 Applicant-Proposed Measures 4.18-2
4.18.3 Direct and Indirect Impacts 4.18-2
4.18.3.1 Alternative 1: Proposed Action 4.18-2
4.18.3.2 Alternative 2: Resource Avoidance Alternative 4.18-5
4.18.3.3 Alternative 3: Reduced Project Alternative 4.18-6
4.18.4 Application of CEQA Significance Thresholds 4.18-6
4.18.5 Alternative 4: No Action Alternative 4.18-9
4.18.6 Cumulative Impacts 4.18-9
4.18.7 Residual Impacts 4.18-12
4.19 Visual Resources 4.19-1
4.19.1 Methodology for Analysis 4.19-1
4.19.1.1 Visual Contrast Rating Process 4.19-2
4.19.1.2 Selection of Key Observation Points 4.19-3
4.19.1.3 Visual Simulations 4.19-4
4.19.1.4 CEQA Significance Criteria 4.19-4
4.19.2 Applicant-Proposed Measures 4.19-5
4.19.3 Direct and Indirect Impacts 4.19-6
4.19.3.1 Alternative 1: Proposed Action 4.19-6
4.19.3.2 Alternative 2: Resource Avoidance Alternative 4.19-14
4.19.3.3 Alternative 3: Reduced Project Alternative 4.19-15
4.19.4 Application of CEQA Significance Thresholds 4.19-16
4.19.5 Alternative 4: No Action Alternative 4.19-19
4.19.6 Cumulative Impacts 4.19-20
4.19.7 Residual Impacts 4.19-25
4.20 Water Resources 4.20-1
4.20.1 Methodology for Analysis 4.20-1
4.20.1.1 CEQA Significance Criteria 4.20-1
4.20.2 Applicant-Proposed Measures 4.20-2
4.20.3 Direct and Indirect Impacts 4.20-3
4.20.3.1 Alternative 1: Proposed Action 4.20-3
4.20.3.2 Alternative 2: Resource Avoidance Alternative 4.20-14
4.20.3.3 Alternative 3: Reduced Project Alternative 4.20-14
4.20.4 Application of CEQA Significance Thresholds 4.20-14
4.20.5 Alternative 4: No Action Alternative 4.20-21
4.20.6 Cumulative Impacts 4.20-21
4.20.7 Residual Impacts 4.20-24
4.21 Wildland Fire 4.21-1
4.21.1 Methodology for Analysis 4.21-1
4.21.1.1 CEQA Significance Criteria 4.21-1
4.21.2 Applicant-Proposed Measures 4.21-1
4.21.3 Direct and Indirect Impacts 4.21-1
4.21.3.1 Alternative 1: Proposed Action 4.21-1
4.21.3.2 Alternative 2: Resource Avoidance Alternative 4.21-4
4.21.3.3 Alternative 3: Reduced Project Alternative 4.21-4
4.21.4 Application of CEQA Significance Thresholds 4.21-4
4.21.5 Alternative 4: No Action Alternative 4.21-4
4.21.6 Cumulative Impacts 4.21-4
4.21.7 Residual Impacts 4.21-6

CHAPTER 5 OTHER NEPA AND CEQA CONSIDERATIONS 5-1
5.1 Irreversible and Irretrievable Commitments of Resources 5-1
5.2 Significant Unavoidable Impacts 5-1
5.3 Energy Conservation 5-2
5.4 Short-Term Uses and Long-Term Productivity 5-4
5.5 Growth-Inducing Impacts 5-5

CHAPTER 6 COORDINATION, CONSULTATION, AND PUBLIC INVOLVEMENT 6-1
6.1 Introduction 6-1
6.2 Agency Coordination 6-1
6.2.1 U.S. Environmental Protection Agency 6-1
6.2.2 Department of Defense 6-2
6.2.3 U.S. Army Corps of Engineers 6-2
6.3 Consultation 6-2
6.3.1 Endangered Species Act Section 7 6-2
6.3.2 National Historic Preservation Act Section 106 6-2
6.3.3 Government-to-Government Tribal Consultation 6-3
6.3.4 County Tribal Consultation 6-4
6.4 Public Involvement 6-5
6.5 List of Preparers 6-5

Appendices

Appendix A:	Figures
Appendix B:	Acronyms and Glossary
Appendix C:	References
Appendix D:	Applicable Statutes, Regulations, Plans, and Standards
Appendix E:	Relationship Between the Desert Quartzite Solar Project PA/EIS/EIR and the Desert Renewable Energy Conservation Plan and Conformance with Conservation and Management Actions
Appendix F:	CDCA Plan, Section 368, and Local Plan
Appendix G:	Mitigation Measures
Appendix H:	Public Scoping Report
Appendix I:	Investigation of the Presence of Corps and US EPA Jurisdictional Waters
Appendix J:	Draft Integrated Weed Management Plan
Appendix K:	Traffic Impact Analysis
Appendix L:	Assessment of NECO CMP Designated Open Routes (Unpaved) Within Project Boundary
Appendix M:	Biological Resources Technical Report and WEST Memorandum
Appendix N:	Identification and Delineation of Areas Potentially Subject to Jurisdiction under the California Department of Fish and Wildlife Lake and Streambed Alteration Program
Appendix O:	Geomorphic, Stratigraphic & Geologic Eolian Evaluation Report
Appendix P:	Class III Archaeological Survey Report
Appendix Q:	Phase I Environmental Site Assessment Report
Appendix R:	Noise Technical Report

Appendix S: Preliminary Geotechnical Investigation Report
Appendix T: Preliminary Paleontological Resource Assessment Technical Report
Appendix U: Visual Resources Technical Report
Appendix V: Drainage Report
Appendix W: Air Quality and Greenhouse Gas Technical Report
Appendix X: Proposed Groundwater Use - Numerical Groundwater Modeling Report
Appendix Y: Water Supply Assessment

Figures

Figure 1-1: Regional Context
Figure 2-1: Project Location
Figure 2-2: Site Plan
Figure 2-3: Photograph of Typical Solar Array
Figure 2-4: Layout of Typical Solar Array
Figure 2-5: Photograph of Typical Power Conversion Station
Figure 2-6: Photograph of Typical PV Combining Switchgear
Figure 2-7: Topographic Map of Site Vicinity
Figure 2-8: Project Site Topography and Grading Plan
Figure 2-9: Alternative 2 – Resource Avoidance
Figure 2-10: Alternative 3 – Reduced Project
Figure 3.2-1: Blythe Airport Wind Rose Diagram
Figure 3.3-1: Biological Resources Study Area
Figure 3.3-2: Vegetation Alliances and Cover Types
Figure 3.3-3: Special Status Plant Species Locations
Figure 3.3-4: Harwoods Milkvetch Locations
Figure 3.3-5: Abram's Spurge Locations
Figure 3.3-6: Utah Vine Milkweed Locations
Figure 3.3-7: Ribbed Cryptantha Locations
Figure 3.3-8: Harwoods Eriastrum Locations
Figure 3.3-9: Desert Unicorn Plant Locations
Figure 3.3-10: Sahara Mustard Distribution
Figure 3.4-1: Desert Tortoise Sign
Figure 3.4-2: USGS Desert Tortoise Habitat Model
Figure 3.4-3: Mojave Fringe-Toed Lizard Locations
Figure 3.4-4: Burrowing Owl Habitat, Observations, and Burrows
Figure 3.4-5: Golden Eagle Habitat and Observations
Figure 3.4-6: Migratory Bird Survey Locations & Avian Line Transects
Figure 3.4-7: Raptor and Raven Nest Locations
Figure 3.4-8: Active Kit Fox Burrows
Figure 3.4-9: Acoustic Bat Monitoring Locations
Figure 3.4-10: Bighorn Sheep WHMAs
Figure 3.5-1: Current APE
Figure 3.6-1: Environmental Justice
Figure 3.7-1: Geologic Map of Project Area
Figure 3.7-2: Soil Map of Project Area
Figure 3.7-3: SSURGO Soils Hydrologic Groups
Figure 3.7-4: SSURGO Soils Wind Erodibility
Figure 3.9-1: Airport Compatibility Zones
Figure 3.10-1: Land Management Areas
Figure 3.10-2: BLM Multiple Use Classes & Energy Corridors
Figure 3.12-1: Noise Measurement Locations
Figure 3.14-1: BLM Administered Recreation Resources

Figures (Continued)

Figure 3.14-2: Regional Recreation Resources
Figure 3.14-3: BLM Routes Near Project
Figure 3.15-1: Drive Times
Figure 3.16-1: Special Designation Areas
Figure 3.17-1: Locations of Intersections Analyzed for Traffic Impacts
Figure 3.19-1: KOP Locations for Visual Impact Analysis
Figure 3.21-1: Fire Ignitions near Project Area
Figure 4.1-1: Cumulative Projects
Figure 4.3-1: State Jurisdictional Watercourse Areas
Figure 4.12-1: Portion of Project Area within 2 KM of NNSR
Figure 4.19-1: KOP2 – Chuckwalla DWMA, Looking East – Existing View
Figure 4.19-2: KOP2 – Chuckwalla DWMA, Looking East – Proposed View
Figure 4.19-3: KOP3 – McCoy Mountains, Looking South – Existing View
Figure 4.19-4: KOP3 – McCoy Mountains, Looking South – Proposed View
Figure 4.19-5: KOP4 – Mule Mountains, Looking Northeast – Existing View
Figure 4.19-6: KOP4 – Mule Mountains, Looking Northeast – Proposed View
Figure 4.19-7: KOP1c – Interstate 10, Looking Southeast – Existing View
Figure 4.19-8: KOP1c – Interstate 10, Looking Southeast – Proposed View
Figure 4.19-9: KOP6 – Nicholls Warm Springs, Looking Southwest – Existing View
Figure 4.19-10: KOP6 – Nicholls Warm Springs, Looking Southwest – Proposed View

Tables

Table ES-1: Comparison of Impacts by Alternative
Table ES-2: Summary of Impact Significance under CEQA
Table 1-1: Recommended PA/EIS/EIR Sections and Required Elements
Table 1-2: Anticipated Permits and Approvals
Table 2-1: Legal Description of the Project Site Area
Table 2-2: Non-Semiconductor Chemicals at Project Site During Construction
Table 2-3: Generation and Disposal of Solid Wastes Associated with Construction
Table 2-4: Proposed Action Components and Approximate Land Areas
Table 2-5: Alternative 2 Components and Approximate Land Areas
Table 2-6: Alternative 3 Components and Approximate Land Areas
Table 2-7: Potential Actions to be Incorporated for Protection of Migratory Birds
Table 2-8: Other Types of Energy Projects Eliminated from Detailed Analysis
Table 3.2-1: Monthly Average Temperature and Precipitation, Blythe Meteorological Station
Table 3.2-2: Federal and State Ambient Air Quality Standards
Table 3.2-3: Summary of Available Air Quality Data for the Project Area (2011 to 2013)
Table 3.2-4: Federal and State Attainment Status for Mojave Desert Air Basin within Riverside County
Table 3.2-5: Toxic Air Contaminants and Associated Health Effects
Table 3.3-1: Vegetation Alliances and Cover Types on the Proposed Action
Table 3.3-2: General Correlation Between Different Source Maps for Alluvial and Eolian Deposit Information
Table 3.3-3: Special-Status Plant Species Evaluated for Potential Occurrence within the Study Area
Table 3.3-4: Summary of CDFW Jurisdictional Watercourse in Study Area
Table 3.3-5: Target Invasive Weeds Documented in the Study Area
Table 3.4-1: Special-Status Wildlife Species Evaluated for Potential Occurrence within the Study Area
Table 3.4-2: Raptor/Raven Nests Detected on the Project Site, Spring 2013 and 2014
Table 3.5-1: Archaeological Sites Within the APE
Table 3.5-2: Isolates within the APE with Further Treatment Suggested
Table 3.6-1: Racial and Income Characteristics for Residents within the Study Area
Table 3.8-1: Global Warming Potentials and Atmospheric Lifetimes of GHGs
Table 3.8-2: State of California GHG Emissions by Sector, 2000-2013
Table 3.9-1: Basic Compatibility Criteria with Compatibility Zone E
Table 3.10-1: Existing Easements and ROWs On and Adjacent to Project Site
Table 3.10-2: Surrounding Land Uses and Designations
Table 3.12-1: Typical Noise Sources and Noise Environments
Table 3.12-2: Short-Term Sound Level Measurement Results
Table 3.13-1: Correlation of Geologic Units Between Applicant’s Preliminary Geotechnical Report and Applicant’s Paleontological Resources Assessment Technical Report
Table 3.13-2: Preliminary PFY Classifications at the Project Site

Tables (Continued)

Table 3.14-1: BLM-Administered Recreational Areas and Opportunities in the Project Vicinity
Table 3.15-1: Population Estimates, Projections, and Average Annual Growth Rates, 2000-2050
Table 3.15-2: Study Area Communities Population Estimates and Average Annual Growth Rates, 2000-2014
Table 3.15-3: Study Area Housing Characteristics, 2009-2013 Averages
Table 3.15-4: Employment by Industry Group, 2009-2013 Averages
Table 3.15-5: Occupational Employment Projections: Top 10 Occupations by Total Increased Number, Riverside and San Bernardino Counties, 2012-2022
Table 3.15-6: Occupational Employment Projections: Top 10 Occupations by Percent Increased Change, Riverside and San Bernardino Counties, 2012-2022
Table 3.15-7: Occupational Employment Projections: Project-Relevant Occupations, Riverside and San Bernardino Counties, 2012-2022
Table 3.15-8: Study Area Communities Employment Statistics and Per Capita Income, September 2015
Table 3.15-9: Riverside County Revenues and Expenses, 2012-2015
Table 3.17-1: Intersection Level of Service Definitions
Table 3.17-2: Peak Hour Intersection Conditions
Table 3.17-3: Roadway Segment Conditions
Table 3.18-1: Summary of Schools and Enrollment in Palo Verde Unified School District, 2014-2015
Table 3.18-2: Hospitals and Clinics Serving the Project Area
Table 3.19-1: Determining Visual Resource Inventory Classes
Table 3.19-2: Visual Resource Management Classes
Table 3.20-1: Estimated Annual Groundwater Budget in the Palo Verde Valley Groundwater Basin
Table 3.20-2: Summary of Groundwater Quality Data (all values reported in mg/L unless otherwise indicated)
Table 3.20-3: Characteristics of Nearby Wells
Table 3.20-4: Beneficial Uses of Surface Waters in the Project Area
Table 4.1-1: Cumulative Scenario
Table 4.1-2: Existing Projects Within the Cumulative Impact Analysis Area
Table 4.1-3: Reasonably Foreseeable Projects Within the Cumulative Impact Analysis Area
Table 4.2-1: MDAQMD’s CEQA Significant Emissions Thresholds
Table 4.2-2: Proposed Action Construction Daily Emission Estimations (Pounds/Day)
Table 4.2-3: Proposed Action Construction Annual Emission Estimations (Tons/Year)
Table 4.2-4: Operational Annual Emission Estimations for All Action Alternatives (Tons/Year)
Table 4.2-5: Alternative 2 Construction Daily Emission Estimations (Pounds/Day)
Table 4.2-6: Alternative 2 Construction Annual Emission Estimations (Tons/Year)
Table 4.2-7: Alternative 3 Construction Daily Emission Estimations (Pounds/Day)
Table 4.2-8: Alternative 3 Construction Annual Emission Estimations (Tons/Year)

Tables (Continued)

Table 4.2-9: Comparison of Daily Construction Emissions Among Action Alternatives (Pounds/Day)
Table 4.2-10: Comparison of Annual Construction Emissions Among Action Alternatives (Tons/Year)
Table 4.2-11: Daily Construction Emission Estimations for Project and Nearby Projects (Pounds/Day)
Table 4.2-12: Construction Annual Emission Estimations for Project and Nearby Projects (Tons/Year)
Table 4.3-1: Comparison of Direct Impacts to Vegetation Alliances
Table 4.3-2: Comparison of Direct Impacts to CDFW Jurisdictional Watercourse
Table 4.3-3: Summary of Direct Impacts to Special-Status Plant Species
Table 4.3-4: Cumulative Impacts to Vegetation Alliances
Table 4.4-1: Summary of Long-Term and Temporary Habitat Disturbance
Table 4.4-2: Potential for Special-Status Wildlife Species to Occur within Each Alternative Area
Table 4.4-3: Summary of Direct Impacts to Special-Status Wildlife Species
Table 4.4-4: Results of Bird Monitoring at Nearby Solar Facilities
Table 4.4-5: Cumulative Impacts to Wildlife Habitat
Table 4.5-1: NRHP and CRHR Eligible Sites Adversely Affected Within the Direct APE
Table 4.5-2: NRHP and CRHR Eligible Sites Adversely Affected Within the Direct APE, Alternative 2
Table 4.5-3: NRHP and CRHR Eligible Sites Adversely Affected Within the Direct APE, Alternative 3
Table 4.7-1: Comparison of Project Footprint to Hydrologic Soil Groups
Table 4.7-2: Comparison of Project Footprint to Soil Wind Erodibility Groups
Table 4.8-1: Monthly GHG Emissions Associated with Project Construction
Table 4.8-2: Annualized GHG Emissions Associated with Proposed Action Construction, Operation, and Decommissioning
Table 4.8-3: Annualized GHG Emissions Associated with Alternative 3 Construction, Operation, and Decommissioning
Table 4.9-1: Relationship of Action Alternatives to Blythe Airport
Table 4.12-1: Construction Activity Breakdown for Noise Analysis (assumes 25 month construction schedule)
Table 4.12-2: Predicted Daytime On-Site Project Construction Noise Per Activity at Nearest Noise Sensitive Receptor (NNSR)
Table 4.12-3: Predicted Project Operational Noise Levels
Table 4.15-1: Regional Employment and Income Impacts from Project Construction
Table 4.15-2: Regional Employment and Income Impacts from Project Operation
Table 4.15-3: Average and Peak Construction Employment for Future Solar Projects
Table 4.15-4: Operational Employment for Existing and Future Solar Projects
Table 4.17-1: Estimated Number of Construction Trips in Peak Month
Table 4.17-2: Peak Hour Intersection Level of Service in Peak Year Construction Conditions

Tables (Continued)

Table 4.17-3: Roadway Segment Level of Service in Peak Year Construction Conditions
Table 4.19-1: Visual Contrast Ratings
Table 4.19-2: KOP Locations and Characteristics
Table 4.19-3: Visual Contrast Rating Summary
Table 4.19-4: Scenic Quality Rating Unit Impact Summary
Table 4.19-5: Estimated Visual Contrast of Cumulative Scenario
Table 6-1: Agency Contact Summary
Table 6-2: List of Consultants

EXECUTIVE SUMMARY

ES.1 Introduction and Background

This Draft Proposed Plan Amendment (PA) to the California Desert Conservation Area (CDCA) Plan/Environmental Impact Statement/Environmental Impact Report (Draft PA/EIS/EIR) analyzes impacts of the Desert Quartzite Solar Project (DQSP; the Project). The Project is described in the right-of-way (ROW) grant application number CACA-049397 filed with the Bureau of Land Management (BLM), and the Application for Land Use and Development/Conditional Use Permit (CUP) 03721 filed with the Riverside County Planning Department, by First Solar Development, LLC (the Applicant), a wholly-owned subsidiary of First Solar Development, Inc. The Applicant proposes to construct, operate, maintain, and decommission the DQSP in the southern California inland desert. The Project would generate up to 450 megawatts (MW) using solar photovoltaic (PV) technology.

The ROW grant application was originally filed for 7,245 acres on September 28, 2007, but has been revised since that time. The Project addressed in this Draft PA/EIS/EIR is described in the most recent Plan of Development (POD), dated November 16, 2016. The Applicant has also filed a Conditional Use Permit Application (Application for Land Use and Development, Form 295-1010, CUP No. 03721) with Riverside County (the County) for authorization to develop a portion of the Project on privately-owned land adjacent to the BLM-administered land. The total Project area under application for BLM and County approval is approximately 5,275 acres. Of this, the application for the BLM ROW grant includes approximately 5,115 acres of BLM administered lands, and the application for a County Conditional Use Permit includes 160 acres of private lands. Within this application area, the Applicant has proposed a Project that would occupy approximately 3,770 acres. This includes 3,560 acres for the portion of the solar facility on BLM land; 54 acres for the proposed 230 kilovolt (kV) transmission line (generation interconnection [gen-tie] line) on BLM land, 2 acres for the offsite portion of a buried telecommunications line and possible above-ground electrical service line on BLM land, and 154 acres for the portion of the solar facility on private land. The larger acreage under application allows for the BLM and the County to consider various site layouts as Project alternatives for their environmental analysis. If approved, the final proposed ROW grant for the Project would be 3,616 acres of BLM land, and the County authorization for use of the private land would cover 154 acres.

Although the Notice of Intent (NOI) To Prepare an Environmental Impact Statement for the Desert Quartzite Solar Project and a Possible Amendment to the California Desert Conservation Area Plan, 80 Fed. Reg. 12195 (March 6, 2015) stated that the Project would be capable of generating 300 MW, advances in photovoltaic (PV) solar technology will allow the installation of additional megawatts on the same footprint proposed in the applicable POD.

This Draft PA/EIS/EIR was prepared as a joint Federal/state environmental document that analyzes the impacts of the Project under both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). This document analyzes the effects of the proposed Project on the solar facility site and gen-tie line corridor and, as appropriate, surrounding areas.

ES.2 Purpose and Need

ES.2.1 BLM Purpose and Need

NEPA guidance published by the Council on Environmental Quality (CEQ) states that an Environmental Impact Statement's Purpose and Need section "shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action" (40 Code of Federal Regulations (CFR) §1502.13). It describes the BLM's purpose and need for action, which is informed by but distinct from the Applicant's interests and objectives.

The BLM's purpose and need for the Project is to respond to the Applicant's application under Title V of the Federal Land Policy and Management Act of 1976 (FLPMA) (43 USC § 1761(a)(4)) for a ROW grant to construct, operate, maintain, and decommission a solar photovoltaic (PV) facility on public lands in compliance with FLPMA, BLM ROW regulations, and other applicable Federal laws. Taking into account BLM's multiple use mandate, the BLM will decide whether to approve, approve with modification(s), or deny issuance of a ROW grant to the Applicant for the proposed Project.

The Proposed Project, or "Action," if approved, also would assist the BLM in addressing several management and policy objectives advanced through the following authorities and policies applicable to the BLM:

1. Executive Order 13783 (March 28, 2017) and Secretary's Order 3349 (March 29, 2017) establishes policy to promote clean and safe development of the energy resources within the United States.
2. Executive Order 13807 (August 15, 2017) and Secretary's Order 3355 (August 31, 2017) established policy to prioritize infrastructure projects and streamline the environmental review process.
3. Section 211 of the Energy Policy Act of 2005 established a goal for the Department of the Interior to approve non-hydropower renewable energy projects on the public lands with at least 10,000 MWs of capacity by 2015. To achieve and exceed this goal, the BLM has now authorized over 17,000 MWs of non-hydropower renewable energy projects. The BLM continues to prioritize renewable energy development on public lands.
4. Desert Quartzite is a covered project under Title 41 of Fixing America's Surface Transportation Act (FAST-41). FAST-41 established new coordination and oversight procedures for infrastructure projects being reviewed by Federal agencies. The intent of the act is to improve early coordination between government agencies, increase public transparency, and increase government accountability.

ES.2.2 CDCA Plan Amendment

The BLM's action also will include consideration of a concurrent amendment of the CDCA Plan. The CDCA Plan, while recognizing the potential compatibility of solar generation facilities on public lands, requires that all sites associated with power generation or transmission that are not identified in the CDCA Plan be added to it through the PA process.

The Record of Decision signed by Secretary of the Interior Ken Salazar for the Solar Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States (the "Western Solar Plan") (BLM 2012) identified the DQSP ROW application area as part of the Riverside East Solar Energy Zone (SEZ) and thus, available for solar development for all but pending projects. Pending projects (such as the DQSP) still require a project-specific PA. Similarly, pursuant to Section II.3.2.4 of the Desert Renewable Energy Conservation Plan (DRECP), the DRECP does not apply to "[a] project that is proposed in a BLM SEZ and that is considered a 'pending project' under the Western Solar Plan (the project application was filed before June 30, 2009)." The initial project application was filed before June 30, 2009, the Project is located within a SEZ, and the amendments contemplated by the Desert Quartzite Solar PV proposal either do not affect the project boundaries (e.g., change in project developer) or are related to avoiding resource or land use conflicts or adapting the Project to third-party-owned infrastructure constraints. Therefore, the Desert Quartzite Solar PV proposal is being processed under the CDCA land use plan decisions in place prior to the adoption of the DRECP LUPA and Western Solar Plan. Therefore, if the BLM decides to approve the issuance of a ROW grant for the DQSP, a PA also would be required.

The Applicant did not directly request an amendment of the CDCA Plan. Nonetheless, because a PA would be required if the requested ROW were granted, BLM has determined, as documented in its March 6, 2015 Notice of Intent To Prepare an EIS for the DQSP and a Possible Amendment to the CDCA, that a PA must be considered as part of the Action analyzed in this Draft PA/EIS/EIR. The PA decisions considered in the Draft PA/EIS/EIR are:

- PA1: The CDCA Plan would be amended to identify the development footprint as suitable for the specific proposed type of solar energy use. This would be adopted if a ROW were granted for the Project, the Resource Avoidance Alternative, or the Reduced Project Alternative.
- PA2: The CDCA Plan would be amended to authorize the portion of the gen-tie corridor that is located outside of BLM's Utility Corridor K and Section 368 Federal Energy Corridor 30-52. This would be adopted if a ROW were granted for the Project, the Resource Avoidance Alternative, or the Reduced Project Alternative.

If these two decisions are not taken, the CDCA Plan would not be amended. This would result if the No Action Alternative were selected.

The Western Solar Plan designates approximately 248,000 acres of BLM administered land as Solar Energy Zones (SEZs) in six southwestern states. These SEZs are designated as locations that are well suited for utility-scale production of solar energy, and where BLM would prioritize solar development on Federal lands. The Riverside East SEZ in eastern Riverside County consists of approximately 148,000 acres of land. The Project is located within the Riverside East SEZ, but it is not subject to the Western Solar Plan because it is a "pending project" (a project in a SEZ with an application filed before June 30, 2009).

ES.2.3 County and Applicant's Project Objectives

The purpose of the project is to construct and operate a solar energy facility using a low-profile, PV solar technology that maximizes the generation of a renewable and reliable source of electrical power consistent with Federal and state policies and plans designed to promote environmentally responsible development of affordable renewable energy projects and green jobs in California. In furtherance of this purpose, the County and Project Applicant have set forth the following basic objectives for the proposed Project:

- To generate up to 450 MW of electricity using PV solar technology and sell that power at the most competitive, low-cost price.
- To locate the Project in a manner that maximizes operational efficiencies, furthers the objectives of landscape-level smart-siting planning efforts, avoids Desert Wildlife Management Areas, Areas of Critical Environmental Concern and National Conservation Lands where feasible, and minimizes water use, new linear developments, and environmental impacts in general.
- To minimize environmental impacts and land disturbance by, among other things, siting the facility on relatively flat, contiguous lands with high solar insolation, in close proximity to established utility corridors, existing transmission lines with available capacity to facilitate interconnection, and accessible roads.
- To assist, to the greatest extent possible, with achieving greenhouse gas (GHG) reduction objectives, including the requirements under SB X1-2 to increase the state's Renewable Portfolio Standard (RPS) to 33 percent by 2020 and under SB 350 to increase the state's RPS to 50 percent by 2030.
- To further the purpose of Secretarial Order 3285A1, establishing the development of environmentally responsible renewable energy as a priority for the Department of the Interior.
- To increase local short-term and long-term employment opportunities.
- To provide economic benefits to Riverside County, in accordance with Policy B-29 and the motivations for its adoption, by stimulating spending at local businesses, increasing tax revenues, and generating development fees.

ES.3 Summary Description of the Proposed Action and Alternatives

The DQSP would be located approximately 2.75 miles southwest of the City of Blythe, just south of the Interstate 10 (I-10) freeway, and 1.5 miles southwest of Blythe Airport in Riverside County, California (Figure 2-1). The Project area associated with the Proposed Action (Alternative 1) after construction would occupy 3,616 acres of BLM land, and 154 acres of private land under the jurisdiction of the County of Riverside. The BLM land would include 3,560 acres for the solar facility, 54 acres for the 2.79-mile long gen-tie line, and 2 acres for the offsite portion of a buried telecommunications line and possible above-ground electrical service line on BLM land. The Project would include 61 acres of temporary construction areas, all on BLM land, for the solar arrays and gen-tie line. Additional appurtenances to be constructed on the Project area would include an Operations and Maintenance (O&M) building, On-Site Substation, internal access roads, and ancillary facilities. The primary ingress and egress to the Project would use existing access roads. The secondary access route would require construction of approximately 0.7 miles of new road near the southeastern boundary of the Project.

In addition to the Proposed Action (Alternative 1), the Draft PA/EIS/EIR also analyzes alternatives to the Project, including a Resource Avoidance Alternative that would support a 450 MW solar PV facility (Alternative 2), a Reduced Project Alternative that would support a 285

MW solar PV facility (Alternative 3), and a No Action Alternative (Alternative 4) as required by NEPA and CEQA.

The Resource Avoidance Alternative was developed to specifically avoid the locations of cultural and biological resources, as well as drainages and watercourses. The Resource Avoidance Alternative would generate up to 450 MW, and would occupy a land area of 2,782 acres, including 2,622 acres on BLM land and 160 acres of private land. Under the Resource Avoidance Alternative, the length of the gen-tie line would be 4.18 miles.

The Reduced Project Alternative further reduces the acreage of the solar arrays, with elimination of the proposed solar arrays primarily in the northern portion of the area to maintain habitat for the Mojave fringe-toed lizard and Harwood's eriastrum, a BLM Sensitive Species plant. The Reduced Project Alternative would generate 285 MW, and would occupy a land area of 2,047 acres, including 1,887 acres on BLM land and 160 acres of private land. Under the Reduced Project Alternative, the length of the gen-tie line would be 4.18 miles.

Under the No Action Alternative, the BLM would deny the Applicant's ROW grant application and no PA would be required.

ES.4 Public Involvement, Consultation, and Coordination

ES.4.1 Scoping

The BLM and County solicited internal and external input on the issues, impacts, and potential alternatives to be addressed in the Draft PA/EIS/EIR for the Project, as well as the extent to which those issues and impacts would be analyzed in the document. The NOI for the Proposed Action was published in the Federal Register on March 6, 2015 (80 FR 12195). The Notice of Preparation (NOP) was issued on March 13, 2015. Both the NOI and the NOP announced the dates, times, and locations of public scoping meetings in Parker, Arizona on March 23, 2015, and in Blythe, California, on March 24, 2015. The purpose of the meetings was to inform the public about the Project; describe the purpose and need of the Project; provide information regarding the environmental review process; and gather public input regarding the scope and content of the Draft PA/EIS/EIR. A total of six individuals made public comments at the meetings. The comment period for the NOI and NOP began on March 6, 2015, and ended on April 13, 2015. A total of nine written comment letters were submitted to BLM, 13 written comment letters were submitted to the County, and four comments letters were jointly submitted to both agencies.

Comments received during the scoping process are provided in Appendix H, *Public Scoping Report*, and raised the following issue topics:

- Air Quality
- Alternatives
- Biological Resources
- BLM Procedures
- Cultural Resources
- Environmental Justice and Impacted Communities
- Fire

- Global Climate Change
- Hazardous Materials/Hazardous Waste/Solid Waste
- Indirect and Cumulative Impacts
- Land Use
- Public Health
- Purpose and Need
- Tribal Governments
- Visual Resources
- Water Resources

ES.4.2 Consultation and Coordination

Pursuant to the Endangered Species Act, Section 7 consultation requirements (16 U.S.C. § 1531 et seq.), the BLM will initiate consultation by submitting a Biological Assessment (BA) to the US Fish and Wildlife Service (USFWS). BLM held a meeting with the USFWS regarding mitigation of impacts to biological resources on March 17, 2015 at the BLM Palm Springs-South Coast Field Office. BLM will continue to consult with the USFWS, which is expected to issue a Biological Opinion (BO) that will specify required measures for protection of Federally-threatened and endangered species.

Pursuant to the National Historic Preservation Act, Section 106 (16 U.S.C. §470), the BLM has coordinated and consulted with potentially affected Indian tribes regarding the Project. Reasonable and good faith efforts undertaken by the BLM to consult and coordinate with the tribes for the Project to date have included written correspondence, meetings for the purposes of information and idea exchange, cultural resource-focused site visits, and responses to information requests. BLM held a field visit with the Colorado River Indian Tribes on June 10, 2015, with three members and one elder in attendance. BLM sent a letter to the potentially affected Indian tribes in April, 2016, announcing the availability of the Class III Archaeological Survey Report. The BLM also responded to a request from the Ft. Yuma Quechan Tribe by holding meeting at the site on June 9, 2016 with four members of the Cultural Resources Committee.

BLM also has undertaken interagency coordination with a number of agencies including the U.S. Environmental Protection Agency, U.S. Department of Defense, U.S. Army Corps of Engineers, California Department of Fish and Wildlife, State Water Resources Control Board/Colorado River Regional Water Quality Control Board, State Historic Preservation Office, Riverside County, and Native American Heritage Commission.

ES.5 Environmental Consequences

Table ES-1 summarizes the environmental impacts that would occur as a result of the Proposed Action and Alternatives by environmental resource. Table ES-2 summarizes the significance of impacts under CEQA.

Table ES-1. Comparison of Impacts by Alternative

Resource	Alternative 1 Proposed Action	Alternative 2 Resource Avoidance Alternative	Alternative 3 Reduced Project Alternative	Alternative 4 No Action Alternative
Air Resources				
Construction and Decommissioning Emissions	Potential temporary exceedances of the Mojave Desert Air Quality Management District (MDAQMD) daily and annual thresholds for NO_x, PM_{10}, and $PM_{2.5}$, the PM_{10} *de minimis* level, and state and Federal Ambient Air Quality Standards (AAQS) for PM_{10} in a non-attainment area.	Potential temporary exceedances of the MDAQMD daily and annual thresholds for NO_x, PM_{10}, and $PM_{2.5}$, the PM_{10} *de minimis* level, and state and Federal AAQS for PM_{10} in a non-attainment area.	Potential temporary exceedances of the MDAQMD daily and annual thresholds for NO_x, PM_{10}, and $PM_{2.5}$, the PM_{10} *de minimis* level, and state and Federal AAQS for PM_{10} in a non-attainment area.	No emissions
Potential health impacts to sensitive receptors and workers	No sensitive receptors within 1,000 feet. Low potential for worker exposure to valley fever through exposure to dust.	No sensitive receptors within 1,000 feet. Low potential for worker exposure to valley fever through exposure to dust.	No sensitive receptors within 1,000 feet. Low potential for worker exposure to valley fever through exposure to dust.	No potential impacts
Operation and Maintenance Emissions	No exceedances	No exceedances	No exceedances	No emissions
Biological Resources – Vegetation				
Parkinsonia florida-Olneya tesota alliance	0 acres	0 acres	0 acres	0 acres
Larrea tridentata and *Larrea tridentata-Ambrosia dumosa* Alliances	3,575 acres	2,607 acres	1,872 acres	0 acres
Pleuraphis rigida alliance	40.4 acres	14 acres	14 acres	0 acres
State jurisdictional waters and wetlands	26.2 acres	0.39 acres	0.36 acres	0 acres
Federal jurisdictional waters and wetlands	0 acres	0 acres	0 acres	0 acres
Abrams' spurge	21 individuals	1 individuals	0 individuals	0 individuals
Desert unicorn-plant	584 individuals	300 individuals	315 individuals	0 individuals
Harwoods eriastrum	510 individuals	77 individuals	77 individuals	0 individuals

Table ES-1. Comparison of Impacts by Alternative

Resource	Alternative 1 Proposed Action	Alternative 2 Resource Avoidance Alternative	Alternative 3 Reduced Project Alternative	Alternative 4 No Action Alternative
Harwood's eriastrum (habitat)	110 acres of occupied habitat 3,660 acres of potential habitat	35 acres of occupied habitat 2,747 acres of potential habitat	34 acres of occupied habitat 2,013 acres of potential habitat	0 acres of occupied habitat 0 acres of potential habitat
Harwoods milkvetch	10,420 individuals	9,507 individuals	9,507 individuals	0 individuals
Ribbed cryptantha	64,234 individuals	30,178 individuals	30,178 individuals	0 individuals
Utah vine milkweed	0 individuals	0 individuals	0 individuals	0 individuals
Biological Resources – Wildlife				
Long-term habitat disturbance	3,770 acres	2,782 acres	2,047 acres	0 acres
Temporary habitat disturbance[1]	61 acres	64 acres	65 acres	0 acres
Mojave desert tortoise (tracks)	1 individuals	1 individuals	1 individuals	0 individuals
Mojave desert tortoise (habitat)	3,575 acres	2,607 acres	1,872 acres	0 acres
Mojave fringe-toed lizard (individuals)	135 individuals	30 individuals	30 individuals	0 individuals
Mojave fringe-toed lizard (habitat)	78 acres of occupied habitat 3,692 acres of potential habitat	16 acres of occupied habitat 2,766 acres of potential habitat	16 acres of occupied habitat 2,031 acres of potential habitat	0 acres of occupied habitat 0 acres of potential habitat
Kit fox (den)	6 dens	5 dens	5 dens	0 dens
Burrowing owl/American badger/kit fox (habitat)	3,831 acres	2,845 acres	2,112 acres	0 acres
Golden eagle (foraging habitat)	3,831 acres	2,845 acres	2,112 acres	0 acres
Cultural Resources				
National Register of Historic Places (NRHP)- and California Register of Historical Resources (CRHR)-Eligible archaeological resources directly adversely affected	9 sites	0 sites	0 sites	0 sites

Table ES-1. Comparison of Impacts by Alternative

Resource	Alternative 1 Proposed Action	Alternative 2 Resource Avoidance Alternative	Alternative 3 Reduced Project Alternative	Alternative 4 No Action Alternative
NRHP- and CRHR-Eligible archaeological resources indirectly adversely affected	0 sites	0 sites	0 sites	0 sites
Environmental Justice				
Disproportionate effects on Environmental Justice populations	No effect	No effect	No effect	No effect
Geology and Soils				
Geologic hazards	Minor risk from seismic hazards, subsidence and settlement, and hydrocompaction. Minor risk from corrosive soils.	Minor risk from seismic hazards, subsidence and settlement, and hydrocompaction. Minor risk from corrosive soils.	Minor risk from seismic hazards, subsidence and settlement, and hydrocompaction. Minor risk from corrosive soils.	No risk
Disturbed soils potentially eroded	3,831 acres	2,845 acres	2,112 acres	0 acres
Global Climate Change[2]				
CO_{2e} emissions avoided by displacing gas-fired generation	787,500 MT CO_2e/year	787,500 MT CO_2e/year	496,125 MT CO_2e/year	0 MT CO_2e/year
Total project annualized CO_2e emissions	1,280 MT CO_2e/year	1,280 MT CO_2e/year	1,261 MT CO_2e/year	0 MT CO_2e/year
Loss of carbon uptake	5,670 MT CO_2e/year	4,211 MT CO_2e/year	3,126 MT CO_2e/year	0 MT CO_2e/year
Hazards and Hazardous Materials				
Release of hazardous materials	Potential releases of fuels and other hazardous materials could result in soil and/or groundwater contamination.	Potential releases of fuels and other hazardous materials could result in soil and/or groundwater contamination.	Potential releases of fuels and other hazardous materials could result in soil and/or groundwater contamination.	No risk
Site security	Mitigated minor security risks, “low vulnerability” site	Mitigated minor security risks, “low vulnerability” site	Mitigated minor security risks, “low vulnerability” site	No risk

Table ES-1. Comparison of Impacts by Alternative

Resource	Alternative 1 Proposed Action	Alternative 2 Resource Avoidance Alternative	Alternative 3 Reduced Project Alternative	Alternative 4 No Action Alternative
Civil Aviation safety	Airport Compatibility Zone E overlain by 424 acres of solar array, 0 miles of gen-tie line. Potential glint and glare from PV panels.	Airport Compatibility Zone E overlain by 311 acres of solar array, 1.08 miles of gen-tie line. Potential glint and glare from PV panels.	Airport Compatibility Zone E overlain by 56 acres of solar array, 1.08 miles of gen-tie line. Potential glint and glare from PV panels.	No effect
DoD Aviation Safety	No impact to Special Use Airspace (SUAs) or Military Training Routes (MTRs)	No impact to SUAs or MTRs.	No impact to SUAs or MTRs.	No effect
Lands and Realty				
Impacts to authorized uses	None	None	None	None
Nonconformance with CDCA Plan	None	None	None	None
Nonconformance with Multiple Use Class M guidelines	None	None	None	None
Restriction of MUC-M land use opportunities	3,616 acres	2,622 acres	1,887 acres	0 acres
Mineral Resources				
Potential impact to mineral extraction[3]	3,616 acres	2,622 acres	1,887 acres	0 acres
Noise				
Construction and decommissioning noise	Noise levels at nearest sensitive receptor may increase beyond the 10 dBA standard. Impact would be mitigated by orienting post installation equipment.	Noise levels at nearest sensitive receptor may increase beyond the 10 dBA standard. Impact would be mitigated by orienting post installation equipment.	Noise levels at nearest sensitive receptor may increase beyond the 10 dBA standard. Impact would be mitigated by orienting post installation equipment.	No impact
Operations noise	Noise levels at nearest sensitive receptor would not increase beyond the 10 dBA standard.	Noise levels at nearest sensitive receptor would not increase beyond the 10 dBA standard.	Noise levels at nearest sensitive receptor would not increase beyond the 10 dBA standard.	No impact

Table ES-1. Comparison of Impacts by Alternative

Resource	Alternative 1 Proposed Action	Alternative 2 Resource Avoidance Alternative	Alternative 3 Reduced Project Alternative	Alternative 4 No Action Alternative
Paleontological Resources				
Potential disturbance of significant vertebrate fossils	Largest area of Project overlies unit of Potential Fossil Yield Classification (PFYC) 5a (Very High), and Society of Vertebrate Paleontology (SVP) Category of High potential	Overall acreage reduced, but acreage on unit with highest potential would be same as Proposed Action	Overall acreage reduced, but acreage on unit with highest potential would be same as Proposed Action	No impact
Recreation				
Direct removal of land area for recreation	3,616 acres	2,622 acres	1,887 acres	0 acres
Displacement of open OHV routes	Requires closure of six routes or 6.8 miles	Requires closure of six routes or 6.8 miles	Requires closure of six routes or 6.5 miles	No impact
Social and Economic Issues[4]				
Construction jobs (direct, indirect, and induced)	893 jobs	893 jobs	893 jobs	0 jobs
Operations jobs (direct, indirect, and induced)	10.7 jobs	10.7 jobs	10.7 jobs	0 jobs
Sales tax revenue to Riverside County (construction)	$864,000	$864,000	$864,000	$0
Riverside County Negotiated Development Agreement	$565,000/year	$439,500/year	$299,400/year	$0
Property tax revenue to Riverside County[1]	$15,800/year	$20,000/year	$20,000/year	$0
Annual beneficial economic impact during construction	$72.5 million	$72.5 million	$72.5 million	$0
Annual beneficial economic impact during operations	$3 million	$3 million	$3 million	$0
Special Designations				
Direct impacts to ACECs, wilderness areas, and lands with wilderness characteristics	No impact	No impact	No impact	No impact

Table ES-1. Comparison of Impacts by Alternative

Resource	Alternative 1 Proposed Action	Alternative 2 Resource Avoidance Alternative	Alternative 3 Reduced Project Alternative	Alternative 4 No Action Alternative
Transportation and Traffic				
Construction impacts on local roadways (Interstate 10 and State Route 78)	No impact	No impact	No impact	No impact
Construction impacts on local intersections	Adverse impact, would not conform with Riverside County General Plan	Adverse impact, would not conform with Riverside County General Plan	Adverse impact, would not conform with Riverside County General Plan	No impact
Operations impacts on local roadways (Interstate 10 and State Route 78)	No impact	No impact	No impact	No impact
Operations impacts on local intersections	No impact	No impact	No impact	No impact
Impacts of parking demand	No impact	No impact	No impact	No impact
Utilities and Public Services				
Public services	No impact	No impact	No impact	No impact
Visual Resources				
Construction dust	Construction dust may temporarily affect the visual quality of the area	Construction dust may temporarily affect the visual quality of the area	Construction dust may temporarily affect the visual quality of the area	No impact
Nighttime construction lighting	Lights may be visible, but would be minimized to not be a nuisance or affect viewers of the night sky	Lights may be visible, but would be minimized to not be a nuisance or affect viewers of the night sky	Lights may be visible, but would be minimized to not be a nuisance or affect viewers of the night sky	No impact
Glint and glare	Glare may temporarily occur, but is unlikely to be visually distracting or a nuisance	Glare would be less likely, and less prominent, than Alternative 1 due to reduced acreage of solar arrays	Glare would be less likely, and less prominent, than Alternatives 1 and 2 due to reduced acreage of solar arrays	No impact
Visual contrast in form, line, color, and texture	Strong visual contrast at two KOPs, and moderate visual contrast at one KOP	Strong visual contrast at two KOPs, and moderate visual contrast at one KOP	Strong visual contrast at two KOPs, and moderate visual contrast at one KOP	No impact
Water Resources				
Erosion and drainage	Disturbance of drainage over 3,831 acres	Disturbance of drainage over 2,845 acres	Disturbance of drainage over 2,112 acres	Disturbance of drainage over 0 acres

Table ES-1. Comparison of Impacts by Alternative

Resource	Alternative 1 Proposed Action	Alternative 2 Resource Avoidance Alternative	Alternative 3 Reduced Project Alternative	Alternative 4 No Action Alternative
Annual groundwater consumption during construction	700 acre-feet per year (AFY) over 25 month construction period, 450 AFY over 48-month period	700 AFY over 25 month construction period, 450 AFY over 48-month period	700 AFY over 25 month construction period, 450 AFY over 48-month period	0 AFY
Annual operational water consumption	38 AFY	38 AFY	38 AFY	0 AFY
Wildland Fire				
Impacts on fire regime	Increased vehicle traffic/human presence may directly result in fire. Potential for spread of invasive weeds may increase fire risk.	Increased vehicle traffic/human presence may directly result in fire. Potential for spread of invasive weeds may increase fire risk.	Increased vehicle traffic/human presence may directly result in fire. Potential for spread of invasive weeds may increase fire risk.	No impact

Notes:

1 – Although the overall acreage of the Project is smaller under Alternatives 2 and 3 versus Alternative 1, the gen-tie line would be longer under Alternatives 2 and 3 than under Alternative 1. Some tax revenues are based on length of the gen-tie line, so are therefore higher under Alternatives 2 and 3 than under Alternative 1.

2 – See Section 4.8 for GHG calculation methodology.

3 - Under Public Land Order No. 7818, the Riverside East SEZ was withdrawn from location and entry under the United States mining laws, subject to valid existing rights, for a period of 20 years. The lands remain open to mineral and geothermal leasing, and mineral material sales.

4 – See Section 4.15 for socioeconomic calculation methodology.

Table ES-2. Summary of Impact Significance under CEQA

Potential Impact	CEQA Significance Before Mitigation[1]	Mitigation	CEQA Significance After Mitigation
Air Resources			
AIR-1) Conflict with or obstruct implementation of the applicable air quality attainment or maintenance plan.	All Alts. - NA	-	-
AIR-2) Violate any air quality standard or contribute substantially to an existing or projected air quality violation when added to the local background.	Alts. 1, 2, 3 – SU Alt. 4 – NI	Alts. 1, 2, 3 - AQ-1, AQ-2, TRN-4	Alts. 1, 2, 3 – SU
AIR-3) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).	Alts. 1, 2, 3 – SU Alt. 4 – NI	Alts. 1, 2, 3 - AQ-1, AQ-2, TRN-4	Alts. 1, 2, 3 – SU
AIR-4) Expose sensitive receptors to substantial pollutant concentrations including those resulting in a cancer risk greater than or equal to 10 in a million and/or a Hazard Index (HI) (non-cancerous) greater than or equal to 1. As defined in the MDAQMD's CEQA Guidelines, sensitive receptors include land uses associated with residences, schools, daycare centers, playgrounds, and medical facilities. The following project types proposed for sites within the specified distance to an existing or planned (zoned) sensitive receptor land use must be evaluated using CEQA Significance Criterion AIR-4: • Any industrial project within 1,000 feet; • A distribution center (40 or more trucks per day) within 1,000 feet; • A major transportation project (50,000 or more vehicles per day) within 1,000 feet; • A dry cleaner using perchloroethylene within 500 feet; or • A gasoline dispensing facility within 300 feet.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
AIR-5) Create objectionable odors affecting a substantial number of people.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
AIR-6) Expose sensitive receptors that are located within one mile of the Project site to substantial point source emissions.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
AIR-7) Involve the construction of a sensitive receptor located within one mile of an existing substantial point source emitter.	Alts. 1, 2, 3, 4 - NI	-	-

Table ES-2. Summary of Impact Significance under CEQA

Potential Impact	CEQA Significance Before Mitigation[1]	Mitigation	CEQA Significance After Mitigation
Biological Resources			
BIO-1) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or the USFWS.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – VEG-1, VEG-2, VEG-3, VEG-4, VEG-5, VEG-6, VEG-7, VEG-8, VEG-9, VEG-10	Alts. 1, 2, 3 – LTS
BIO-2) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by CDFW or USFWS.	Alts. 1, 2, 3, 4 - NI	-	-
BIO-3) Have a substantial adverse effect on Federal protected wetlands as defined by Section 404 of the Clean Water Act (CWA) (including, but not limited to, marshes, vernal pools, and coastal areas) or any state-protected jurisdictional areas not subject to regulation under Section 404 of the CWA through direct removal, filling, hydrological interruption, or other means.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – VEG-10	Alts. 1, 2, 3 – LTS
BIO-4) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – WIL-1, WIL-4, WIL-9, WIL-12, WIL-13	Alts. 1, 2, 3 – LTS
BIO-5) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	Alts. 1, 2, 3, 4 - NI	-	-
BIO-6) Conflict with the provisions of an adopted habitat conservation plan; natural community conservation plan; or other approved local, regional, or state habitat conservation plan.	All Alts. - NA	-	-
BIO-7) Substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or substantially reduce the number or restrict the range of an endangered, rare, or threatened species.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
Cultural Resources			
CUL-1) Cause a substantial adverse change in the significance of a historical resource as defined in Code of Regulations Section 15064.5.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – CULTURAL-1 through CULTURAL-7	Alts. 1, 2, 3 – LTS

Table ES-2. Summary of Impact Significance under CEQA

Potential Impact	CEQA Significance Before Mitigation[1]	Mitigation	CEQA Significance After Mitigation
CUL-2) Cause a substantial adverse change in the significance of an archaeological resource as defined in California Code of Regulations Section 15064.5.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – CULTURAL-1 through CULTURAL-7	Alts. 1, 2, 3 – LTS
CUL-3) Disturb any human remains, including those interred outside of formal cemeteries.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – CULTURAL-3	Alts. 1, 2, 3 – LTS
TCR-1) Would the Project cause a substantial adverse change in the significance of a Tribal Cultural Resource that is listed or eligible for listing in the California Register of Historical Resources?	Alt. 1 – S Alts 2, 3, 4 - NI	Alt. 1 – CULTURAL-1, CULTURAL-6	Alt. 1 – LTS
TCR-2) Would the Project cause a substantial adverse change in a resource identified through consultation with any California Native American tribe that requests consultation and is traditionally and culturally affiliated with the geographic area of a proposed project?	Alts. 1, 2, 3, 4 - NI	-	-
Geology and Soils			
GEO-1) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, involving: a) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault. b) Strong Seismic ground shaking. c) Seismic-related ground failure, including liquefaction. d) Landslides.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – GEO-1	Alts. 1, 2, 3 – LTS
GEO-2) Result in substantial soil erosion or the loss of topsoil.	Alts. 1, 2, 3 – S (wind erosion) Alt. 4 - NI	Alts. 1, 2, 3 – AQ-1	Alts. 1, 2, 3 – LTS
GEO-3) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – GEO-1	Alts. 1, 2, 3 – LTS
GEO-4) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life and property.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – GEO-1	Alts. 1, 2, 3 – LTS
GEO-5) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – GEO-1	Alts. 1, 2, 3 – LTS

Table ES-2. Summary of Impact Significance under CEQA

Potential Impact	CEQA Significance Before Mitigation[1]	Mitigation	CEQA Significance After Mitigation
GEO-6) Be subject to geologic hazards, such as seiche, mudflow, or volcanic hazard.	All Alts. - NA	-	-
GEO-7) Change topography or ground surface relief features.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
GEO-8) Create cut or fill slopes greater than 2:1 or higher than 10 feet.	All Alts. - NI	-	-
GEO-9) Result in grading that affects or negates subsurface sewage disposal systems.	All Alts. - NI	-	-
GEO-10) Change deposition, siltation, or erosion that may modify the channel of a river or stream or the bed of a lake.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – WATER-1, WATER-2	Alts. 1, 2, 3 – LTS
GEO-11) Result in any increase in water erosion either on- or off-site.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – WATER-1, WATER-2	Alts. 1, 2, 3 – LTS
GEO-12) Be impacted by or result in an increase in wind erosion and blowsand, either on- or off-site.	Alts. 1, 2, 3 – S (wind erosion) Alt. 4 - NI	Alts. 1, 2, 3 – AQ-1	Alts. 1, 2, 3 – LTS
GEO-13) Be an incompatible land use located adjacent to a state classified or designated area or existing surface mine.	All Alts. - NA	-	-
GEO-14) Expose people or property to hazards from proposed, existing or abandoned quarries or mines.	All Alts. - NI	-	-
Greenhouse Gas Emissions			
GHG-1) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.	Alts. 1, 2, 3 – LTS/B Alt. 4 - S	Alt. 4 - None	-
GHG-2) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.	Alts. 1, 2, 3 – B Alt. 4 - S	Alt. 4 - None	-

Table ES-2. Summary of Impact Significance under CEQA

Potential Impact	CEQA Significance Before Mitigation[1]	Mitigation	CEQA Significance After Mitigation
Hazards and Hazardous Materials			
HAZ-1) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – HAZ-1, HAZ-2, WATER-1	Alts. 1, 2, 3 – LTS
HAZ-2) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – HAZ-1, HAZ-2, WATER-1	Alts. 1, 2, 3 – LTS
HAZ-3) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.	All Alts. - NI	-	-
HAZ-4) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment	All Alts. - NI	-	-
HAZ-5) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would result in a safety hazard for people residing or working in the project area.	Alts. 1, 2, 3 – S (FAA) Alts. 1, 2, 3 – LTS (RCALUCP) Alt. 4 – NI (FAA and RCALUCP)	Alts. 1, 2, 3 – HAZ-3 (FAA)	Alts. 1, 2, 3 – LTS
HAZ-6) For a project within the vicinity of a private airstrip, would result in a safety hazard for people residing or working in the project area.	All Alts. - NI	-	-
HAZ-7) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	All Alts. - NI	-	-
HAZ-8) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.	All Alts. - NI	-	-
HAZ-9) Result in an inconsistency with an Airport Master Plan.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
HAZ-10) Require review by the Airport Land Use Commission.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-

Table ES-2. Summary of Impact Significance under CEQA

Potential Impact	**CEQA Significance Before Mitigation**[1]	**Mitigation**	**CEQA Significance After Mitigation**
Lands, Realty, and Agricultural and Forestry Resources			
LU-1) Physically divide an established community.	All Alts. - NI	-	-
LU-2) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project (including but not limited to the general plan, specific plan, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
LU-3) Conflict with any applicable habitat conservation plan or natural community conservation plan.	All Alts. - NA	-	-
LU-4) Result in a substantial alteration of the present or planned land use of an area.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
LU-5) Affect land use within a city sphere of influence and/or within adjacent city or county boundaries.	All Alts. - NI	-	-
LU-6) Be inconsistent with the site's existing or proposed zoning.	All Alts. - NI	-	-
LU-7) Be incompatible with existing surrounding zoning.	All Alts. - NI	-	-
LU-8) Disrupt or divide the physical arrangement of an established community (including a low income or minority community).	All Alts. - NI	-	-
AG-1) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the map prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.	All Alts. - NI	-	-
AG-2) Conflict with existing zoning for agricultural use, or a Williamson Act contract.	All Alts. - NI	-	-
AG-3) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 1220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g)).	All Alts. - NI	-	-
AG-4) Result in the loss of forest land or conversion of forest land to non-forest use.	All Alts. - NI	-	-

Table ES-2. Summary of Impact Significance under CEQA

Potential Impact	CEQA Significance Before Mitigation[1]	Mitigation	CEQA Significance After Mitigation
AG-5) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use.	All Alts. - NI	-	-
AG-6) Conflict with land within a Riverside County Agricultural Preserve.	All Alts. - NI	-	-
AG-7) Cause development of non-agricultural uses within 300 feet of agriculturally zoned property (Ordinance No. 625, "Right-to-Farm").	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
Mineral Resources			
MR-1) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state.	All Alts. - NI	-	-
MR-2) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.	All Alts. - NI	-	-
MR-3) Be an incompatible land use located adjacent to a state classified or designated area or existing surface mine.	All Alts. - NI	-	-
MR-4) Expose people or property to hazards from proposed, existing or abandoned quarries or mines.	All Alts. - NI	-	-
Noise			
NOI-1) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	All Alts. - NI	-	-
NOI-2) Substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
NOI-3) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
NOI-4) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, the exposure of people residing or working in the project area to excessive noise levels.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-

Table ES-2. Summary of Impact Significance under CEQA

Potential Impact	CEQA Significance Before Mitigation[1]	Mitigation	CEQA Significance After Mitigation
NOI-5) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
NOI-6) For a project within the vicinity of a private airstrip, the exposure of people residing or working in the project area to excessive noise levels.	All Alts. - NI	-	-
NOI-7) Impacts from railroad or highway noise.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
Paleontological Resources			
PALEO-1) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
Recreation and Public Access			
REC-1) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – REC-3	Alts. 1, 2, 3 – LTS
REC-2) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.	All Alts. - NI	-	-
REC-3) Located within a Community Service Area (CSA) or recreation and park district with a Community Parks and Recreation Plan (Quimby fees).	All Alts. - NI	-	-
Social and Economic Effects			
SOC-1) Induce substantial population growth in an area, either directly or indirectly.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
SOC-2) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere.	All Alts. - NI	-	-
SOC-3) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.	All Alts. - NI	-	-

Table ES-2. Summary of Impact Significance under CEQA

Potential Impact	CEQA Significance Before Mitigation[1]	Mitigation	CEQA Significance After Mitigation
SOC-4) Create a demand for additional housing, particularly housing affordable to households earning 80% or less of the County's median income.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
SOC-5) Affect a County Redevelopment Project Area.	All Alts. - NI	-	-
SOC-6) Cumulatively exceed official regional or local population projections.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
Transportation and Traffic			
TRA-1) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – TRN-3, TRN-4	Alts. 1, 2, 3 – LTS
TRA-2) Conflict with an applicable congestion management program, including, but not limited to, level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
TRA-3) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.	All Alts. - NI	-	-
TRA-4) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).	All Alts. - NI	-	-
TRA-5) Result in inadequate emergency access.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – TRN-4	Alts. 1, 2, 3 – LTS
TRA-6) Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
TRA-7) Alter waterborne, rail or air traffic.	All Alts. - NI	-	-
TRA-8) Cause an effect, or a need for new or altered maintenance of roads.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – REC-1, TRN-4	Alts. 1, 2, 3 – LTS

Table ES-2. Summary of Impact Significance under CEQA

Potential Impact	CEQA Significance Before Mitigation[1]	Mitigation	CEQA Significance After Mitigation
TRA-9) Cause an effect upon circulation during the project's construction.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – TRN-3, TRN-4	Alts. 1, 2, 3 – LTS
TRA-10) Affect bike trails.	All Alts. - NI	-	-
Utilities and Public Services			
USS-1) Result in substantial adverse environmental impacts associated with the provision of utility services. Substantial adverse environmental impacts may occur if the Project would: 1. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board. 2. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects. 3. Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects. 4. Have insufficient water supplies available to serve the project from existing entitlements and resources, or require new or expanded entitlements. 5. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments. 6. Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs. 7. Fail to comply with Federal, state, and local statutes and regulations related to solid waste.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
PS-1) Result in substantial adverse physical impacts associated with the provision of new or physically altered facilities to provide public services.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-

Table ES-2. Summary of Impact Significance under CEQA

Potential Impact	CEQA Significance Before Mitigation[1]	Mitigation	CEQA Significance After Mitigation
USS-2) Impact the following facilities requiring or resulting in the construction of new facilities or the expansion of existing facilities, the construction of which could cause significant environmental effects. 1. Electricity 2. Natural gas 3. Communications systems 4. Stormwater drainage 5. Street lighting 6. Maintenance of public facilities, including roads 7. Other government services	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – REC-1, TRN-4	Alts. 1, 2, 3 – LTS
USS-3) Conflict with any adopted energy conservation plans.	All Alts. - NI	-	-
Visual Resources			
VIS-1) Have a substantial adverse effect on a scenic vista.	All Alts. - NI	-	-
VIS-2) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
VIS-3) Substantially degrade the existing visual character or quality of the site and its surroundings.	Alts. 1, 2, 3 – SU Alt. 4 - NI	Alts. 1, 2, 3 – VIS-1, VIS-2, VIS-3, VIS-4	Alts. 1, 2, 3 – SU
VIS-4) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
VIS-5) Result in the creation of an aesthetically offensive site open to public view.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
VIS-6) Interfere with nighttime use of the Mt. Palomar Observatory, as protected through Riverside County Ordinance No. 655.	All Alts. - NI	-	-

Table ES-2. Summary of Impact Significance under CEQA

Potential Impact	CEQA Significance Before Mitigation[1]	Mitigation	CEQA Significance After Mitigation
VIS-7) Expose residential property to unacceptable light levels.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
Water Resources			
HYD-1) Violate any water quality standards or waste discharge regulations.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – WATER-1, WATER-2	Alts. 1, 2, 3 – LTS
HYD-2) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – WATER-4	Alts. 1, 2, 3 – LTS
HYD-3) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – WATER-1, WATER-2	Alts. 1, 2, 3 – LTS
HYD-4) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – WATER-1, WATER-2, WATER-3	Alts. 1, 2, 3 – LTS
HYD-5) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – WATER-1, WATER-2	Alts. 1, 2, 3 – LTS
HYD-6) Otherwise substantially degrade water quality.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – WATER-4	Alts. 1, 2, 3 – LTS
HYD-7) Place housing within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.	All Alts. - NI	-	-
HYD-8) Place within a 100-year flood hazard area structures which would impede or redirect flood flows.	All Alts. - NI	-	-
HYD-9) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.	All Alts. - NI	-	-

Table ES-2. Summary of Impact Significance under CEQA

Potential Impact	CEQA Significance Before Mitigation[1]	Mitigation	CEQA Significance After Mitigation
HYD-10) Be at risk of inundation by seiche, tsunami, or mudflow.	All Alts. - NI	-	-
HYD-11) Include new or retrofitted Stormwater Treatment Control BMPs (e.g., water quality treatment basins, constructed treatment wetlands), the operation of which could result in significant environmental effects (i.e., increased vectors and/or odors).	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
HYD-12) Cause changes in absorption rates or the rate and amount of surface runoff.	Alts. 1, 2, 3 – S Alt. 4 - NI	Alts. 1, 2, 3 – WATER-1, WATER-2	Alts. 1, 2, 3 – LTS
HYD-13) Cause changes in the amount of surface water in any water body.	Alts. 1, 2, 3 – LTS Alt. 4 - NI	-	-
Wildland Fire			
Fire-1) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.	All Alts. - NI	-	-

1 - SU – Significant and unavoidable
LTS – Less than significant
S – Significant
NI – No impact
B – Beneficial
NA – Not applicable

CHAPTER 1
INTRODUCTION AND PURPOSE AND NEED

1.1 Introduction

This Draft Proposed Plan Amendment (PA) to the California Desert Conservation Area (CDCA) Plan/Environmental Impact Statement/Environmental Impact Report (Draft PA/EIS/EIR) analyzes impacts of the Desert Quartzite Solar Project (DQSP; the Project), which is first described in the right-of-way (ROW) grant application number CACA-049397 filed with the Bureau of Land Management (BLM) by First Solar Development, LLC (the Applicant), a wholly-owned subsidiary of First Solar Development, Inc. The ROW grant application was originally filed for 7,245 acres on September 28, 2007, but has been revised several times. The current Project is described in the most recent POD, dated November 15, 2016. The Applicant has also filed a Conditional Use Permit Application (Application for Land Use and Development, Form 295-1010) to Riverside County (the County) for an additional 160 acres of privately-owned land adjacent to the BLM-administered land.

The total Project area now under application for BLM and County approval is approximately 5,275 acres. Of this, the application for the BLM ROW grant includes approximately 5,115 acres of BLM administered lands, and the application for a County Conditional Use Permit includes 160 acres of private lands. Within this application area, the Applicant has proposed a Project which would occupy approximately 3,770 acres, including 3,560 acres for portion of the solar facility on BLM land, 54 acres for the proposed 230 kilovolt (kV) transmission line (generation interconnection [gen-tie] line) on BLM land, 2 acres for the offsite portion of a buried telecommunications line and possible above-ground electrical service line on BLM land, and 154 acres for the portion of the solar facility on private land. The larger acreage under application allows for the BLM and the County to consider various site layouts as Project alternatives for their environmental analysis. The final post-construction ROW grant for the Project would be 3,616 acres of BLM land, and the County authorization for use of the private land would be 154 acres. The larger acreage under application allows for BLM and the County to consider various site layouts as Project alternatives for their environmental analysis. In addition to the long-term Project ROW area, the Project would include 61 acres of temporary construction areas on BLM land outside of the ROW area. The combined acreage of the BLM and County authorizations would total 3,831 acres, and the remaining area within the application boundary would not be incorporated as part of the Project.

The Regional Context of the Project is shown in Figure 1-1 (see Appendix A for all figures referenced in the Draft PA/EIS/EIR); the Project Location, Proposed Site Layout, and Solar Unit Detail are shown in Figures 2-1, 2-2, and 2-3.

The Draft PA/EIS/EIR evaluates the potential effects of the Proposed Action and two other alternatives on BLM-administered lands and privately-owned lands under the County's jurisdiction. A number of other alternatives to the Proposed Action were developed and evaluated by the BLM but ultimately not carried forward for detailed analysis (see Section 2.9 for further information). These include alternative sites, other solar and renewable technologies, generation technologies using different fuels, and conservation and demand-side management. Of the alternatives considered, four alternatives were determined by the BLM to warrant detailed analysis: Alternative 1, the Proposed Action that would generate up to 450 megawatts (MW);

Alternative 2, a Resource Avoidance Alternative that would generate up to 450 MW; Alternative 3, a Reduced Project Alternative that would generate up to 285 MW; and Alternative 4, the No Action Alternative.

Acronyms used in this document are defined in Appendix B, which also includes a glossary of various terms used in this document. The references used in this document are listed in Appendix C.

1.2 Joint NEPA/CEQA Document

This Draft PA/EIS/EIR was prepared as a joint Federal/state environmental document (State Clearinghouse Number 2015031066 and EIS Number DOI-BLM-CA-D060-2017-0002). This document analyzes the effects of the proposed Project solar facility site and gen-tie line corridor, and Alternatives.

1.2.1 NEPA Environmental Impact Statement

The National Environmental Policy Act (NEPA) requires the preparation of an EIS for all “major Federal actions significantly affecting the quality of the human environment” 42 U.S.C. §4332(2)(C). The ROW grant for the proposed solar facility and associated gen-tie line would be located on BLM-managed lands and triggers the need for environmental review with BLM as the NEPA lead agency. In accordance with NEPA (42 U.S.C. § 4321 et seq.); Council on Environmental Quality’s (CEQ) NEPA regulations (40 Code of Federal Regulations (CFR) §1502.13); the DOI’s NEPA regulations, 43 CFR Part 46; the BLM NEPA Handbook, H-1790-1; FLPMA Sections 201, 202, and 206, (43 U.S.C. §§ 1711, 1712, 1716; 43 CFR Part 1600); and the BLM Land Use Planning Handbook, H-1601-1, this joint Draft PA/EIS/EIR (1) describes the affected environment relevant to potential impacts of the proposed action, action alternatives, and no action alternative; (2) evaluates the environmental impacts that are expected to result from construction, operation, maintenance, and decommissioning of the proposed solar facility and its alternatives in the BLM ROW; and (4) identifies and characterizes cumulative impacts that could result from the proposed action (and its action alternatives) in relation to other ongoing or reasonably foreseeable activities within the surrounding area. Additionally, this Draft PA/EIS/EIR presents recommended mitigation measures that, if adopted, would avoid, minimize, or otherwise mitigate for certain direct and indirect environmental impacts identified. The information contained in this Draft PA/EIS/EIR will be considered by the BLM in its deliberations regarding approval of the ROW grant, and may also be considered by other Federal agencies for use in decision-making to protect, preserve, and enhance the human environment and natural ecosystems.

1.2.2 CEQA Environmental Impact Report

Under the California Environmental Quality Act (CEQA), as amended (Public Resources Code Section 21080(a)), an environmental review document must be prepared, reviewed, and certified by the decision-making body before action is taken on any non-exempt discretionary project proposed to be carried out or approved by a state or local public agency in California. This Draft PA/EIS/EIR serves as the environmental review document that evaluates the potential environmental effects associated with implementation of the proposed Project. This Draft

PA/EIS/EIR has been prepared pursuant to CEQA (California Public Resources Code Section 21000 et seq.) and the state CEQA Guidelines (California Code of Regulations, Title 14, Section 15000 et seq.).

The Draft PA/EIS/EIR will serve as an informational disclosure document for the County, responsible agencies, and other interested parties. The County will consider the conclusions of the Final PA/EIS/EIR, in light of the entire administrative record, before certifying the Final PA/EIS/EIR and taking action on the Project. The following are included among the stated purposes of an EIR in the state CEQA Guidelines:

- Disclose significant environmental impacts that are expected to result from the construction, operation, and maintenance of the proposed Project;
- Indicate ways in which significant impacts can be avoided or otherwise mitigated;
- Identify any unavoidable adverse impacts that cannot be mitigated; and
- Identify feasible alternatives to the Project that would substantially lessen or eliminate significant adverse impacts.

1.3 Purpose and Need

1.3.1 BLM Purpose and Need

NEPA guidance published by the Council on Environmental Quality (CEQ) states that an Environmental Impact Statement's Purpose and Need section "shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action" (40 Code of Federal Regulations (CFR) §1502.13). It describes the BLM's purpose and need for action, which is informed by but distinct from the Applicant's interests and objectives.

The BLM's purpose and need for the Project is to respond to the Applicant's application under Title V of the Federal Land Policy and Management Act of 1976 (FLPMA) (43 USC §1761(a)(4)) for a ROW grant to construct, operate, maintain, and decommission a solar photovoltaic (PV) facility on public lands in compliance with FLPMA, BLM ROW regulations, and other applicable Federal laws, policies and plans. In accordance with §302(a) of FLPMA, public lands are to be managed for sustained yield and multiple uses that take into account the long-term needs of future generations for renewable and non-renewable resources. The Secretary of the Interior is authorized to grant rights-of-way on public lands for systems of generation, transmission, and distribution of electric energy (43 USC §1761(a)(4)). Taking into account BLM's sustained yield and multiple use mandates, the BLM will decide whether to approve, approve with modification(s), or deny issuance of a ROW grant to the Applicant for the proposed Project.

The Proposed Action, if approved, also would assist the BLM in addressing several management and policy objectives advanced through the following authorities and policies applicable to the BLM:

1. Executive Order 13783 (March 28, 2017) and Secretary's Order 3349 (March 29, 2017) establishes policy to promote clean and safe development of the energy resources within the United States.

2. Executive Order 13807 (August 15, 2017) and Secretary's Order 3355 (August 31, 2017) established policy to prioritize infrastructure projects and streamline the environmental review process.
3. Section 211 of the Energy Policy Act of 2005 established a goal for the Department of the Interior to approve non-hydropower renewable energy projects on the public lands with at least 10,000 MWs of capacity by 2015. To achieve and exceed this goal, the BLM has now authorized over 17,000 MWs of non-hydropower renewable energy projects. The BLM continues to prioritize renewable energy development on public lands.
4. Desert Quartzite is a covered project under Title 41 of Fixing America's Surface Transportation Act (FAST-41). FAST-41 established new coordination and oversight procedures for infrastructure projects being reviewed by Federal agencies. The intent of the act is to improve early coordination between government agencies, increase public transparency, and increase government accountability.

1.3.2 County and Applicant's Project Objectives

The purpose of the project is to construct and operate a solar energy facility using a low-profile, PV solar technology that maximizes the generation of a renewable and reliable source of electrical power consistent with Federal and state policies and plans designed to promote environmentally responsible development of affordable renewable energy projects and green jobs in California. In furtherance of this purpose, the County and Project Applicant have set forth the following basic objectives for the proposed Project:

- To generate up to 450 MW of electricity using PV solar technology and sell that power at the most competitive, low-cost price.
- To locate the Project in a manner that maximizes operational efficiencies, furthers the objectives of landscape-level smart-siting planning efforts, avoids Desert Wildlife Management Areas, Areas of Critical Environmental Concern and National Conservation Lands where feasible, and minimizes water use, new linear developments, and environmental impacts in general.
- To minimize environmental impacts and land disturbance by, among other things, siting the facility on relatively flat, contiguous lands with high solar insolation, in close proximity to established utility corridors, existing transmission lines with available capacity to facilitate interconnection, and accessible roads.
- To assist, to the greatest extent possible, with achieving greenhouse gas (GHG) reduction objectives, including the requirements under SB X1-2 to increase the state's Renewable Portfolio Standard (RPS) to 33 percent by 2020 and under SB 350 to increase the state's RPS to 50 percent by 2030.
- To further the purpose of Secretarial Order 3285A1, establishing the development of environmentally responsible renewable energy as a priority for the Department of the Interior.
- To increase local short-term and long-term employment opportunities.

- To provide economic benefits to Riverside County, in accordance with Policy B-29 and the motivations for its adoption, by stimulating spending at local businesses, increasing tax revenues, and generating development fees.

California's Renewable Energy Standards and Goals

California's RPS originally required California's investor-owned electric utilities to obtain 20 percent of the electricity that they supply from renewable sources by 2010. Executive Order S-14-08 expanded this goal, mandating that "all retail sellers of electricity shall serve 33 percent of their load with renewable energy by 2020." State government agencies were furthermore directed to take all appropriate actions to implement this target in all regulatory proceedings, including siting, permitting, and procurement for renewable energy power plants and transmission lines.

California's three large investor-owned utilities (Pacific Gas and Electric, San Diego Gas and Electric, and Southern California Edison) made quick progress toward meeting these goals, and by 2016, they collectively served 34.8 percent of their retail electricity sales with renewable power (CPUC 2017). In 2015, the Legislature and Governor accordingly raised the bar for renewable energy by mandating a 50% RPS by 2030 in SB 350.

California policy has mandated significant increases in renewable energy generation, including utility-scale solar facilities like the proposed Project, and requires that California utilities meet their electrical supply needs from both large central station power sources, and from distributed generation. "Utility scale power plants can take advantage of economies of scale early in the growth of new technologies. As of November, 2017, California has approximately 17,210 MW of CEC-installed utility-scale renewable energy capacity (CEC 2017).

Greenhouse Gas Reduction

California is committed to a significant and substantial increase in reliance on renewable resources for electrical power, the reduction of fossil-fuel based pollutants, and promoting the green economy, consistent with protection of the environment. The RPS embodies this commitment, but it is evident in other statutes and policies as well, in particular those policies that aim to reduce California's contribution of approximately 6.2 percent of the total United States GHG.

Former Governor Arnold Schwarzenegger issued Executive Order S-03-05 on climate change to advance renewable energy and to reduce California's GHG emissions. Further, in enacting the California Global Warming Solutions Act of 2006 (Assembly Bill 32), the Legislature found that global warming poses a serious threat to California's economic well-being, public health, natural resources, and environment. Aspiring to exercise a global leadership role, Assembly Bill 32 directed the California Air Resources Board (CARB) to develop regulations, market mechanisms, and other actions to reduce California's greenhouse gas emissions, such as carbon dioxide, to 1990 levels by 2020 (see Health and Safety Code, § 38501).

In fulfilling its duties under Assembly Bill 32, CARB determined that electricity generation accounts for approximately 22 percent of carbon dioxide (CO_2) emissions in California due to the burning of fossil fuel energy sources such as coal and natural gas. Renewable energy power plants are urgently needed to address the emissions and enable the state to meet its GHG reduction objectives and RPS standard. The Project is anticipated to produce approximately 2.25 billion kilowatt hours (kWh) of electrical energy per year (URS 2015). The total annualized GHG emissions of the Project are approximately 1,280 metric tons (MT) CO_2 equivalent (CO_2e) per year, including 669 MT of amortized construction emissions, 277 MT CO_2e of corresponding operational emissions, and an estimated 334 MT CO_2e of annualized decommissioning emissions. In comparison, gas turbine and coal-fired power plants of the same electrical energy output are estimated to produce approximately 787,500 and 2,250,000 metric tons of CO_2e, respectively. The net GHG emission displacement or offset of the Project's solar facility in place of a conventional fossil-fuel combustion power plant is estimated to range from 786,220 to 2,248,720 MT CO_2e per year.

Proximity to Electrical Transmission Facilities

A major impediment to meeting the RPS is transmission line capacity and availability. California Independent System Operator (CAISO) manages the high-voltage transmission system and controls the process of obtaining rights to interconnect to the statewide grid. To obtain permission to interconnect with transmission facilities, an electric generator must submit an interconnection application to CAISO, which then places the electric generator into the "interconnection queue" and evaluates and apportions the cost of any associated transmission facility upgrades. Accordingly, a key driver in achieving the state's RPS is to locate renewable energy power plants where transmission capacity is expected to be available and sufficient queue position has been reserved by the electric generator, such that interconnection approvals can be granted within the near term.

The Project would be located approximately 3.0 miles from Southern California Edison's Colorado River Substation (CRSS), a component of the Devers-Palo Verde 2 (DPV2) Transmission Line project, which received its approval from the California Public Utilities Commission (CPUC) in July 2011 (Decision D.11-07-011) and was completed in September, 2013. A portion of the proposed 230 kV gen-tie line that is outside of the solar facility but part of the Project would be collocated in a utility corridor with gen-tie lines from other local solar power facilities.

High Potential Solar Resource Area

The Project site receives anywhere between 6.0 and 7.0 kWh per square meter per day (kWh/m2/day) of solar radiation energy, giving it a higher degree of solar radiation than most areas within the United States (NREL 2012). The BLM and Department of Energy prepared a Solar Energy Development Programmatic Environmental Impact Statement (PEIS; also known as the Western Solar Plan) that identified the Riverside East Solar Energy Zone (SEZ), of which the Project site is a part, as having a high potential for solar resources (BLM and DOE 2012). Also, there are a number of proposed and approved solar projects that have been constructed in close proximity to the Project site (refer to the Cumulative Project Map found in Chapter 4.1). As such, the Project would be sited in an area with excellent solar energy resources in order to maximize productivity from the PV panels.

Proven and Available Solar PV Technology

The Project would use proven and available PV solar modules, mounted on either single-axis horizontal tracker structures or fixed-tilt mounting systems, which provide efficient solar energy at a cost-effective utility scale. Solar PV technology has been commercially used for over 40 years. According to the U.S. Solar Market Insight Report, 6,234 MW of utility-scale photovoltaic solar systems were installed in the United States in 2017. The cumulative contracted PV capacity operating in the country now stands at 18,100 MW (SEIA 2018).

1.4 Project Location and Overview

The Applicant proposes to construct, operate, maintain, and decommission a solar PV electric generating facility with a capacity of 450 MW. The DQSP would be located in the southern California inland desert, approximately 2.75 miles southwest of the City of Blythe, just south of the Interstate 10 (I-10) freeway, and 1.5 miles southwest of Blythe Airport in Riverside County, California (Figure 2-1).

As reflected in the ROW grant application filed with the BLM, and subsequently serialized as application # CACA-049397 for BLM record tracking, the DQSP would be located primarily on BLM-administered land, within Sections 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 22, 23, and 24 of Township 7S, Range 21E, San Bernardino Base and Meridian. The Applicant is seeking a ROW grant for approximately 3,616 acres. Within the proposed Project area, construction and operation would disturb approximately 3,560 acres of BLM land for the solar plant site and other Project-related facilities, 54 acres of BLM land for a 2.79 mile gen-tie corridor with a width of 160 feet, and 2 acres for the offsite portion of a buried telecommunications line and possible above-ground electrical service line on BLM land. The DQSP also would disturb approximately 154 acres of private lands that are under County jurisdiction, and are adjacent to the BLM ROW grant boundary. The Project does not include any County real property or County right-of-way.

1.5 Major Authorizing Laws and Regulations/Agency Roles and Authorizations

The primary agency-specific authorizing laws, regulations, and policies governing the Lead Agencies' decisions are summarized below. Other relevant resource- and issue-specific laws, regulations, plans, and policies are summarized in Appendix D.

1.5.1 BLM

BLM's authority and policy guidance for making a decision related to the Proposed Action is derived from FLPMA (43 USC §1701 et. seq.), EPAct § 211 (119 Stat. 594, 600). FLPMA authorizes the BLM to issue ROW grants for systems for generation, transmission, and distribution of electric energy. Section 211 of the EPAct states that the Secretary of the Interior should seek to have approved a minimum of 10,000 MW of renewable energy-generating capacity on public lands by 2015. The BLM's policies and procedures for authorizing individual solar energy projects are found in the BLM's regulations at 43 CFR 2800.

The BLM will decide whether to deny the proposed ROW, grant the ROW, or grant the ROW with modifications. The BLM may include any terms, conditions, and stipulations it determines to be in the public interest, which may include modifying the proposed use or changing the route or location of the proposed facilities (43 CFR Part 2805.10(b)(1)).

The Western Solar Plan recognizes the DQSP as a "pending" ROW application (Western Solar Plan §9.4.22.2, p. 9.4-133). Pending applications like the DQSP are not subject to the land use planning decisions in the Western Solar Plan (Western Solar Plan ROD Section B.1.2) or to the CDCA Plan amendments made in that decision. Therefore, if the BLM elects to approve the ROW grant application for the DQSP, a Project-specific PA would be required. The decision to be made by the BLM regarding the ROW grant for the gen-tie line corridor will also require a PA, because a portion of that proposed facility lies outside of a designated utility corridor. This Draft PA/EIS/EIR acts as the mechanism for complying with the NEPA and plan amendment requirements of the CDCA Plan relevant to the Proposed Action.

1.5.2 Riverside County

Implementation of the portions of the proposed Project that would be located on privately-owned lands would require discretionary approvals from Riverside County, including a Conditional Use Permit (CUP) and Public Use Permit (PUP). In addition to the Conditional Use Permit, the Applicant would be required to enter into a Development Agreement with the County for the DQSP consistent with the County's solar power plant program. The Development Agreement has a term of 30 years and will grant the Applicant vesting rights to develop the Project in accordance with the terms of the agreement. The Development Agreement contains terms consistent with Board of Supervisors Policy No. B-29, including terms regarding annual public benefits payments and increases and terms requiring the applicant to take actions to ensure allocation directly to the County of the sales and use taxes payable in connection with the construction of the solar power plant, to the maximum extent possible under the law. Approval and use of the Conditional Use Permit are conditioned upon the Development Agreement being entered into and effective.

This Draft PA/EIS/EIR will be used by the County, in conjunction with other information developed in the County's formal administrative record for the Project, when considering whether to approve the CUP, PUP, and Development Agreement for the construction, operation, maintenance, and decommissioning of the proposed Project on lands subject to County jurisdiction. Pursuant to CEQA requirements, the County will determine the adequacy of the Final EIR and, if determined adequate, will certify the document as complying with CEQA.

1.5.3 U.S. Fish and Wildlife Service

The United States Fish and Wildlife Service (USFWS) has jurisdiction over threatened and endangered species listed under the Federal Endangered Species Act (FESA) (16 USC § 1531 et seq.). Formal consultation with the USFWS under Section 7 of the FESA is required for any Federal action that may adversely affect a Federally listed species. This consultation will be initiated through the preparation and submittal of a Biological Assessment (BA) and is expected to conclude with the USFWS's issuance of a Biological Opinion (BO) that specifies reasonable and prudent measures that must be implemented to minimize the impacts of incidental take of any protected species that is anticipated to result from implementing the Project.

1.5.4 U.S. Army Corps of Engineers

The United States Army Corps of Engineers (USACE) has jurisdiction to protect the waters of the United States, including protection of water quality and wetland resources, under §404 of the Clean Water Act (CWA). Under that authority, USACE regulates the discharge of dredged or fill material into waters of the United States, including wetlands, by reviewing proposed projects to determine whether they may impact such resources and, thereby, are subject to retain a §404 permit. On May 8, 2015, the Applicant submitted a request to the Los Angeles District of the USACE for an approved Department of the Army Jurisdictional Determination (JD) for the Project site. Additional field data in support of the request were submitted to the USACE in October, 2015. In a letter dated February 18, 2016, the USACE determined that waters of the United States do not occur on the Project site. The letter is attached to the Federal Jurisdictional Delineation provided in Appendix I.

1.5.5 California Department of Fish and Wildlife

The California Department of Fish and Wildlife (CDFW) protects fish and aquatic habitats within the state through regulation of modifications to stream and lakebeds, under §1602 of the California Fish and Game Code. CDFW has interpreted the term “streambed” to encompass all portions of the bed, banks, and channel of any stream, including intermittent and ephemeral streams, extending laterally to the upland edge of riparian vegetation. In the case of vegetated ephemeral dry washes, such as those present on the Project site, this CDFW interpretation often results in an asserted geographic jurisdictional area that is much wider than the active channel of the stream and, therefore, much wider than the jurisdiction of the USACE. Section 1602(a) states that it is unlawful for an entity to “substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake” without first notifying CDFW of that activity. If CDFW determines that the activity may substantially adversely affect an existing fish or wildlife resource, the entity will need to obtain a Lake or Streambed Alteration Agreement from the CDFW before it may commence the activity (Fish & Game Code §1602(a)(4)(B)). CDFW would include in the Lake or Streambed Alteration Agreement measures necessary to protect the affected resources. The requirements of a Streambed Alteration Agreement would apply to the Project independent of and in addition to mitigation measures included in the PA/EIS/EIR.

CDFW also has the authority to regulate potential impacts to species that are protected under the California Endangered Species Act (CESA) (Fish and Game Code §2050, et seq.). If appropriate, the Applicant would be required to file an Incidental Take Permit application, and the requirements of the Incidental Take Permit would apply to the Project independent of and in addition to the mitigation measures included in the PA/EIS/EIR.

Under the provisions of the California Desert Native Plants Act, CDFW is charged with oversight of harvesting certain species of California desert native plants on both public and privately owned lands in the counties of Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego. Removal of specific plants species requires a valid permit and any required tags or seals obtained from the respective county Sheriff’s Office or Commissioner’s Office where collection occurs. Plants found in the Project area that fall under the California Desert Native Plants Act are listed in Section 3.3.

1.6 Policy Consistency and Land Use Conformance

1.6.1 Relationship of the Proposed Action to the Western Solar Plan

In order to address interest in solar energy development and to implement a national energy policy recommendation to increase renewable energy production, in 2012 BLM and the U.S. Department of Energy (DOE) undertook efforts to comprehensively evaluate solar energy potential on public lands. In July 2012, BLM and DOE published the Final Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States (Western Solar Plan). The Western Solar Plan analyzed two alternative plans for managing solar energy development on BLM-administered public lands in the six-state study area. One of these plans, called the Western Solar Plan, was adopted through the Approved Resource Management Plan Amendments/ROD for Solar Energy Development in Six Southwestern States in October 2012.

The Western Solar Plan made amendments to 89 BLM land use plans, including the CDCA Plan, not only to support solar energy development on public lands, but also to minimize potential environmental, cultural, and socioeconomic impacts. As part of the Western Solar Plan, the BLM identified priority development areas called Solar Energy Zones (SEZs) that are well suited for utility-scale production of solar energy, "variance" areas outside of SEZs where solar development would be open to applications, and "exclusion" areas where utility-scale solar energy development would not be permitted. The Project is located within the Riverside East SEZ.

The Western Solar Plan states that "pending" applications filed within SEZs prior to June 30, 2009 are not subject to the land use planning decisions in the Western Solar Plan. Amendments to pending applications are also not subject to the Plan's new requirements, provided that such amendments either (1) do not change the boundaries of the pending ROW applications; or (2) are related to avoiding resource or land use conflicts, adapting the project to third-party-owned infrastructure constraints, or using or designating translocation or mitigation lands (Section B.12, Western Solar Plan ROD). Instead, "pending" applications and qualifying amendments (that is, revisions to applications) must be processed consistently with the land use plan decisions that existed prior to the adoption of the Western Solar Plan ROD.

The Desert Quartzite Solar Project's initial application for a right-of-way grant (ROW) was submitted to BLM on September 28, 2007. Therefore, the Project qualifies as a "pending" application which is exempt from the Western Solar Plan ROD, and is instead subject to the land use plan decisions that preceded the Western Solar Plan. The Desert Quartzite Solar PV proposal is an amendment to this pending application. As explained below, to the extent that the Desert Quartzite PV proposal "change[s] the boundaries of the pending ROW application" those changes are related either to "avoiding resource or land use conflicts" or to "adapting the project to third-party-owned infrastructure constraints." Thus, Desert Quartzite Solar PV Project is exempt from the requirements of the Western Solar Plan ROD. The Desert Quartzite Solar PV proposal is therefore being processed under the CDCA land use plan decisions that were in place prior to the adoption of the Western Solar Plan.

The qualifications for the exemption provided in ROD Section B.1.2 focus on amendments to an application that affect the boundaries of the ROW. Therefore, amendments which do not relate to boundary changes are not relevant to the exemption inquiry. For instance, the change in footprint boundaries to avoid or reduce impacts under the DQSP proposal do not affect whether the Project is exempt from the Western Solar Plan ROD.

1.6.2 Relationship of the Proposed Action to the Desert Renewable Energy Conservation Plan

In November 2008, pursuant to an executive order by the Governor of California, Federal and California state agencies formed the Renewable Energy Action Team (REAT) to, among other things, develop the DRECP. As ultimately approved, the purpose of the DRECP is to conserve and manage plant and wildlife communities on BLM-administered Federal lands in the desert regions of California while streamlining the approval of compatible renewable energy projects. BLM published its ROD and Land Use Plan Amendment (LUPA) to the California Desert Conservation Plan, Bishop Resource Management Plan, and Bakersfield Resource Management Plan in September 2016.

Of the approximately 10 million acres of BLM-managed public lands in the Mojave and Colorado desert regions of California, the DRECP LUPA allocated approximately 388,000 acres as Development Focus Areas (DFAs) for solar, wind, and geothermal projects, similar to the SEZs under the Western Solar Plan. It also allocated variance lands where renewable energy may be developed depending on further review. The DRECP LUPA also allocated lands for conservation and recreation, and determined that those allocations were not compatible with renewable energy development. Finally, renewable energy may be considered on general public lands, which are lands not allocated for specific values or uses. The Project is located within a DFA.

Pursuant to Section II.3.2.4 of the DRECP LUPA, the DRECP does not apply to "[a] project that is proposed in a BLM SEZ and that is considered a 'pending project' under the Western Solar Plan (the project application was filed before June 30, 2009)." As discussed above, the initial project application was filed before June 30, 2009, the Project is located within a SEZ, and the amendments contemplated by the Desert Quartzite Solar PV proposal either do not affect the project boundaries (e.g., change in project developer) or are related to avoiding resource or land use conflicts or adapting the Project to third-party-owned infrastructure constraints. Therefore, the Desert Quartzite Solar PV proposal is being processed under the CDCA land use plan decisions in place prior to the adoption of the DRECP LUPA and Western Solar Plan.

Although this application is being processed under the CDCA Plan in place prior to the DRECP LUPA and Western Solar Plan, the BLM has considered information developed through the DRECP LUPA process in this EIS, as reflected in the affected environment and environmental consequences sections. Additionally, Alternative 3 (Reduced Project Alternative) considers application of some mitigation and avoidance measures developed through the DRECP LUPA (called Conservation and Management Actions [CMAs] in the DRECP LUPA).

To assist the reader in understanding how the Project was analyzed under a prior land use plan after a new plan had been developed, a discussion of the differences between the CDCA Plan and the DRECP land use allocations, and their effect on the analysis of the Project in this PA/EIS/EIR, is presented in Appendix E. In some instances, the Proposed Project and/or its alternatives substantially conform with the CMAs identified in the DRECP for the development of renewable energy in DFAs. In other instances, BLM looked to select CMAs for guidance on mitigating or avoiding certain impacts.

1.6.3 Northern and Eastern Colorado Desert Coordinated Management Plan

The BLM's Northern and Eastern Colorado (NECO) Plan amended the CDCA Plan in 2002 to make it compatible with desert tortoise conservation and recovery efforts. The NECO Plan is a landscape-scale planning effort that covers most of the California portion of the Sonoran Desert ecosystem, including over 5 million acres and two Mojave desert tortoise recovery units. The NECO Plan established conservation areas and proscribed management actions in the region that includes the Project area.

1.6.4 Land Use Plan Conformance

The CDCA Plan area encompasses 25 million acres in southern California designated by Congress in 1976 through FLPMA. The CDCA Plan is a comprehensive, long-range plan that was adopted in 1980; it has since been amended many times. The CDCA is a 25-million-acre area that contains over 12 million acres of BLM-administered public lands in the California Desert, which includes the Mojave Desert, the Sonoran Desert, and a small part of the Great Basin Desert. The CDCA Plan provides regional guidance for BLM-administered lands within the Plan Area and establishes long-term goals for protection and use of the California desert. It is based on the concepts of multiple use, sustained yield, and maintenance of environmental quality. The CDCA Plan establishes multiple use classes, multiple use class guidelines, and plan elements for specific resources or activities, such as motorized vehicle access, recreation, and vegetation. While the DRECP has eliminated the multiple use classes, the Proposed Action is analyzed under the classes because it is not subject to land use planning decisions in the DRECP.

The Desert Quartzite Solar site is classified in the CDCA Plan as Multiple-Use Class (MUC) M (Moderate Use). The Desert Quartzite Solar site currently is not identified in the CDCA Plan for use as a solar power facility. To accommodate the DQSP or any of the action alternatives, the CDCA Plan must be amended to identify the use of the site as a solar power facility. As noted above, both the Western Solar Plan and the DRECP have defined the Desert Quartzite Solar site as being appropriate for solar development. However, because the DQSP is not subject to those plan amendments, it requires a project-specific PA. Compliance of the Project with the multiple use class designations is discussed in the lands and realty section of the PA/EIS/EIR (Section 4.10, and in Appendix F).

Based on CDCA Plan Table 1, Multiple Use Class Guidelines, and CDCA Plan Chapter 3, Energy Production and Utility Corridors Element, solar uses are conditionally allowed in the Multiple Use Class M designation contingent on NEPA requirements being met for the proposed use. Table 1, Item 7 (Transmission Facilities) of the CDCA Plan specifies that new electric transmission facilities are allowed only within designated corridors. A portion of the proposed gen-tie line would be located outside of a designated corridor. Therefore, a PA is required to authorize this portion of the gen-tie line. This Draft PA/EIS/EIR will act as the mechanism for complying with the NEPA and plan amendment requirements of the CDCA Plan relevant to the Proposed Action.

Planning Criteria (BLM)

The CDCA Plan planning criteria are the constraints and ground rules that guide and direct the development of the PA. They ensure that the PA is tailored to the identified issues and ensure that unnecessary data collection and analyses are avoided. They focus on the decisions to be made in the PA regarding authorization of the solar facility and the portion of the gen-tie line outside of the solar facility boundary and a designated utility corridor.

As specified in Chapter 7 of the CDCA Plan, "Plan Amendment Process", there are three categories of plan amendments:

- Category 1, for proposed changes that will not result in significant environmental impact or analysis through an Environmental Impact Statement;
- Category 2, for proposed changes that would require a significant change in the location or extent of a multiple-use class designation; and
- Category 3, to accommodate a request for a specific use or activity that will require analysis beyond the plan amendment decision.

Based on these criteria, approval of the location for the proposed solar facility and of the gen-tie line outside of the main facility and designated corridor, would each require a Category 3 amendment. The section below summarizes the procedures necessary to evaluate the proposed PAs, as well as the procedures required to perform the environmental review of the ROW application for both.

Plan Amendment Process

The plan amendment process is outlined in Chapter 7 of the CDCA Plan. In analyzing an applicant's request for amending or changing the CDCA Plan, the BLM District Manager will:

1. Determine if the request has been properly submitted and if any law or regulation prohibits granting the requested amendment.
2. Determine if alternative locations within the CDCA are available which would meet the applicant's needs without requiring a change in the Plan's classification, or an amendment to any Plan element.
3. Determine the environmental effects of granting and/or implementing the applicant's request.
4. Consider the economic and social impacts of granting and/or implementing the applicant's request.
5. Provide opportunities for and consideration of public comment on the proposed amendment, including input from the public and from Federal, state, and local government agencies.
6. Evaluate the effect of the proposed amendment on BLM management's desert-wide obligation to achieve and maintain a balance between resource use and resource protection.

Decision Criteria for Evaluation of Proposed Plan Amendment

The Decision Criteria to be used for approval or disapproval of the proposed amendment require that the following determinations be made by the BLM Desert District Manager:

1. The proposed amendment is in accordance with applicable laws and regulations; and

2. The proposed amendment will provide for the immediate and future management, use, development, and protection of the public lands within the CDCA.

The BLM Desert District Manager will base the rationale for these determinations on the principles of multiple use, sustained yield, and maintenance of environmental quality as required in FLPMA.

Decision Criteria for Evaluation of Application

In addition to defining the required analyses and Decision Criteria for plan amendments, the CDCA Plan also defines the Decision Criteria to be used to evaluate future applications in the Energy Production and Utility Corridors Element of Chapter 3. These Decision Criteria include:

1. Minimize the number of separate rights-of-way by utilizing existing rights-of-way as a basis for planning corridors;
2. Encourage joint-use of corridors for transmission lines, canals, pipelines, and cables;
3. Provide alternative corridors to be considered during processing of applications;
4. Avoid sensitive resources wherever possible;
5. Conform to local plans whenever possible;
6. Consider wilderness values and be consistent with final wilderness recommendations;
7. Complete the delivery systems network;
8. Consider ongoing projects for which decisions have been made; and
9. Consider corridor networks which take into account power needs and alternative fuel resources.

The BLM will include a statement in the Record of Decision evaluating these criteria based on the information contained in this PA/EIS and on comments received during the public comment period on the Draft PA/EIS/EIR.

1.7 Document Organization

This is a joint Draft PA/EIS/EIR document prepared in compliance with both NEPA and CEQA. The document is longer and more complex than would be typical if the document were an EIS or EIR only.

This document follows regulations promulgated by the CEQ for Implementing the Procedural Provisions of NEPA (40 CFR §§1500-1508); the DOI's NEPA regulations, 43 CFR Part 46; the BLM NEPA Handbook, H-1790-1; FLPMA §§201, 202, and 206 (43 CFR §1600); the BLM Land Use Planning Handbook, H1601-1; and DOE's NEPA implementing procedures (10 CFR §1021). This PA/EIS/EIR describes the components of and reasonable alternatives to the Proposed Action, environmental consequences of the Proposed Action and other alternatives, and the agencies and persons consulted during preparation of the PA/EIS/EIR. Table 1-1 identifies each NEPA element with a reference to the corresponding section(s) in the Draft PA/EIS/EIR where the elements are discussed. The format and content of this Draft PA/EIS/EIR are consistent with the BLM NEPA Handbook (H-1790-1) as listed in Table 1-1.

The state CEQA Guidelines provide that each EIR contain essential elements of discussion. Table 1-1 identifies each CEQA element that must be described in an EIR along with a reference to the corresponding section(s) in the Draft PA/EIS/EIR where the elements are discussed.

The PA/EIS/EIR is organized as follows:

Executive Summary provides the reader an opportunity to understand the entire Project and its implications. The Executive Summary includes: a brief description of the Project Applicant; lead agency and responsible agency data; a narrative summary of each impact, with proposed mitigation measures and alternatives that would reduce those impacts; areas of interest known to the lead agencies; and issues to be resolved including the choice among alternatives and whether or how to mitigate the impacts.

Chapter 1 provides general background on the Proposed Action (CEQA Project Description); describes the purpose of NEPA, CEQA and the Draft PA/EIS/EIR; identifies the purpose and need for the Proposed Action, and Project objectives; and identifies roles of the BLM, the County, and other agencies and authorities regulating various aspects of the Proposed Action. Chapter 1 also describes the format and content of the Draft PA/EIS/EIR; permits and other discretionary actions required for the Project; related review and consultation requirements; and contact persons for the Draft PA/EIS/EIR.

Chapter 2 describes the Proposed Action (Project Description), the Action/Project alternatives development, and the screening process conducted for the Project alternatives. It presents a range of reasonable alternatives that address the stated purpose and need for the Project and identifies and explains why other alternatives were considered but not analyzed in detail.

Chapter 3 describes the affected environment (environmental setting, 14 CCR § 15125) for 20 environmental resource and issue areas relevant to that area that would be affected by the Proposed Action. The regulatory framework for each environmental resource topic is summarized in Appendix D. Please see Section 1.8.2 for a list of the resource topics covered in this Draft PA/EIS/EIR.

Chapter 4 provides a comprehensive analysis and assessment of direct, indirect, and cumulative impacts (environmental consequences) and mitigation measures (by environmental resource and issue area) for the Proposed Action and alternatives (including a No Action Alternative). It also describes other aspects of BLM compliance with NEPA procedures, including any residual impacts. Please see Section 1.8.2 for a list of the resource topics covered in this Draft PA/EIS/EIR.

Chapter 5 presents analyses of other NEPA and CEQA issues, including any irreversible or irretrievable commitments of resources (40 CFR § 1502.16), significant irreversible environmental changes, growth-inducing impacts, and unavoidable significant environmental impacts under CEQA.

Chapter 6 identifies the persons, groups, agencies, and other governmental bodies that were consulted or that contributed to the preparation of the Draft PA/EIS/EIR; describes Native American consultations and public participation during scoping; provides a list of Draft PA/EIS/EIR preparers; and lists agencies, organizations, and persons to whom the Draft PA/EIS/EIR will be sent.

Appendices contain information that supplements or supports the analyses in the body of the Draft PA/EIS/EIR, as follows:

- Appendices A through C provide the figures, acronyms, glossary, and references associated with the PA/EIS/EIR document;
- Appendix D provides the Applicable Regulations, Plans, and Standards for each of the resources analyzed;
- Appendices E and F provide analyses of the Project with respect to land management plans;
- Appendix G provides the mitigation measures developed for the Project;
- Appendix H provides the Public Scoping Report; and
- Appendices I through Y provide the technical reports developed by the Applicant to support the environmental analysis of the Project.

The baseline physical conditions as analyzed in the technical reports are the conditions that existed at the time of the issuance of the NOI for the preparation of a Draft PA and EIS, and Notice of Preparation (NOP) of an EIR (state CEQA Guidelines Section 15125(a)) in March, 2015.

Table 1-1. Recommended PA/EIS/EIR Sections and Required Elements

Draft PA/EIS/EIR Section	Recommended NEPA EIS Sections	CEQA Required Element/ State CEQA Guidelines
Table of Contents	N/A	Table of Contents (Section 15122)
Executive Summary	N/A	Summary (Section 15123)
Chapter 1	Introduction Identifying Information Location of Proposal Purpose and Need for Action and Decision to be Made Scoping and Public Involvement Issues	Project Description (Section 15124) Regional Map Project Objectives List of Agencies Expected to Use EIR List of Required Permits and Approvals List of Related Review and Consultation Requirements
Chapter 2	Proposed Action and Alternatives Description of Proposed Action Description of Alternatives Analyzed in Detail Alternatives Considered but not Analyzed in Detail	Project Description (Section 15124) Precise location and boundaries of the Project Project's Characteristics Alternatives to the Proposed Project (Section 15126)
Chapter 3	Affected Environment	Environmental Setting (Section 15125) Effects Found Not to Be Significant (Section 15128)
Chapter 4	Environmental Effects Direct and Indirect Effects Cumulative Effects Residual Effects Identify and analyze mitigation measures, if any	Environmental Impact Analysis (Section 15126) Significant Environmental Effects Significant Environmental Effects that Cannot Be Avoided Mitigation Measures Cumulative Impacts (Section 15130) Alternatives Evaluation (15126.6)

Table 1-1. Recommended PA/EIS/EIR Sections and Required Elements

Draft PA/EIS/EIR Section	Recommended NEPA EIS Sections	CEQA Required Element/ State CEQA Guidelines
Chapter 5	Irreversible or irretrievable commitments of resources (40 CFR §1502.16	Long-Term Implications of the Proposed Project (Section 15126.2) Significant Irreversible Environmental Changes Growth-Inducing Impacts
Chapter 6	Tribes, Individuals, Organizations, or Agencies Consulted List of Preparers	List of Organizations, Agencies, and Persons Consulted and List of Preparers (Section 15129)

N/A = not applicable

1.8 Scoping/Issues Addressed in the Analysis

1.8.1 Scoping Process

The BLM and County solicited internal and external input on the issues, impacts, and potential alternatives to be addressed in the Draft PA/EIS/EIR for the Project, as well as the extent to which those issues and impacts would be analyzed in the document. This process is called "scoping" (40 CFR §1501.7; 14 CCR §§ 15082[a], 15103, 15375). Internal input was provided by the BLM, Riverside County, and cooperating agencies as an interdisciplinary process, to help define issues, alternatives, and data needs. External scoping involved notification and opportunities for feedback from other agencies, organizations, tribes, local governments, and the public. Formal public scoping began following publication of a NOI under NEPA and release of a NOP under CEQA.

The NOI for the Proposed Action was published in the Federal Register on March 6, 2015 (80 FR 12195). The NOP was issued on March 13, 2015. In addition to being published in the NOI and NOP, information regarding the public meetings was published in the Parker Pioneer, Desert Sun, and Palo Verde Times on March 18, 2015. The meetings were also were announced on the BLM website for the Project, at http://www.blm.gov/ca/st/en/fo/palmsprings/Desert_Quartzite.html. Notice of the meetings was also mailed to 190 recipients, which included agencies, Native American tribes, organizations, and interested individuals. Copies of the NOP were provided to the Office of Planning and Research (State Clearinghouse) for issuance to state agencies. One hundred and ninety copies of the NOP were distributed to Federal, state, and local agencies, responsible and trustee agencies, local governments, private organizations, Native American tribes, and other interested parties.

Both the NOI and the NOP announced the dates, times, and locations of public scoping meetings in Parker, Arizona on March 23, 2015, and in Blythe, California, on March 24, 2015. The purpose of the meetings was to inform the public about the Project; describe the purpose and need of the Project; provide information regarding the environmental review process; and gather public input regarding the scope and content of the Draft PA/EIS/EIR. The BLM, County, and Applicant presented information about the Project, alternatives, environmental review process, and potential impacts. Following the presentations, members of the public were invited to make verbal comments. A total of six individuals made public comments at the meetings. At the conclusion of the public comments, staff members from the agencies and the Applicant were available to answer questions and gather input.

The comment period for the NOI and NOP began on March 6, 2015, and ended on April 13, 2015. A total of nine written comment letters were submitted to BLM, 13 written comment letters were submitted to the County, and four comment letters were jointly submitted to both agencies. Comments received during the scoping process are provided in Appendix H, *Public Scoping Report* and raised the following issue topics:

- Air Quality
- Alternatives
- Biological Resources
- BLM Procedures
- Cultural Resources
- Environmental Justice and Impacted Communities
- Fire
- Global Climate Change
- Hazardous Materials/Hazardous Waste/Solid Waste
- Indirect and Cumulative Impacts
- Land Use
- Public Health
- Purpose and Need
- Tribal Governments
- Visual Resources
- Water Resources

1.8.2 Resources Analyzed

The following environmental resources have a potential to be affected by activities related to the proposed Project and alternatives and thus are evaluated in this Draft PA/EIS/EIR:

- Air Resources
- Biological Resources – Vegetation
- Biological Resources – Wildlife
- Cultural Resources
- Geology and Soils
- Global Climate Change
- Hazards and Hazardous Materials
- Lands and Realty
- Mineral Resources

- Noise
- Paleontological Resources
- Recreation
- Socioeconomics and Environmental Justice
- Special Designations
- Traffic and Transportation
- Utilities and Public Services
- Visual Resources
- Water Quality

The following environmental resources are either not present or not impacted by the proposed Project or Alternatives, and therefore not discussed in detail in this Draft PA/EIS/EIR:

- Forestry
- Livestock Grazing
- Wild Horses and Burros

None of these resources or activities are located on the site, or in areas that could be impacted by the Proposed Action. There is no forest land located on or near the site. There is no livestock grazing within the East Riverside SEZ, and no wild horse or burro populations. Accordingly, impacts to these resources are unlikely to occur.

1.9 Permits and Approvals

Review and approval of the Proposed Action is within the primary jurisdiction of the BLM for those portions of the Proposed Action that would be constructed, operated, maintained, and decommissioned on BLM-administered public land, and within the County's primary land use jurisdiction for those portions of the Proposed Action that would be developed and operated on privately owned or County-owned land within its jurisdiction. The BLM may issue a ROD making a decision regarding the issuance of the ROW grant for the portions of the Proposed Action on public land. The County may issue the CUP and/or PUP for the portions on private land and County-owned land. Other Federal, state, and local agencies also could exercise authority over specific elements of the Proposed Action with respect to air quality and greenhouse gas emissions, land use, biological and cultural resources, stormwater drainage and hydrology issues, roadway easements, and crossing encroachments.

Table 1-2 below provides a list of the anticipated Federal, state, and local permits and approvals that would be required for the proposed Project and the agencies that are anticipated to rely on the Draft PA/EIS/EIR. Other relevant resource- and issue-specific laws, regulations, plans, and policies applicable to the proposed Project are summarized in Appendix D. Please refer to Chapter 6, *Coordination, Consultation, and Public Involvement* for a detailed discussion on consultations and persons consulted for the proposed Project and alternatives.

1.9.1 Related Federal Review and Consultation Requirements

In addition to complying with NEPA, the BLM will comply with other Federal regulations and authorizations and conduct necessary consultations regarding the resources potentially affected by the proposed Project. Such consultations include but are not limited to:

- United States Fish and Wildlife Service (USFWS): The USFWS has jurisdiction to protect threatened and endangered species under the Endangered Species Act (ESA) (16 U.S.C. § 1531 et seq.). Under Section 7 of the ESA, the BLM is obligated to conduct informal and, if necessary, formal consultation with the USFWS relative to Federal actions that may adversely affect a Federally listed species.
- Section 106 of the National Historic Preservation Act (NHPA), as amended, 54 U.S.C. § 100101 et seq., (36 CFR Part 800), requires Federal agencies to take into account the effects of a proposed undertaking on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment (36 CFR Part 800.1(a)). The Section 106 process seeks to accommodate historic preservation concerns with the needs of Federal undertakings through consultation among the agency official and other parties with an interest in the effects of the undertaking on historic properties. The goal of consultation is to identify historic properties potentially affected by the undertaking, assess the undertaking's effects, and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties (36 CFR Part 800.1).
- Government-to-Government Consultation: In addition to the requirements of the NHPA and NEPA, the BLM is required to consult with Native American tribes according to Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, which directs Federal agencies to establish regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Native American tribes, and to reduce the imposition of unfunded mandates upon Native American tribes. Also, the Presidential Memorandum for the Heads of Executive Departments and Agencies Regarding Government-to-Government Relations with Native American Tribal Governments, issued November 5, 2009, directs executive departments and agencies to engage in regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, and to strengthen the government-to-government relationship between the United States and Native American tribes. Government-to-government consultation between the BLM and tribal governments is an ongoing process that will continue even after the Section 106 process for the proposed Project has been completed.
- The USACE has jurisdiction to protect navigable and interstate waters (waters of the United States), including water quality and wetland resources, under Section 404 of the Clean Water Act (CWA). Under that authority, the USACE regulates the discharge of dredged or fill material into waters of the United States, including wetlands and tributaries, by reviewing proposed projects to determine whether they may impact such resources and, thereby, are subject to a Section 404 permit. Alternatively, minor impacts may be covered under one of several nationwide permits. On May 8, 2015, the Applicant submitted a request to the Los Angeles District of the USACE for an approved Department of the Army Jurisdictional Determination (JD) for the Project site.

Additional field data in support of the request were submitted to the USACE in October 2015. In a letter dated February 18, 2016, the USACE determined that waters of the United States do not occur on the Project site. The letter is attached to the Federal Jurisdictional Delineation provided in Appendix I.

1.9.2 Related State and Local Review and Consultation Requirements

Ancillary permits, including encroachment permits, grading and construction permits, and certificates of occupancy, are anticipated from the County. These permits and approvals are local ministerial actions that will parallel or follow CEQA compliance. Other state and local agencies or regulatory entities that could exercise authority over specific elements of the proposed Project include:

- Riverside County Airport Land Use Commission (ALUC): The ALUC will review the proposed solar facility layout, transmission components, glint and glare analysis, and ancillary facilities to determine the consistency of the Project with the 2004 Blythe Airport Land Use Compatibility Plan.
- California Department of Fish and Wildlife (CDFW): Informal consultation will occur with the CDFW, Inland Desert Region, concerning the scope of biological resource studies and species of interest relative to the portion of the proposed Project on private lands.
- Mojave Desert Air Quality Management District (MDAQMD): Permits regulating air pollutant emissions during Project construction, operation, maintenance, and decommissioning are anticipated to be issued by the MDAQMD upon demonstration that the Project will comply with local air regulations.
- Native American Heritage Commission (NAHC): The Applicant has submitted a letter to the NAHC requesting a list of Native American tribes that should be contacted for information about cultural resources that may occur on or in close proximity to the proposed Project area, as well a Sacred Lands File search. Information requests were submitted to the listed Tribes via United States mail.
- California Independent System Operator (CAISO): On December 15, 2010, the Applicant submitted a request to CAISO for a secured interconnection queue position. This is a necessary element of being able to transmit generated power to the statewide electric grid.
- Department of Defense: As required by California Senate Bill 1462 (2004), the County will notify the DoD that the Project is being planned, and invite consultation, if needed, to determine the potential impact on military overflights and operations.

Consultation under AB 52 is not applicable to the Project because the date of the NOP for the DQSP was March 12, 2015, prior to the effective date of AB 52 on July 1, 2015.

The Project is being evaluated pursuant to the Riverside County General Plan (RCGP) (Riverside County 2015a). Land Use Policy LU-17.2 of the RCGP states: “Permit and encourage, in an environmentally and fiscally responsible manner, the development of renewable energy resources and related infrastructure, including but not limited to, the development of solar power plants in the County of Riverside.” In connection with General Plan Amendment 1080, Riverside also enacted Ordinance No. 348.4705, which amended the zoning code to allow a solar power plant on a lot 10 acres or larger in certain zoning districts, upon issuance of a use permit.

Table 1-2. Anticipated Permits and Approvals

Authority or Approving Agency	Permit or Approval	Triggering Action	Statutory Reference
Federal			
BLM	Grant of long-term ROW	Proposed solar facility and gen-tie line construction and operation would occur, in part, on lands under BLM management	Federal Land Policy and Management Act of 1976 (PL 94-579), 43 U.S.C. §§1761-1771; 43 CFR Part 2800. National Environmental Policy Act of 1969 as amended (PL 91-190), 42 U.S.C. §4332, and related statutes
BLM (cont'd)	Grant of short-term ROW	Temporary construction areas that would not be included in long-term ROW.	Federal Land Policy and Management Act of 1976 (PL 94-579), 43 U.S.C. §§1761-1771; 43 CFR Part 2800. National Environmental Policy Act of 1969 as amended (PL 91-190), 42 U.S.C. §4332, and related statutes
	ROW permits for pre-construction activities	Permits are required for the Applicant to enter the site to perform site assessment activities such as geotechnical investigations, groundwater well installation, and placement of a meteorological tower, as well as for pre-construction site clearance.	Federal Land Policy and Management Act of 1976 (PL 94-579), 43 U.S.C. §§1761-1771; 43 CFR Part 2800. National Environmental Policy Act of 1969 as amended (PL 91-190), 42 U.S.C. §4332, and related statutes
	Section 106 Compliance	BLM will consult with the State Historic Preservation Office and tribal governments to meet Section 106 consultation requirements.	National Historic Preservation Act
	Cultural Resource Use Permit	Testing may be required to determine the National Register of Historic Places significance and eligibility of identified sites.	Archaeological Resources Protection Act
	Field work authorization	The Applicant obtained a BLM Fieldwork Authorization Permit prior to conducting Class III archaeological resource inventories.	Federal Land Policy and Management Act of 1976 (PL 94-579), Sec. 302 (b), 43 USC 1732, Sec. 4 of P. L. 96-95, October 31, 1979, 16 USC, 470cc
U.S. Fish and Wildlife Service	Endangered/ Threatened Species Consultation and Incidental Take Permit	Proposed solar facility and gen-tie line construction and operation may impact Federally-listed species	Endangered Species Act

Table 1-2. Anticipated Permits and Approvals

Authority or Approving Agency	Permit or Approval	Triggering Action	Statutory Reference
U.S. Fish and Wildlife Service	Bird and Bat Conservation Strategy	Proposed solar facility and gen-tie line construction and operation may impact migratory birds	Migratory Bird Treaty Act
Bureau of Reclamation	Project review	Coordination regarding the Draft Groundwater Accounting Surface	N/A
State of California			
California Department of Fish and Wildlife	Endangered/ Threatened Species Take Authorization	Proposed solar facility and gen-tie line construction and operation may impact state-listed species	California Endangered Species Act (CESA)
California Department of Fish and Wildlife (cont'd)	Lake or Streambed Alteration Agreement	Proposed construction and operation may potentially impact sensitive biological resources	California Fish and Game Code, Section 1601
State Water Resources Control Board – California Water Quality Control Boards for Colorado River Region	Demonstrate compliance with General Discharge Permits for Storm Water Associated with Construction Activity	Proposed construction may involve storm water discharges to surface Waters of the State	Clean Water Act, Section 401
Mojave Desert Air Quality Management District	Dust Control Plan	Proposed construction would generate fugitive dust	MDAQMD Rule 403
County of Riverside			
County of Riverside	Conditional Use Permit, Public Use Permit, Development Agreement	Proposed construction and operation of a portion of the Project located within County jurisdiction	County of Riverside Zoning Ordinance (Ordinance No. 348; CEQA, California Public Resources Code, Sec. 21000 et seq.
Riverside County Airport Land Use Commission	Director's Determination	Portions of the Project located within Compatibility Zone E.	Policy 1.5.2(d) of the Countywide Policies of the 2004 Riverside County Airport Land Use Compatibility Plan

1.10 Contact Persons

Please contact the following individuals regarding questions and concerns about the Project:

NEPA Lead Agency:

Brandon Anderson, Program Manager
Bureau of Land Management
Palm Springs-South Coast Field Office
1201 Bird Center Drive
Palm Springs, CA 92262

CEQA Lead Agency:

Russell Brady
Riverside County Planning Department
4080 Lemon Street, 12th Floor
P.O. Box 1409
Riverside, CA 92502-1409

CHAPTER 2
PROPOSED ACTION AND ALTERNATIVES

2.1 Introduction

This chapter describes the Applicant’s proposal to construct, operate, maintain, and decommission a 450 MW solar PV energy generating facility and related infrastructure in unincorporated Riverside County, California, to be known as the Desert Quartzite Solar Project (DQSP; the “Project” or the “Proposed Action”) on a combination of public land administered by the BLM and private land under the jurisdiction of the County. This chapter also describes alternatives to the Project, including a Resource Avoidance Alternative that would support a 450 MW solar PV facility, a Reduced Project Alternative that would support a 285 MW solar PV facility, and a No Action Alternative as required by NEPA and CEQA. Finally, this chapter describes the alternatives screening process, including alternatives that were considered but eliminated from detailed analysis.

2.2 Alternatives

NEPA and CEQA both require consideration of a reasonable range of alternatives to the proposed Project that have the potential to feasibly attain most of the basic objectives of the Project, and to meet the Federal purpose and need. In addition, CEQA requires the consideration of how to avoid or substantially lessen any of the significant or adverse effects caused by the Project. The NEPA and CEQA requirements for the identification of Project alternatives are described below.

2.2.1 NEPA and CEQA Requirements for Alternatives

Under NEPA, a Federal agency undertaking a “major Federal action” significantly affecting “the quality of the human environment” must prepare an EIS. 42 USC § 4332(2)(C). NEPA requires the BLM to “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources”. The range of appropriate alternatives is governed by a “rule of reason.” An agency need only consider feasible and distinguishable alternatives reasonably related to the purposes of the project. It is not required to undertake an analysis of alternatives with substantially similar consequences as the proposed action.

Similar to NEPA, a rule of reason also governs the range of alternatives under CEQA. An agency need not consider alternatives that (i) fail to meet most of the basic project objectives, (ii) are infeasible, or (iii) cannot avoid significant environmental impacts. More specifically, state CEQA Guidelines Section 15126.6 states the following:

(a) An EIR shall describe a range of reasonable alternatives to the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives.

(b) The discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly.

(c) The EIR should briefly describe the rationale for selecting the alternatives to be discussed. The EIR should also identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination. Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts.

(d) The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project.

(e) The EIR shall include the evaluation of the "No project" alternative.

(f) The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR need examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the project. The range of feasible alternatives shall be selected and discussed in a manner to foster meaningful public participation and informed decision making.

In accordance with the foregoing principles, the Federal and state lead agencies identified the alternatives below to be carried forward and analyzed in this Draft PA/EIS/EIR.

2.2.2 Alternatives Development and Screening Process

Alternatives were evaluated using the criteria set forth in Section 6.6.3 of the BLM NEPA Handbook, which provides that an action alternative may be eliminated from detailed analysis if:

1. It is ineffective (it would not respond to the BLM's purpose and need);
2. It is technically or economically infeasible;
3. It is inconsistent with the basic policy objectives for the management of the area (such as, not in conformance with the land use plan (i.e., the CDCA Plan));
4. Its implementation is remote or speculative;
5. It is substantially similar in design to an alternative that is analyzed; or
6. It would have substantially similar effects to an alternative that is analyzed.

Similarly, state CEQA Guidelines 15126.6(f) specifies that "The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR need examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the project."

The Project, Resource Avoidance Alternative, and Reduced Project Alternative were found to meet the specified requirements, and were therefore carried forward for more detailed analysis in Chapter 4. The No Action Alternative is described in Section 2.7, and the NEPA Preferred/CEQA Environmentally Superior Alternative is described in Section 2.8. Potential alternatives that met BLM's exclusionary criteria were eliminated from further analysis, and are described in Section 2.9.

2.2.3 Proposed Land Use Plan Amendment Decisions

The BLM has determined that a PA would be required if a ROW were granted for a solar power generating facility on the proposed site.

The Final Western Solar Plan and Record of Decision (ROD) and the DRECP recognize the DQSP as a “pending” ROW application (Western Solar Plan §9.4.22.2, p. 9.4-133; DRECP Section II.3.2.4, p. 68-69). Pending applications like the DQSP are not subject to the Western Solar Plan ROD (Western Solar Plan ROD Section B.1.2), the DRECP, or to the CDCA plan amendments made in those decisions. Therefore, if the BLM elects to approve the ROW grant application for the DQSP, a Project-specific PA, summarized in PA1, below would be required. Any subsequently filed applications for the Project site would, however, be subject to the Solar Energy Program and associated land use plan amendments.

The proposed gen-tie line would be sited almost entirely within BLM’s Utility Corridor K and Section 368 Federal Energy Corridor 30-52 (referred to as Corridor K/30-52 in this Draft PA/EIS/EIR). Section 368 of the Energy Policy Act of 2005 (P.L. 109-58) required Federal agencies to engage in transmission corridor planning (see Section 1.6.2.1 of the Draft Solar PEIS). As a result of this mandate, the BLM, DOE, USFS, and DoD prepared a PEIS to evaluate the designation of energy corridors on Federal lands in 11 western states (BLM 2009). The BLM and USFS issued RODs to amend their respective land use plans to designate numerous corridors, often referred to as Section 368 corridors. BLM’s Utility Corridor K, originally designated by BLM in the CDCA Plan, was also designated as a Section 368 Federal Energy Corridor 30-52 in the DOE and DOI PEIS.

The interconnection point for the Project, the Colorado River Substation (CRSS), is sited approximately 1,500 feet south of the southern boundary of Corridor K/30-52. Consequently, the portion of the gen-tie corridor between the corridor and the CRSS would be located outside of the corridor, and would require consideration through the CDCA plan amendment process. Therefore, if the BLM elects to approve the ROW grant application for the DQSP, a Project-specific PA, summarized in PA2 below, would be required.

The PA decisions considered in the Draft PA/EIS are:

> **PA1:** The CDCA Plan would be amended to identify the development footprint as suitable for the proposed type of solar energy use. This would be adopted if a ROW were granted for the Project, the Resource Avoidance Alternative, or the Reduced Project Alternative.
>
> **PA2:** The CDCA Plan would be amended to authorize the portion of the gen-tie corridor which is located outside of BLM’s Utility Corridor K and Section 368 Federal Energy Corridor 30-52. This would be adopted if a ROW were granted for the Project, the Resource Avoidance Alternative, or the Reduced Project Alternative.

If these two decisions are not taken, the CDCA Plan would not be amended. This would result if the No Action Alternative were selected.

2.3 Features Common to all Action Alternatives, Including the Proposed Action

This section details the Project components that would be developed if any of the action alternatives were approved, regardless of the particular solar plant layout selected. Distinctions specific to each action alternative are detailed in Section 2.4 relating to the Proposed Action; in

Section 2.5 relating to the Resource Avoidance Alternative; and in Section 2.6 relating to the Reduced Project Alternative.

Each of the three action alternatives consists of the solar facility, a gen-tie line to connect the solar facility to the CRSS, O&M facility, an On-Site Substation, access roads, and other ancillary facilities.

2.3.1 Overview

The Applicant proposes to construct, operate, maintain, and decommission the DQSP in the southern California inland desert (Figure 2-1). The Project would occupy a total land area of approximately 3,770 acres. This includes 3,560 acres for the portion of the solar facility on BLM land; 54 acres for the 2.79-mile long, 160 foot wide transmission line (generation interconnection [gen-tie]) corridor on BLM land; 2 acres for the offsite portion of a buried telecommunications line and possible above-ground electrical service line on BLM land; and 154 acres for the portion of the solar facility on private land. The final ROW grant for the Project would be 3,616 acres of BLM land, and the County authorization for use of the private land would cover 154 acres. The Project would also require 61 acres of temporary work areas for construction (Figure 2-2). The Project would generate up to 450 MW using solar photovoltaic (PV) technology.

The Applicant provided the technical information about the Project components that are described in this section. All quantities, including those referring to land disturbance, equipment, schedule, mileage, and workforce, are based on the most current data available and generally represent conservative estimates for purposes of analyzing impacts. The numbers may change based on final engineering and various agencies' permit requirements.

In addition to the ROW application to use BLM land, the Applicant submitted a Conditional Use Permit Application (Application for Land Use and Development, Form 295-1010) to the County on February 25, 2015 (Riverside County CUP No. 3721). That application requests a permit to develop 160 acres of private land adjacent to, and surrounded on all sides by, the lands requested in the BLM ROW application.

The POD and 2015 County application are the primary sources of Project description information on which this section is based. Both the BLM POD and County applications have been supplemented with additional Project details, in the form of letters submitted to the BLM and the County, technical reports, management plans, and responses to requests for additional information.

Based on this input, key components of the Project are:

1. The solar plant site, which would include the solar arrays; power conversion systems; an On-Site Substation; an operations and maintenance (O&M) facility; a meteorological station; a guard shack; groundwater wells; energy storage systems; and related infrastructure and improvements; and
2. An overhead 230 kilovolt (kV) gen-tie line (maximum of 135 feet tall), connecting the solar plant site to the CRSS.

The key features of the Project are shown in Figure 2-2, and are discussed in the following subsections.

2.3.2 Site Description

2.3.2.1 Location

The DQSP would be located approximately 2.75 miles southwest of the City of Blythe, just south of the Interstate 10 (I-10) freeway, and 1.5 miles southwest of Blythe Airport in Riverside County, California (Figure 2-1). The Applicant is seeking a ROW grant from BLM, as well as authorization from the County to develop an approximately 160-acre parcel of private land that is surrounded by the BLM land. The portion of the ROW for the proposed gen-tie line would exit the solar facility at the northwest corner, and traverse approximately 2.79 miles west to the CRSS.

2.3.2.2 Legal Description

A legal description of the Project Site CACA-049397 is provided in Table 2-1. Figure 2–2 shows the Project Site Boundary in relation to the Public Land Survey System, along with land ownership of the Project Site and adjacent lands. The DQSP would be located primarily on BLM-administered land, within Sections 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 22, 23, and 24 of Township 7S, Range 21E, San Bernardino Base and Meridian.

The privately owned parcel consists of Assessor's Parcel Number 879-110-001, in Section 15 of Township 7S, Range 21E, San Bernardino Base and Meridian. First Solar Development, LLC has executed an agreement with the private land owner for an option to purchase the private land which would be used as a part of the DQSP. The Project does not include any County real property or County right-of-way.

Table 2-1. Legal Description of the Project Site Area

All lands located in Township 7S, Range 21E, San Bernardino Base and Meridian

BLM Lands	
Section 3	W1/2, W1/2E1/2, S1/2SE1/4SE1/4, Lots 4, 5, 6
Section 4	S1/2S1/2S1/2
Section 5	S1/2S1/2S1/2
Section 6	S1/2S1/2SE1/4
Section 7	NE 1/4
Section 8	NW1/4NW1/4, SW1/4NW1/4
Section 9	E1/2
Section 10	All
Section 11	N1/2, SW1/4
Section 12	NW1/4, N1/2SW1/4
Section 13	N1/2, SW1/4, W1/2SE1/4, All that area NW CA 08974
Section 14	S1/2NE1/4, W1/2, SE1/4
Section 15	NW1/4, N1/2SW1/4, SE1/4, All that area NE of CA 4163
Section 22	NE1/4NE1/4, All that area NE of CA 4163
Section 23	N1/2, NE1/4SW1/4, SE1/4, All that area NE of CA 4163
Section 24	N1/2NW1/4, SW1/4NW1/4, NW1/4SW1/4, All that area NW of CA 8974
Private Lands under County Jurisdiction	
Section 15	NE 1/4

2.3.2.3 Onsite and Adjacent Land Uses

The portion of the Project area located on BLM land is currently undeveloped. The 160-acre private parcel was previously the location of a jojoba farm. A detailed description of the adjacent and nearby land uses is provided in Section 3.10.1.4.

2.3.3 Facilities

The DQSP would consist of a single unit with a generating capacity of 450 MW. The proposed facilities on BLM-managed public land would include solar arrays, gen-tie line, O&M building, internal access roads, groundwater production wells, On-Site Substation, and ancillary facilities. The only facilities to be placed on the private land parcel would be solar arrays, access roads, and power distribution lines. The only linear facilities extending out of the solar plant site would be the gen-tie line, its associated access road, an above-ground electrical service line, and a buried telecommunications line. The primary ingress and egress to the Project would use existing access roads. The secondary access route would require construction of approximately 0.7 miles of new road near the southeastern boundary of the Project.

The number and size of Project-related facilities would vary among the Project alternatives. The facilities associated with the Proposed Action are discussed in detail in Section 2.4, the facilities associated with Alternative 2 are discussed in Section 2.5, and the facilities associated with Alternative 3 are discussed in Section 2.6. The following subsections discuss the characteristics and features of the facilities.

2.3.3.1 Solar Panels and Arrays

The Project would involve the installation of photovoltaic modules mounted on either single-axis horizontal tracker structures, fixed tilt mounting systems, or a combination of these two mounting systems. The solar facility would generate up to 450 MW of alternating current (AC) power. The principal materials used in the PV panels and mounting systems are glass, steel, and various semiconductor metals. The specific type of solar panels to be used would be determined as part of final Project design. The Proposed Action assumes that commercial panels, available to any potential developer, would be used. An alternative that assumes use of thin-film cadmium telluride (CdTe) panels is developed as Alternative 2, the Resource Avoidance Alternative, which is discussed in Section 2.5.

The mounting system for the PV modules would consist of steel posts driven into the ground. The Applicant has conducted a Preliminary Geotechnical Investigation, and estimates that posts for fixed-tilt structures would need to be driven between 4 and 7 feet into the ground, and posts for single-axis tracking structures would need to be driven up to 12 feet into the ground. During pre-construction, the Applicant would conduct more field geotechnical investigations which would include borings to evaluate subsurface conditions. If these field investigations result in identifying a more optimal foundation, then the Applicant may propose other embedded foundation designs, including cement foundations, to BLM and the County. Tilt-brackets would be bolted onto the steel posts, and either steel table frames (for fixed tilt) or tracker structures would be bolted onto to the brackets. The PV panels would then be mechanically fastened to the table frames or tracker structures.

If fixed-tilt arrays, which do not track the sun, are used, they would be positioned in a south-facing orientation at a tilt between 20 and 25 degrees from horizontal (ground surface) to receive optimal solar energy throughout the year. The arrays would be installed in rows oriented in an east-west direction. The maximum height of the fixed-tilt arrays above the ground surface would be 13 feet.

An example of a typical horizontal tracker PV array is shown in Figure 2-3. If single-axis horizontal trackers are used, the PV modules would be mounted horizontally (not tilted to the south). The arrays would be installed in rows oriented in a north-south direction. Panels would be powered by drive motors to track the east-west path of the sun throughout the course of a day. The maximum height of a module on a horizontal tracker during the course of a day would be 13 feet. The minimum height would be approximately 1.5 to 2 feet above the ground surface.

The assemblies would be organized into arrays, as shown in Figure 2-4. Each array would be approximately 800 feet long, and 500 feet wide, but may vary depending on technology and array design. The exact placement of the arrays within the Project area would be based on topography, hydrology, and geotechnical conditions, and may also be modified to avoid environmentally sensitive resources. Prior to ground-breaking activities and issuance of a Notice to Proceed by the authorized officer, all final design features and placement of all Project facilities would be included in the approved POD.

2.3.3.2 Power Distribution

The PV modules would be electrically connected to each other by wire harnesses and combiner boxes that collect power from several rows of modules. Underground direct current (DC) cables would then lead to a Power Conversion Station (PCS), which would be situated within each array. Alternatively, above-ground cables may be used and attached to the array posts 1 to 4 feet above the ground. A typical PCS is shown in Figure 2-5. The PCS would use inverter hardware to convert the DC electric output of the solar panels into grid-quality AC electric output. A transformer located at each PCS would then step up the voltage of the output to medium voltage AC (MVAC) at approximately 34.5 kV, before it is transmitted to one of several PV Combining Switchgear (PVCS) units, which would be housed in cabinets dispersed among the arrays. A typical PVCS is shown in Figure 2-6. Each PVCS would collect power from a group of arrays, and then transmit it to the On-Site Substation through overhead high-capacity collection system lines. As an alternative to the PCS, the low voltage DC would be stepped up to medium voltage DC (MVDC) at several converters throughout the site and transmitted to one or more MVDC to MVAC inverters. The overhead lines would be carried on wood or steel poles with a maximum height of 70 feet. The PCSs, converters, and transformers would be situated on concrete vaults or bases.

The On-Site Substation facility would occupy approximately 2.6 acres in the northwest portion of the Project site. At the On-Site Substation, the voltage of the electricity would be stepped up to match that of the Southern California Edison (SCE) regional transmission grid. The power would be transmitted from the On-Site Substation to the CRSS through the overhead gen-tie line, which would be a maximum of 135 feet tall. The gen-tie line would run north from the On-Site Substation to the existing Corridor K/30-52 along 16th Avenue/Seeley Avenue. The line would then turn west and follow the existing Corridor K/30-52 approximately 2.79 miles to the SCE-operated CRSS, where it would interconnect to the CAISO grid. The gen-tie line would be included within a 160-foot wide corridor, and be approximately 2.79 miles long, for a total off-facility area of 54 acres.

The Project would also include Energy Storage Systems (ESSs), which are battery storage modules that would allow the facility to continue supplying energy to the grid for up to four hours in the evening after sundown. The ESSs would occupy approximately 15 acres, and would include switchboards; integrated heating, ventilation, and air conditioning (HVAC) units; inverters; transformers; and associated controls. The batteries would be composed of lithium ion, sodium-sulphur, vanadium-redox-flow, or similar technology. The ESSs would be situated in pre-fabricated metal containers located near the On-Site Substation. Each container would have an appropriate fire suppression system designed in compliance with Section 608 of the International Fire Code, as well as apron containment systems to prevent the escape of spills or leaks of fluids. The units would also be designed to comply with Article 480 of the electrical code, which specifies requirements for insulation and venting.

2.3.3.3 Access Roads

Primary and secondary access roads are shown on Figure 2-2. Primary access to the solar facility would be from Exit 236 off of I-10. Traffic would follow S. Neighbours Boulevard (State Route [SR]-78) approximately one mile south to 16th Avenue/Seeley Avenue, and then west approximately 5 miles to the facility gate. This access uses existing roads.

Emergency access to the Project area would be from 22nd Avenue off of SR78. Emergency access from 22nd Avenue would be directly west to Gravel Pit Road. A new road, approximately 0.7 miles long, would be constructed to connect Gravel Pit Road to an entrance gate at the southern tip of the Project site.

For most of its length, the proposed gen-tie line would run parallel to, and approximately 150 feet south of, the gen-tie line for the McCoy Solar Energy Project (MSEP). The existing road used to access the MSEP gen-tie line is 16th Avenue/Seeley Avenue, which runs parallel to, and north of, the MSEP gen-tie line. To use 16th Avenue/Seeley Avenue to access the DQSP gen-tie structure sites, a series of spur roads would be constructed. Each of these spur roads would be approximately 20 feet wide and 100 feet long, and would extend from 16th Avenue/Seeley Avenue north of the MSEP gen-tie line, pass underneath the MSEP gen-tie line, and provide access to the DQSP gen-tie structure locations on the south of the MSEP gen-tie line. Where the gen-tie line turns southwest to enter the CRSS, it would no longer be parallel to the MSEP gen-tie line and 16th Avenue/Seeley Avenue. Along this portion of the gen-tie line, a new access road parallel to the gen-tie line, approximately 20 feet wide and 1,750 feet long, would be constructed. The total length of access roads constructed for the gen-tie line would be approximately 4,000 feet.

Graded, graveled, or otherwise stabilized all-weather internal access roads would also be constructed at selected locations within the Project site. These roads would be required to facilitate transport of large Project components and materials from the staging areas to the construction work areas. Approximately 1.2 miles of existing on-site roads would be stabilized with gravel, and approximately 112.9 miles of additional internal roads would be constructed by compaction and/or stabilization of native soil material. Final placement of roads within the ROW would be identified in the approved POD. The gravel would be obtained locally to the extent practicable. These internal roads would continue to be used to access the facilities during Project operation and maintenance.

2.3.3.4 Operations and Maintenance Building

The O&M Building would be located adjacent to the On-Site Substation, in the northwest corner of the facility. The O&M Building would be used for parts storage, plant security systems, and monitoring equipment. The O&M Building would include offices, a restroom, and a storage area. The building would rest on a cement foundation, and would be approximately 120 feet by 50 feet in size. A small parking lot and additional storage containers would be located outside of the building. The building would receive backfeed power through the On-Site Substation, with long-term backup provided by a temporary diesel generator or electrical service line. An above-ground water tank would be located at the building, and would be used for drinking water and sanitary purposes. A septic system and leach field located at the O&M Building would serve as the sanitary waste system for Project operations.

2.3.3.5 Meteorological Facilities

The facility would include one or more meteorological stations and an associated data acquisition system (DAS), to collect data for analysis and system monitoring. The DAS would consist of a network of data loggers and programmable logic controllers at each PCS. The data loggers and controllers would be connected to a Wide Area Network and monitored in the O&M Building. Data would also be transmitted off-site, to a remote Network Operations Center.

The meteorological system may include an estimated nine anemometer towers installed around the site perimeter. The purpose of the anemometers would be to measure and communicate wind speed data to the facility control room, so that solar arrays on trackers could be re-positioned for safety in the event of high winds. The anemometer towers would range from approximately 20 to 30 feet high.

2.3.3.6 Power and Telecommunications Utilities

Hard-wired fiber-optic cable would be installed for telephone, internet, and other communications. Underground cables would be installed to connect the site to existing communications cables, located approximately one mile to the north. On the Project site, the communications system would connect to the temporary construction trailer area, the O&M Building, and the On-Site Substation. Alternatively, communications could be provided by microwave to the nearest available telecommunication site that connects to a local provider.

Power to support Project construction would be provided by generators or by an above-ground electrical service line installed along the same route as the underground communication line to an existing service line approximately one mile to the north. Power for operations (when the Project is not producing electricity) would be provided by backfeed power from Southern California Edison's (SCE) grid through the On-Site Substation. Long-term backup would be provided by a temporary diesel generator that would connect to a set of disconnects at the substation, or from the electrical service line installed during construction. A pad and a set of disconnects would be installed to facilitate rapid installation of the generator in the event of an emergency.

A separate communications line and a redundant communication system between the Project and the CRSS will be required by SCE. The separate system would be a fiber optic line attached to the Project gen-tie. The redundant system could be either a buried fiber optic line located in or adjacent to the gen-tie right-of-way, or a microwave system between the Project and the CRSS.

2.3.3.7 Security and Fencing

A guard shack would be located at the facility entrance gate. The shack would be manned by security personnel up to 24 hours per day throughout the construction period.

The perimeter of the solar facility, coinciding with the ROW boundary, would be fenced to provide security. The facility area included within the perimeter fenceline would be approximately 3,714 acres. Fence posts for the perimeter fencing would be set into a concrete footing. In addition, the temporary construction staging areas near the O&M Building (i.e., construction move on area) would be separately surrounded by temporary security fencing. All fencing would be seven feet high, chain-link or wire fence and the upper one foot may be barbed wire. Where required, the base of the fence may include tortoise exclusionary fencing, anchored below the ground surface according to USFWS (2009) guidelines. Because the Project area is almost flat, the fences will not cross any defined surface water drainages. Gates in the fencing would be situated at roads entering or exiting the facility. Two gates off of 16th Avenue/Seeley Avenue would be installed as entrances to the temporary construction area on the northern perimeter of the facility. A gate would be installed off of 16th Avenue/Seeley Avenue at the O&M Building. A gate would be installed at the southern end of the facility, to provide access from Gravel Pit Road. There would be no external roads along the outside of the fence.

Site security would be provided 24 hours per day, 7 days per week, through a combination of the fencing, lighting, security patrols, and remote monitoring by electronic security systems. Surveillance systems such as security cameras, motion detectors, or heat sensors may be installed along the site perimeter.

2.3.3.8 Water Supply

The facility would require the use of water during both construction and operations. During construction, water would be used for fugitive dust control, soil compaction associated with site preparation and grading activities, sanitary purposes, and fire protection. The rate at which water would be used would depend on the timing and intensity of construction. The duration of Project construction is expected to be between 25 to 48 months. The shorter estimate would require more intensive water use, and therefore a higher rate of water use. The longer estimate would use water at a slower rate because less disturbance would occur at any given time compared to the shorter construction schedule, but would result in a greater amount of water use overall because the water use for dust control would be required for a longer period of time. The Applicant estimates that the 25-month construction timeframe would require a total of approximately 1,400 AF of water, or 700 AFY, and that a 48-month construction timeframe would require approximately 1,800 AF of water, or 450 AFY.

No water use is required for electricity generation during operations except for washing of solar panels. Water use would be required for sanitary purposes, fire protection, dust control, and vegetation management. No water would be used to irrigate landscaping. The Applicant estimates that operations would require up to 38 AFY, including 18 AFY for panel washing, and

20 AFY for other combined purposes. An aboveground process water/firewater storage tank would be located adjacent to the O&M Building, and would be supplied either with water piped from a proposed on-site well, or from trucks delivering from sources off-site. The size and dimensions of the tank would be determined based on Riverside County Fire Department requirements for firewater storage.

The Applicant plans to obtain water for construction from newly installed onsite wells. However, testing has not been done to verify if this is feasible. If onsite production is not feasible, then water would be transported to the site by truck. This PA/EIS/EIR analyzes the impacts of both options.

If onsite groundwater is used, as proposed, a well to support construction, operations, and decommissioning would be installed west of the O&M Building, and water would be piped through a water line to the above-ground storage tank. Water trucks would be filled at the above-ground tank, and would transport water for use at active construction locations. A second, temporary well, to be used only during construction, may be installed either along the southwest perimeter of the facility, or along the southeast perimeter.

An off-site water supply may be required as a temporary water source before a water supply well can be installed, or may be needed throughout the duration of construction if onsite production is not feasible. In the scenario where no well is installed and all water is delivered by truck, there would be an estimated 57,000 truck trips required for water delivery during construction. The source of this water would be the Palo Verde Irrigation District (PVID), which obtains water from the Colorado River through Priority 1 and Priority 3 rights pursuant to a 1933 Water Delivery contract with the United States. The water would be accessed from a pump station located along Neighbours Boulevard, just north of West 11th Street (URS 2016a). Acquiring this water from any other source, such as the PVID canals, would require a separate environmental analysis.

2.3.3.9 Sanitary Facilities

Sanitary needs during construction would be served by the use of portable toilets. Portable toilets would be serviced by licensed contractors, and waste would be regularly pumped and hauled to proper offsite disposal facilities.

During operations, sanitary needs would be supplied by a septic system and leach field located near the O&M Building. The volume of sanitary waste during operations is expected to be no more than a few hundred gallons per day. The onsite sanitary system would require construction and annual operating Onsite Wastewater Treatment System (OWTS) permits from the County. The Applicant would conduct soil percolation tests to verify that an on-site septic system and leach field is feasible at the proposed location. The specific location of the system would be determined based on the results of percolation tests.

2.3.4 Construction

2.3.4.1 Preconstruction Surveying and Staking

The first activities conducted as part of construction would be fencing of the construction area, wildlife clearance, and surveying and staking of facility locations.

Field topographic surveys would be conducted to obtain detailed topographic information, with one-foot interval accuracy, needed to support the final grading plan and stormwater management system. The surveys would be conducted using photogrammetry and field cross sections. The grading plan would be supplemented with a review of historical aerial photographs to determine changes in land use and stream channel configurations.

Prior to mobilizing heavy equipment, the construction work area would be fenced with tortoise exclusionary fencing. The exclusionary fence may be temporary in nature, or may be installed at the base of the perimeter security fence. Whether the tortoise exclusionary fence is temporary or long-term in nature, it will be designed and installed to match specifications contained in the USFWS (2009) guidelines. Once exclusion fence is established, biological surveys, clearance, relocation, and/or transplanting would be conducted, as determined necessary. These activities could include clearance surveys for Mojave desert tortoise and other sensitive species (e.g., Mojave fringe-toed lizard); translocation for Mojave desert tortoise; seasonal avoidance of nesting birds, including burrowing owls; passive relocation of burrowing owls, as necessary; and possible transplantation of sensitive plant species and species listed under the California Desert Native Plants Act.

Simultaneous with the field surveys, the locations of Project facilities would be surveyed and staked. Facilities to be staked would include the locations of internal roads; buried electrical lines; PV arrays; ROW and construction area boundaries; temporary work areas; areas to be graded or excavated; transmission structure centers; foundation structures; and offsets designated for protection of biological or cultural resources. A construction Stormwater Pollution Prevention Plan (SWPPP) would be developed, and would be used to develop the grading plan and any necessary stormwater management structures.

2.3.4.2 Temporary Construction Facilities

Several construction areas, some situated within the permanent ROW and others outside of the permanent ROW, would be developed to support construction activities. These areas would be used during construction for office trailers, temporary equipment laydown areas, pulling sites for the gen-tie line, and temporary access roads for construction sites. Once construction is completed, the areas situated within the permanent ROW would be converted to other uses to support operations. The areas situated outside of the permanent ROW would be restored.

Two staging areas to be used for support of construction of the solar arrays would be located on the northern site boundary, with a gated entrance off of 16th Avenue/Seeley Avenue. These areas, shown on Figure 2-2, would consist of a 28 acre laydown area, and a 15 acre Move-On Area for temporary construction trailers and parking. Temporary access roads located in this area would total approximately 4.5 acres. These areas, and the associated roads, are located outside of the permanent ROW, and would be restored upon completion of construction.

Construction of the gen-tie line would be supported by a temporary office trailer, gen-tie structure sites, spur roads, pulling sites, and laydown area. Most of these areas would be situated within the 160 foot wide permanent gen-tie ROW. However, construction activities would require an area larger than the permanent ROW, so portions of these areas would only be used temporarily during construction. The acreages of the temporary construction areas outside of the permanent ROW are summarized in Table 2-4. The total area of temporary construction areas outside of the perimeter ROW, including 47.5 acres for the staging areas and roads near the facility entrance and 13.8 acres associated with gen-tie line construction, would be approximately 61 acres.

Two construction areas located on the southwestern and southeastern Project boundaries would be included within the perimeter fence and would remain part of the ROW after construction. These two areas, comprising 28 acres, would be used as equipment laydown and assembly areas.

All staging areas would be un-paved and un-graveled, but would be treated with dust palliative and water as necessary to control dust. One or more temporary water storage ponds or tanks would be utilized during construction. Hazardous materials storage for construction would be located in one of the temporary laydown areas. Stormwater management features for protecting the staging areas from stormwater damage would be included within the construction SWPPP.

Construction materials would be stored in the staging areas in uncovered rows, grouped according to the type of material: steel piles, PV modules, table frames, tilt brackets, hardware, electrical cables, and other categories. Electrical equipment, such as transformers, PVCSs, and PCSs, would not be shipped until they are ready to install, so would not be stored in the staging areas. Aggregate for road construction and foundations would be delivered to the site at a rate proportional to its use, so would not require substantial storage areas.

2.3.4.3 Site Preparation

Operation of the solar panels, safe and effective movement of workers and materials throughout the site during construction, and management of stormwater would require site preparation to remove vegetation, and create a flat and compacted surface. Soil would be compacted to a level that allows delivery trucks, pile driving equipment, and cranes to move across the site. After grading and underground work, most areas would be compacted to approximately 85 percent of its maximum dry density. The exact locations to be prepared, and techniques to be used for site preparation, would be determined in a final site grading plan following the pre-construction surveys and included in the approved POD prior to actual ground disturbance and issuance of a Notice to Proceed by the authorized officer.

The preferred methods for site preparation would be either mowing or a disk contour grade and roll method and compaction of vegetation throughout most of the Project site. These methods would be used for approximately 88 percent of the Project area. These methods are preferred because they would leave topsoil and vegetative matter in place. Where feasible to use these methods, vegetation would be mowed or disked under, mulched or composted, and retained on-site to assist in erosion control and to limit waste disposal. Plant root systems would be left in place, to the maximum extent practicable, to provide soil stability.

Mowing and disk and roll site preparation would be performed using conventional farming equipment including tractors with mowing or disking equipment and vibratory rollers. In the disk and roll method, rubber-tired tractors would tow disk harrow equipment to treat the top 5 to 7 inches of soil. Each tractor would be followed by a water truck, which would use water to keep fugitive dust emissions to acceptable levels. The disk would incorporate the roots, topsoil nutrients, and seed bank into the soil. Following disking, a drum roller would be used to flatten the surface and return the soil to a compaction level similar to the preconstruction stage. In some areas, there may be limited use of scrapers to perform micrograding to reduce mounds greater than six inches in height. This technique would leave the macro-level topography and stormwater drainage unchanged, but would produce a level surface needed for worker safety.

A topographic map of the Project area is shown in Figure 2-7, and a more detailed view of the Project site is shown in Figure 2-8. Figure 2-8 shows the areas where cut and fill would be used in limited areas to fill depressions to stop water from pooling, and to maintain a consistent grade throughout the Project site. The cut and fill methods would be used for approximately 12 percent of the Project area. Areas which would be occupied by structures, including the O&M Building, On-Site Substation, access roads, PCS and PVCS vault areas, temporary construction area, and anemometer towers, would be graded and compacted to meet engineering specifications for those facilities. The Applicant's preliminary grading plan indicates that cut and fill depths can be minimized, and no import or export of soil material would be required, as the amount of cut and fill would be balanced on-site.

Topsoil removed through grading in these areas would be stockpiled and used for post-construction reclamation of temporarily-disturbed areas, or for balancing cut-and-fill needs throughout the Project area. Vegetation in cut and fill areas, roadways, locations of concrete foundations, and locations of stormwater management structures would be removed, after necessary permits for removing desert vegetation are obtained from the County of Riverside, as required by the California Desert Native Plants Act. Vegetation from these areas would be mulched and redistributed within the construction area for soil stabilization. Cut and fill grading would be timed to minimize the duration in which open, uncovered ground would be exposed, and thereby minimize dust and erosion issues.

Concrete would be used to construct foundations for the On-Site Substation equipment, the O&M Building, fence footings, and transmission structure footings. Concrete pads, foundations, and vaults may include both pre-cast and poured-in-place construction methods. Concrete would be obtained from local sources, as much as practicable, and the Applicant does not propose construction of an onsite cement plant.

2.3.4.4 Assembly and Installation of Solar Arrays

Assembly and construction of solar arrays would be completed in two stages. The specific sequence of construction within the Project site would be developed during final Project design.

The first step of construction following site preparation in each area would be the digging of trenches and installation of underground AC and/or DC cables to a depth of three feet. The underground DC cables would connect each row of panels with the PCS, and the underground AC cables would connect the PCSs and transformers to the PVCSs. Alternatively, these facilities may be connected through above-ground cables approximately 1 to 4 feet off of the ground. At the same time, cement foundations for the inverter enclosures and transformers would be prepared. If DC converters are utilized, there would be no PCS, rather DC cables would be placed underground or above ground to the converters. The trenched areas would be backfilled once the cables are buried, and the previous contours would be restored. Although the construction area would be surrounded with Mojave desert tortoise exclusion fence, the trenches would be excavated with slope inclines at various intervals in order to allow egress and prevent entrapment of wildlife.

Following installation of cables in an area, the next step would be to install the vertical support posts for the mounting system for the solar panels. The posts would be driven using small, tracked-vehicle-mounted post drivers. The module frames would then be attached to the posts using prefabricated tilt brackets, and the PV panels would be attached to the frames using brackets. The PV modules and module framing assemblies would be delivered to the construction staging area in containers on tractor-trailers. The PV modules and the assemblies would be lifted from the tractor-trailers and placed adjacent to the array locations. Wire harnesses, held to the panels by brackets, would connect the PV modules to the electrical collection system.

2.3.4.5 Power Distribution

The PCS enclosures would be pre-fabricated and delivered to the site. They would be installed on cement vaults, foundations, or piers within each block, and would be connected to incoming power lines from the combiner boxes. DC converters on concrete bases may be installed rather than utilizing PCSs. The modules would use standard touch-safe wiring connectors, and workers would walk behind each row and plug the wires from each module into the wiring harness, and then the wiring harnesses into a combiner box. The combiner boxes would then be connected to the DC cables that lead to the PCS enclosure and transformer. The transformers would then be connected to the AC cables which lead to each PVCS. From the PVCS, power would then be transferred by overhead lines to the On-Site Substation. The On-Site Substation would step the power up for transmission to the CRSS through the gen-tie line.

All electrical work would be conducted by certified electricians. Utility journeymen would perform or supervise the high-voltage electrical work for the On-Site Substation and gen-tie line.

The overhead power lines from the PVCS to the On-Site Substation, and for the gen-tie line, would be strung overhead on the supporting transmission structures. Heights of structures would vary depending on the electrical clearances required, but would be lower than 70 feet for the on-site overhead lines and 135 feet for the gen-tie line.

2.3.4.6 Gen-Tie Line

The ROW and structure locations for the gen-tie line would be surveyed and marked during preconstruction surveying. A laydown yard for materials required for the gen-tie line would be developed within the Project area. Access roads, including a road for gen-tie line maintenance and temporary roads for access for construction vehicles, would be cleared and graded. Temporary sites for pulling and tensioning would be developed by grading a level area. Specific locations for puller and tensioning sites would be developed following detailed design of the gen-tie line. These locations may lie outside of the 160 foot wide ROW, but would be located within the 600-foot wide gen-tie study area used to determine the proposed routing for the gen-tie line corridor, authorized through a short-term right-of-way for construction, and identified clearly in the approved POD prior to issuance of a Notice to Proceed. Temporary work areas would also be mapped for reference and established around each transmission structure, to enable pole assembly and erection.

Long-term disturbance would be limited to areas within the 160-foot-wide ROW corridor, but temporary disturbance for the puller and tensioning sites may occur outside of the ROW. Some disturbance has been assumed for the entire 160-foot wide ROW, but once any construction areas to enable pole assembly and erection have been restored, would physically consist only of the 20-foot wide access spur roads and footprint of each transmission tower. A short-term ROW would be obtained to authorize temporary puller and tensioner sites.

Following site preparation, foundations would be installed at each transmission structure location. The exact type of foundation would vary, depending on the type of structure developed in the final design. Foundations may include drilled-shaft anchor-bolted foundations, drilled-shaft embedded foundations, or vibrated steel casings.

The transmission structures for the gen-tie line would be delivered to the laydown yard for storage, and then transferred from the laydown yard to their installation location as needed. The structures would be assembled in sections on cribbing that provides for the proper alignment of the steel members. Steel sections would be laid out with hydraulic cranes. The pole base and top sections would be assembled at each structure site. Insulators and hardware may be placed on the structure prior to its erection.

The gen-tie line structures would be constructed of tubular steel monopoles. A crane would be used to set the pole base sections onto each foundation. An electrical grounding crew would then install the grounding, and test the ground resistance. The structures would be no higher than 135 feet.

The cable for the gen-tie line would be strung using conventional wire stringing using tension stringing equipment. The wires would be sagged in accordance with specified sagging data, corrections, and offsets. The wires would be dead-ended on the dead-end structures and clipped-in on the tangent and angle structures.

2.3.4.7 Construction Schedule

The Applicant would construct the solar facility and gen-tie line simultaneously, over a 25- to 48-month period. Construction is expected to typically occur from 7:00 a.m. to 5:00 p.m., Monday through Friday. However, work in the early morning, evening, or nights and on weekends during certain construction phases may be necessary. The work schedule may also be modified to account for weather conditions during the year, such as starting the workday earlier in the summer months to avoid work during the hottest part of the day for health and safety reasons. In addition, for safety reasons, certain construction tasks, including final electrical terminations, must be performed after dark when no energy is being produced. Any nighttime work would be conducted using restricted, task-specific lighting, as needed in order to provide a safe workplace. Lights would be focused downward, shielded, and directed toward the interior of the site to minimize light exposure to areas outside the construction area. Construction work taking place outside of typical hours would comply with Riverside County standards for construction noise levels.

2.3.4.8 Construction Equipment and Workforce

The Applicant estimates that the construction workforce would average approximately 450 employees over the construction period, and would have a peak workforce of approximately 810 employees, resulting in an estimated 1,620 daily commuting trips. The construction workforce would be recruited from within Riverside County and elsewhere in the surrounding region to the maximum extent practicable. Construction would also involve an estimated 300 daily trips by 50 vehicles to deliver materials to the Project site.

The majority of the construction equipment and vehicles would be brought to the construction site at the beginning of the construction process, and would remain on-site throughout the duration of the construction activities. Transport and delivery of equipment and materials would be done in accordance with a traffic monitoring and control plan, as described in Section 4.17.2, to minimize short-term impacts associated with temporary use of the roads. Equipment would generally not be driven on public roads while in use for the Project. Traffic on public roads would include construction worker commuting vehicles, periodic truck deliveries of materials and supplies, and periodic truck removal of recyclables and wastes. A total of approximately 14,400 truck deliveries of materials are anticipated throughout the construction period for the Proposed Action and Alternative 2, and approximately 10,800 truck deliveries would be required for Alternative 3.

In addition to truck deliveries of materials, truck deliveries of water for construction may be used. Although groundwater from on-site wells is the anticipated source for construction water needs, in the event an on-site source is not available, it may be necessary to truck water from an off-site source. If trucking water is required for the entire 25 month construction period, up to approximately 57,000 water truck deliveries (assuming 8,000 gallon capacity water trucks) could potentially be required. The Applicant would schedule truck deliveries and shipments to avoid the peak traffic hours in the morning and evening. Materials would generally be delivered within approximately two weeks prior to its use, except for electrical systems (PCSs and PVCSs), which would be received just prior to installation.

2.3.4.9 Construction Hazardous Materials and Wastes

As shown in Table 2-2, chemicals used onsite during construction are primarily fuels and lubricants associated with motorized vehicles and equipment, solvents and adhesives used for assembly of solar modules, and soil stabilizers to be used for dust control. Procedures to be used for management of hazardous materials used onsite during construction are discussed in Section 2.3.7.1.

Table 2-2. Non-Semiconductor Chemicals at Project Site During Construction

Product	Use
Diesel Fuel	Vehicles
Gasoline	Vehicles
Motor Oil	Vehicles
Hydraulic Fluids and Lube Oils	Vehicles and Equipment
Solvents and Adhesives	PV Module Assembly
Soil Stabilizers	Roads and PV Table Areas

Diesel and gasoline fuel storage during construction is estimated to be approximately 2,500 gallons each; storage will include refueling tanks, generators, portable light stands, and other small stationary containers.

Wastes generated during construction of the Project would include broken PV modules, wood, concrete, and miscellaneous packaging materials. A summary of the expected solid wastestreams, volumes, and expected recycling or disposal, for construction is presented in Table 2-3. The proposed methods for managing sanitary wastes during construction are discussed in

Section 2.3.3.9. Procedures to be used for management and disposal of other wastes during construction are discussed in Section 2.3.7.1. The potential for releases of hazardous materials, and the risks associated with potential releases, are discussed in Section 4.9.3.

Table 2-3. Generation and Disposal of Solid Wastes Associated with Construction

Waste	Origin	Composition	Estimated Quantity[1]	Classification	Disposal
Scrap wood, steel, glass, plastic, paper	Construction activities	Normal refuse	1,200 tons (14,160 cubic yards)[1]	Nonhazardous	Recycle and/or dispose of in industrial or municipal landfill
Scrap metals	Construction activities	Parts, containers[2]	<12 tons (<168 cubic yards)	Nonhazardous	Recycle and/or dispose of in industrial or municipal landfill
Waste oil filters	Construction equipment and vehicles	Solids	3,000 lbs.	Used Oil	Recycle at a permitted Treatment, Storage, and Disposal Facility (TSDF)
Oily rags, oil sorbent excluding lube oil flushes	Cleanup of small spills	Hydrocarbons	600 cubic ft.	Used Oil	Recycle or dispose at a permitted TSDF
Spent lead acid batteries	Construction machinery	Heavy metals	60	Hazardous	Recycle or dispose offsite at a Universal Waste Destination Facility
Spent alkaline batteries	Equipment	Metals	300 lbs.	Universal waste solids	Recycle or dispose offsite at a Universal Waste Destination Facility
Waste oil	Equipment, vehicles	Hydrocarbons	3,000 gallons	Used Oil	Dispose at a permitted TSDF
Sanitary waste	Portable toilet holding tanks	Solids and liquids	1,200,000 gallons	Nonhazardous liquid	Remove by contracted sanitary service

Notes:

1 – Quantities were provided by Applicant in the form of tons per 150 MW phase of construction. Those quantities have been multiplied by 3X to estimate the total quantity associated with construction of the 450 MW Project, and then converted from tons to cubic yards using the conversion factor for wood construction debris (11.8 cubic yards/ton) and scrap metal (14.0 cubic yards/ton) in EPA 2016a.

2 - Containers include <5-gallon containers and 55-gallon drums or totes

2.3.5 Operations and Maintenance

Operations and maintenance of the solar facility and gen-tie line require minimal activities on the part of the operator. The facility operates passively, with no fuels, no thermal cycle, and no need for water use for electricity generation except for washing of solar panels. No water would be used to irrigate landscaping. The primary operational activities would be maintaining the solar panels, electrical systems, and gen-tie line; providing security; and maintaining access for maintenance and security.

The access roads and aisles between rows of solar panels would require occasional vegetation management and correction of minor erosional features or ruts caused by vehicle use. The Project areas covered by solar modules allow vegetation to grow. Dust would be washed from solar panels up to twice per year.

The workforce to perform for operations, maintenance, and site security purposes is estimated to be up to 5 full time workers. Workers are expected to operate in two 12-hour shifts. The workforce would generate up to 5 round-trips for commuting each day. During operations, potable water for drinking and sanitary purposes would either be trucked into the site from Blythe, or would be supplied by an onsite groundwater well.

Operations and maintenance would require occasional delivery of materials for replacement of solar panels and electrical equipment. Up to 10 delivery trucks per day may be required, when such replacements are scheduled.

Further maintenance is also required to assure soil stabilization and vegetation restoration of temporary disturbance sites. These sites would be restored using methods defined in the Revegetation Plan.

During operation, the only hazardous materials used onsite would be fuels and lubricants for vehicles, emergency generators, and other equipment. Procedures to be used for management of hazardous materials used onsite during operations are discussed in Section 2.3.7.1. The potential for releases of hazardous materials, and the risks associated with potential releases, are discussed in Section 4.9.3.

Electrical generating activities would not produce hazardous or other industrial waste. The Applicant would use transformers that contain biodegradable oil, rather than mineral oil. Wastes generated during operations would include broken solar panels, spent batteries, office-related refuse generated by workers, and wind-blown debris caught against the perimeter fence or between panels. If hazardous materials are released from their containers and/or containment areas during their storage or use, contaminated soil would be generated as a result of response or remediation activities. The proposed methods for managing sanitary wastes during operations are discussed in Section 2.3.3.9. Procedures to be used for management and disposal of other wastes during operations are discussed in Section 2.3.7.1.

2.3.6 Decommissioning

If the ROW grant is not renewed beyond the 30-year operational period, or the Project ceases for other reasons, the ROW grantholder would be responsible for removal of the Project facilities and restoration of the public land through decommissioning. The Applicant has developed a Draft Decommissioning and Site Reclamation Plan (Desert Quartzite 2015) which describes the general outlines of the proposed activities. The Draft Decommissioning and Site Reclamation

Plan would be updated and finalized prior to decommissioning to ensure that the Project area would be restored according to applicable regulations and site conditions in effect at that time.

Prior to decommissioning, preparation activities would occur. A Phase I Environmental Site Assessment would be conducted to document existing conditions, including the potential presence of hazardous materials or conditions. All hazardous materials would be removed from the site before structures are removed. Containers for hazardous materials and petroleum fuels would be rinsed clean, when feasible, and the waste liquid collected for off-site disposal. Phase II environmental sampling and, if needed, remediation would occur in areas where hazardous materials were stored, and in any areas where releases during construction or operations were documented. The leach field would be removed, and the area sampled to identify and address any remaining contamination. Prior to beginning decommissioning, a decommissioning SWPPP would be developed and implemented, to decrease the potential for release of contaminants to the environment and contact with stormwater.

Decommissioning would include removal of all aboveground and near-ground facilities, including the PV arrays and supporting electrical and facility systems. The PCSs, PVCS cabinets, gen-tie line, and On-Site Substation would be de-energized, dismantled, and removed in accordance with all Federal, state, and local regulatory requirements. Some structures would be removed only to a depth sufficient to allow site restoration, as has been authorized by BLM on similar projects. Concrete foundations would be removed to a depth of three feet. The underground cables that comprise the DC power collection system would be cut off and left in place at a depth of three feet. Poles associated with the 12 kV distribution line would be removed to a depth of three feet. The plan for decommissioning the facilities, including the O&M Building, parking areas, water storage tank, access roads, fencing, lighting, gen-tie line, and related infrastructure would depend on the planned future use of the site. If a reuse proposal for the site is received prior to decommissioning, some items may be left in place for use by that development. However, the approved decommissioning plan would assume such a proposal does not exist and would encompass removal of all Project facilities and reclamation of the public land to pre-application conditions.

Once removed during decommissioning, all equipment and infrastructure would be recycled or resold as practicable, or disposed of in compliance with applicable laws. Removed materials and debris would be broken down into pieces of a manageable size onsite, so that they can be safely transported offsite. Most of the Project facilities would be composed of materials that can be recycled, including glass, semiconductor material, aluminum, steel, and wiring. Project materials to be removed from the site and recycled or resold include the steel tables and posts, wiring, and PV modules themselves. PV modules and other products used during construction and operation of the Project are generally not hazardous and are not subject to Federal or state hazardous material management regulations. If used, CdTe PV modules are currently characterized as Federal non-hazardous waste, but may be characterized as a California-only hazardous waste.

If no other uses are planned, the site would be restored to mimic the original pre-application topography. The Project area soil and vegetation would be restored to their preconstruction condition or analog condition to reflect climate change, with native vegetation similar to plants in the surrounding vicinity or as approved by the authorized officer. Upon removal of the infrastructure, the disturbed soil would be stabilized using erosion control Best Management Practices (BMPs) until final measures for restoring ecosystem functions can be implemented. Topsoil, brush, rocks, and natural debris would be distributed so that the site visually blends in with the surrounding landscape, and to facilitate re-vegetation. Compacted soils would be de-compacted. Revegetation would include a combination of natural regeneration, mechanical re-seeding, planting of nursery stock, and transplanting local vegetation. Soil disturbance by mechanical means would be minimized to prevent invasions of non-native plant species and to maintain soil fertility.

Following decommissioning, monitoring would be conducted to verify whether restoration is successful or additional interventions for restoration are warranted. Reference sites would be established to allow comparison of the re-vegetation effort with adjacent undisturbed sites. Success standards, including metrics, would be established. Monitoring would be conducted using line and belt transects and quadrat or circular plot techniques. Results would be reported to the applicable agencies for review to determine if restoration was achieved as determined by the BLM Authorized Officer.

Decommissioning is expected to take up to a year to complete. The types of equipment, workforce, and traffic associated with decommissioning are expected to be similar to those used for construction. Monitoring will begin at the end of decommissioning, and is expected to continue for one to three years, or until the site meets success criteria.

2.3.7 Applicant-Proposed Management Plans and Mitigation Measures

The Applicant has proposed a variety of management procedures and mitigation measures, to be implemented during construction, operations, and decommissioning, to ensure compliance with all permit conditions, avoidance of environmental impacts where possible, and mitigation, reduction, and/or compensation for environmental impacts where avoidance is not possible. These measures are discussed, with respect to each applicable resource, within the resource sections of Chapter 4.

Prior to construction, the Applicant would develop and implement an Environmental Inspection and Compliance Monitoring Program, that would provide an over-arching program covering all environmental resources, permits, and mitigation measures. A qualified individual would be assigned to serve as the Project's Environmental Manager, with responsibility for implementation of the program. The Environmental Manager would be responsible for:

- Development and implementation of the overall Project compliance program;
- Communication and coordination with the applicable regulatory agencies;
- Ensuring compliance with the APMs, agency-required mitigation measures, and various conditions and requirements of permits and approvals;
- Record keeping and reporting required by permits and approvals;
- Ensuring that all applicable environmental plans are up to date;
- Advising management of actual and potential compliance issues; and
- Ensuring that Project planning takes appropriate account of compliance issues in advance.

2.3.7.1 Hazardous Materials and Waste Management

The Applicant's procedures for management of wastes, handling of hazardous materials, prevention of releases of hazardous materials, and plans for responding to emergencies would be specified in a variety of permits and plans required by various agencies. The Applicant has developed a Preliminary Hazardous Materials Management and Emergency Response Plan, which describes the issues to be addressed in a completed Plan prior to the beginning of construction. The completed Plan would specify BMPs, including storage, management, and disposal procedures, to be used during construction, operations, and decommissioning. BMPs to be implemented as part of the completed Plan would include:

- Keep materials in their original containers with the original manufacturer's label and resealed when possible;
- Avoid storage of excessive quantities of chemicals by procuring and storing only the amounts needed;
- Store hazardous materials in secondary containment, including associated inspection and maintenance procedures to ensure proper function of the secondary containment;
- Follow manufacturer's recommendation for proper handling and disposal;
- Conduct routine inspections to ensure that all chemicals on-site are being stored, used, and disposed of appropriately;
- Perform timely maintenance on vehicles/equipment that are leaking oil or other fluids, and place drip plans under the leak when the vehicle/equipment is parked prior to the maintenance event;
- Encourage mobile refueling of vehicles onsite to minimize stationary tank storage of fuel and other hazardous materials;
- Ensure that no hazardous materials, chemicals, fuels, or lubricating oils would be stored within 100 feet of any wetland, water body, or water supply well, or within any designated municipal watershed;
- Refuel all construction equipment at least 100 feet from any water body, water well or wetland;
- Ensure that all personnel dealing with hazardous materials are properly trained in the use and disposal of these materials in accordance with local, state and Federal regulations;
- Maintain Material Safety Data Sheets available on the site for use during Project construction and operation; and
- Notification and response actions to be taken in the case of discovery of unanticipated hazardous materials.

Chemicals would be stored in appropriate containers, in an enclosed and secured location such as portable outdoor hazardous materials storage cabinets equipped with secondary containment to prevent contact with rainwater. During construction, chemical storage cabinets may be moved to different locations throughout the site, to provide workers access to the chemicals as the location of work activities moves. Chemical storage areas would be designed to not be located immediately adjacent to any drainage, and protection of the locations from stormwater damage would be evaluated within the construction SWPPP. Waste lubricating oil would be recovered and recycled by a waste oil recycling contractor. Bulk chemicals are not expected to be used on-site, with most materials being stored in small-volume, returnable delivery containers. All chemical storage areas would be designed to contain the spread of leaks and spills within containment areas.

The Preliminary Hazardous Materials Management and Emergency Response Plan also summarizes planning and response procedures for fire, spill, and explosion emergencies. The completed Plan would specify employee roles and responsibilities for hazardous materials management, waste management, and emergency response; emergency response and communication procedures; and requirements for posting emergency information and training employees.

The Applicant has developed a preliminary summary of a construction SWPPP, which would be developed and implemented prior to Project construction. In addition to stormwater control procedures discussed in Section 2.3.7.9, the SWPPP would include requirements for hazardous materials storage and handling in order to protect water quality. These would include prohibiting the storage of hazardous materials or re-fueling of vehicles within 100 feet of a wetland, water body, or water supply well.

As specified in the Preliminary Hazardous Materials Management and Emergency Response Plan, the Applicant would avoid storage of excessive quantities of chemicals by procuring and storing only the amounts needed. Therefore, the amount of each hazardous material present onsite at any given time is expected to be limited.

The Applicant proposes to store up to 2,500 gallons each of diesel and gasoline during construction, which exceeds 55 gallons of a liquid, 500 pounds of a solid, or 200 cubic feet of compressed gas, or extremely hazardous substances above the threshold planning quantity. As a result, the Applicant would develop and implement a Hazardous Materials Business Plan (HMBP) in coordination with Riverside County Department of Environmental Health and County fire officials. In addition, because the Project would involve onsite storage of more than 1,320 gallons of oil or oil products, the Applicant would develop and implement a Spill Prevention, Control, and Countermeasure (SPCC) Plan. The Applicant has developed a summary outline of an SPCC Plan, which describes the issues that would be addressed in a completed Plan. Issues to be addressed would include a diagram showing the facility and locations of oil storage, description of the type of oil, methods used to prevent and control releases, and requirements for inspections, testing, employee training, and reporting. Appropriately sized and supplied spill containment kits would be maintained onsite in the area of the O&M Building, and operations employees would be trained on the appropriate spill prevention, response, and containment procedures.

The completed Hazardous Materials Management and Emergency Response Plan would identify expected wastestreams; specify how waste would be sampled, analyzed, and characterized; and specify potential waste disposal locations for different categories of wastes. Elements of the Plan relevant to waste management would include waste determination procedures, waste disposal locations, container management, inspection requirements, preparedness and prevention requirements, and requirements for packaging, placarding, manifests, and record-keeping and reporting. Disposal of any excess materials and wastes would be performed in accordance with local, state and Federal regulations, and any excess materials or waste would be recycled or reused to the maximum extent practicable. Any equipment broken or requiring replacement would be removed offsite for recycling or disposal.

PV modules damaged during construction, operations, or removed at the end of the Project life would either be recycled, or would be disposed of in accordance with local, state, and Federal regulations. The disposal would depend on the specific semi-conducting material used in the solar panels. Some materials, such as CdTe PV modules, may be regulated as a California-state hazardous waste.

The batteries in the ESS units would be regulated as hazardous waste under Title 22, California Code of Regulations §§ 66273.9 and 66273.2. The disposal of the batteries would be managed under a Hazardous Materials Business Plan, either a new plan developed with the Certified Unified Program Agency, or through an existing plan.

2.3.7.2 Vegetation Management

The Applicant and the BLM would jointly develop a Vegetation Resources Management Plan (VRMP) to be implemented at the Project site. The VRMP would be developed in coordination with and approval by Riverside County and the BLM to determine the best methods and species to employ. The Plan would include identification of special-status plant species that could be impacted by Project activities; any required mitigation for special-status plants; and proposed methods for revegetation of temporarily disturbed areas with native species. The Applicant has conducted focused surveys for special status plant species, and the results of those surveys have been used to develop Project alternatives that would avoid, to the maximum extent practicable, impacts to special status plant species.

The Applicant has developed a Draft Integrated Weed Management Plan (IWMP; provided in Appendix J), which would be a component of the VRMP, to control invasive and exotic weeds. The IWMP was developed in accordance with BLM's Vegetation Treatments Using Herbicides Final EIS (2007), and the Applicant would acquire and comply with any required permits for the use of herbicides or pesticides. The Plan would be finalized with the assistance of plant ecologists on staff and/or engaged by the BLM, as described in Applicant-Proposed Measure (APM) BIO-5.

The final plan would also address prescriptions for temporarily disturbed sites, including the possibility of allowing BLM access to these areas to test new and emerging strategies and management practices for improvement in reestablishing native vegetation. Experimentation in these areas would be allowed so long as they do not conflict with facility operation.

2.3.7.3 Fire Prevention and Control

The Project area has limited potential for wildfire. The area is sparsely vegetated, and vegetation onsite would be salvaged if required or otherwise crushed or removed through mowing or disking during Project construction. The Project is not located adjacent to wild lands with a high fire potential.

The Applicant would coordinate with Riverside County to ensure that appropriate measures are implemented to control the risk of fire. An aboveground water storage tank may be maintained adjacent to the O&M Building, and may be sized to meet Riverside County Fire Department requirements, as applicable, to supply sufficient fire suppression water during operations.

Additional fire protection measures would include sprinkler systems in the O&M Building; a FM200 fire suppression system, or equivalent, in the facility control room at the O&M building; and portable carbon dioxide (CO_2) fire extinguishers mounted at the power conversion system units. All Project facilities would be designed, constructed, and operated in accordance with applicable fire protection and other environmental, health and safety requirements.

Fire prevention and response would be addressed in the Hazardous Materials Management and Emergency Response Plan for construction and operation. The plan would comply with applicable Riverside County regulations, and would be coordinated with the Riverside County Fire Department and BLM.

During construction, electrical equipment would only be energized after the necessary inspection and approval, so there is minimal risk of any electrical fire. Workers would monitor fire risks during both construction and operation, to ensure that prompt measures are taken to mitigate identified risks. In addition, transformers located on-site would be equipped with coolant that is non-flammable, biodegradable, and contains no polychlorinated biphenyls or other toxic compounds. The network of access roads would be developed to ensure that there is adequate access for fire control and emergency vehicles to the site.

2.3.7.4 Health and Safety

The Applicant would develop and implement an Environmental Health and Safety Plan to ensure that all construction and operations activities are safe, and comply with all local, state and Federal regulatory requirements. The plan would be based on existing plans for similar solar facilities operated by the Applicant, but would be customized specifically for the Project, based on location, scope and hazards. The Project would comply with all Occupational Safety and Health Administration (OSHA) and California OSHA (CalOSHA) requirements in construction and operation. Illness and Injury Prevention Programs would also be developed and implemented for both construction and operation.

All subcontractors performing work onsite would be screened to review their safety performance. All contractors would be required to participate in safety orientation, to make them aware of all Project safety hazards and requirements and procedures. Daily tailgate safety meetings would be held to discuss site conditions, the planned daily tasks, and any potential hazards.

2.3.7.5 Wildlife

The Applicant would develop and implement a variety of management plans and procedures for protection and mitigation of impacts to wildlife. The plans are required under a variety of Federal and state environmental regulations, including the Federal Endangered Species Act (ESA), California Endangered Species Act (CESA), Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act, and both BLM and County requirements.

A Bird and Bat Conservation Strategy (BBCS) would be developed to describe measures to protect sensitive bird species. Unavoidable impacts to burrowing owls would be mitigated in consultation with CDFW, and in compliance with the latest CDFW and California Burrowing Owl Consortium guidelines. Due to potential for electrocution, collision, and nesting/perching by migratory birds on overhead power lines, the Applicant proposes to follow APLIC guidelines specified in Suggested Practices for Avian Protection on Power Lines (APLIC 2006). Additional information that would be used in Project design is provided in Reducing Avian Collisions with Power Lines (APLIC 2012).

Additional plans to be developed include:

- Mojave Desert Tortoise Mitigation Plan;
- Raven Management Plan;
- Desert Kit Fox and Badger Management Plan; and
- VRMP, which would include components for habitat restoration and site revegetation.

Prior to construction, the requirements of all of the management plans and mitigation measures associated with wildlife protection would be incorporated into a Worker Environmental Awareness Program (WEAP). The Applicant has developed a preliminary summary of the WEAP, which would be completed and implemented prior to construction. This program would include training and communication mechanisms to educate all site workers regarding the requirements for general housekeeping, hazardous materials and waste handling, spill reporting and response, unanticipated discoveries of cultural resources, and measures to identify and protect biological resources. The WEAP measures applicable to biological resources would include flagging or staking of protected areas; instructions to not feed, kill, or harass wildlife; and requirements for reporting injured or dead animals.

The Applicant would adopt and implement the general mitigation measures for the Mojave desert tortoise, as set forth in the *Desert Tortoise Mitigation Measures* for the CDCA Plan as amended by the Northern and Eastern Colorado Desert Coordinated Management (NECO) Plan and subsequent amendments. A Mojave desert tortoise mitigation plan and, if necessary, a translocation plan would be developed in consultation with BLM, USFWS, and CDFW. The measures are expected to include mitigation measures and habitat compensation ratios that are proportional to and consistent with the quality of habitat and management status associated with the Project area.

Prior to construction, a pre-construction clearance survey would be conducted to determine how many tortoises, if any, occupy the Project area. If any tortoises are located during the survey, the Applicant would consult with the USFWS to confirm the result, and in accordance with an approved Desert Tortoise Translocation Plan, present a plan for translocating tortoises to an off-site location (if more than five tortoises are discovered in the Project area) or relocating tortoises to a near-site location (if between one and five tortoises are discovered in the Project area). The Applicant would then initiate a clearance survey to capture tortoises for translocation/relocation, affix radio transmitters, and perform protocol health assessments to facilitate monitoring of their movements and health status following translocation/relocation. The translocation/relocation of tortoises from the Project area would be conducted in accordance with USFWS (2009, 2011, 2013) protocols.

2.3.7.6 Air Quality

Prior to issuance of the Notice to Proceed, the Applicant would prepare and implement a Phased Site Preparation Plan, which would include a finalized Dust Control and Soil Stabilization Plan. The Applicant has developed a preliminary summary of a Dust Control Plan to control fugitive dust emissions during Project construction. The Dust Control Plan would be designed to minimize water use and dust emissions through optimal site preparation techniques. The Plan would take into consideration surface disturbance and construction schedule, seasonal winds, site specific wind patterns, soil properties, and soil disturbances to ensure adequate measures are implemented to manage fugitive dust. The construction schedule would minimize the size of open areas of disturbance requiring stabilization and maintain existing vegetation, where feasible. The Plan would:

- Identify a comprehensive construction schedule for the entire Project site. When feasible, surface disturbance would be minimized to those areas necessary for project access and installation of solar panels and other infrastructure associated with the solar facility.
- Identify all measures being undertaken during construction activities and operational activities to ensure fugitive dust being blown offsite is minimized. Measures may include, but are not limited to use of water trucks as required for the expected level of winds in the area, and use of dust suppressant (i.e., soil binders or mulch), as necessary.

The Plan would include requirements such as use of water or dust suppressants on dirt roads and graded areas, speed limits for vehicles, and covers for vehicles transporting soil. Dust control measures and BMPs would include limiting ground disturbance and vegetation removal to the extent practicable; using water on unpaved areas and stockpiles; stabilizing inactive surfaces and stockpiles with soil binders or dust palliatives; covering stockpiles at all times when not in use; using gravel at key locations on roads to prevent track-out; covering bulk material on trucks; maintain 15 mile per hour speed limits for vehicles on public and private earthen or gravel roads; and suspending grading activities during periods of high wind.

Impacts and mitigation associated with air quality are discussed in Section 4.2. In addition to addressing air quality, the Plan would assist in protecting workers and residents from exposure to soil-borne diseases such as valley fever. The potential for soil-borne diseases to be present in site soils is discussed in Section 3.9, and potential impacts and mitigation are discussed in Section 4.9.

2.3.7.7 Water Conservation

Water would be used during construction primarily for dust control and soil compaction, with small amounts used for sanitary and other purposes. Because Project water use is almost entirely associated with dust control during construction, the measures associated with the Phased Site Preparation Plan would also be used to conserve water where feasible. Although grading would be necessary in some parts of the site, the measures used to phase construction, control vehicle speed, cover stockpiles, minimize the amount of disturbed ground, and maintain existing vegetation, where feasible, would also result in minimizing water use. In addition, the use of soil stabilizers would minimize the need to use water to control dust in those areas.

Impacts and mitigation associated with water resources are discussed in Section 4.20.

2.3.7.8 Traffic

The Applicant has developed a Traffic Impact Analysis (provided in Appendix K) to evaluate and minimize impacts to traffic on local roads, as well as impacts to local residents and businesses. The Applicant proposes mitigation measures to reduce impacts associated with

Project-related traffic. These include limiting the number of commuting vehicles leaving the Project site between 4:00 and 6:00 PM to 650 vehicles, and developing and implementing a Traffic and Monitoring Control Plan.

Impacts and mitigation associated with traffic and transportation are discussed in Section 4.17.

2.3.7.9 Stormwater Management

A topographic map of the Project area is shown in Figure 2-7. The Project area consists of two distinct types of topography which affect site drainage. The northwestern portion of the Project area, comprising approximately half of the overall Project site, is part of an alluvial fan which slopes in a southeastward direction from the McCoy Mountains. The I-10 highway crosses this alluvial fan between the mountains and the Project site; the natural flow of the alluvial fan is interrupted, passes through concentrated channels underneath a highway bridge, and then becomes dispersed again on its route between I-10 and the Project site.

The southeastern portion of the site is a flat plateau, part of the Palo Verde Mesa. This area receives drainage from the alluvial fan to the northwest, but also from an alluvial fan system originating in the Mule Mountains to the southwest of the Project area. The ground surface in this area is characterized by a series of depressions in which surface water can pool. A drainage divide crosses from north to south through the eastern portion of the Project area. The depressions west of this divide drain surface water to the west and southwest, meeting the flow from the Mule Mountains and eventually draining off of the mesa to the southeast, towards the Colorado River. The depressions to the east of this divide drain directly to the east, towards the Colorado River. Although the drainage flows in the direction of the Colorado River, the drainages were determined by the USACE to be ephemeral, intrastate, isolated waters, and not under the jurisdiction of the USACE.

There are no Federal Emergency Management Agency (FEMA) designated flood zones within the vicinity of the Project. The Project site and general vicinity are classified by FEMA as Zone D – Not Studied.

The Applicant has developed a preliminary summary of a SWPPP, which would be developed and implemented prior to Project construction. The SWPPP would describe BMPs to be used for stormwater management and erosion control. The Applicant would use facility design, site preparation and stormwater control techniques to protect the facility from potential flood damage, avoid modifying upstream or downstream drainage flow rates, and avoid the potential for stormwater pollution through erosion. These techniques would be designed to encourage sheet flow across the Project site. Site preparation would be done by mowing or disk and roll method throughout most of the Project site. Where feasible, vegetation would be cut at ground level, leaving root systems in place. Cut and fill would be used in limited areas to fill depressions to stop water from pooling, and in limited areas where mounding occurs. Areas which would be occupied by structures, including the O&M Building, On-Site Substation, access roads, PCS and PVCS vault areas, temporary construction area, and anemometer towers, would be graded and compacted to meet engineering specifications. As shown in Table 2-4, these areas would comprise less than one percent of the overall Project area.

In addition to site preparation, the Applicant would use fiber rolls, filter fabric fence, and other erosion control methods at locations which may be subjected to erosion. Heavily used areas, such as the construction entrance, concrete wash-out area, and trackout pad areas would be stabilized with gravel, filter fabric, and straw bales to minimize the quantity and duration of soil exposure, and to reduce the velocity of runoff.

The SWPPP would define the sequence of construction events; identify potential pollutants; identify potentially affected stream, wetlands, and locations of special-status species; describe BMPs and stormwater control measures; summarize applicable regulatory requirements; define inspection, monitoring, and maintenance requirements; define site restoration and revegetation requirements; and specify training and reporting requirements. The SWPPP would also address hazardous material storage, including precluding the storage of hazardous materials or the fueling of vehicles within 100 feet of any water body, well, or wetland.

Impacts and mitigation associated with stormwater flow are discussed in Section 4.20.

2.3.7.10 Visual Resources

The Applicant has developed a preliminary Lighting Management Plan to minimize visual impacts of the facility at night. Lighting would be shielded, focused downward and toward the interior of the facility, and would be limited to the O&M Building, the On-Site Substation, the temporary construction staging areas, and on or near each PCS station. The level and intensity of lighting would be designed to provide the minimum needed for security and safety reasons. Lighting may be controlled by hand-switches, or by motion sensors set to operate at human height. No lighting would be installed along the facility perimeter. The preliminary plan would be updated prior to construction, once final design of lighting systems is completed.

Impacts and mitigation associated with visual resources are discussed in Section 4.19.

2.3.7.11 Cultural Resources

Prior to the Notice to Proceed, the Applicant would develop a Cultural Resources Monitoring and Mitigation Plan (CRMMP), which would identify areas to be monitored during construction by a qualified archaeologist. The Plan would include an unanticipated discovery plan, which would describe procedures to be followed in the event that subsurface archaeological materials are encountered during construction. The CRMMP would include requirements for the education of construction workers regarding identification, reporting, and protection of cultural properties and suspected discoveries. The Plan would provide for curation of recovered archaeological materials with an accredited curation facility. All cultural resources to be curated from this Project will be curated in one single location.

Impacts and mitigation associated with cultural resources are discussed in Section 4.5.

2.3.7.12 Paleontological Resources

The Applicant would develop and implement a Paleontological Resources Monitoring and Mitigation Plan prior to construction. This Plan would identify areas to be monitored by a qualified paleontological professional during construction. The Plan would include worker awareness training to educate construction personnel regarding the identification, reporting, and protection of suspected fossil discoveries. The Plan would provide for curation of recovered fossils through an appropriate curation facility.

Impacts and mitigation associated with paleontological resources are discussed in Section 4.13.

2.3.7.13 Recreation

The Applicant has performed an assessment of the impact of the Project on designated open routes on the Project site (URS 2015; provided in Appendix L). Six open routes were identified within the Project footprint. Of these, three are associated with access to the 160 acre private land parcel. Because the Applicant would incorporate the private land parcel into the Project, the previous need for access to the parcel would no longer be applicable, and closure of these routes would not interfere with any access needs. The other three open routes are associated with access to the Mule Mountains to the southwest of the Project site. Although these would need to be closed to accommodate the Project, there are other existing open routes on the perimeter of the Project area which would continue to provide the same level of access.

Impacts and mitigation associated with recreation are discussed in Section 4.14.

2.4 Alternative 1: Proposed Action

The number and size of Project-related facilities associated with the Proposed Action is shown in Table 2-4, and the layout of the proposed facilities is shown in Figure 2-2. Table 2-4 also provides the land area that would be occupied the proposed facilities, expressed both as an acreage, and as a percentage of the total solar facility site land area.

The total Project area under application for BLM and County approval is approximately 5,275 acres (approximately 5,115 acres of BLM administered lands and 160 acres of private lands). Within this area, the Project would occupy approximately 3,770 acres (3,560 acres for the portion of the solar facility on BLM land, 154 acres for the portion of the solar facility on private land, 2 acres for the offsite portion of a buried telecommunications line and possible above-ground electrical service line on BLM land, and 54 acres for the gen-tie line corridor). The larger acreage under application allows for BLM and the County to consider various site layouts as Project alternatives for their environmental analysis.

As shown in Figure 2-2, the Project would include temporary construction areas located outside of the long-term Project area. A construction laydown area on the northern boundary of the Project, totaling 43 acres, would be enclosed by temporary fence during construction, would be removed and restored after the completion of construction, and would not be included within the 3,770 acre Project area. An additional 4.5 acres of temporary construction for an access road would be used. In addition, a total of 27.5 acres would be temporarily required for spur roads, laydown areas, and pulling areas for construction of the gen-tie line. Half of this acreage (approximately 14 acres) would be incorporated into the permanent gen-tie ROW, and the other half would not be included within the 3,770 acre Project area.

Including the temporary areas, the combined acreage of the BLM and County authorizations would total 3,831 acres, and the remaining area within the application boundary would not be incorporated as part of the Project.

Of the 3,714 acre solar array area, approximately 3,248 acres, or 87 percent of the site, would have site preparation performed by either mowing or the disk and roll method. Grading, in the form of cut and fill, would be performed on approximately 466 acres, or 13 percent of the site.

The output of the Proposed Action would be 450 MW. As conceived under this proposal, the Project would be PV-technology neutral, meaning it could accommodate any of a number of different panel options, regardless of the efficiency and capacity of the panels. The specific type of solar panels to be used would be determined as part of final Project design. The Proposed Action assumes that commercial panels, available to any potential developer, would be used, but the total output would be limited to 450 MW.

The majority of the Project site would be occupied by the solar arrays and power conversion equipment. The total amount of ground disturbance for the Project site would be 3,831 acres. Less than one percent of the total Project area would be covered with at-grade facilities (e.g., O&M Building, On-Site Substation, PCSs, and PVCSs). Approximately 75 percent of the solar facility site would be covered or shaded by solar modules.

Table 2-4. Proposed Action Components and Approximate Land Areas

Project-Related Facility	Size or Number of Components	Approximate Land Area on BLM (acres)	Approximate Land Area on Private Land (acres)	Total Land Area (acres)[1]	Percentage of Total Project Site[1]
Area Included within BLM and County Applications					
BLM ROW Application Area	NA	5,115	NA	5,115	NA
Private Lands under County Jurisdiction	NA	NA	160	160	NA
Total Application Area	**NA**	**5,115**	**160**	**5,275**	**NA**
Facilities Within Perimeter Fence and Post-Construction ROW					
PV Arrays[2]	314 arrays; 7.4 million individual modules; 506,356 piles	2,652	125	2,777	74.8%
At-Grade Items (On-Site Substation, O&M Building, PCSs, and PVCSs)	1 On-Site Substation, 1 O&M Building, 314 PCSs, 16 PVCSs	8.4	0.1	8.5	0.2%
Internal Access Roads	112.9 miles	396	14	410	11.1%
Construction Staging Areas[3]	2	28	0	28	0.8%
Communication and Power Lines (inside fence)	1.4 miles long by 20 feet wide	3.4	0	3.4	0.1%
Undeveloped Area	NA	472	15	487	13.0%
Sub-total Area Enclosed by Perimeter Fencing[4]	**17.4 miles of security fence**	**3,560**	**154**	**3,714**	**100%**

Table 2-4. Proposed Action Components and Approximate Land Areas

Project-Related Facility	Size or Number of Components	Approximate Land Area on BLM (acres)	Approximate Land Area on Private Land (acres)	Total Land Area (acres)[1]	Percentage of Total Project Site[1]
Facilities Outside Perimeter Fence and Post-Construction ROW					
Gen-Tie Line Corridor	2.79 miles long by 160 feet wide	54	0	54	NA
Communication and Power Lines (outside fence)	1 mile long by 20 feet wide	2	0	2	NA
Total Permanent Project Area[1]	**NA**	**3,616**	**154**	**3,770**	**NA**
Facilities Outside Perimeter Fence, Temporary ROW for Construction					
Temporary Construction Staging Areas[5]	2	43	0	43	NA
External Access Road[6]	1.2 miles	4.5	0	4.5	NA
Temporary Disturbance Areas associated with Gen-Tie Structure Sites, Spur Roads, Pulling Sites, and Laydown Area	NA	13.8	0	13.8	NA
Total Temporary Project Area	**NA**	**61**	**0**	**61**	**NA**
Total Project Area[1]	**NA**	**3,677**	**154**	**3,831**	**NA**

1 - Values may not add to 100% due to rounding to nearest whole number.
2 - Acreage based on horizontal tracker design, which represents worst-case disturbance compared to fixed-tilt designs.
3 - Includes two construction staging areas. These areas will not be covered with solar panels and are considered undeveloped area from a long term perspective.
4 – Even though the term of the ROW would be 30 years, all disturbance within the perimeter fence is considered to be permanent disturbance, for the purpose of impact analysis.
5 - Includes two temporary construction staging areas, construction offices and parking and temporary water storage. This area will be enclosed by temporary perimeter fencing.
6 – Exact location to be determined based on final design, and approved by BLM in the Final POD. Length and acreage are maximum, not to be exceeded.

2.5 Alternative 2: Resource Avoidance Alternative

The number and size of Project-related facilities associated with Alternative 2, the Resource Avoidance Alternative, is shown in Table 2-5, and the layout of the proposed facilities is shown in Figure 2-9. Table 2-5 also provides the land area that would be occupied by the facilities, expressed both as an acreage, and as a percentage of the total Project land area.

The Resource Avoidance Alternative was developed to specifically reduce impacts to cultural and biological resources, as well as drainages and watercourses. In general, the alternative would avoid the drainages and sand dunes in the northwestern portion of the Project area, as well as resources in the southwestern portion of the Project area. This alternative further provides a buffer between the project and avoided resources in most instances. To accommodate the relocation of the northern Project boundary and to avoid resources, the locations of the O&M Building, On-Site Substation, and temporary construction areas in the Proposed Action would be moved from the northwestern Project boundary to the northeastern Project boundary. This would result in moving the On-Site Substation a further distance from the CRSS, and thus require an increase in the length of the gen-tie line from 2.79 to 3.89 miles.

The Resource Avoidance Alternative would be based on the use of thin-film technology with CdTe as the semiconductor material, or other high efficiency technology. Because of advancements in technology and efficiency of solar panels, the Resource Avoidance Alternative would generate the same power output as the Proposed Action, but would do so on a reduced Project footprint that has been designed to avoid specific biological, cultural, and other resource impacts.

The output of the Resource Avoidance Alternative would be 450 MW, the same as the Proposed Action. As with the Proposed Action, the majority of the Project site would be occupied by the solar arrays and power conversion equipment. The total amount of ground disturbance would be 2,845 acres. Less than one percent of the total Project area would be covered with at-grade facilities (e.g., O&M Building, On-Site Substation, PCSs, and PVCSs). Approximately 72 percent of the total Project area would be covered or shaded by solar modules.

Of the 2,698 acre solar array area included in Alternative 2, approximately 2,403 acres, or 89 percent of the site, would have site preparation performed by either mowing or the disk and roll method. Grading, in the form of cut and fill, would be performed on approximately 295 acres, or 11 percent of the site.

Table 2-5. Alternative 2 Components and Approximate Land Areas

Project-Related Facility	Size or Number of Components	Approximate Land Area on BLM (acres)	Approximate Land Area on Private Land (acres)	Total Land Area (acres)[1]	Percentage of Total Project Site[1]
Area Included within BLM and County Applications					
BLM ROW Application Area	NA	5,115	NA	5,115	NA
Private Lands under County Jurisdiction	NA	NA	160	160	NA
Total Application Area	**NA**	**5,115**	**160**	**5,275**	**NA**
Facilities Within Perimeter Fence and Post-Construction ROW					
PV Arrays[2]	139 arrays; 1.08 million individual modules; 390,312 piles	1,805	141	1,946	72.13%

Table 2-5. Alternative 2 Components and Approximate Land Areas

Project-Related Facility	Size or Number of Components	Approximate Land Area on BLM (acres)	Approximate Land Area on Private Land (acres)	Total Land Area (acres)[1]	Percentage of Total Project Site[1]
At-Grade Items (On-Site Substation, O&M Building, PCSs, and PVCSs)	1 Substation, 1 O&M Building, 132 PCSs, 10 PVCSs	5.6	0.1	5.7	0.21%
Internal Access Roads	30 miles	69	4	73	2.71%
Construction Staging Areas[3]	0	0	0	0	0%
Communication and Power Lines (inside fence)	0.3 miles long by 20 feet wide	1	0	1	<0.1%
Undeveloped Area	NA	657	15	672	24.92%
Sub-total Area Enclosed by Perimeter Fencing[4]	**17.8 miles of security fence**	**2,538**	**160**	**2,698**	**100%**
Facilities Outside Perimeter Fence and Post-Construction ROW					
Gen-Tie Line Corridor	4.18 miles long by 160 feet wide	81	0	81	NA
Communication and Power Lines (outside fence)	1.2 mile long by 20 feet wide	2.8	0	2.8	NA
Total Permanent Project Area[1]	**NA**	**2,622**	**160**	**2,782**	**NA**
Facilities Outside Perimeter Fence, Temporary ROW for Construction					
Temporary Construction Staging Areas[5]	2	37	0	37	NA
External Access Road[6]	14,499 feet	7.2	0	7.2	NA
Temporary Disturbance Areas associated with Gen-Tie Structure Sites, Spur Roads, Pulling Sites, and Laydown Area	NA	19.4	0	19.4	NA
Total Temporary Project Area	**NA**	**63.6**	**0**	**63.6**	**NA**
Total Project Area[1]	**NA**	**2,685**	**160**	**2,845**	**NA**

Table 2-5. Alternative 2 Components and Approximate Land Areas

Project-Related Facility	Size or Number of Components	Approximate Land Area on BLM (acres)	Approximate Land Area on Private Land (acres)	Total Land Area (acres)[1]	Percentage of Total Project Site[1]

1 - Values may not add to 100% due to rounding to nearest whole number.
2 - Acreage based on horizontal tracker design, which represents worst-case disturbance compared to fixed-tilt designs.
3 – Staging areas inside perimeter fence would be covered with solar panels, so are included in PV array acreage.
4 - Even though the term of the ROW would be 30 years, all disturbance within the perimeter fence is considered to be permanent disturbance, for the purpose of impact analysis.
5 - Includes two temporary construction staging areas, construction offices and parking and temporary water storage. This area will be enclosed by temporary perimeter fencing.
6 – Varies from 20 to 30 feet wide. Exact location to be determined based on final design, and approved by BLM in the Final POD. Length and acreage are maximum, not to be exceeded.

2.6 Alternative 3: Reduced Project Alternative

The number and size of Project-related facilities associated with Alternative 3, the Reduced Project Alternative, is shown in Table 2-6, and the layout of the proposed facilities is shown in Figure 2-10. Table 2-6 also provides the land area that would be occupied by the facilities, expressed both as an acreage, and as a percentage of the total Project land area.

The Reduced Project Alternative further reduces the acreage of the solar arrays, with elimination of the proposed solar arrays primarily in the northern portion of the area to maintain habitat for the Mojave fringe-toed lizard and Harwood’s eriastrum, a BLM Sensitive Species plant. The locations of the O&M Building and On-Site Substation would be situated approximately 0.29 miles further south than in Alternative 2, resulting in a slightly longer gen-tie line that would be 4.18 miles long (1.39 miles longer compared to the Proposed Action.

The output of the Reduced Project Alternative would be 285 MW. The Reduced Project Alternative would use CdTe PV panels or other high efficiency technology. The majority of the Project site would be occupied by the solar arrays and power conversion equipment. The total amount of ground disturbance would be 2,112 acres. Less than one percent of the total Project area would be covered with at-grade facilities (e.g., O&M Building, On-Site Substation, PCSs, and PVCSs). Approximately 76 percent of the total Project area would be covered or shaded by solar modules.

Of the 1,963 acre solar array area included in Alternative 3, approximately 1,703 acres, or 87 percent of the site, would have site preparation performed by either mowing or the disk and roll method. Grading, in the form of cut and fill, would be performed on approximately 260 acres, or 13 percent of the site.

Table 2-6. Alternative 3 Components and Approximate Land Areas

Project-Related Facility	Size or Number of Components	Approximate Land Area on BLM (acres)	Approximate Land Area on Private Land (acres)	Total Land Area (acres)[1]	Percentage of Total Project Site[1]
Area Included within BLM and County Applications					
BLM ROW Application Area	NA	5,115	NA	5,115	NA
Private Lands under County Jurisdiction	NA	NA	160	160	NA
Total Application Area	**NA**	**5,115**	**160**	**5,275**	**NA**
Facilities Within Perimeter Fence and Post-Construction ROW					
PV Arrays[2]	107 arrays; 832,032 individual modules; 300,456 piles	1,352	141	1,493	76.49%
At-Grade Items (On-Site Substation, O&M Building, PCSs, and PVCSs)	1 On-Site Substation, 1 O&M Building, 104 PCSs, 9 PVCSs	5.6	0.1	5.7	0.29%
Internal Access Roads	20 miles	44	4	48	2.46%
Construction Staging Areas[3]	0	0	0	0	0%
Communication and Power Lines (inside fence)	0.3 miles long by 20 feet wide	1	0	1	<0.1%
Undeveloped Area	NA	400	15	415	21.26%
Sub-total Area Enclosed by Perimeter Fencing[4]	**13.2 miles of security fence**	**1,803**	**160**	**1,963**	**100%**
Facilities Outside Perimeter Fence and Post-Construction ROW					
Gen-Tie Line Corridor	4.18 miles long by 160 feet wide	81	0	81	NA
Communication and Power Lines (outside fence)	1.2 mile long by 20 feet wide	2.8	0	2.8	NA
Total Permanent Project Area[1]	**NA**	**1,887**	**160**	**2,047**	**NA**
Facilities Outside Perimeter Fence, Temporary ROW for Construction					
Temporary Construction Staging Areas[5]	2	37	0	37	NA

Table 2-6. Alternative 3 Components and Approximate Land Areas

Project-Related Facility	Size or Number of Components	Approximate Land Area on BLM (acres)	Approximate Land Area on Private Land (acres)	Total Land Area (acres)[1]	Percentage of Total Project Site[1]
External Access Road[6]	16,973 feet	8.36	0	8.36	NA
Temporary Disturbance Areas associated with Gen-Tie Structure Sites, Spur Roads, Pulling Sites, and Laydown Area	NA	19.4	0	19.4	NA
Total Temporary Project Area	**NA**	**65**	**0**	**65**	**NA**
Total Project Area[1]	**NA**	**1,952**	**160**	**2,112**	**NA**

1 - Values may not add to 100% due to rounding to nearest whole number.
2 - Acreage based on horizontal tracker design, which represents worst-case disturbance compared to fixed-tilt designs.
3 - Staging areas inside perimeter fence would be covered with solar panels, so are included in PV array acreage.
4 - Even though the term of the ROW would be 30 years, all disturbance within the perimeter fence is considered to be permanent disturbance, for the purpose of impact analysis.
5 - Includes two temporary construction staging areas, construction offices and parking and temporary water storage. This area will be enclosed by temporary perimeter fencing.
6 –Varies from 20 to 30 feet wide. Exact location to be determined based on final design, and approved by BLM in the Final POD. Length and acreage are maximum, not to be exceeded.

2.7 Alternative 4: No Action Alternative

Under the No Action Alternative, the BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, no new structures or facilities would be constructed, operated and maintained, or decommissioned on the site, and no related ground disturbance or other Project-specific impacts would occur at this time.

The Western Solar Plan ROD designated the Riverside East SEZ (including the DQSP application area) as a priority area for commercial-scale solar development. In addition, the area has been designated as a DFA in the DRECP. Accordingly, a different commercial-scale solar development may be proposed within the ROW application area even if the DQSP ROW application were denied. Because the Project area has been designated as a DFA in the DRECP, it would be subject to development under those parameters.

2.8 Preferred Alternative/Environmentally Superior Alternative

Under NEPA, the "preferred alternative" is a preliminary indication of the Lead Agency's preference of action among the Proposed Action and alternatives. A NEPA Lead Agency may select a preferred alternative for a variety of reasons, including the agency's priorities, in addition to the environmental considerations discussed in the EIS.

A comparison of the potential environmental impacts associated with the four Project Alternatives (No Project/No Action Alternative and three action Alternatives) are summarized in

Table ES-1. The impacts, mitigation measures, and residual impacts after mitigation of the proposed Project and alternatives are detailed in Chapter 4 of this Draft PA/EIS/EIR.

The BLM (NEPA Federal Agency) has identified Alternative 2: Resource Avoidance alternative as the Agency Preferred Alternative. This identification is based on BLM planning regulations (BLM Manual 1790-1, Ch V(B)(4)(c)). The BLM will re-evaluate the preferred alternative following analysis of public comments on the Draft PA/EIS/EIR.

CEQA requires analysis of a reasonable range of alternatives to the proposed Project to foster informed decision making and public participation (14 CCR § 15126.6(a)) and the identification of an environmentally superior alternative. If the environmentally superior alternative is the "no project" alternative, the EIR must also identify an environmentally superior alternative among the other alternatives (state CEQA Guidelines § 15126.6(e)).

The magnitude of impacts, including acreages, numbers of impacted receptors, and amounts of emissions are discussed in Table ES-1, and a summary of the significance of impacts under CEQA is provided in Table ES-2. After comparing and weighing the benefits and impacts of all of the feasible alternatives, the County (CEQA Lead Agency) has identified Alternative 4, the No Action Alternative, as the environmentally superior alternative, subject to public review.

Because the No Action Alternative would not accomplish the County's or Applicant's objectives, the County has reviewed the impacts associated with the three action alternatives, Table ES-1 shows that Alternative 3 involves the least amount of total ground disturbance. However, this reduction in total acreage results in a project that would produce 285 MW, which falls short of the County's and Applicant's objective of generating 450 MW. At the same time, the impacts of Alternative 3 to the *Pleuraphis rigida* vegetation alliance, state jurisdictional waters, occupied habitat for the Harwoods eriastrum, occupied habitat for the Mojave fringe-toed lizard, CRHR-eligible cultural resources, and groundwater use would be the same as Alternative 2, which does meet the objective of generating 450 MW. As a result, the County has identified Alternative 2 as the environmentally superior alternative among the action alternatives, pending analysis of public comments on the Draft PA/EIS/EIR.

2.9 Alternatives Considered but Eliminated from Detailed Analysis

2.9.1 Rationale for Eliminating Alternatives

In accordance with 43 CFR 2804.10, the BLM worked closely with the Applicant during the pre-application phase to identify appropriate areas to site the Project. The BLM discouraged the Applicant from including in its application alternate BLM locations with significant environmental concerns, such as critical habitat, Areas of Critical Environmental Concern (ACECs), Desert Wildlife Management Areas (DWMAs, now designated as Desert Tortoise ACECs), designated off-highway vehicle (OHV) areas, wilderness study areas, and designated wilderness areas. The BLM encouraged the Applicant to locate its Project on public land with the fewest potential conflicts.

Other alternative sites, technologies and methods discussed below were considered by the BLM but eliminated from detailed analysis under NEPA. These alternatives were eliminated from detailed analysis based on one or more of the following reasons:

1. It is ineffective (it would not respond to the BLM's purpose and need)

2. It is technically or economically infeasible
3. It is inconsistent with the basic policy objectives for the management of the area (such as, not in conformance with the land use plan (i.e., the CDCA Plan)
4. Its implementation is remote or speculative
5. It is substantially similar in design to an alternative that is analyzed
6. It would have substantially similar effects to an alternative that is analyzed

Consistent with the sixth reason to eliminate a potential alternative from detailed analysis, the BLM and County also considered whether a proposed alternative would avoid or reduce to a level of insignificance effects to human or environmental resources associated with the Proposed Action, or, conversely, create significant effects potentially greater than those of the Proposed Action.

State CEQA Guidelines (Section 15126.6) state the following:

> (a) An EIR [Environmental Impact Report] shall describe a range of reasonable alternatives to the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives.
>
> (b) The discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly.
>
> (c) The EIR should briefly describe the rationale for selecting the alternatives to be discussed. The EIR should also identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination. Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts.
>
> (d) The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project.
>
> (e) The EIR shall include the evaluation of the "No project" alternative.
>
> (f) The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR need examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the project. The range of feasible alternatives shall be selected and discussed in a manner to foster meaningful public participation and informed decision making.

This process for eliminating alternatives from detailed analysis complies with 40 CFR 1502.14(a), BLM IM 2011-059, PA Handbook Section 6.6.3, and state CEQA Guidelines Section 15126.6. It is described briefly in the following sections.

2.9.2 Alternatives Considered but Eliminated from Detailed Analysis

Alternatives considered included alternative sites, alternative construction methods, alternative designs and layouts, and alternative technologies for generating or delivering power.

2.9.2.1 Site Alternatives

Potential alternative sites to the DQSP site include sites entirely on private land, different locations on BLM-managed public lands, brownfield sites identified by the U.S. Environmental Protection Agency (EPA), and distributed generation alternatives.

In deciding where to propose the development of new solar facilities, the Applicant considered multiple options, including sites on private land and on other BLM-administered lands. The Applicant's consideration of alternative locations for large-scale solar facilities was restricted by several criteria, including:

- Availability of a contiguous area of land large enough to accommodate the proposed Project;
- Technical constraints, including insolation, slope, and hydrology;
- Environmental impacts, based on the presence of potentially impacted resources and associated management and resource protection constraints; and
- Costs associated with site accessibility, and proximity to existing high voltage transmission facilities with sufficient available capacity and viable access to energy markets, including suitable interconnection and priority queue position.

In evaluating potential sites, the Applicant also reviewed the Transmission Ranking Cost Report filed by SCE with the California Public Utilities Commission (CPUC) to identify feasible interconnection locations. In this review, the Applicant identified the CRSS as one of the most viable interconnection points for new renewable projects, and thus considered site locations which met the factors presented above.

Private Land Alternative

Private lands within Riverside County were considered by the Applicant for development of the proposed solar PV energy facility. The Applicant's siting process identified the area along the I-10 corridor, in close proximity to the CRSS, as an area where sites that meet the criteria discussed above are found. In general, the land ownership in this area does not include large, available or obtainable parcels of private property, or multiple private parcels in close proximity to one another, that are sufficiently close to transmission. The area does have large areas of privately-owned agricultural land in and around the city of Blythe. However, much of this land is currently under cultivation, has sufficient water sources to grow crops, and is part of an interdependent hydrologic system managed through agreements with the Metropolitan Water District of Southern California. In addition, many of these parcels are encumbered by Williamson Act contracts, and purchasing and converting such land, including prime farmlands, to nonagricultural uses would significantly increase the time, effort and cost of obtaining control of these parcels for solar development. These lands are also located in closer proximity to, and in the floodplain of, the Colorado River, potentially increasing environmental impacts and flood risks as compared to sites, such as the DQSP site, located at a higher elevation.

In considering solar development in close proximity to the CRSS, the Applicant engaged local real estate experts to determine the feasibility of acquiring enough private land for the Project. Compiling enough contiguous small land parcels necessary to develop a commercial-scale solar facility is difficult. The Applicant evaluated private land holdings in the Palo Verde area, Coachella Valley, north of Blythe, and near the Salton Sea. Private land in the Palo Verde and Coachella Valley areas is highly parcelized, and the Palo Verde area is complicated by the presence of significant drainages, an adjacent wilderness area, and close proximity to the Colorado River to the east. Abandoned agricultural lands and other private land north of Blythe are less parcelized, but also require substantially longer gen-tie transmission lines to connect to the CRSS, increasing resource impacts and costs. Larger parcel options near the Salton Sea do not have viable transmission options. In evaluating potential sites, the Applicant determined that it was not feasible to compile the privately-owned acreage necessary to accommodate the proposed Project and have available interconnection access to the CRSS.

The challenges in compiling private land parcels have been documented in environmental analysis documents for other nearby solar facilities. For example, for the EIS for the McCoy Solar Energy Project (MSEP), located just north of the DQSP on the other side of I-10, the Applicant for that project evaluated more than 195,000 acres of private land within 20 miles of the CRSS, and determined that only 68 individual parcels, comprising about 4,700 acres, were available for sale or lease. The largest contiguous block was 858 acres, which consisted of 7 different parcels owned by four different landowners.

Because insufficient private land was available to meet the basic needs of the Project, an all-private land alternative was not carried forward for detailed consideration.

Alternative BLM-Administered Land

In general, BLM-administered land satisfies the need to provide contiguous parcels of land of sufficient size, and in close proximity to transmission infrastructure, better than does a private land alternative. However, BLM land is also constrained by technical factors and resource protections which limit the number and size of sites that can be considered for solar development. Much of the BLM-administered land in the California desert is precluded from development by special designations such as wilderness areas and ACECs, and many potentially suitable areas outside these designated areas are precluded because they are in use. The changes to land use allocations under the DRECP further restrict the availability of BLM-administered land on which solar development can occur.

The Applicant has submitted ROW applications for numerous other potential sites in eastern Riverside County in the past, including Desert Opal (CACA-48818), Desert Jasper (CACA-49357), Desert Onyx (CACA-4894), Desert Amber (CACA-49361), Desert Ruby (CACA-48819), Desert Sapphire (CACA-48820), Desert Garnet (CACA-49017), Desert Obsidian (CACA-49511) and Desert Turquoise (CACA-49613). The Applicant’s predecessor, Nextlight Renewable Power, filed an application for a 4,120 acre site between the Coxcomb Mountains and the Palen Dry Lake that was specifically intended to be an alternative to the DQSP Project site in 2010 (CACA-051954, the “Golden State Solar Project”). These applications have all been withdrawn, for various reasons related to resource impact concerns and/or lack of necessary transmission developments and upgrades.

More importantly, BLM has already determined that the DQSP site is suitable for solar development, in both the Western Solar Plan and the DRECP. The Western Solar Plan identified specific locations that, at a plan level, appear well-suited for utility-scale production of solar energy where the BLM would prioritize development (i.e., solar energy zones or SEZs) as well as categories of lands to be excluded from such development. The area of the DQSP was designated as the Riverside East SEZ, signifying that the DQSP site and the surrounding area are preferred for large-scale solar energy development based on environmental and technical suitability for such development.

Although both the Western Solar Plan and the DRECP include a process for proposing renewable energy projects on “variance lands” outside of designated SEZs and DFAs, the objective of these landscape-level planning efforts was to promote development in certain designated areas. Through the Western Solar Plan, BLM already considered whether other locations on public lands might be suitable for solar development and, after years of review, determined that the Riverside East SEZ, encompassing the proposed DQSP, contained the areas most suitable for solar development. Similarly, the DRECP considered technical suitability and resource impacts in implementing new land use allocations for resource protection, and for the focus of renewable energy development. Although the DQSP application is exempt from the land use decisions made in the DRECP because it is a pending application, the DRECP recognized the area of the DQSP site as suitable for solar development by designating it as a DFA.

As a result of the technical, procedural, and environmental constraints discussed above, timely development of the Project on other lands administered by BLM would not be feasible, and is likely to be inconsistent with the basic policy objectives for management of areas outside of the proposed DFAs.

Brownfield Sites

The USEPA tracks 480,000 contaminated sites for potential reuse for renewable energy development as part of its RE-Powering America's Lands Initiative. Of these sites, USEPA has identified 5,000 sites nationwide as potentially suitable for PV development. Using the USEPA's Renewable Energy Interactive Mapping Tool, which is a Google Earth KMZ file, it is possible to view information about potential utility scale PV solar energy sites on contaminated lands. In addition to the contaminated site's location, the tool also provides the site name and identification information, a link to the site's cleanup status information, and specific acreage and renewable energy resource information. For example, the tool indicates which potential sites are (and which are not) within a designated Renewable Energy Zone (REZ). REZs have been established by the BLM in coordination with the Western Governors Association, the Department of Energy, and the States of Colorado and California and take into consideration both resource potential and exclusion zones.

Using the tool to select USEPA tracked sites (i.e., abandoned mined lands, brownfields, RCRA sites, Federal and non-Federal Superfund sites, and landfills) as well as state-tracked sites, BLM identified four locations with excellent utility solar power potential along the I-10 corridor between Riverside and the Arizona border. These sites ranged in size from 75 to 160 acres, and are therefore not of a scale necessary to generate 450 MW of solar power.

The Applicant also reviewed a Google Earth Map and data set developed by USEPA and the National Renewable Energy Laboratory (NREL) that illustrates approximately 11,000 contaminated and degraded public and private sites in California that could be candidates for renewable energy development (USEPA 2016). This tool includes additional California sites and uses a screening tool to filter and suggest sites as the best for utility-scale renewable energy development based on the various renewable energy technologies and associated screening criteria.

Of the approximately 11,000 sites, only one potential utility-scale PV solar site was identified within nearly 50 miles of the proposed site: Wiley Wells Water Point, which is a former military training area located south of I-10 and 12 miles west of Ripley. This site is located seven miles from the grid connection at the CRSS, and approximately seven miles from an access road. In addition, the site has had very little historic use, so is undeveloped. In contrast, the DQSP site is located approximately 1.5 miles from the CRSS, is adjacent to a designated utility corridor, and is bordered by county roads that can provide site access. Although the BLM portion of the site is undeveloped, the site is bordered by high voltage transmission lines on all sides, and there is an existing solar generation facility bordering the site to the north. Based on its proximity to transmission and access road infrastructure, the DQSP is expected to be more favorable, and have fewer environmental impacts, than the Wiley Wells site, so the Wiley Wells site was eliminated from further consideration.

2.9.2.2 Alternative Construction Methods

The Applicant considered using construction methods that would reduce or eliminate the amount of grading and vegetation removal that would occur during site preparation. In general, some level of both grading and vegetation removal is needed due to safety and constructability issues.

With respect to safety, removal of vegetation and leveling of the ground surface is necessary because materials, including the panels and the modular supports, are moved about the site and stored in stacks. The materials are brought in by truck, but then must be moved to their installation location by forklifts, and set on the ground on pallets and on folding tables. Moving stacks of materials by forklift, or storing them on pallets in stacks, on uneven ground presents a very high risk of toppling of the stacks. This process would not only damage the materials, but would be a substantial safety hazard for workers in the vicinity. In addition, the panel installation process occurs by workers on foot. This includes workers on foot moving as spotters for the forklifts and cranes (often moving backwards), and also workers on foot attaching panels to the modular supports with clamps. Performing these tasks on uneven ground, and with vegetation present, would present a substantial tripping hazard.

In addition to safety issues, the installation of PV panels requires very limited vertical and horizontal tolerances. Each row of panels is attached to a series of 28 support posts, and the support posts must be perfectly straight, and aligned to within 0.5 inches vertical height. Installing the posts within this tolerance using post drivers sitting on uneven surfaces is not feasible.

Through the application and environmental review process, BLM worked with the Applicant to ensure that site grading and vegetation removal would be minimized to the extent necessary for safety and constructability. Although the agency agrees that vegetation impacts would be reduced by mowing as opposed to grading, leaving original topography and vegetation onsite would increase construction safety hazards and render panel installation infeasible. Therefore, an alternative which would maintain all on-site drainages and vegetation was eliminated as being infeasible.

2.9.2.3 Migratory Bird and Special Status Species Protection Alternative

During scoping, the USFWS requested that an alternative designed to minimize impacts to migratory birds, as well as other special status species, be considered. As shown in Table 2-7, some of the features of these suggestions are already incorporated into either the Proposed Action or into the Resource Avoidance or Reduced Project Alternatives. Other suggested features are not technically or economically feasible. As a result, a specific Migratory Bird and Special Status Species Protection Alternative was not developed, but the features which are feasible are encompassed within the existing alternatives.

Table 2-7. Potential Actions to be Incorporated for Protection of Migratory Birds and Other Special Status Species

Recommended Project Feature	Alternative 1 Proposed Action	Alternative 2 Resource Avoidance Alternative	Alternative 3 Reduced Project Alternative
Reduce project footprint to the extent possible to minimize attractive illusion of a large water body.	The Project footprint is minimized, for the technology proposed, by using optimal (tightest) spacing of solar array.	Proposed use of different technology (CdTe panels) allows Project footprint to be reduced further, while maintaining the same output.	Project footprint reduced further, by reducing proposed output from 450 to 285 MW.
Instead of long continuous rows, use irregular spacing for solar arrays to break up the illusion of a large water body. Fill in spaces if monitoring demonstrates no difference in mortalities.	Irregular spacing within arrays reduces power output, results in an increase in the Project footprint, and is not economically feasible.	Irregular spacing within arrays reduces power output, results in an increase in the Project footprint, and is not economically feasible. Irregular overall outline of this alternative may contribute to breaking up the illusion of a large water body.	Irregular spacing within arrays reduces power output, results in an increase in the Project footprint, and is not economically feasible. Irregular overall outline of this alternative may contribute to breaking up the illusion of a large water body.
No construction ponds.	Water storage is required to ensure adequate water availability for dust control during construction. Temporary ponds or tanks are proposed during construction. No ponds would be used for operations.	Water storage is required to ensure adequate water availability for dust control during construction. Temporary ponds or tanks are proposed during construction. No ponds would be used for operations.	Water storage is required to ensure adequate water availability for dust control during construction. Temporary ponds or tanks are proposed during construction. No ponds would be used for operations.
Undergrounding or monopoles for gen-ties and distribution lines.	Gen-tie line would use tubular steel monopoles, but collection lines within solar arrays may use H-frame construction.	Gen-tie line would use tubular steel monopoles, but collection lines within solar arrays may use H-frame construction.	Gen-tie line would use tubular steel monopoles, but collection lines within solar arrays may use H-frame construction.

Table 2-7. Potential Actions to be Incorporated for Protection of Migratory Birds and Other Special Status Species

Recommended Project Feature	Alternative 1 Proposed Action	Alternative 2 Resource Avoidance Alternative	Alternative 3 Reduced Project Alternative
Use dual-axis tracking panels so that panels may be tilted vertically at night, to break up any illusion of a large water body.	There are no commercial applications of this technology to utility-scale PV power plants. Dual axis trackers use up to twice the land area of single-axis trackers (Sunpower 2016).	There are no commercial applications of this technology to utility-scale PV power plants. Dual axis trackers use up to twice the land area of single-axis trackers (Sunpower 2016).	There are no commercial applications of this technology to utility-scale PV power plants. Dual axis trackers use up to twice the land area of single-axis trackers (Sunpower 2016).
Test deterrent systems such as lights and noise.	No deterrent systems are proposed.	No deterrent systems are proposed.	No deterrent systems are proposed.
Leave a gap in bottom of the fence to evaluate wildlife use of the site after construction.	Tortoise fencing requirements preclude leaving a gap.	Tortoise fencing requirements preclude leaving a gap.	Tortoise fencing requirements preclude leaving a gap.
Utilize some sort of fence marking to reduce avian collisions with newly constructed fences.	No markings are proposed.	No markings are proposed.	No markings are proposed.
Avoid the sand transport corridor to the extent possible, in particular those areas mapped as active/stabilized dunes that support the species as identified in the Project-specific surveys.	Proposed Action would disturb portions of the sand transport corridor, mostly by placement of solar arrays.	The alternative is designed, in part, to reduce direct impacts to sand dunes. Most disturbance would be temporary disturbance associated with gen-tie construction.	The alternative is designed, in part, to reduce direct impacts to the sand dunes. Most disturbance would be temporary disturbance associated with gen-tie construction.
Avoid using lattice-type structures or placing external ladders and platforms on any infrastructure to minimize perching and nesting.	Gen-tie line would use tubular steel monopoles, but collection lines within solar arrays may use H-frame construction. No lattice structures are proposed.	Gen-tie line would use tubular steel monopoles, but collection lines within solar arrays may use H-frame construction. No lattice structures are proposed.	Gen-tie line would use tubular steel monopoles, but collection lines within solar arrays may use H-frame construction. No lattice structures are proposed.
Avoid use of guy wires on meteorological towers.	The meteorological stations would not use guy wires.	The meteorological stations would not use guy wires.	The meteorological stations would not use guy wires.
Use minimal lighting. Where lighting is necessary, facility lighting should be focused downward to reduce sky illumination	Section 2.3.7.10 discusses the components of the Lighting Management Plan, which would include minimizing lighting and focusing lighting downward.	Section 2.3.7.10 discusses the components of the Lighting Management Plan, which would include minimizing lighting and focusing lighting downward.	Section 2.3.7.10 discusses the components of the Lighting Management Plan, which would include minimizing lighting and focusing lighting downward.
Build power lines in accordance with guidelines from the Avian Power Line Interaction Committee.	Conformance with APLIC is discussed in Section 2.3.7.5, and is a requirement of Mitigation Measure VEG-8.5.	Conformance with APLIC is discussed in Section 2.3.7.5, and is a requirement of Mitigation Measure VEG-8.5.	Conformance with APLIC is discussed in Section 2.3.7.5, and is a requirement of Mitigation Measure VEG-8.5.

Table 2-7. Potential Actions to be Incorporated for Protection of Migratory Birds and Other Special Status Species

Recommended Project Feature	Alternative 1 Proposed Action	Alternative 2 Resource Avoidance Alternative	Alternative 3 Reduced Project Alternative
Minimize permanent disturbance area by minimizing creation of roads, avoidance of excessive clearing of vegetation, and avoidance of grading whenever possible.	Site preparation methods are discussed in Section 2.3.4.3. Site preparation would use mowing or disk contour grade and roll methods and compaction of vegetation, in order to leave topsoil and vegetative matter in place, to the extent feasible.	Site preparation methods are discussed in Section 2.3.4.3. Site preparation would use mowing or disk contour grade and roll methods and compaction of vegetation, in order to leave topsoil and vegetative matter in place, to the extent feasible.	Site preparation methods are discussed in Section 2.3.4.3. Site preparation would use mowing or disk contour grade and roll methods and compaction of vegetation, in order to leave topsoil and vegetative matter in place, to the extent feasible.
Clear vegetation outside the bird breeding season pursuant to a Nest Bird Plan; any variances should be approved by the agencies.	Mitigation Measure WIL-7 requires pre-construction surveys and nest avoidance if construction takes place during breeding season.	Mitigation Measure WIL-7 requires pre-construction surveys and nest avoidance if construction takes place during breeding season.	Mitigation Measure WIL-7 requires pre-construction surveys and nest avoidance if construction takes place during breeding season.
Perform clearance surveys to locate and identify active nests or bat colonies	The results of pre-application bat surveys are summarized in Table 3.4-1. No roosting habitat for bats exists onsite.	The results of pre-application bat surveys are summarized in Table 3.4-1. No roosting habitat for bats exists onsite.	The results of pre-application bat surveys are summarized in Table 3.4-1. No roosting habitat for bats exists onsite.
Conduct surveys for golden eagle nests each year during construction activities within the nesting season.	The results of pre-application golden eagle surveys are summarized in Table 3.4-1. No nesting habitat for golden eagles exists onsite.	The results of pre-application golden eagle surveys are summarized in Table 3.4-1. No nesting habitat for golden eagles exists onsite.	The results of pre-application golden eagle surveys are summarized in Table 3.4-1. No nesting habitat for golden eagles exists onsite.
Conduct clearance surveys for burrowing owls, including a 150-m buffer area.	Mitigation Measure WIL-9 requires burrowing owl surveys within 656 foot of any construction area.	Mitigation Measure WIL-9 requires burrowing owl surveys within 656 foot of any construction area.	Mitigation Measure WIL-9 requires burrowing owl surveys within 656 foot of any construction area.
Conduct mandatory site training for all construction personnel regarding avoidance of nests and bat colonies and other biological resources.	Mitigation Measure VEG-6 requires a Worker Environmental Awareness Program.	Mitigation Measure VEG-6 requires a Worker Environmental Awareness Program.	Mitigation Measure VEG-6 requires a Worker Environmental Awareness Program.
Conduct raven management on-site for the life of the Project; including water and refuse control to avoid creating attractions for birds or bats.	Mitigation Measure WIL-5 specifies requirements for raven management for the life of the Project.	Mitigation Measure WIL-5 specifies requirements for raven management for the life of the Project.	Mitigation Measure WIL-5 specifies requirements for raven management for the life of the Project.
Develop and implement an Integrated Weed Management Plan.	APM BIO-5 specifies the components of the Applicant’s Integrated Weed Management Plan.	APM BIO-5 specifies the components of the Applicant’s Integrated Weed Management Plan.	APM BIO-5 specifies the components of the Applicant’s Integrated Weed Management Plan.
Use native species for seeding and planting during re-vegetation efforts.	Section 2.3.7.2 discusses the requirement for a VRMP, including use of native species.	Section 2.3.7.2 discusses the requirement for a VRMP, including use of native species.	Section 2.3.7.2 discusses the requirement for a VRMP, including use of native species.

2.9.2.4 Alternative Energy Projects

Table 2-8 describes alternative types of energy technologies and sources that were considered by the BLM but not carried forward for detailed analysis and the agency's rationale for dismissing from further review.

Table 2-8. Other Types of Energy Projects Eliminated from Detailed Analysis

Alternative	Responsiveness to Purpose and Need	Meets Policy Objectives	Feasibility	Environmental Criteria
Stirling Dish Technology Uses mirrors distributed over a parabolic dish surface to concentrate sunlight on a receiver fixed at the focal point. Uses a working fluid such as hydrogen that is heated up to temperatures of approximately 1,200° F in the receiver to drive an engine. A dish will generate 5-30 kilowatts (kW) of electricity depending on the system. Stirling Energy Systems' 25 kW SunCatcher™ is 38 feet tall and 40 feet wide.	Would not meet BLM's purpose and need to respond to an application for a solar PV facility on public lands.	Would meet policy objectives associated with development of renewable energy and reducing GHG emissions.	Stirling Dish Technology is the proprietary technology of Stirling Energy Systems, which filed for bankruptcy in September, 2011. As such, it is not currently commercially available. Two utility-scale projects were proposed to use this technology, and both have either been withdrawn or re-proposed using a different technology.	With a minimum size of nearly 4,500 acres for 500 MW, Stirling Dish Technology would increase the footprint of the DQSP and, due to the greater height of this technology, also would increase visual impacts relative to the Proposed Action.
Solar Power Tower Technology A flat mirror "heliostat" system that tracks the sun and focuses solar energy on a central receiver at the top of a high tower. The focused energy is used to heat a transfer fluid to produce steam and run a central power generator.	Would not meet BLM's purpose and need to respond to an application for a solar PV facility on public lands.	Would meet policy objectives associated with development of renewable energy and reducing GHG emissions.	This technology has been approved and is operating on BLM lands, but more recent project applications have faced significant public opposition. There are no active applications pending before BLM for projects using this technology.	No substantial reduction in impacts would occur under this technology. The large area needed for a solar power tower plant would exceed the land requirement for the DQSP, and the height of the heliostats would increase visual impacts relative to the Proposed Action, the heliostats could cause impacts to air traffic at the Blythe Airport, and the combination of the tower and heliostats would have a greater impact on avian species.

Table 2-8. Other Types of Energy Projects Eliminated from Detailed Analysis

Alternative	Responsiveness to Purpose and Need	Meets Policy Objectives	Feasibility	Environmental Criteria
Linear Fresnel Technology Uses long parallel rows of flat mirrors to focus the sun's energy onto elevated receivers, which consist of a system of tubes through which water flows. The concentrated sunlight boils the water, generating high-pressure steam for direct use in power generation and industrial steam applications.	Would not meet BLM's purpose and need to respond to an application for a solar PV facility on public lands.	Would meet policy objectives associated with development of renewable energy and reducing GHG emissions.	Ausra operates a 5 MW plant in Bakersfield. There is no indication that the company, which has changed its focus to medium-sized (50 MW) solar steam generating systems, would be available or interested in developing a project with sufficient capacity to take the place of the Proposed Action.	Solar thermal technologies generally require water use, as well as project structures which have greater visual impacts than PV projects.
Parabolic Trough Technology Uses a series of parabolic-shaped mirrors to focus sunlight on a pipe containing a thermal fluid. The fluid flows to a central power plant which uses a steam cycle to generate electricity.	Would not meet BLM's purpose and need to respond to an application for a solar PV facility on public lands.	Would meet policy objectives associated with development of renewable energy and reducing GHG emissions.	This technology has been approved and is operating on BLM lands.	Solar thermal technologies generally require water use, as well as project structures which have greater visual impacts than PV projects.

Table 2-8. Other Types of Energy Projects Eliminated from Detailed Analysis

Alternative	Responsiveness to Purpose and Need	Meets Policy Objectives	Feasibility	Environmental Criteria
Distributed Solar Generation Uses small, modular power generators, typically up to 50MW, located at or near customer demand.	Would not meet BLM's purpose and need to respond to an application for a solar PV facility on public lands.	Would not meet BLM's renewable energy goals, as there are limited, if any, disturbed public lands where BLM might co-locate a distributed generation project of equivalent size.	To be a viable alternative to the DQSP, there would have to be sufficient newly installed solar panels to generate 450 MW of capacity. The rate of PV manufacturing and installation is expected to continue to grow and larger distributed solar PV installations are becoming more common. California has approximately 40 million square feet (approximately 920 acres) of distributed solar. An additional approximately 90 million square feet (approximately 2,100 acres) would be required to provide 450 MW. In addition to planning and permitting barriers, replacing the action alternatives with a DG solar energy alternative would be speculative based on existing limitations on the integration of DG into the electric grid. The present electric grid, built decades ago, was based on a centralized generation approach and was not designed to handle high levels of distributed renewable energy systems.	Distributed sources may allow some portion to be constructed on previously disturbed areas, thus reducing land overall land use of undisturbed sites.
Wind Power	Would not meet BLM's purpose and need to respond to an application for a solar PV facility on public lands.	Would be inconsistent with BLM's prior programmatic determination that the Project site is most suitable for solar development.	The BLM manages 20.6 million acres of public lands with wind potential. The BLM has authorized 198 ROWs for the use of public lands for wind energy site testing or development. Of these, 29 authorizations have a total installed capacity of 437 MW.	Wind energy projects could cause significant impacts to biological, visual, cultural, water, and soils resources. Accordingly, these alternatives would not reduce impacts relative to the Proposed Action.

Table 2-8. Other Types of Energy Projects Eliminated from Detailed Analysis

Alternative	Responsiveness to Purpose and Need	Meets Policy Objectives	Feasibility	Environmental Criteria
Geothermal Power	Would not meet BLM's purpose and need to respond to an application for a solar PV facility on public lands.	Would be inconsistent with BLM's prior programmatic determination that the Project site is most suitable for solar development.	Of the geothermal producing leases managed by the BLM nationally, 59 leases generate about 1,275 MW of installed geothermal energy. The 2008 programmatic EIS relating to BLM's authorization of geothermal leasing estimates a potential for 5,540 MW of new electric generation capacity from 111 new geothermal power plants in 12 western states, and an additional 6,600 MW from another 133 plants by 2025. In California, 14 parcels have been competitively leased. However, geothermal energy production would not be a feasible alternative use for the public land identified in the ROW application given that there are no known geothermal resources in the area.	If a geothermal power project were feasible it would reduce effects on air quality, and cultural and biological resources as geothermal power projects use less land; however, they can cause visual impacts and produce waste and byproducts such as hydrogen sulfide that can have impacts on air quality. Spills of geothermal fluids when pipes break can lead to soil and groundwater contamination.
Biomass	Would not meet BLM's purpose and need to respond to an application for a solar PV facility on public lands.	Would not meet BLM's or the County's objectives to meet Federal and state renewable energy development goals.	Most biomass facilities produce only small amounts of electricity (in the range of 3 to 10 MW) and so could not produce an amount of energy necessary to replace the DQSP. Thus, it would be technically infeasible at the scale required to replace the DQSP.	Biomass facilities generate significant air emissions especially short-lived climate pollutants such as methane, and require numerous truck deliveries to supply the plant with the waste. Other environmental concerns associated with biomass relate to the emission of toxic chemicals, such as dioxin, and the disposal of the toxic ash that results from biomass burning. Accordingly, these alternatives would not reduce impacts relative to the Proposed Action.

Table 2-8. Other Types of Energy Projects Eliminated from Detailed Analysis

Alternative	Responsiveness to Purpose and Need	Meets Policy Objectives	Feasibility	Environmental Criteria
Tidal Energy	Would not meet BLM's purpose and need to respond to an application for a solar PV facility on public lands.	Would not meet BLM's or the County's objectives to meet Federal and state renewable energy development goals.	The use of tidal fence technology is limited to areas that are adjacent to body of water with a large difference between high and low tides (unlike the proposed site). In-flow tidal turbines are a relatively new technology, unproven at the scale that would be required to replace the DQSP.	Tidal energy alternatives could create significant environmental impacts to ocean ecosystems.
Wave Energy	Would not meet BLM's purpose and need to respond to an application for a solar PV facility on public lands.	Would not meet BLM's or the County's objectives to meet Federal and state renewable energy development goals.	The use of wave energy technology is limited to areas that are adjacent to body of water with significant wave action (unlike the proposed site). Because wave energy technology is new, it is not known whether it would be technologically feasible at the scale required to replace the DQSP.	If a wave energy project were feasible, aesthetic, biological resource, vessel traffic, and recreation impacts may increase. There would also be potential impacts on the size and amount of waves with possible effects to beaches (e.g., changes to sediment transport processes).
Natural Gas	Would not meet BLM's purpose and need to respond to an application for a solar PV facility on public lands.	Would not meet BLM's or the County's objectives to meet Federal and state renewable energy development goals.	Technically feasible.	Air quality impacts would increase as a result of operational emissions of short-lived climate pollutants, e.g., methane, from the power plant. Impacts would occur off site from construction of natural gas and water supply lines resulting in potentially greater impacts to air quality, biological, cultural, groundwater, hazardous materials, land use, utilities, and visual resources.

Table 2-8. Other Types of Energy Projects Eliminated from Detailed Analysis

Alternative	Responsiveness to Purpose and Need	Meets Policy Objectives	Feasibility	Environmental Criteria
Coal	Would not meet BLM's purpose and need to respond to an application for a solar PV facility on public lands.	Would not meet BLM's or the County's objectives to meet Federal and state renewable energy development goals.	Technically feasible.	Impacts associated with air quality, greenhouse gas, and health risks would increase substantially. Impacts would also occur from transportation of coal to the power plant. Impacts would occur off site from construction of a water supply line resulting in potentially greater air quality, biological, cultural, groundwater, land use, utilities, and visual resources impacts.
Nuclear Energy	Would not meet BLM's purpose and need to respond to an application for a solar PV facility on public lands.	Would not meet BLM's or the County's objectives to meet Federal and state renewable energy development goals.	The permitting of new nuclear facilities in California is currently illegal, so the implementation of this technology would be legally infeasible.	Greater impacts would result from a nuclear power plant, including the impacts from the need for obtaining large quantities of water at the project site.
Conservation and Demand-Side Management Consists of a variety of approaches to reduce electricity use, including energy efficiency and conservation, building and appliance standards, and load management and fuel substitution.	Would not meet BLM's purpose and need to respond to an application for a solar PV facility on public lands.	Would not meet BLM's or the County's objectives to meet Federal and state renewable energy development goals.	Energy conservation is an active goal handled by local utilities and the state, but ongoing growing demand and the state's renewable energy initiatives will still require development of additional generating capacity.	Would reduce effects on all environmental resources.

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CHAPTER 3
AFFECTED ENVIRONMENT

3.1 Introduction

The Applicant proposes to construct, operate, maintain, and decommission a 450 MW solar PV energy generating facility and related infrastructure in unincorporated Riverside County, California, to be known as the Desert Quartzite Solar Project (DQSP; the Project).

If approved, the Project would be located on a combination of public land administered by the BLM and private land under the jurisdiction of the County. The Project would be located approximately 2.75 miles southwest of the City of Blythe, just south of the Interstate 10 (I-10) freeway, and 1.5 miles southwest of Blythe Airport in Riverside County, California (Figure 2-1). The Applicant is seeking a ROW grant for approximately 3,616 acres from BLM, as well as authorization from the County to develop a 160-acre parcel of private land that is surrounded by the BLM land. The corridor for the proposed 230 kV transmission gen-tie line would exit the solar facility at the northwest corner, and traverse approximately 2.79 miles west to the CRSS.

The total Project area would be 3,770 acres, including the portion of the solar facility on BLM land, the portion of the solar facility on private land, the gen-tie corridor on BLM land, and the offsite portion of a buried telecommunications line and possible above-ground electrical service line on BLM land. Within this 3,770 acre site, construction and operation would disturb approximately 3,714 acres for the solar plant site, 54 acres for the gen-tie line corridor with a width of 160 feet, and 2 acres for the offsite portion of a buried telecommunications line and possible above-ground electrical service line on BLM land. In addition, temporary construction areas totaling 61 acres would be disturbed, although they would not be included within the long-term ROW. The total amount of ground disturbance would be 3,831 acres.

The Proposed Action would utilize solar PV technology to generate electricity. With this technology, arrays of solar PV modules (or panels) collect radiant energy from the sun and convert it directly into DC electrical energy. The assemblies would be organized into arrays. Each array would be approximately 800 feet long, and 500 feet wide. The exact placement of the arrays within the Project area would be based on topography and geotechnical conditions, and may also be modified to avoid biological or other resources.

Chapter 3 describes the resources, resource uses, special designations, and other important topics (including public health and safety, social and economic considerations, and environmental justice conditions) that may be impacted by the Proposed Action. “Resources” include air, soil, water, vegetative alliances, wildlife, wildland fire ecology and management, as well as cultural, paleontological, and visual resources. “Resource uses” include land use planning and realty, minerals, recreation management, public services, transportation and public access, and utilities and service systems. “Special designations” include areas of critical environmental concern (ACECs), wilderness areas, wilderness study areas, and lands with wilderness characteristics.

For each resource topic in Chapter 3, the affected environment and the existing environmental conditions, or “baseline conditions,” associated with the construction, operation, and decommissioning of the Project and alternatives are described. The baseline conditions are used for comparison to establish the type and extent of the potential environmental effects of the Project. In the following sections, the environmental setting is described within a defined Project area and a regional vicinity context, with a focus on the particular environmental impacts being discussed. The term “Project area” refers to the entire 3,831 acres that would be disturbed for both the permanent ROW and temporary construction areas. As discussed in Chapter 2, this Draft PA/EIS/EIR analyzes three action alternatives, including the Proposed Action (Alternative 1), a Resource Avoidance Alternative (Alternative 2), and a Reduced Project Alternative (Alternative 3). The Draft PA/EIS/EIR also analyzes the No Action Alternative (Alternative 4). The geographic scope of analysis of each alternative varies based on the resource being evaluated, and the predicted locations of direct and indirect effects of the Proposed Action.

Information and data used to prepare this chapter were obtained from the CDCA Plan of 1980, as amended, various BLM planning and NEPA documents, County of Riverside General Plan, and applicable regulations and plans. Information and data also were collected from many other related planning documents and research publications prepared by various Federal, state, and local agencies as well as from private sources pertaining to key resource conditions and resource uses found within the Project area, along with surveys and studies conducted for the Project by the Applicant. The purpose of this chapter is to provide a description of affected resources and resource uses within the existing environment of the Project area, which will be used as a baseline to evaluate and assess the direct, indirect, and cumulative impacts of the Proposed Action and alternatives described in Chapter 2. Descriptions and analyses of the impacts themselves are presented in Chapter 4, Environmental Consequences.

Regulations, plans, and policies including Federal, state, and local laws related to each resource topic that may be relevant to the Proposed Action are summarized in Appendix D.

3.2 Air Resources

This section describes the existing meteorological conditions, baseline air quality, and sensitive receptors associated with the Project area.

3.2.1 Environmental Setting

3.2.1.1 Regional Climate

The Project site is located in southeastern California, in the Colorado Desert. The climate in the Blythe area is categorized as a desert climate, with dry, hot summers and mild winters. The region is characterized by extreme fluctuations of daily temperatures, strong seasonal winds, and clear skies. January is the coldest month, with a mean low temperature of 41.7 degrees Fahrenheit (°F). July is the hottest month, with a mean high temperature of 108.4°F.

Temperature and precipitation data were measured at Blythe from July 1948 through June 2016 (Western Regional Climate Center [WRCC] 2018a). The mean temperature for the Blythe station is 73.7°F, and the mean annual precipitation is 3.55 inches. More than half of the precipitation occurs between November and March. Although rainfall occurs primarily in the winter months, the region is periodically influenced by subtropical weather conditions, especially sudden monsoonal late summer storms. Monthly average temperatures and precipitation for the area are summarized in Table 3.2-1.

A wind rose from Blythe Airport, for the years 2008 to 2018, is shown in Figure 3.2-1. This figure shows the predominant wind directions in the Project area are from the northwest, south, and southwest.

Table 3.2-1. Monthly Average Temperature and Precipitation, Blythe Meteorological Station

Month	Monthly Average Temperature (°F)		Precipitation (Inches)
	Maximum	Minimum	Mean
January	66.9	41.7	0.48
February	71.9	45.4	0.44
March	78.5	50.2	0.35
April	86.4	56.5	0.15
May	95.2	64.5	0.02
June	104.5	72.7	0.02
July	108.4	81.1	0.28
August	106.7	80.3	0.60
September	101.5	73.1	0.34
October	89.8	60.8	0.26
November	75.9	48.6	0.19
December	66.6	41.3	0.41
Annual	87.7	59.7	3.55

Source: WRCC 2018a

3.2.1.2 Existing Air Quality

Air Quality Standards

The Federal Clean Air Act (CAA) and the California Clean Air Act (CCAA) both require the establishment of standards for ambient concentrations of air pollutants, called Ambient Air Quality Standards (AAQS). The Federal standards, the National AAQS (NAAQS) established by USEPA, are typically higher (less protective) than the California state (CAAQS), which are established by the California Air Resources Board (CARB). The Federal and state air quality standards are listed in Table 3.2-2. The times over which the various air quality standards are measured range from 1 hour to an annual average. The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per a volume of air, in milligrams or micrograms of pollutant in a cubic meter of air (mg/m3 or µg/m3, respectively).

Table 3.2-2. Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standard	California Standard
Ozone (O_3)	8 Hour	0.070 ppm (137 µg/m^3)	0.070 ppm (137 µg/m^3)
	1 Hour	—	0.09 ppm (180 µg/m^3)
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m^3)	9.0 ppm (10 mg/m^3)
	1 Hour	35 ppm (40 mg/m^3)	20 ppm (23 mg/m^3)
Nitrogen Dioxide (NO_2)[a]	Annual	0.053 ppm (100 µg/m^3)	0.030 ppm (57 µg/m^3)
	1 Hour	0.100 ppm[a] (188 µg/m^3)	0.18 ppm (339 µg/m^3)
Sulfur Dioxide (SO_2)[b]	Annual	0.030 ppm for certain areas	—
	24 Hour	0.14 ppm for certain areas	0.04 ppm (105 µg/m^3)
	3 Hour	0.5 ppm (1,300 µg/m^3)	—
	1 Hour	0.075 ppm[b] (196 µg/m^3)	0.25 ppm (655 µg/m^3)
Particulate Matter (PM_{10})	Annual	—	20 µg/m^3
	24 Hour	150 µg/m^3	50 µg/m^3
Fine Particulate Matter ($PM_{2.5}$)	Annual	12.0 µg/m^3	12 µg/m^3
	24 Hour	35 µg/m^3	—
Sulfates (SO_4)	24 Hour	—	25 µg/m^3
Lead	30 Day Average	—	1.5 µg/m^3
	Calendar Quarter	1.5 µg/m^3	—
	Rolling 3-Month Average	0.15 µg/m^3	—
Hydrogen Sulfide (H_2S)	1 Hour	—	0.03 ppm (42 µg/m^3)
Vinyl Chloride (chloroethene)	24 Hour	—	0.01 ppm (26 µg/m^3)
Visibility Reducing Particulates	8 Hour	—	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70%.

Table 3.2-2. Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Standard	California Standard

Notes:
a -To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb.
b - On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.
Source: CARB 2015a, USEPA 2015b

Ambient Air Quality Data

The Proposed Action and Alternatives are located within the MDAQMD. A summary of the various emission sources that contribute to ambient air quality in the Project area is presented in Tables 4.2-11 and 4.2-12 in Section 4.2.6.

Ambient air concentrations of pollutants are measured at monitoring stations in Riverside and San Bernardino counties operated by CARB and/or MDAQMD. Table 3.2-3 presents ambient air quality data for the region from 2011 to 2016. Due to the remote location, no monitoring stations with complete data sets are close to the Project site, except for except for the 445 West Murphy Street monitoring station at Blythe with data for ozone. PM_{10}, $PM_{2.5}$, NO_2, and CO data are from the Palm Springs Fire Station monitoring station (105 miles distant); and SO_2 data are from the Victorville-14306 Park Avenue monitoring station (160 miles distant). The air quality monitoring data were compared to the most stringent applicable standards for the years 2011 through 2016 at the most representative monitoring stations for each pollutant.

According to the NECO Plan Amendment to the CDCA Plan, the ozone standard is exceeded due to long-distance transport of pollutants from the Los Angeles Basin In contrast the PM_{10} exceedance is due to natural sources occurring with various land uses found in a desert environment. These uses include OHV use, mining, crop agricultural, and livestock grazing. The PM_{10} concentrations are from fugitive dust emission sources, rather than from combustion particulate or secondary particulate emission sources (BLM 2002).

Table 3.2-3. Summary of Available Air Quality Data for the Project Area (2011 to 2016)

Pollutant	Parameter	2011	2012	2013	2014	2015	2016
Ozone	Days above 1-hr CAAQS (0.09 ppm)	0	0	0	0	0	0
	Days above 8-hr CAAQS (0.070 ppm)	0	12	0	16	0	0
	Days above 8-hr NAAQS (was 0.075 ppm during 2011 to 2013, 0.70 after 2013)	0	9	0	12	0	ND
Nitrogen dioxide (NO_2)	Days above the CAAQS (180 ppb)	0	0	0	0	0	0
	Days above the NAAQS (100 ppb)	0	0	0	0	0	0

Table 3.2-3. Summary of Available Air Quality Data for the Project Area (2011 to 2016)

Pollutant	Parameter	2011	2012	2013	2014	2015	2016
Respirable Particulate matter less than or equal to 10 microns in diameter (PM_{10})	Days above CAAQS (50 µg/m^3)	0	0	2	2	2	ND
	Days above NAAQS (150 µg/m^3)	2	0	1	1	1	1
Fine particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$)	Days above NAAQS (35 µg/m^3)	0	0	0	0	0	0
Carbon monoxide (CO)	Days above the CAAQS (9.0 ppm)	0	0	0	0	ND	ND
	Days above the NAAQS (9 ppm)	0	0	0	0	ND	ND

Notes:
ND = no data available.
Monitoring data from USEPA and ARB monitoring databases http://www.epa.gov/airdata/ and http://www.arb.ca.gov/adam/.
O_3 data are from Blythe; PM_{10}, $PM_{2.5}$, NO_2, and CO data are from Palm Springs. SO_2 data not available.
Source: CARB 2018.

Attainment Status

Areas that do not meet the NAAQS or CAAQS for a given criteria pollutant are designated as “non-attainment areas” by the USEPA and/or the CARB. Further classifications are given to non-attainment areas to identify the severity and number of violations experienced, and the year in which attainment is anticipated based on implementation of attainment plans. In circumstances where ambient data is not sufficiently available to support designation as either attainment or non-attainment, the area can be designated as “unclassified”. An unclassified area is normally treated by the USEPA in the same way as an attainment area for regulatory purposes.

Table 3.2-4 summarizes the site area's attainment status for various applicable state and Federal standards. The air basin for the Project area is considered an unclassified/attainment area for all of the NAAQS. The air basin is considered a non-attainment area for the CAAQSs for O_3 and PM_{10}. The air basin is considered “unclassified/attainment” for all other CAAQS.

Table 3.2-4. Federal and State Attainment Status for the Mojave Desert Air Basin within Riverside County

Pollutant	Attainment Status[a]	
	Federal	State
Ozone	Unclassified/Attainment[b]	Non-attainment
CO	Unclassified/Attainment	Unclassified
NO_2	Unclassified/Attainment[c]	Attainment
SO_2	Unclassified	Attainment
PM_{10}	Unclassified/Attainment[b]	Non-attainment
$PM_{2.5}$	Unclassified/Attainment	Unclassified

Table 3.2-4. Federal and State Attainment Status for the Mojave Desert Air Basin within Riverside County

Pollutant	Attainment Status[a]

Notes:
a - Attainment = Attainment or Unclassified, where Unclassified is treated the same as Attainment for regulatory purposes.
b - Attainment status for the Mojave Desert Air Basin within Riverside County only, not the entire air basin. For ozone, the attainment level is for the old standard of 0.075 ppm, not the new standard of 0.070 ppm (effective December 28, 2015)
c - Nitrogen dioxide attainment status for the new Federal 1-hour NO_2 standard was determined on February 29, 2012.
Source: CARB 2015b, USEPA 2015a, USEPA 2015c.

3.2.1.3 Criteria Air Pollutants

The following subsections describe the source and associated health effects of the Criteria Air Pollutants.

Ozone (O_3)

Ozone (O_3) is not directly emitted from stationary or mobile sources, but is formed as the result of chemical reactions in the atmosphere between directly emitted O_3 precursors, primarily nitrogen oxides (NO_x), and hydrocarbons (volatile organic compounds or VOCs) being of primary concern, in the presence of sunlight. Pollutant transport from the South Coast Air Basin (Los Angeles Area) is one source of the pollution experienced in the eastern Riverside County portion of the Mojave Desert Air Basin (MDAB).

The 1- and 8-hour ozone concentrations measured at the eastern border of Riverside County have been very slowly decreasing over time. The raw collected air quality data indicate that the ozone violations occurred primarily during the sunny and hot periods typical during May through September.

O_3 is considered a respiratory irritant and prolonged exposure can reduce lung function, aggravate asthma and increase susceptibility to respiratory infections. Exposure to levels of ozone above the current ambient air quality standard can lead to human health effects such as lung inflammation, tissue damage, impaired lung function, coughing, chest tightness, shortness of breath, and the worsening of asthma symptoms. Harmful health effects are associated with outdoor workers, athletes, children and others who spend greater amounts of time outdoors during smoggy periods.

Nitrogen Dioxide (NO_2)

The entire MDAB is classified as attainment for the state 1-hour and annual and Federal annual NO_2 standards. The NO_2 attainment standard could change due to the new Federal 1-hour standard, but a review of the air basin-wide monitoring data suggests that the prospective new standard would not changes the status for NO_2 in the MDAB.

Approximately 90 percent of the NO_x emitted from combustion sources is nitric oxide (NO), while the balance is NO_2. NO is oxidized in the atmosphere to NO_2, but some level of photochemical activity is needed for this conversion. The highest concentrations of NO_2 typically occur during the fall. The winter atmospheric conditions can trap emissions near ground level, but with less substantial photochemical activity (sun light), NO_2 levels are relatively low. In the summer the conversion rates of NO to NO_2 are high, but the relatively high temperatures and windy conditions disperse pollutants, preventing the accumulation of NO_2. The NO_2 concentrations in the Project area are well below the NAAQS and CAAQS.

NO_2 is a respiratory irritant and may affect those with existing respiratory illness, including asthma. Exposure to NO_2 along with other traffic-related pollutants, is associated with respiratory symptoms, episodes of respiratory illness and impaired lung functioning.

Carbon Monoxide (CO)

The MDAB is classified as attainment for the state and Federal 1- and 8-hour CO standards. The highest concentrations of CO occur when low wind speeds and a stable atmosphere trap the pollution emitted at or near ground level. These conditions occur frequently in the wintertime late in the afternoon, persist during the night and may extend 1 or 2 hours after sunrise. The Project area has a lack of significant mobile source emissions and has CO concentrations that are well below the NAAQS and CAAQS.

Exposure to CO near the levels of the ambient air quality standards can lead to fatigue, headaches, confusion, and dizziness. CO interferes with the blood's ability to carry oxygen. Exposure to CO is especially harmful to those with heart disease and has been associated with aggravation of angina pectoris and other aspects of coronary heart disease, decreased exercise tolerance in people with peripheral vascular disease and lung disease, impairment of central nervous system functions, and possible increased risk to fetuses.

Particulate Matter (PM_{10}) and Fine Particulate Matter ($PM_{2.5}$)

PM_{10} can be emitted directly or it can be formed many miles downwind from emission sources when various precursor pollutants interact in the atmosphere.

MDAB is classified as non-attainment for state PM_{10} standards and unclassified for the Federal PM_{10} standard (CARB 2015b). Table 3.2-3 shows recent PM_{10} and $PM_{2.5}$ concentrations, and shows clear exceedances of the state 24-hour PM10 standard. It should be noted that an exceedance does not necessarily mean violation or non-attainment, as exceptional events do occur and some of those events, which may not count as violations, may be included in the data. The MDAB is designated as non-attainment for the state PM_{10} standard.

Fine particulate matter, or $PM_{2.5}$, is derived mainly either from the combustion of materials, or from precursor gases (SO_x, NO_x, and VOC) through complex reactions in the atmosphere. $PM_{2.5}$ consists mostly of sulfates, nitrates, ammonium, elemental carbon, and a small portion of organic and inorganic compounds.

The entire MDAB is classified as attainment for the Federal standard and, in the Project area, is designated unclassified for the state $PM_{2.5}$ standards. As indicated in Table 3.2-3, $PM_{2.5}$ concentrations did not exceed applicable standards during the 5-year study period. This divergence in the PM_{10} and $PM_{2.5}$ concentration levels and attainment status indicates that a substantial fraction of the ambient particulate matter levels are most likely due to localized fugitive dust sources, such as vehicle travel on unpaved roads, agricultural operations, or wind-blown dust. Fugitive dust, unlike combustion source particulate and secondary particulate, is composed of a much higher fraction of larger particles than smaller particles, so the $PM_{2.5}$ fraction of fugitive dust is much smaller than the PM_{10} fraction. Therefore, when PM_{10} ambient concentrations are significantly higher than $PM_{2.5}$ ambient concentrations this tends to indicate that a large proportion of the PM_{10} are from fugitive dust emission sources, rather than from combustion particulate or secondary particulate emission sources.

Particulates may lead to excess deaths from short-term exposures and exacerbation of symptoms in sensitive patients with respiratory disease.

Sulfur Dioxide (SO_2)

The entire MDAB is classified as attainment for the state and Federal SO_2 standards.

Sulfur dioxide is typically emitted as a result of the combustion of a fuel containing sulfur. Sources of SO_2 emissions within the MDAB come from a wide variety of fuels: gaseous, liquid and solid; however, the total SO_2 emissions within the eastern MDAB are limited due to the limited number of major stationary sources and California's and USEPA's substantial reduction in motor vehicle fuel sulfur content. The Project area's SO_2 concentrations are well below the NAAQS and CAAQS.

Effects from SO_2 exposures at levels near the one-hour standard include bronchoconstriction accompanied by symptoms, which may include wheezing, shortness of breath and chest tightness, especially during exercise or physical activity. Children, the elderly, and people with asthma, cardiovascular disease or chronic lung disease (such as bronchitis or emphysema) are most susceptible to these symptoms. SO_2 is a respiratory irritant that can cause narrowing of the airways leading to wheezing and shortness of breath. Long-term exposure to SO_2 can cause respiratory illness and aggravate existing cardiovascular disease.

3.2.1.4 Toxic Air Contaminants

Toxic air contaminants (TACs) are substances that have the potential to be emitted into the ambient air that have been determined to present some level of acute or chronic health risk (cancer or non-cancer) to the general public. These pollutants may be emitted in trace amounts from various types of sources, including combustion sources. TACs that may be produced by construction and operation of the proposed Project are listed in Table 3.2-5, including the most relevant health effects. The current California list of TACs includes approximately 200 compounds, including particulate emissions from diesel-fueled engines (CARB 2011).

Table 3.2-5. Toxic Air Contaminants and Associated Health Effects

Contaminant	Characteristics	Health Effects
Vinyl Chloride	This chlorinated hydrocarbon is a colorless gas with a mild, sweet odor.	Short-term exposure to high levels of vinyl chloride in air causes central nervous system effects, such as dizziness, drowsiness and headaches. Long-term exposure through inhalation and oral exposure causes liver damage. Cancer is a major concern from exposure via inhalation.

Table 3.2-5. Toxic Air Contaminants and Associated Health Effects

Contaminant	Characteristics	Health Effects
Benzene	Benzene is found in the air from emissions from burning coal and oil, gasoline service stations, and motor vehicle exhaust.	Short-term inhalation exposure of humans to benzene may cause drowsiness, dizziness, headaches, as well as eye, skin, and respiratory tract irritation, and, at high levels, unconsciousness. Long-term inhalation exposure has caused various disorders in the blood, including reduced numbers of red blood cells and aplastic anemia, in occupational settings. Reproductive effects and increased incidences of leukemia have been observed in humans occupationally exposed to benzene. A Group A human carcinogen.
Formaldehyde	Formaldehyde exposure may occur by breathing contaminated indoor air, tobacco smoke, or ambient urban air.	Short-term and long-term inhalation exposure to formaldehyde in humans can result in respiratory symptoms, and eye, nose, and throat irritation. Short-term high exposure may lead to eye, nose and throat irritation, and in the respiratory tract, nasal obstruction, pulmonary edema and dyspnea. Prolonged or repeated exposures have been associated with allergic sensitization, respiratory symptoms, and decrements in lung function. A Group B1 probable human carcinogen.
Diesel Particulate Matter (DPM)	Diesel particulate matter is emitted from both mobile and stationary sources of diesel powered on-road and off-road equipment.	Occupational exposures to diesel exhaust particles have been associated with significant cross-shift decreases in lung function. Increased cough, labored breathing, chest tightness, and wheezing have been associated with exposure to diesel exhaust in bus garage workers. A number of adverse long-term non-cancer effects have been associated with exposure to diesel exhaust. Occupational studies have shown that there may be a greater incidence of cough, phlegm and chronic bronchitis among those exposed to diesel exhaust than among those not exposed. Reductions in pulmonary function have also been reported following occupational exposures in chronic studies. Exposure to diesel exhaust has also shown cellular changes in laboratory animals.
Acrolein	Acrolein is a powerful irritant.	Short-term exposures to levels above 1.0 ppm result in mucous hypersecretion and exacerbation of allergic airway response in animal models. Moderately higher exposures may result in severe lacrimation, and irritation of the mucous membranes of the respiratory tract. Death due to respiratory failure has been associated with high level exposures. Long term exposure to acrolein may result in structural and functional changes in the respiratory tract, including lesions in the nasal mucosa, and pulmonary inflammation.
1,3–Butadiene	Motor vehicle exhaust is a constant source of 1,3-butadiene. Although 1,3-butadiene breaks down quickly in the atmosphere, it is usually found in ambient air at low levels in urban and suburban areas.	Short-term exposure to 1,3-butadiene by inhalation in humans results in irritation of the eyes, nasal passages, throat, and lungs. The EPA has classified 1,3-butadiene as carcinogenic to humans by inhalation.

Table 3.2-5. Toxic Air Contaminants and Associated Health Effects

Contaminant	Characteristics	Health Effects
Naphthalene	Naphthalene is used in the production of phthalic anhydride; it is also used in mothballs.	Short-term exposure of humans to naphthalene by inhalation, ingestion, and dermal contact is associated with hemolytic anemia, damage to the liver, and neurological damage. Cataracts have also been reported in workers acutely exposed to naphthalene by inhalation and ingestion. Long-term exposure of workers and rodents to naphthalene has been reported to cause cataracts and damage to the retina. Hemolytic anemia has been reported in infants born to mothers who "sniffed" and ingested naphthalene (as mothballs) during pregnancy. A Group C, possible human carcinogen.
Polycyclic Organic Matter (POM)	The term polycyclic organic matter (POM) defines a broad class of compounds that includes the polycyclic aromatic hydrocarbon compounds (PAHs), of which benzo[a]pyrene is a member. POM compounds are formed primarily from combustion and are present in the atmosphere in particulate form. Sources of air emissions are diverse and include cigarette smoke, vehicle exhaust, home heating, laying tar, and grilling meat.	Cancer is the major concern from exposure to POM. Epidemiologic studies have reported an increase in lung cancer in humans exposed to coke oven emissions, roofing tar emissions, and cigarette smoke; all of these mixtures contain POM compounds. Animal studies have reported respiratory tract tumors from inhalation exposure to benzo[a]pyrene and forestomach tumors, leukemia, and lung tumors from oral exposure to benzo[a]pyrene. The EPA has classified seven PAHs (benzo[a]pyrene, benz[a]anthracene, chrysene, benzo[b]fluoranthene, benzo[k]fluoranthene, dibenz[a,h]anthracene, and indeno[1,2,3-cd]pyrene) as Group B2, probable human carcinogens.

Source: SRA 2013, as cited in Riverside County 2014

3.2.1.5 Sensitive Receptors

For the purposes of this air quality analysis, sensitive receptors are defined as facilities and land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples include schools, hospitals, and daycare centers. Schools, hospitals, and convalescent homes are considered to be relatively sensitive to poor air quality because children, elderly people, and the infirm are more susceptible to respiratory distress and other air quality-related health problems than the general public. Residential areas are considered sensitive to poor air quality because people usually stay home for extended periods of time, which results in greater exposure to ambient air quality.

The site is located in proximity to rural agricultural lands, undeveloped lands, uses associated with the Blythe Airport, power generation, local roads, and interstate highway and other non-sensitive uses. No schools, hospitals, convalescent homes or any other sensitive receptors are located within one mile of the proposed Project. The closest residence (apparent occupied mobile home trailer) is located approximately 3,700 feet north of the northeast corner of the Project boundary. The next two closest sensitive air quality receptors are located in the residential community of Nicholls Warm Springs/Mesa Verde approximately 4,800 feet north of the northeast corner of the Project site boundary.

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3.3 Biological Resources – Vegetation

This section describes the environmental setting relevant to vegetation resources, including existing vegetation alliances; special-status plant species including species managed under the California Desert Native Plant Act; cacti; and noxious weeds that are present within and surrounding the Project area. It also lists the special-status plant species that have potential to occur but that were not observed during focused botanical surveys.

This discussion is based primarily upon information from these sources:

1. Biological Resources Technical Report (Ironwood 2016, provided in Appendix M) and Western EcoSystems Technology memorandum (WEST 2018, also included in Appendix M);
2. Identification and Delineation of Areas Potentially Subject to Jurisdiction Under the California Department of Fish and Wildlife Lake and Streambed Alteration Agreement Program (Huffman-Broadway Group 2017, provided in Appendix N).
3. Investigation of the Presence of Corps and US EPA Jurisdictional Waters (Huffman-Broadway Group 2015, provided in Appendix I).
4. California Natural Diversity Database (CDFW 2016);
5. NECO Plan Amendment to the CDCA Plan (BLM 2002);
6. Consortium of California Herbaria (Consortium of California Herbaria 2012); and
7. All BLM California Special Status Plants (BLM 2015).

Generally, the Study Area for vegetation resources included a 5,045-acre area consisting of public lands administered by the BLM (4,885 acres) and private land under the land use jurisdiction of Riverside County (160 acres) (Figure 3.3-1). The privately-owned portion of the Study Area is generally referred to herein as the “160-acre private inholding.” Inventories of individual special-status species, succulent plant species (cacti), and nonnative invasive species were limited to within the 5,045-acre Study Area.

3.3.1 Environmental Setting

The Study Area is located in the Colorado Desert. The Colorado Desert is a part of the larger Sonoran Desert, which extends across the southwest United States and into Mexico. The climate is very hot and dry in the summer months, and mild in the winter.

The Study Area is specifically located on the Palo Verde Mesa on the west bank of the Colorado River. The Study Area is relatively flat and ranges in elevation from approximately 330 feet above mean sea level (amsl) at the southeast corner to 475 feet amsl in the northwest (USGS 1983). The Study Area is near the McCoy Mountains on the north, the Mule Mountains on the southwest, and the Colorado River on the east. Surface water is ephemeral on Palo Verde Mesa and consists of limited seasonal and perennial sources. The closest perennial water is the Colorado River, which lies approximately 10 miles east of the eastern edge of the Study Area.

The 160-acre private inholding, which is surrounded on all sides by BLM land, was previously a jojoba farm. Rows of jojoba (*Simmondsia chinensis*), a species native to the region, were planted in a north-south orientation at approximately 4 meter spacing. These rows are slightly raised to cover the buried three-fourths inch perforated irrigation pipe running their entire length. There is a wellhead and some debris remaining at the northeast corner entrance to the site. Of the thousands of jojoba that were planted about one third currently survive without any maintenance. However, the health of the existing plants is diminished; most are dying-back from their center outwards but a few are still flowering and fruiting. Since abandonment, native vegetation seems to be recovering slowly.

Generally, the Study Area is dominated by desert scrub vegetation. In total, 124 plant species were detected in the Study Area during botanical field surveys. Of this total, 114 species are native, while 10 species are nonnative. Vegetation alliances, special-status plant species, cacti, and noxious weeds documented during botanical field surveys are discussed further in the following subsections.

3.3.1.1 Vegetation Alliances

Information used to support the analysis of vegetation alliances includes:

- Site-specific mapping of vegetation alliances by BLM;
- Vegetation cover maps used to support the DRECP;
- Site-specific vegetation and sand deposit mapping conducted by the Applicant; and
- Other sources available in the scientific literature.

Vegetation alliances were characterized by the BLM using the vegetation classification system used for the DRECP following Federal Geographic Data Committee (FGDC) and National Vegetation Classification Standards (NVCS). The vegetation alliances are shown in Figure 3.3-2, and the acreage of each alliance in the project area is shown in Table 3.3-1.

Table 3.3-1. Vegetation Alliances and Cover Types within Project Application Area

Vegetation Alliance	Acreage Within the Project Application Area
Anthropogenic areas of Little or No Vegetation	6.83
Built-up & Urban Disturbance	44.3
Chorizanthe rigida - Geraea canescens Desert Pavement Sparsely Vegetated	17.6
Larrea tridentata	2,922
Larrea tridentata - Ambrosia dumosa	1,893
Parkinsonia florida - Olneya tesota	13.8
Pleuraphis rigida	171.4
Woody Agriculture (orchards, vineyards)	161

Chorizanthe rigida – Geraea canescens Desert Pavement Alliance

The *Chorizanthe rigida – Geraea canescens* Desert Pavement Alliance, commonly known as Rigid spineflower – hairy desert sunflower, is found on the northern edge of the application area.

The alliance covers approximately 17.6 acres (0.3 percent) of the Project application area. As discussed in Section 1.1, the total Project area under application for BLM and County approval is approximately 5,275 acres, but the Project proposed by the Applicant would occupy approximately 3,770 acres of the total application area. The *Chorizanthe rigida – Geraea canescens* Desert Pavement Alliance occurs within the application area, but outside of the area proposed for development, approximately one mile north of the gen-tie line.

Larrea tridentata and *Larrea tridentata-Ambrosia dumosa* Alliances

The *Larrea tridentata* alliance, commonly known as creosote bush scrub and *Larrea tridentata-Ambrosia dumosa* alliance, commonly known as creosote bush – white bursage scrub, are the dominant vegetation alliances, covering approximately 4,815 acres (92 percent) of the overall Project application area. Other species include Cheesebush (*Ambrosia salsola*), brittlebush (*Encelia farinosa*), Emory's indigo bush (*Psorothamnus emoryi*), big galleta grass (*Hilaria rigida*), and occasional cacti. These alliances are sparsely vegetated with widely scattered relatively low-growing individual shrubs. No creosote rings were reported by BLM, or in Ironwood (2016).

Sparse creosote bush (*Larrea tridentata*) was observed throughout the 160-acre private inholding and on the surrounding berms. These plants are probably re-growth from old root crowns, but some smaller new plants have taken hold. Other common native perennials appearing occasionally on the 160-acre private inholding include white bursage (*Ambrosia dumosa)* and brittlebush (*Encelia farinosa)*. Native annual plants recolonizing the site include desert pincushion (*Chaenactis stevioides),* brown-eyed primrose *(Chylismia claviformis),* narrowed-leaved popcorn flower *(Cryptantha angustifolia),* chuckwalla combseed *(Pectocarya heterocarpa),* Harwood's milkvetch *(Astragalus insularis* var. *harwoodii),* dwarf white milkvetch *(A. didymocarpus),* stigose bird's-foot trefoil *(Acmispon strigosus)*, and hairy desert sunflower (*Gerea canescens)*.

These alliances are not designated as sensitive plant communities by BLM (NECO Plan) and both have a State Rarity rank of S5, meaning that they are commonly found throughout their historic range.

Parkinsonia florida-Olneya tesota Alliance

The *Parkinsonia florida-Olneya tesota* alliance is commonly known as blue palo verde-ironwood woodland alliance. The alliance covers approximately 13.8 acres (0.3 percent) of the overall Project application area. The occurrence of the *Parkinsonia florida-Olneya tesota* alliance in the Project area is limited to the northeastern corner, adjacent to the NRG Blythe PV Project.

Like the *Chorizanthe rigida – Geraea canescens* Desert Pavement Alliance, the *Parkinsonia florida-Olneya tesota* alliance occurs within the application area, but outside of the area proposed for development. However, it is directly on the boundary of the Project area, within less than 100 feet of the Project. The area is adjacent to the Palowalla Sand Migration Zone (SMZ) mapped by Kenney (2017), and was mapped by Kenney (2017) as critically important for eolian sand systems as a sand source and stabilizing moisture for sand dune systems. The area is also mapped as the FP1 active watercourse, a state jurisdictional water covering 34.14 acres, in Huffman-Broadway (2017).

The *Parkinsonia florida-Olneya tesota* alliance has a state rarity rank of S4.2, which is limited in distribution and moderately threatened in California. Blue palo verde-ironwood woodland is identified in DRECP as microphyll woodland, which is considered a Special Vegetation Feature, and is subject to Conservation and Management Actions (CMAs) under the DRECP. Although the Project is not subject to land use planning decisions in the DRECP, identification of the extent of impacts to the microphyll woodland assists in understanding the significance of the impacts of the Proposed Action and the alternatives.

***Pleuraphis rigida* Alliance**

The *Pleuraphis rigida* alliance, commonly known as big galleta shrub-steppe, is found along the northern Project boundary, approximately coincident with the Project gen-tie corridor. The alliance covers approximately 171.4 acres (3.3 percent) of the overall Project application area. Big galleta (*Hilaria rigida*) is a densely branched perennial bunch grass that occurs locally on sand sheets and dunes. Co-dominants are widely scattered creosotes (*Larrea tridentata*), with occasional occurrences of Emory's indigo bush (*Psorothamnus emoryi*), desert wire lettuce (*Stephanomeria pauciflora*), fan-leaved tiquilia (*Tiquilia plicata*) and desert dicoria (*Dicoria canescens*). Dense infestations of the invasive weed Saharan mustard (*Brassica tournefortii*) are evident on many areas of this vegetation type.

The *Pleuraphis rigida* alliance has a state rarity rank of S2.2, which is moderately threatened in California.

3.3.1.2 Sand Dunes

As shown in Figure 3.3-2, the Project area is mapped as occurring within a regional sand corridor, which is the “Dunes/Sand” feature shown on DRECP Figure D-15.

Multiple authors have mapped the extent of sand deposits both onsite, and within the regional sand corridor. Most of these reports were either published in peer-reviewed literature, or were specifically developed by or for BLM in support of the DRECP. Studies by Zimbelman et al. (1995), Lancaster and Tchakerian (1996), Lancaster and Tchakerian (2003), Muhs et al. (2003), Potter and Weigand (2016), and Muhs et al. (2017) evaluate whether sand sources are expected to be active or dormant, or are expected to be regional in nature versus primarily local. Also, the agency has identified and considered other sources (Stone 2006, Hayhurst and Bedrossian 2010, Lancaster 2014, and Ironwood 2016) that map the extent of sand deposits in the Project area. In addition, three site-specific studies, Ironwood 2016 (Appendix M), Huffman-Broadway 2017 (Appendix N), and Kenney 2017 (Appendix O) were developed by the Applicant in support of the Project application. These reports have not been peer-reviewed or published in the scientific literature. Therefore, although BLM has considered their findings in its analysis of the potential impact of the Project on sand dunes, these are just a few of the many sources of information considered.

Description of the Regional Sand Corridor

The regional sand corridor is a complex, regional-scale network of sand dunes, oriented from northwest to southeast, stretching from the central Mojave Desert in the west to the Colorado River. In some areas, there are also dunes on the east side of the Colorado River, stretching into Arizona. Within this network, there are three specific linear features. The southern-most of the systems is the Dale Lake-Palen-Ford dune system, also referred to as the Clark's Pass system by some authors (such as Zimbelman et al. 1995; Lancaster and Tchakerian 2003).

Several authors have studied sand transport, both regionally within southern California, and locally in the Ford-Palen area. A primary focus of these studies is the question of the source of the sand within the corridor. The two prevailing hypotheses are that the sand corridor operates as a transport corridor on a regional scale, and that the corridor is made up of an agglomeration of individual dune systems, disconnected from each other, and each sourced and operating on a local scale.

In the regional scale model advanced by Zimbelman et al. (1995), sand enters the corridor primarily through surface water erosion and deposition at its western upwind end, is blown along the flat surfaces, including playa lakebeds, in the valleys, then is pushed up sand ramps by saltation through low mountain passes, is deposited on the leeward side of the mountain passes, and then continues to be blown eastward. Zimbelman et al. (1995) describe the pathway for the sand dunes near the Project area to originate from Dale Playa at the eastern end of the Twentynine Palms Valley. From there, the sand climbed sand ramps through Clark's Pass, which is a gap between the Sheep Hole and Pinto Mountains. East of Clark's Pass, the sand entered Palen and Ford Playas. From there, the sand continued to travel eastward through Chuckwalla Valley, and thus entered the Palo Verde Mesa, where it ends directly within the Project area.

Zimbelman et al. (1995) noted that previous authors had assumed that the corridor was discontinuous, consisting of a series of deposits locally derived from the nearest playas. Based on their remote sensing and field observations, Zimbelman et al. (1995) hypothesized that the areas were connected, forming a "more through-going movement of windblown sand", and that they might be considered "rivers of sand". This hypothesis has formed the basis for much subsequent research, and is the basis for the potential concern that large-scale project development in one part of the corridor could have indirect impacts to sand-related resources in others parts of the corridor.

Lancaster and Tchakerian (1996) made a detailed study of the sediments in the sand ramps, including those in the Dale Lake-Palen-Ford system. They concluded that the sediments in the sand ramp component of the corridors consisted of a mixture of eolian, alluvial, and talus deposits.

In addition to the literature discussing the regional characteristics of the sand corridors, multiple site-specific studies support the hypothesis that the part of the corridor that overlies the Project area is not continuous. Although the Project area falls within the sand corridor shown in Figure D-15 of DRECP, multiple surface geology maps show that the bulk of the Project area is composed of alluvial deposits, and that active sand dunes occupy only a small portion of the site. The geologic map of the site in Figure 3.7-1 was derived from the U.S. Geological Survey (USGS) map of the region (Stone 2006). This map shows that eolian sand is present only in the northern gen-tie corridor of the Project area. The site-specific mapping by Ironwood (2016) shows that only the northern gen-tie corridor and two other small areas are mapped as sand dunes. Regional scale mapping of the eolian system in the East Riverside area was done by Lancaster (2014), in support of the DRECP. This map shows the corridor west of the Project area to be a complex mix of dune deposits, but the Project site itself is occupied mostly by alluvial deposits (Qoa) and dune deposits (Qye/Qal).

The report by Kenney (2017) postulates that most onsite sand sources are local, and that the sand corridor does not currently operate as a continuous river of moving sand. Kenney (2017) identified and mapped the sand sources for the local SMZs, and found that their sources were locally derived from surface water erosion in Wiley's Well Basin, the Mule Mountains, and the McCoy Mountains. Kenney (2017), based on his own research and citing California Geological Survey comments on the DRECP in 2015, posited that the use of the term "sand transport corridor" is misapplied because connectivity between individual sand dune areas may not exist.

Current Level of Activity

Several authors since 1995 have questioned whether the regional model of the formation of the corridor by Zimbelman et al. (1995) is accurate or, if it is accurate, whether it represents current conditions. In general, most researchers have continued to use the phrases "sand transport path" and "sand transport corridor" even while demonstrating that the corridors are largely inactive today. Neither Zimbelman et al. (1995) who initiated the hypothesis of "rivers of sand," nor Lancaster and Tchakerian (2003), nor any other researchers claim that the Dale Lake-Ford-Palen system is currently active as a continuous transport corridor. Although they do not specifically make a statement about the current level of activity, Zimbelman et al. (1995) use past tense words in describing the system, including statements such as sand ramps "allowed sand to exit the valley", the orientation of the mountains "acted like a funnel", and the sand "traversed the northern end of the Eagle Mountains."

Although Zimbelman et al. (1995) used the phrase "sand transport paths" and hypothesized that the system was continuous, they also acknowledged that the timing of sand transport along the path was episodic. They based this conclusion on the presence of multiple paleosols (relict soil profiles) present within the deposits. To form a soil profile, a sand deposit would need to be inactive and exposed on the surface for a substantial period of time. Therefore, the presence of such paleosols indicates that active sand deposition was punctuated by extended periods of inactivity.

Bach (1995) observed that dune mobility indices based on wind energy, precipitation, and evapotranspiration predicted that most dunes in the Mojave and Colorado Deserts should be active, while the observation was that most of the dunes were currently inactive.

Lancaster and Tchakerian (1996) specifically studied the sand ramps that were instrumental in allowing sand transport across topographic barriers in the model of Zimbelman et al. (1995), and stated that most sand ramps in the Mojave are relict features and are not currently accumulating sand. They stated that, with the exception of the western part of the Devil's Playground (an area not associated with the Dale Lake-Palen-Ford system), the sand transport corridors are "currently in a dormant or relict (inactive, vegetated) state".

Many studies of eolian deposits in the area concentrate on mapping dune systems and nearby alluvial deposits to establish both local and regional geologic timelines of dune activity. Lancaster and Tchakerian (2003) used mineral luminescence dating across several of the different sand systems to identify general periods of activity and inactivity on a regional basis. Their study included Dale Lake at the western end of the Dale Lake-Palen-Ford system (which they referred to as the Clark's Pass system), but did not include any areas further to the east in this system, including the Project area. Their main conclusion is that operation of the systems in the Mojave Desert is episodic, depending on sediment supply, availability, and mobility. Even though Lancaster and Tchakerian (2003) refer to this system as a "sand transport corridor", they concluded this system was active between >35,000 years ago to 25,000 years ago, and then again from 15,000 to 10,000 years ago (Lancaster and Tchakerian 2003).

For the Project area and the Dale Lake-Palen-Ford dune systems, the conclusion that operation of the sand corridor is episodic is important in demonstrating that, even if the regional Dale Lake-Palen-Ford dune system operated as a continuous transport corridor in the past, it probably does not do so today.

Future Activity

Episodic activity of the sand deposits within the sand corridor indicates that it will eventually re-activate, and stable deposits will eventually expand to cover a larger area than they do at present. This will occur regardless of the magnitude or types of changes that may occur from future climate change. However, the timeframe in which this re-activation will occur, and the extent to which it will impact the Project area, are unknown. It is also unknown whether this re-activation will be the next phase of change to the corridor, or whether the corridor will become less active before entering a new period in which it is more active.

Potter and Weigand (2016) used remote sensing to study rates of dune migration in the Palen Dune field between 1985 and 2014. They observed that there was little change to the overall area of the sand accumulation zone, with the leading (southeastern) edge of the dune field shifting by less than 0.1 kilometers (about 300 feet) between 1995 and 2014. However, they observed that there were substantial changes in the level of activity within the zone. In 1984, much of the dune area was inactive, with active sand fields separated by scattered brush and desert grass cover. Between 1985 and 2014, active sand sheets that had been separate spread to cover areas that had been vegetated. Individual dunes migrated at rates up to 50 meters per year, and the area of active dunes expanded from 21.3 square kilometers (approximately 5,263 acres) to 34.12 square kilometers (approximately 8,430 acres), an increase of 60 percent. This suggests that inactive areas within dune fields can become active within the timeframe of the life of the DQSP Project.

Downwind Resources

The Project area is situated near the far eastern, downwind end of the Dale Lake-Palen-Ford system. Local-scale mapping suggests that the sand corridor feature may not actually extend to the edge of the Palo Verde Mesa, as is shown on Figure 3.3-2. Mapping by Stone (2006), Hayhurst and Bedrossian (2010), Lancaster (2014), Ironwood (2016), and Kenney (2017) shows that the eolian deposits largely dissipate as they approach the Project area from the west. These maps do not show eolian deposits on the eastern half of the site or further to the east. The Palo Verde Valley, the area between the Project and the Colorado River, may once have been the ultimate depository for sand transport in the Palen-Ford corridor. If so, any sand deposited in this valley would likely have been routinely reworked and transported downstream during floods on the river, or obscured by agricultural activity in the valley. Therefore, the Project area itself does not contribute sand to dunes located further eastward.

Onsite Sand Deposits

Eolian deposits in the Project area have been mapped on both a regional scale and local scale by five separate researchers, including Stone (2006), Hayhurst and Bedrossian (2010, a compilation from previous sources), Ironwood (soils and vegetation mapped in 2012, but reported in the BRTR in 2016), Lancaster (2014), and Kenney (2017). A general correlation of the mapped units between these sources is shown in Table 3.3-2. The geologic map of the site shown in Figure 3.7-1 is based on Stone (2006), but all five studies are consistent in showing the Project area to be composed of a mixture of eolian and alluvial deposits. The maps also generally agree on the distribution of each type of deposit. These maps show that deposits dominated by eolian processes are found only in the western and northern edges of the Project area. Based on Kenney (2017), these deposits occupy only about 7.5 percent of the Project area. The remainder of the Project area is occupied by deposits dominated by alluvial processes.

Table 3.3-2. General Correlation Between Different Source Maps for Alluvial and Eolian Deposit Information

<table>
<tr><th>General Age</th><th>Deposit Type</th><th>Stone 2006</th><th>Hayhurst and Bedrossian 2010</th><th>Ironwood 2016</th><th colspan="2">Lancaster 2014</th><th colspan="2">Kenney 2017</th></tr>
<tr><td>Holocene</td><td>Eolian</td><td>Qs</td><td>Qe</td><td>Sand dune</td><td>Qe</td><td>Qye</td><td>Qe-ds</td><td>Qe-de</td></tr>
<tr><td>Holocene</td><td>Alluvial</td><td>Qa6 (100 to 2,000 years old)</td><td>Qf (late Holocene)</td><td rowspan="2">Sonoran Creosote bush scrub</td><td colspan="2">Qyf (late Pleistocene and Holocene)</td><td colspan="2" rowspan="2">Qal</td></tr>
<tr><td>Pleistocene</td><td>Alluvial</td><td>Qpv</td><td>Qot (old terrace deposits, late to middle Pleistocene)</td><td colspan="2">Qoa (Pleistocene)</td></tr>
</table>

Onsite Sand Sources

In addition to mapping eolian sand deposits, Kenney (2017) mapped areas that were identified as critically important for eolian sand systems as a sand source and stabilizing moisture for sand dune systems, These areas are typically relatively flat ponding areas found at the ends of desert washes. Alluvial sands are deposited in these areas through stormwater erosion in the surrounding mountains. When the areas dry, the sand deposits are subject to wind erosion and transport to dune areas.

Detailed maps of the eolian deposits on the site are shown in Plates 3 and 6a of Kenney 2017 (Appendix O). The Palowalla SMZ is not specifically indicated on Plate 6a, but Plate 3a shows that it is associated with the light blue area surrounding the west wide of the NRG Blythe PV Project (identified as “Blythe 21 Solar Facility” on the Plate). This area is referred to as a ponding area by Kenney (2017), and the limits of the area were mapped by Huffman-Broadway (2017) using ponding indicators such as desiccation cracks. This ponding area is also mapped as the *Parkinsonia florida-Olneya tesota* alliance by BLM in Figure 3.3-2, and as the FP1 active watercourse, a state jurisdictional water, in Huffman-Broadway (2017). The Palowalla SMZ is known to be currently active, having been formed within the past 150 years as a result of diversion of stormwater flow from the McCoy Mountains underneath Interstate 10. The drainage ends at this ponding area, which itself has been modified in recent years by the construction of the NRG Blythe PV Project (Kenney 2017).

3.3.1.3 Special-Status Plants

Special-status plants are those species that have been afforded special recognition by Federal, state, or local resource agencies or organizations. Special-status species are of relatively limited distribution and typically require unique habitat conditions. For the purposes of this Draft PA/EIS/EIR, special-status plant species are defined as meeting one or more of the following criteria:

1. Listed as threatened or endangered or candidates for future listing as threatened or endangered under the Federal Endangered Species Act (FESA) or California Endangered Species Act (CESA);
2. Designated as BLM Sensitive; or
3. For non-BLM lands, considered by the CNPS to be "rare, threatened, or endangered in California" (CNPS Rank 1A, 1B, and 2) as well as CNPS Rank 3 and 4 plant species.

A list of 33 special-status plant species with potential to occur within the vicinity of the Study Area was generated by searching multiple databases and reference sources for occurrence records. Rare plant surveys were conducted on BLM lands in Fall 2012 (September 11 to 19, 2012), Spring 2013 (March 18 to 30, 2013), and Spring 2017 (May 9 to 14, 2017), and on the private inholding in Spring 2015 (March 10 to 12, 2015). Localized winter rainfall for each rare plant survey was sufficient to germinate abundant annual blooms, and timing was optimal for observing and identifying all potentially occurring target plants.

Six of the 33 special-status plant species were documented during rare plant surveys conducted between Fall 2012 and Spring 2015 (Table 3.3-3; Figure 3.3-3). These include Harwood's milkvetch (*Astragalus insularis var. harwoodii*), Abrams' spurge (*Euphorbia abramsiana*), Utah vine milkweed (*Funastrum utahense*), ribbed cryptantha (*Cryptantha costata*), Harwood's eriastrum (*Eriastrum harwoodii*), and desert unicorn-plant (*Proboscidea altheifolia*). None of these special-status plant species are Federally- or state-listed under FESA or CESA. Harwood's eriastrum is designated as BLM Sensitive. Special-status species documented within the Study Area are described further below.

Table 3.3-3. Special-Status Plant Species Evaluated for Potential Occurrence within the Study Area

Common Name	Scientific Name	Status (State/Federal/BLM/CNPS)[a]	Potential for Occurrence within Study Area
Chaparral sand verbena	*Abronia villosa var. aurita*	-/-/BLM Sensitive/1B.1	**PRESUMED ABSENT**. Potential habitat present on site but not found during surveys.
Angel trumpets	*Acleisanthes longiflora*	-/-/-/2B.3	**ABSENT**. No suitable habitat onsite (rocky carbonate canyon bottoms).
Harwood's milk-vetch	*Astragalus insularis var. harwoodii*	-/-/-/2B.2	**PRESENT**. 26,370 individuals estimated on site.
Borrego milk-vetch	*Astragalus lentiginosus var. borreganus*	-/-/-/4.3	**PRESUMED ABSENT**. Potential habitat present on site but not found during surveys.
Coachella Valley milk-vetch	*Astragalus lentiginosus var. coachellae*	-/FE/-/1B.2	**PRESUMED ABSENT**. Potential habitat present on site but not found during surveys.
Gravel milk-vetch	*Astragalus sabulonum*	-/-/-/2B.2	**PRESUMED ABSENT**. Potential habitat present on site but not found during surveys.
Pink fairy duster	*Calliandra eriophylla*	-/-/-/2B.3	**PRESUMED ABSENT**. Potential habitat present on site but not found during surveys.
Saguaro	*Carnegia gigantean*	-/-/-/2.B.2	**PRESUMED ABSENT**. Not found during surveys, little potential habitat on site.
Emory's crucifixion thorn	*Castela emoryi*	-/-/-/2B.2	**PRESUMED ABSENT**. Potential habitat present on site but not found during surveys.
Abrams' spurge	*Chamaesyce abramsiana*	-/-/-/2B.2	**PRESENT**. 2,104 individuals estimated on site.
Parry's spurge	*Chamaesyce parryi*	-/-/-/2B.3	**PRESUMED ABSENT**. Potential habitat present on site but not found during surveys.
Flat-seeded spurge	*Chamaesyce platysperma*	-/-/BLM Sensitive/1B.2	**PRESUMED ABSENT**. Potential habitat present on site but not found during surveys. No predicted occupied habitat present onsite in DRECP model.
Las Animas colubrina	*Colubrina californica*	-/-/-/2B.3	**ABSENT**. Not found during surveys; no potential habitat on site (rocky wash bottoms & margins).
Foxtail cactus	*Coryphantha alversonii*	-/-/-/4.3	**PRESUMED ABSENT**. Potential habitat present on site but not found during surveys.
Ribbed cryptantha	*Cryptantha costata*	-/-/-/4.3	**PRESENT**. 64,234 individuals estimated on site.
Glandular ditaxis	*Ditaxis claryana*	-/-/-/2B.2	**PRESUMED ABSENT**. Potential habitat present on site but not found during surveys.
California ditaxis	*Ditaxis serrata var. californica*	-/-/-/3.2	**PRESUMED ABSENT**. Potential habitat present on site but not found during surveys.

Table 3.3-3. Special-Status Plant Species Evaluated for Potential Occurrence within the Study Area

Common Name	Scientific Name	Status (State/Federal/BLM/CNPS)[a]	Potential for Occurrence within Study Area
Harwood's eriastrum	*Eriastrum harwoodii*	-/-/BLM Sensitive/1B.2	**PRESENT**. 956 individuals estimated on site. Predicted occupied habitat present onsite in DRECP model.
Utah vine milkweed	*Funastrum utahense*	-/-/-/4.2	**PRESENT**. 1 individual found on site.
Algodones Dunes sunflower	*Helianthus niveus ssp. Tephrodes*	SE/-/BLM Sensitive/1B.2	**PRESUMED ABSENT**. Potential habitat present on site but not found during surveys.
California satintail	*Imperata brevifolia*	-/-/BLM Sensitive/2B.1	**ABSENT**. No suitable habitat on site (moist river plains and canal margins).
Bitter hymenoxys	*Hymenoxys odorata*	-/-/-BLM Sensitive/2B.1	**ABSENT**. No suitable habitat on site (moist river margins and benches).
Crown-of-Thorns	*Koeberlinia spinosa ssp. Tennuispina*	-/-/-/2B.2	**PRESUMED ABSENT**. Potential habitat present on site but not found during surveys.
Graham's fishhook cactus	*Mammillaria grahamii var. grahamii*	-/-/-/2B.2	**PRESUMED ABSENT**. Potential habitat present on site but not found during surveys.
Darlington's blazing star	*Mentzelia puberula*	-/-/-/2B.2	**ABSENT**. No potential habitat present on site (rocky limestone and granite slopes).
Wiggins' cholla	*Opuntia wigginsii*	-/-/-/3.3	**PRESUMED ABSENT**. Potential habitat occurs on site but not found during surveys.
Desert beardtongue	*Penstemon pseudospectabilis ssp. Speudospectabilis*	-/-/-/2B.2	**PRESUMED ABSENT**. Potential habitat present on site but not found during surveys
Lobed ground cherry	*Physalis lobata*	-/-/-/2B.3	**PRESUMED ABSENT**. Potential habitat present on site but not found during surveys.
Desert portulaca	*Portulaca halimoides*	-/-/-/4.2	**PRESUMED ABSENT**. Potential habitat present on site but not found during surveys.
Desert unicorn-plant	*Proboscidea althaeifolia*	-/-/-/4.3	**PRESENT**. 811 individuals estimated on site.
Dwarf germander	*Teucrium cubense ssp. depressum*	-/-/-/2B.2	**PRESUMED ABSENT**. Marginal habitat present on site but not found during surveys.
Jackass clover	*Wislizenia refracta ssp. refracta*	-/-/-/2B.2	**PRESUMED ABSENT**. Potential habitat present on site but not found during surveys.
Palmer's jackass clover	*Wislizenia refracta ssp. palmeri*	-/-/-/2B.2	**PRESUMED ABSENT**. Potential habitat present on site but not found during surveys.

Table 3.3-3. Special-Status Plant Species Evaluated for Potential Occurrence within the Study Area

Common Name	Scientific Name	Status (State/Federal/BLM/CNPS)[a]	Potential for Occurrence within Study Area

[a] **Status Codes**:

Federal

FE = Federally listed, endangered: species in danger of extinction throughout a significant portion of its range
FT = Federally listed, threatened: species likely to become endangered within the foreseeable future

State

SE = State listed as endangered
ST = State listed as threatened
R = State characterized as rare

BLM

BLM Sensitive = Species that require special management consideration to avoid potential future listing under the FESA and that have been identified in accordance with procedures set forth in BLM Manual section 6840 (BLM 2008).

CNPS

California Rare Plant Rank (CRPR):
1A = Includes plants that are both presumed extirpated in California and either rare or extinct elsewhere
1B = Rare, threatened, or endangered in California and elsewhere
2A = Plants presumed extirpated in California but more common elsewhere
2B = Plants rare, threatened, or endangered in California, but more common elsewhere
3 = Plants which need more information
4 = Limited distribution – a watch list
Threat Ranks (follows a CRPR, where applicable):
0.1 = Seriously threatened in California (high degree/immediacy of threat)
0.2 = Fairly threatened in California (moderate degree/immediacy of threat)
0.3 = Not very threatened in California (low degree/immediacy of threats or no current threats known)

Harwood's Milkvetch

Background

Harwood's milkvetch is an annual herb in the Fabaceae with a CNPS Rank of 2B.2. It is known to occur in desert dunes and Mojavean and Sonoran desert scrub at elevations ranging from 0 to 2,300 feet amsl. Its mechanism for dispersal is unknown, but most likely its inflated seed pods get carried by the stiff westerly winds and deposited at some wind-breaking disturbance such as soil berms. According to the CNDDB, there are 39 records of Harwood's milkvetch within five miles of the Project site, and two occurrences that were recorded on the Project site prior to the rare plant surveys that were conducted in 2013 (CDFW 2016).

Survey Results

Large populations of Harwood's milkvetch were documented within the proposed solar facility during Spring 2013 rare plant surveys (Figure 3.3-4). The total estimated count during Spring 2013 surveys was 13,712 individuals. The species was distributed widely across most of the southern half of the Study Area, with concentrated populations along the disturbed berm surrounding the private inholding and some very shallow sand dunes and sand sheets at the southwest corner of the Study Area. The majority of the plants were in fertile condition, often both flowering and fruiting and there appeared to be a robust fruit and seed set in Spring 2013.

Harwood's milkvetch was also found distributed widely across the entire 160-acre private inholding during Sprint 2015 rare plant surveys, with 26,370 individuals found (Figure 3.3-4). The inholding, being a fallow jojoba farm, supports a regular grid of shallow mounds and berms, providing micro-breaks in the flow of wind. Thus, there are opportunities for milkvetch seedpods to drop and accumulate anywhere within the inholding, leading to the large numbers of individuals counted during the survey. The linear distribution of Harwood's milkvetch waypoints as depicted on Figure 3.3-4 is an artifact of the mapping protocol. Actual distribution of this plant was patchy and evenly dispersed across the entire inholding with no evident pattern visually observed, except for its accumulation at breaks in the terrain from artificial berms. The species appears sometimes to profit from re-contouring the native terrain.

Abrams' Spurge

Background

Abrams' spurge is annual herb in the Euphorbiaceae with a CNPS Rank of 2B.2. It is known to occur in Mojavean desert scrub, playas, and sandy/silty Sonoran desert scrubs at elevations ranging from sea level to 3,000 feet amsl. Recent surveys on the nearby MSEP have yielded over 4,000 individuals, and reports of populations in the "tens of thousands" have been observed on Ford Dry Lake and Hayfields Dry Lake (Karl, Pers. comm. 2012). According to the CNDDB, there are 16 records of Abrams' spurge within five miles of the Project site (CDFW 2016).

Survey Results

Abrams' spurge was documented as a few small occurrences and one large population during the Fall 2012 rare plant surveys (Figure 3.3-5). The total number of individuals was estimated to be approximately 2,104. The majority of these individuals exist as depauperate dwarf plants on a cracked-muddy flat at the southwest border of the Study Area. This species was not documented on the 160-acre private inholding during Spring 2015 rare plant surveys.

Utah Vine Milkweed

Background

Utah vine milkweed is a perennial herb in the Apocynaceae with a CNPS Rank of 4.2. It typically grows along wash margins and in sandy/gravelly areas throughout the Sonoran and Mojave deserts of California, sprawling and clambering over common shrubs for support. Flowering from April to September, its elevation range is 300 to 4,700 feet amsl.

The species was documented within the region during rare plant surveys conducted for nearby solar projects. Approximately 5,180 individuals were documented on the MSEP site while 398 were documented on the Modified Blythe Solar Power Project (Modified BSPP) site.

Survey Results

One small individual of Utah vine milkweed was observed within the Study Area during the Spring 2013 rare plant survey (Figure 3.3-6). This individual was located near the northern most border of the Study Area in a shallow runnel margin. This is an insignificant occurrence, especially with respect to large distributed populations found elsewhere in the vicinity of the Study Area (e.g., 5,180 individuals documented on the MSEP site and 398 individuals documented on the Modified BSPP site).

Ribbed Cryptantha

Background

Ribbed cryptantha is an annual herb in the Boraginaceae with CNPS Rank of 4.3. It occurs on fine sandy soil and shallow dunes within Sonoran and Mojavean creosote bush scrub, at an elevation range below 3,200 feet amsl. Flowering from January through May, it has been widely documented from California herbarium records, with several occurrences (including a reference population) within approximately 5 miles of the Study Area.

The species was documented within the region during rare plant surveys conducted for nearby solar projects. Approximately 1,715 individuals were documented on the MSEP site while 71,000 were documented on the Modified BSPP site.

Survey Results

Spring 2013 rare plant surveys documented approximately 64,234 individuals of ribbed cryptantha, exclusively on sandy areas of the Study Area. Some occurrences were so dense that the numbers of individuals were estimated systematically. Very dense populations were recorded along the gen-tie line and on sandy areas southwest of the exiting solar facility (Figure 3.3-7).

Two individuals of ribbed cryptantha were found during Spring 2015 rare plant surveys on the 160-acre private inholding (Figure 3.3-7). Both appear to be waifs and it is unlikely that they would promote establishment of larger populations on the inholding. This occurrence is insignificant when compared to the approximately 56,000 individuals found on deeper sandy areas of the Study Area.

Harwood’s Eriastrum

Background

Harwood's eriastrum is an annual herb in the Polemoniaceae with a CNPS Rank of 1B.2. Harwood's eriastrum is also a BLM Sensitive species. The species is endemic to California, being distributed on sand dunes in desert areas of Riverside, San Bernardino, and San Diego counties. Typically flowering occurs from March to May, its elevation range is 400 to 3,000 feet amsl.

The species was documented within the region during rare plant surveys conducted for nearby solar projects. Approximately 386 individuals were documented on the MSEP site approximately 7 miles north of the Project, while 2,134 were documented on the Modified BSPP site approximately 5 miles north of the Project. According to the CNDDB, there are 14 records of Harwood’s eriastrum within five miles of the Project site, and one occurrence that was recorded on the Project site prior to the rare plant surveys that were conducted in 2013 (CDFW 2016). There is predicted occupied habitat present onsite in the DRECP suitable habitat model.

Survey Results

Figure 3.3-8 shows the occurrences of Harwood’s eriastrum identified in the Project area during the planning and analysis of the Project. This includes occurrences reported to the California Natural Diversity Database (CNDDB) in 2010 and 2011, and occurrences identified in onsite surveys in 2013 and 2017.

Rare plant surveys for the Harwood’s eriastrum, on 10 meter spacing, were conducted on the BLM portion of the Project area in Spring 2013. The results of these surveys documented 882 Harwood's eriastrum individuals within the Study Area; all were found exclusively on sandy areas of the gen-tie line and solar array area. Harwood's eriastrum appears to co-occur sympatrically with ribbed cryptantha, with similar substrate preferences and distribution, although in fewer numbers and more sporadically dispersed (Ironwood 2016).

Additional surveys, also on 10 meter spacing, were conducted on the private land parcel in Spring 2015. No occurrences were found (Ironwood 2016).

Although 2013 and 2015 had slightly higher than average rainfall, even higher rainfall in the winter of 2016/2017 prompted additional surveys in Spring 2017 (WEST 2018). These surveys did not include the areas in which the species had been detected in 2013. Surveys were conducted at 60 meter spacing to identify suitable habitat. In locations where suitable habitat occurred, more detailed surveys were conducted at 10 meters spacing. The 2017 surveys identified occurrences in two locations in which the species had not been identified in 2013. One of these was a single individual in the central portion of the Project site, in a small sand deposit on the downwind side of a creosote bush. This single occurrence is located more than 0.5 miles from any other occurrences of the species. The second location was an occurrence of 73 individuals on sand dunes near the CRSS.

The entire Project area is included within the DRECP suitable habitat model for the species.

Desert Unicorn-Plant

Background

Desert unicorn-plant is a perennial herb in the Martyniaceae with a CNPS Rank of 4.3. It is historically known to occur in sandy Sonoran desert scrub at elevations ranging from 490 to 3,280 feet amsl.

The species was documented within the region during rare plant surveys conducted for nearby solar projects. Approximately 662 individuals were documented on the MSEP site while 1,687 were documented on the Modified BSPP site.

Survey Results

Approximately 811 individuals of desert unicorn-plant were documented during Fall 2012 rare plant surveys within the Study Area (Figure 3.3-9). The number of individuals is an estimate because sometimes a single root tuber might produce two to three above ground leaf rosettes, and closely spaced aboveground stems were counted as separate individuals. The species' distribution was found occasionally on shallow sand sheets, but was mostly seen in creosote bush scrub, on both loose sandy-gravelly soils, and silt deposit areas. It prefers shallow swales where summer monsoonal rainfall collects and soaks the soil. The largest concentrations of this plant were the silty outwash flats on the southwest border of the site, and on similar silt deposit areas near the existing solar facility.

3.3.1.4 Jurisdictional Waters and Wetlands

Field investigations were conducted to determine the extent of state jurisdictional waters and wetlands within the ROW application area during the spring of 2014 and fall of 2015 (Huffman-Broadway Group 2017). Investigations for Federal jurisdictional waters and wetlands were conducted during the spring of 2014 and 2015 (Huffman-Broadway Group 2015).

The state delineation identified the presence of areas potentially subject to CDFW jurisdiction under the Department's Lake and Streambed Alteration Agreement Program (California Fish and Game Code (FGC) Sections 1600-1616). The areas are shown on Figure 4.3-1, along with the overlap of the areas with the different alternative footprints. These areas are primarily on the northern extent of the Study Area, north of the sand dune area, and in the northeastern corner of the Study Area, immediately south of the existing NRG Blythe PV Power Plant. The acreage of the areas is presented in Table 3.3-4. The floodplain area, designated as FP1 is situated at the end of Palowalla Ditch, roughly corresponds to the *Parkinsonia florida-Olneya tesota* vegetation alliance mapped by BLM, and as a ponding area that is critically important for eolian sand systems as a sand source and stabilizing moisture for sand dune systems by Kenney (2017). Specific impacts to this area are discussed in Section 4.3.1.1.

Table 3.3-4. Summary of CDFW Jurisdictional Watercourses in Study Area[1]

Type of Watercourse	Linear Distance in Study Area	Acres in Study Area
Active Channel	5,744 ft	0.13
Dormant Channel	6,778 ft	0.16
Abandoned Channel[2]	45,189 ft	1.04

Table 3.3-4. Summary of CDFW Jurisdictional Watercourses in Study Area[1]

Type of Watercourse	Linear Distance in Study Area	Acres in Study Area
Active Floodplain[3]	NA	Watercourse FP1 – 34.14 acres
		Watercourse FP2 – 32.32 acres
		Watercourse FP3 – 0.51 acres
		Subtotal - 66.98
Total	57,711 ft	68.31

1 – Study Area is defined as the potential development area, plus a buffer of 300 feet. The specific acreage of each type of watercourse that may be impacted is presented in Table 4.3-2.

2 – Abandoned channels are considered to be potentially under CDFW jurisdiction at this time. A final determination of jurisdiction will be made by CDFW through the Streambed Alteration Permit process.

3 - Active floodplains are identified in Huffman-Broadway 2017 with the designation “FP”.

The Federal jurisdictional delineation guidelines, based on the USACE and U.S. Environmental Protection Agency guidance, determined the potential waters of the U.S. within the Study Area totaled 41,932 linear feet of either ephemeral riverine intermittent streambed (40,349 linear feet) or excavated ephemeral riverine intermittent streambed (1,583 linear feet). Of these potential Federal waters, none were categorized as streambeds subject to Section 10 of the Rivers and Harbors Act of 1899. Additionally, all of the 41,932 linear feet of potential Federal waters were determined by the Corps to be intrastate isolated waters with no apparent interstate or foreign commerce connection, and are therefore excluded from Clean Water Act jurisdiction.

3.3.1.5 Cacti

Systematic sampling of succulents (cacti) was conducted during Fall 2012 rare plant surveys. Yuccas were not found on site, but three species of cactus were documented within the Study Area. The cacti were not recorded with GPS waypoints or in the electronic database; however, they were tallied and represent a good census of all cacti onsite. No cacti were observed on the inholding. The estimated totals of all cacti found on site are as follows:

- silver cholla (*Cylindropuntia echinocarpa*): 106 individuals;
- common fish hook cactus (*Mammillaria tetrancistra*): 11 individuals; and
- barrel cactus (*Ferocactus cylindraceus*): 1 individual.

3.3.1.6 Invasive Weeds

Invasive weeds are defined as species of nonnative plants that are included on the California Invasive Plant Council’s (CAL-IPC) list of invasive species for the Mojave Desert, have a rating of High or Moderate (CAL-IPC 2015) and are included on the United States Department of Agriculture (USDA) database of Federal Noxious Weeds (USDA 2015a), the USDA California state-listed Noxious Weeds (USDA 2015b), California Department of Food and Agriculture’s (CDFA) Noxious Weed List (CDFA 2015), and the BLM National List of Invasive Weed Species of Concern (BLM 2008). Weeds are commonly categorized as either noxious, invasive, or both. The differences in definition lie in both legislative- and action-oriented considerations.

Invasive weeds are of particular concern in wildlands because of their potential to degrade habitat and disrupt the ecological functions of an area (Cal-IPC 2006). Specifically, noxious and invasive weeds can alter habitat structure, increase fire frequency and intensity, decrease forage (including for special-status species, such as Mojave desert tortoise), exclude native plants, and decrease water availability for both native plants and animals. Soil disturbance and gathering and channeling water create conditions favorable to the introduction of new noxious and invasive weeds or the spread of existing populations. Construction equipment, fill, and mulch can act as vectors introducing noxious and invasive weeds into an area.

Per the Project's IWMP, there are six target invasive weed species observed on the Study Area during rare plant surveys (Table 3.3-5). Each of these species is described further below. Four additional nonnative plants, including lamb's quarters, nettleleaf goosefoot, prostate knotweed, and puncture vine, were scarce in occurrence on the Project site and have low invasive potential, and thus, are not considered target invasive weed species on the Project site.

Table 3.3-5. Target Invasive Weeds Documented in the Study Area

Common Name	Scientific Name	Abundance in the Study Area	BLM Risk Rating
Sahara mustard	*Brassica tournefortii*	Widespread, locally abundant on sand	Highly invasive
Bermuda grass	*Cynodon dactylon*	Scarce	Low
Eucalyptus	*Eucalyptus* sp.	Scarce	Low
Russian thistle	*Salsola tragus*	Abundant on sand	Moderate
Mediterranean grass	*Schismus barbatus*	Widespread	Moderate
Tamarisk	*Tamarix ramosissima*	Scarce	Low

Sahara mustard is the most aggressive and abundant invasive plant within the Study Area. It is diffusely distributed throughout the Study Area on many habitats, and locally abundant throughout the sandier areas of the Study Area (e.g., along the gen-tie line). Millions of individuals were observed flowering and fruiting during the Spring 2013 rare plant survey. This species spreads easily, and its degree of invasiveness has been listed as 'high' by Cal-IPC. Its BLM risk rating for spread on the Project site is considered high. Minimal winter rains can germinate multiple leaf rosettes, many of which can bolt and produce seed in a short time. Potential for Sahara mustard to expand its presence across other less sandy areas of the site remains high, especially if aided by soil surface disturbance.

Figure 3.3-10 shows the heaviest infestations of Sahara mustard on the site. Although it generally invades sandy areas, the surveyors noticed that it is most abundant along the shallow margins and skirts of the major dune systems on the west portion of the Study Area. It also dominates shallow sand sheets elsewhere, as well as certain sand accumulations adjacent to abandoned agriculture fields.

Sahara mustard had very little presence on the 160-acre private inholding. This goes against the common association of disturbed areas becoming breeding grounds for weeds. In fact, both of the main agricultural fields seemed to support very few invasive weeds at all.

Russian thistle (*Salsola tragus*) was observed mostly on the gen-tie line sand dune areas, with occasional small occurrences across disturbed areas of the site. This plant represents the second most common weed onsite after Sahara mustard. Occasional locally abundant populations are to be expected associated with soil disturbance and loose sand. This species is considered limited in its degree of invasiveness by Cal-IPC, and it is considered a noxious weed by the California Department of Food and Agriculture (CDFA 2011). Its BLM risk rating for spread on the Project site is considered moderate.

Mediterranean grass (*Schismus barbatus*) is widespread across the site (including the 160-acre private inholding) in many habitats but never “abundant.” This plant is so widespread across many California deserts that it has become the dominant annual grass in many situations. Although it is very common, it poses only a slight ecological type conversion risk in this locally harsh situation. This species is considered limited in its degree of invasiveness by Cal-IPC. Its BLM risk rating for spread on the Project site is considered moderate.

Bermuda grass (*Cynodon dactylon*) was observed in the *Parkinsonia florida-Olneya tesota* alliance along the northern part of the site adjacent to an existing solar facility. Two small patches were seen growing in the shade of ironwoods. They were in robust condition, flowering and fruiting. It occurs as a weed in disturbed areas throughout California at elevations below 3,000 feet, and is considered moderately invasive by Cal-IPC. Due to the conditions on the Project site, its BLM risk rating for spread on the Project site is considered low.

Eucalyptus (*Eucalyptus* sp.) occurs only as a couple of planted individuals on the north margin of the site on the border of an existing solar facility. Its potential for invasiveness is low due to the harsh conditions of the local landscape.

Tamarisk (*Tamarix ramosissima*) occurs as only a couple of dwarfed individuals on the north margin of the site at the border of the existing solar facility. This species spreads easily in riparian areas and lake margins with perennial water supply, and its degree of invasiveness has been listed as ‘high’ by Cal-IPC. Furthermore, it is considered a noxious weed by the California Department of Food and Agriculture (CDFA 2011). Its BLM risk rating for spread on the Project site is considered low. However, the risk rating could differ if the Project were to introduce ponds.

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3.4 Biological Resources – Wildlife

This section describes the environmental setting relevant to wildlife resources and special-status wildlife species that are present within and surrounding the Project area. It also lists the special-status wildlife species that have potential to occur but that were not observed during focused wildlife surveys. This section is based, in part, upon information from these sources:

1. Biological Resources Technical Report (Ironwood 2016, provided in Appendix M);
2. California Natural Diversity Database (CDFW 2016);
3. Northern and Eastern Colorado Desert Coordinated Management Plan (NECO Plan Amendment to the CDCA Plan) (BLM 2002); and
4. BLM Special Status Animal Species by Field Office (BLM 2014).

Generally, the Study Area for wildlife resources included a 5,045-acre area consisting of public lands administered by the BLM (4,885 acres) and private land under the land use jurisdiction of Riverside County (160 acres). The privately-owned portion of the Study Area is generally referred to herein as the “160-acre private inholding.” In some instances species-specific survey protocols required survey buffers, resulting in a larger Study Area (e.g., golden eagle and bat surveys). Survey buffers are discussed where necessary under species-specific discussions.

3.4.1 Environmental Setting

The Study Area supports a variety of desert-adapted wildlife that use the vegetation alliances described in Section 3.3, *Biological Resources - Vegetation*. Wildlife observed within the Study Area during biological surveys was representative of the western Sonoran Desert. Bird species documented during surveys, listed in order of most-to-least frequently observed, included black-throated sparrow (*Amphispiza bilineata*), horned lark (*Eremophila alpestris*), common raven (*Corvus corax*), Brewer's sparrow (*Spizella breweri*), white-crowned sparrow (*Zonotrichia leucophrys*), house finch (*Carpodacus mexicanus*), and ash-throated flycatcher (*Myiarchus cinerascens*). Brewer’s sparrow and White-crowned Sparrow are passing migrants and winter residents only. Reptile species documented during surveys included Mojave fringe-toed lizard (*Uma scoparia*), Great Basin whiptail (*Cnemidophorus tigris*), side-blotched lizard (*Uta stansburiana*), zebra-tailed lizard (*Callisaurus draconoides*), desert iguana (*Dipsosaurus dorsalis*), and desert horned lizard (*Phrynosoma platyrhinos*). Six Mojave desert tortoise carcasses and one set of tortoise tracks were also observed on the Project site. Small mammal trapping documented the desert kangaroo rat (*Dipodomys deserti*), Merriam's kangaroo rat (*Dipodomys merriami*), desert woodrat (*Neotoma lepida*), Pacific pocket mouse (*Perognathus longimembris*), pocket mouse (*Chaetodipus spp.*), southern grasshopper mouse (*Onychomys torridus*), and round-tailed ground squirrel (*Spermophilus tereticaudus*). Species of amphibians and fish were not detected within the Study Area. Potential habitat for desert amphibian species (Couch’s spadefoot toad) exists in the Study Area.

The Study Area is not located within any ACECs, Desert Tortoise ACECs, BLM wilderness areas, or USFWS-designated critical habitat. The Mule Mountains ACEC, which was established to manage prehistoric resources, is located less than one mile west of the Study Area. The Chuckwalla Desert Tortoise ACEC for Mojave desert tortoise is located approximately five miles west of the Study Area. The Chuckwalla Unit of Mojave desert tortoise critical habitat is approximately 15 miles west of the Study Area.

The NECO Plan Amendment to the CDCA Plan addresses conservation of the bighorn sheep through the designation of Bighorn Sheep Wildlife Habitat Management Areas (WHMAs). The McCoy Mountains WHMA is located approximately 0.5-mile north of the Study Area's ROW Boundary, immediately north of Interstate 10, and the Mule Mountains WHMA is located approximately 0.9-mile southwest of the Study Area's ROW Boundary. These two WHMAs (shown in Figure 3.4-10) are currently listed as unoccupied range (BLM 2002). Lastly, a Herd Management Area (HMA) for burros is located approximately five miles south of the Study Area.

3.4.1.1 Special-Status Wildlife Species

Special-status wildlife species are those afforded special recognition by Federal, state, or local resource agencies or organizations. Special-status wildlife species have relatively limited distribution and typically require unique habitat conditions. For the purposes of this Draft PA/EIS/EIR, special-status wildlife species are defined as meeting one or more of the following criteria:

1. Listed as threatened or endangered or candidates for future listing as threatened or endangered under the Federal Endangered Species Act (FESA) or California Endangered Species Act (CESA);
2. Protected by the Bald and Golden Eagle Protection Act (BGEPA);
3. Designated as BLM Sensitive;
4. Designated by CDFW as a Species of Special Concern (SSC);
5. Designated as a Fully Protected Species per FGC Sections 3511, 4700, 5050, and 5515; or
6. Protected under FGC Section 4000 (fur-bearing mammals).

A list of 29 special-status wildlife species meeting the criteria above and with potential to occur within the vicinity of the Study Area was generated by searching multiple databases and reference sources for occurrence records, including the following:

- U.S. Fish and Wildlife Service Information for Planning and Conservation (IPaC, online at https://ecos.fws.gov/ipac/);
- California Natural Diversity Database (CNDDB);
- California Wildlife Habitat Relationship System (CWHRS, online at *http://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx*); and
- DRECP modeled suitable habitat layers.

Sixteen of these 29 special-status wildlife species or their sign were observed during Project-specific surveys performed between Fall 2012 and Spring 2015 (Table 3.4-1). Avian species solely protected by the Migratory Bird Treaty Act (MBTA) and FGC Sections 3503, 3503.5, and 3513 are excluded from Table 3.4-1 given that these regulations afford protection to most avian species occurring naturally in North America. While excluded from Table 3.4-1, avian-specific surveys were conducted to determine presence and evaluate risks to all migratory birds and raptors.

Special-status species exclude wild horses and burros. While these species are protected under the Wild Free-Roaming Horse and Burro Act, they are not generally considered special-status wildlife species given that they are introduced species to North America and are afforded protection primarily given their historic relevance in the western U.S. The potential presence of wild horses and burros is discussed further in Section 3.4.1.2.

Special-status wildlife species detected during Project-specific surveys are discussed further below. Species for which evidence of occurrence was detected and those likely to occur are also discussed. Generally, special-status wildlife species for which species-specific surveys were performed are discussed separately whereas discussions of some special-status species detected during general inventories (i.e., migratory birds and bats) are grouped.

Table 3.4-1. Special-Status Wildlife Species Evaluated for Potential Occurrence within the Study Area

Common Name	Scientific Name	Status (State/Federal/BLM)[a]	Potential for Occurrence within Study Area
Amphibians			
Couch's spadefoot toad	*Scaphiopus couchii*	SSC/-/BLM Sensitive	**LOW POTENTIAL.** No Couch's spadefoot individuals were observed during surveys conducted between 2008 and 2013. However, two locations identified as likely to support were identified, and were inspected after heavy rains from 2008 to 2013. These areas were found to not hold water for a period of 8 days. Surveys of the CRSS for other projects identified the species in that area. Predicted occupied habitat present on a portion of the site in DRECP model.
Reptiles			
Mojave (Agassiz's) Desert tortoise	*Gopherus agassizii*	ST/FT/-	**PRESENT – Resident (low numbers)**. Study Area is located within BLM Category III Mojave desert tortoise habitat. Six carcasses and one set of fresh tracks found in Study Area during focused surveys. One live adult female Mojave desert tortoise was observed within the buffer area during avian surveys. Predicted occupied habitat present onsite in DRECP model.
Mojave fringe-toed lizard	*Uma scoparia*	SSC/-/BLM Sensitive	**PRESENT – Resident**. Presence confirmed during herpetofaunal surveys. Approximately 241 individuals observed in areas supporting fine sand or sandy loam soils. Predicted occupied habitat present onsite in DRECP model.
Birds			
Cooper's hawk	*Accipiter cooperi*	SSC/-/-	**PRESENT - Foraging.** Observed foraging during Fall 2013 and Spring/Fall 2014 surveys. Nesting habitat limited. May forage year-round.
Western burrowing owl	*Athene cunicularia hypugaea*	SSC/-/BLM Sensitive	**PRESENT – Resident**. Observed during focused surveys. Predicted occupied habitat present onsite in DRECP model.
Elf owl	*Micrathene whitneyi*	SE/-/BLM Sensitive	**ABSENT**. Suitable habitat was not present.in the Study Area or surrounding 1-mile. No predicted occupied habitat present onsite in DRECP model.
Golden eagle	*Aquila chrysaetos*	CFP/BGEPA/BLM Sensitive	**MODERATE POTENTIAL – Foraging**. Observed within 10-mile survey buffer. Nesting habitat is absent from Project Site but nests and active territories potentially located within 10-mile buffer. One nest occurrence is identified within the 10-mile radius, in the McCoy Mountains, in the DRECP. No predicted occupied habitat present onsite in DRECP model.
Ferruginous hawk	*Buteo regalis*	-/-/BLM Sensitive	**PRESENT – Foraging/Migration**. Nesting habitat absent. May use site vicinity for overwintering. No predicted occupied habitat present onsite in DRECP model.
Swainson's hawk	*Buteo swainsoni*	ST/-/-	**PRESENT – Foraging/Migration**. Nesting habitat absent. May be present (foraging) during summer and during fall migration.

Table 3.4-1. Special-Status Wildlife Species Evaluated for Potential Occurrence within the Study Area

Common Name	Scientific Name	Status (State/Federal/BLM)[a]	Potential for Occurrence within Study Area
Vaux's swift	*Chaetura vauxi*	SSC/-/-	**PRESENT – Foraging/Migration.** Nesting habitat absent. May be present (foraging) during summer and fall prior to migration.
Western snowy plover	*Charadrius alexandrines nivosus*	SSC/FT/-	**LOW POTENTIAL – Migration**. Nesting habitat not present. May be a rare migrant vagrant to the area if ephemeral water is present
Northern harrier	*Circus cyaneus*	SSC/-/-	**PRESENT –Resident/Migration**. Nesting habitat limited in agricultural settings nearby. May use site vicinity for overwintering.
Peregrine falcon	*Falco peregrinus anatum*	CFP/-/-	**MODERATE POTENTIAL – Foraging/Migration**. Nesting habitat absent from vicinity of Study Area. May occur (foraging) during migration.
Loggerhead shrike	*Lanius ludovicianus*	SSC/-/-	**PRESENT – Resident**. Nesting habitat present. Many individuals observed within the Study Area.
Vermilion flycatcher	*Pyrocephalus rubinus*	SSC/-/-	**LOW POTENTIAL – Resident/Foraging**. Nesting habitat limited. May be present (foraging) year-round.
Bendire's thrasher	*Toxostoma bendirei*	SSC/-/BLM Sensitive	**LOW POTENTIAL – Resident**. Nesting habitat present.
Crissal thrasher	*Toxostoma crissale*	SSC/-/-	**LOW POTENTIAL – Resident**. Nesting habitat present.
Le Conte's thrasher	*Toxostoma lecontei*	SSC/-/BLM Sensitive	**PRESENT – Resident**. Nesting habitat present.
Mammals			
Pallid bat	*Antrozous pallidus*	SSC/-/BLM Sensitive	**PRESENT – Foraging.** Species detected during acoustic surveys as a foraging species; no roosting habitat occurs onsite. Predicted occupied habitat present onsite in DRECP model.
Townsend's big-eared bat	*Corynorhinus townsendii*	SSC, CT/-/BLM Sensitive	**LOW POTENTIAL – Foraging.** No roosting habitat occurs, but the species may potentially forage onsite. Predicted occupied habitat present onsite in DRECP model.
Western mastiff bat	*Eumops perotis californicus*	SSC/-/BLM Sensitive	**PRESENT – Foraging.** Species detected during acoustic surveys. This species has a low potential to roost onsite.
Pocketed free-tailed bat	*Nyctinomops femorosaccus*	SSC/-/-	**PRESENT – Foraging.** Species detected during acoustic surveys. This species has a low potential to roost onsite.
Western red bat	*Lasiurus blossevillii*	SSC/-/-	**LOW POTENTIAL – Foraging.** No roosting habitat occurs, but the species may potentially forage onsite.
California leaf-nosed bat	*Macrotus californicus*	SSC/-/BLM Sensitive	**MODERATE POTENTIAL – Roosting/Foraging.** Roosting and foraging habitat occurs onsite, although not documented during acoustic surveys. Predicted occupied habitat present onsite in DRECP model.

Table 3.4-1. Special-Status Wildlife Species Evaluated for Potential Occurrence within the Study Area

Common Name	Scientific Name	Status (State/Federal/BLM)[a]	Potential for Occurrence within Study Area
Cave myotis	*Myotis velifer*	SSC/-/ BLM Sensitive	**PRESENT – Foraging.** Species detected during acoustic surveys. Closest known maternity colony is located at the Hodge Mine, approximately 3.4 miles south of the study area.
American badger	*Taxidea taxus*	SSC/-/-	**PRESENT – Resident**. No live badgers were seen. Evidence that badgers utilize the Project site. Predicted occupied habitat present onsite in DRECP model.
Desert kit fox	*Vulpes macrotis arsipus*	FCG 4000-4012/-/-	**PRESENT- Resident**. Nine individuals documented during surveys.
Desert bighorn sheep	*Ovis Canadensis nelsoni*	-/-/-	**LOW POTENTIAL –** WHMAs located 0.5 miles north and 0.9 miles southwest of Project.
Burro deer	*Odocoileus hemionus eremicus*	-/-/-	**MODERATE POTENTIAL –** No records of this species are found for the site, it has a moderate potential to utilize the surrounding area for foraging or movement.

[a] **Status codes:**

State

SE = State listed as endangered; ST = State listed as threatened; CT = State candidate as threatened
SSC = California Species of Special Concern. Species of concern to CDFW because of declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction
CFP = California Fully Protected Species WL = State watch list
FGC 4000-4012 = Fish and Game Code Sections 4000 through 4012 – California regulations addressing fur-bearing mammals

Federal

FE = Federally listed endangered: species in danger of extinction throughout a significant portion of its range; FT = Federally listed, threatened: species likely to become endangered within the foreseeable future
BGEPA = Bald and Golden Eagle Protection Act

Bureau of Land Management

BLM Sensitive = Species that require special management consideration to avoid potential future listing under the FESA and that have been identified in accordance with procedures set forth in BLM Manual section 6840.

Mojave Desert Tortoise

Background

Agassiz's Mojave desert tortoise is a long-lived, medium-sized, burrowing, terrestrial turtle in the family Testudinidae. They grow slowly, reach sexual maturity at a delayed age, and live long lives; they have low reproductive output each year, but can reproduce for many years and show no reproductive senescence; their eggs and hatchlings have very low survivorship but adults display high survivorship. Populations are able to overcome low annual reproductive rates and low survivorship of eggs and young because of the long, reproductive lives and high survivorship of adult females. Thus, human activities that negatively affect population density and survival of individual adult tortoises are likely to cause declines in tortoise populations (Doak et al. 1994; Wisdom et al. 2000; Reed et al. 2009; Tuma et al. 2016).

Agassiz's Mojave desert tortoise was listed under the Endangered Species Act (ESA) by the USFWS following concerns that several populations had undergone significant and precipitous declines. In response to reports of die-offs from scientists and managers in the field, the USFWS emergency-listed tortoise populations located north and west of the Colorado River in California, Nevada, Utah, and the northwestern portion of Arizona as Endangered on August 4, 1989. The USFWS subsequently changed the desert tortoise to Threatened status on April 2, 1990. The desert tortoise was listed as Threatened by the State of California on August 3, 1989. The Project area is within the Colorado Desert Recovery Unit of the Mojave Population of the Desert Tortoise (USFWS 2011a).

Agassiz's Mojave desert tortoise occupies a broad range of landforms throughout the Mojave and Colorado Deserts, at elevations ranging from below sea level to 2,225 meters (7,300 feet) amsl (Luckenbach 1982). Within California, the most favorable habitat occurs at elevations of approximately 305 to 914 meters (1,000–3,000 feet) amsl (Luckenbach 1982), though more recent evidence from range-wide monitoring efforts indicates the desert tortoises are consistently documented above 914 meters (3,000 feet) (USFWS 2006a, 2011). Luckenbach (1982) reported that desert tortoises are often found on valley bottoms and on bajadas; Bury et al. (1994) determined desert tortoises in the eastern Mojave Desert occur on a variety of landforms from flats and bajadas to rocky slopes. Andersen et al. (2000) found that higher tortoise densities were encountered in areas with loamy soils. Mojave desert tortoises typically occupy habitats dominated by creosote bush scrub at lower elevations, and blackbrush scrub and juniper woodland ecotones at higher elevations (Germano et al. 1994). Luckenbach (1982) reported that the most favorable habitats within California contained a high diversity of perennial plant species and high production of annual plant (forage) species. Mojave desert tortoises in California are mostly distributed among four communities, including creosote scrub, cactus scrub, saltbush scrub, and Joshua Tree woodland, but are most commonly found in desert scrub vegetation communities dominated by creosote (Luckenbach 1982). Mojave desert tortoises use cover sites such as soil burrows, pallets, and caliche caves (Bulova 1994; O'Connor et al. 1994). Tortoises hibernate, aestivate, or rest in subterranean burrows or caves, spending as much as 98 percent of their time underground (Marlow 1979; Nagy and Medica 1986).

Mojave desert tortoises are active during the spring, summer, and fall periods, and generally inactive during the winter. Tortoises begin their spring activity period upon emergence from hibernacula. In the eastern Mojave Desert, Mojave desert tortoises emerge from hibernacula between mid-February and late April (Rautenstrauch et al. 1998; Nussear et al. 2007); in the western Mojave Desert, tortoises emerge from hibernacula between early March and late April (Burge 1977). Tortoises are most active between mid-April and mid-May, a period when they forage on spring annual plants. Mojave desert tortoises are herbivorous, consuming a diet of annual, perennial, and grass species. The majority of their diet consists of the succulent parts and blooms of spring annual plants. For approximately 60-65 days between mid-May and mid-July, tortoise activity declines significantly due to increasing temperatures and precipitation, and most enter a period of dormancy called aestivation. Mojave desert tortoises are typically activated from aestivation when mid-summer thunderstorms produced by the North American Monsoon between early to mid-July and September provide opportunities for drinking. Mojave desert tortoises remain active until late October, when most enter a second dormancy period – hibernation. Tortoises in the northeastern portion of the species' range may hibernate for as long as six months (Woodbury and Hardy 1948; Bury et al. 1994).

Mojave desert tortoises occupy home ranges that include cover sites, mates, mineral salt licks, and drinking sites, and have a "remarkable" knowledge of the locations of these resources within their homes ranges, and often travel along well-worn paths (Berry 1986). Arguably the most important resources within the home ranges of tortoises are cover sites, particularly burrows and caliche caves. Not only do cover sites offer protection from extreme temperatures and predators, but they also serve as nest site locations and centers for social interactions among tortoises, particularly mate-seeking. Males typically use more cover sites, cover greater distances, and use larger areas as they search for females to court and copulate (Burge 1977; Bulova 1994; O'Connor et al. 1994).

The decline in Mojave desert tortoise population densities and abundances since the 1970s has been attributed to numerous threats, and the plight of the desert tortoise has been described as a "death by a thousand cuts." In the final rule for Endangered Species Act listing, the USFWS attributed population decline to two major factors: 1) habitat loss and degradation caused by human activities such as OHV use, urbanization, agriculture, energy development, military training, mining, and livestock grazing; and 2) mortality of individual desert tortoises to disease (URTD), increased predation by common ravens, collection by humans for pets or consumption, and collisions with vehicles on paved and unpaved roads (USFWS 1990). These threats and others have cumulatively contributed to desert tortoise population declines within the Mojave Population of the species, which includes the Colorado Desert Recovery Unit (USFWS 2011a). Anthropogenic threats are exacerbated during droughts, and can lead to disease outbreaks where multiple threats combine to add stress to tortoise populations.

The Project is located in the historic range of Agassiz's Mojave desert tortoise, but anthropogenic disturbances in the Project vicinity, including agriculture, OHV recreation, utility corridors, roads, and other developments, and residential trash dumping, appear to have limited tortoise populations in the vicinity. According to the CNDDB, there are 16 occurrences for Mojave desert tortoise within five miles of the Project (CDFW 2016). The observations suggest that Mojave desert tortoise populations in the vicinity of the Project are most dense on bajadas of nearby mountain ranges, particularly along the north slopes of the Mule Mountains situated southwest of the Project. They appear to be largely absent from the valley floors, though they may access them during April and May when annual forage plants are in bloom, and during dispersal movements between the Mule Mountains and the McCoy Mountains located to the north.

Survey Results

Full-coverage protocol Mojave desert tortoise surveys were conducted in Spring 2013 to document tortoise sign (e.g., live tortoises, shell/bone/scutes, scat, burrows/pallets, tracks, and egg shell fragments) within the Study Area. Mojave desert tortoise surveys followed the most current USFWS survey protocol (USFWS 2010) and consisted of belt transects approximately 10 meters wide to provide 100 percent coverage of the portion of the Study Area administered by BLM (i.e., 4,885 acres). Preliminary baseline herpetofaunal investigations and visual encounter surveys were not performed on the 160-acre private inholding. However, a habitat assessment of the inholding was conducted in Spring 2015 by walking 100 percent of the parcel. There is predicted occupied habitat present onsite in the DRECP suitable habitat model.

Mojave desert tortoise sign found during protocol surveys included six carcasses (Figure 3.4.1). All carcasses were disarticulated and over four years of age. No live Mojave desert tortoises or tortoise burrows were detected during protocol surveys. In addition to the carcasses found during protocol surveys, a set of Mojave desert tortoise tracks was found incidental to protocol surveys by Alice Karl, PhD. during the botany surveys in March 2013 traveling north across the dunes (Figure 3.4.1). Also, a live Mojave desert tortoise individual was observed on September 4, 2014, incidentally during avian surveys, approximately 1.3 kilometers from the southern boundary of the proposed Project site (Figure 3.4-1). This individual was an adult female and was observed foraging in the open. The general habitat and wildlife surveys performed on the 160-acre private inholding, which included focused surveys for burrowing owl and rare plants, did not find any burrows that would be associated with Mojave desert tortoise. Although the entire Project site could be considered suitable Mojave desert tortoise habitat, the lack of burrows and observations of 6 older, disarticulated tortoise carcasses and a set of fresh tortoise tracks during surveys of the Project site in 2013 (Ironwood 2016) appear to suggest that Mojave desert tortoises occasionally disperse through the area.

The USFWS protocol provides methods to estimate the abundance of tortoises occurring within a survey area. However, the USFWS density calculation algorithm is dependent upon documenting live tortoises during protocol surveys. Since no live Mojave desert tortoises were observed within the Study Area during protocol surveys, the USFWS algorithm cannot be used to estimate the Mojave desert tortoise population density. Based on the CNDDB records in the Project vicinity and survey results within and adjacent to the Project, tortoise densities in the Project site are very low, likely less than one tortoise per square kilometer. This is consistent with tortoise densities on the nearby MSEP, where densities were estimated to be 0.2 tortoises/km^2.

Figure 3.4-2 shows the situation of the Project with respect to the USGS desert tortoise habitat model. This shows the Project area to be situated within an area with a predicted habitat potential model score of 0.5, which is the mid-range on a scale of 0 to 1. The Project area is not mapped as predicted occupied habitat in the habitat layers for the DRECP analysis, and is not included in any Tortoise Conservation Areas or linkages in Figure D-16 of DRECP.

Mojave Fringe-Toed Lizard

Background

The Mojave fringe-toed lizard (*Uma scoparia*) is designated as a BLM Sensitive species and CDFW SSC. This species is endemic to southern California deserts and Arizona, where it is restricted to eolian sand habitats in the deserts of Inyo, Los Angeles, Riverside and San

Bernardino Counties. The species is restricted to areas with fine aeolian sand including both large and small dunes, margins of dry lakebeds and washes, and isolated pockets against hillsides. The species may also share specific habitat requirements that the closely related Coachella Valley Fringe-toed lizard (*Uma inornata*) needs, such as access to shaded sand for thermoregulatory burrowing (Muth 1991). Distribution of the Mojave fringe-toed lizard is naturally fragmented because of their obligate habitat specificity to eolian sand, a patchy habitat type (Murphy et al. 2006). According to the CNDDB, there are 14 records of Mojave fringe-toed lizards within five miles of the Project site and two records within the Project site (CDFW 2016). The DRECP suitable habitat model predicts occupied habitat is present onsite.

The Mojave fringe-toed lizard is found in arid, sandy, sparsely vegetated habitats and is associated with creosote scrub throughout much of its range (Norris 1958; Jennings and Hayes 1994). Windblown sand is required for the lizard's life cycle. This species is restricted to habitats of fine, loose eolian sand, typically with sand grain size no coarser than 0.375 mm in diameter (Turner et al. 1984; Jennings and Hayes 1994; Stebbins 1944). Mojave fringe-toed lizard diets consist of insects such as, but not limited to, ants, sand cockroaches, grasshoppers and spiders.

Mojave fringe-toed lizards normally hibernate from November to February, emerging from hibernation sites from March to April. The breeding season is April to July, and adult Mojave fringe-toed lizards reach sexual maturity two summers after hatching (Jennings and Hayes 1994; USFWS 2011b). From April to May, while temperatures are relatively cool, this species is active during mid-day; from May to September, lizards are active in mornings and late afternoon, but seek cover during the hottest parts of the day. Mojave fringe-toed lizards can usually be found burrowed in the sand on the side of the dunes.

Survey Results

Two preliminary baseline herpetofaunal investigations from October 22 to 23, 2012 and March 25 to April 12, 2013 and one visual encounter survey in Spring 2013 were completed on the portion of the Project site administered by BLM (i.e., 4,885 acres and additional buffer area). Herpetological surveys also included the 160-acre private inholding. Preliminary baseline herpetofaunal investigations consisted of walking belt transects approximately 10 meters wide to provide 100 percent coverage of the portion of the Project site administered by BLM. The visual encounter survey, which is a more intensive survey compared to baseline investigations, was performed along 12 transects (ten on-site and two in a one-mile buffer zone). Preliminary baseline herpetofaunal investigations and visual encounter surveys were not performed on the 160-acre private inholding. However, a habitat assessment of the inholding was conducted in Spring 2015 by walking 100 percent of the parcel.

The presence of the Mojave fringe-toed lizard within the Study Area was confirmed during herpetofaunal surveys. Occurrences of the species are shown in Figure 3.4-3, overlaid on the vegetation alliances. Thirteen individuals determined to be of the genus *Uma* were collected briefly to identify them to the species level using the inter-naris scale pattern, as recommended by Stebbins and McGinnis (2012). All individuals were determined to be Mojave fringe-toed lizard, as opposed to the Colorado Desert fringe-toed lizard (*Uma notata*) or the Coachella Valley fringe-toed lizard (*Uma inornata*). The Project site is coincident with a portion of the range of the Mojave fringe-toed lizard, but is not coincident with the ranges for either the Colorado Desert fringe-toed lizard or the Coachella Valley fringe-toed lizard. Therefore, it is assumed that all observations of *Uma* recorded during herpetofaunal surveys are the Mojave fringe-toed lizard. Approximately 241 individuals were detected during herpetofaunal surveys. Observations of Mojave fringe-toed lizards were confined to the northwest corner and gen-tie line portion of the Project site (Figure 3.4-3).

The habitat assessment of the 160-acre private inholding determined that this area does not have suitable habitat for fringe-toed lizards. No lizards or evidence of lizards utilizing the 160-acre inholding were found.

Couch's Spadefoot Toad

Background

Couch's spadefoot toad (*Scaphiopus couchii*) is a CDFW Species of Special Concern and a BLM Sensitive species. It is found where substrate is capable of sustaining temporary breeding pools for at least nine days (to allow larval development), and loose enough to permit burial in subterranean burrows. Breeding habitat includes temporary impoundments at the base of dunes as well as road or railroad embankments, temporary pools in washes or channels, pools that form at the downstream end of culverts, and playas. There are reports from other projects of the species being present at the CRSS. There is predicted occupied habitat present onsite in the DRECP suitable habitat model.

Survey Results

The BRTR (Ironwood 2016) identified 27 locations within the Study Area that had standing water at some point between 2008 and 2012. Two of these locations were identified as likely to support the species, due to their extent and association with dry desert wash woodland plant species. One of these was the *Parkinsonia florida-Olneya tesota* alliance area located near the NRG Blythe Solar facility (also identified in Huffman-Broadway [2017] as floodplain FP-1), and the other was located in the buffer outside of the Project area. Both locations were visited after heavy rains between 2008 and 2012 to determine if they held ponded water for more than 8 days, and they were also subjected to monitoring during the monsoon season in the summer of 2013. Neither area was determined to hold ponded water for more than 8 days.

Western Burrowing Owl

Background

The western burrowing owl (*Athene cunicularia hypugaea*) is a CDFW SSC. Burrowing owls inhabit open dry grasslands and desert scrubs throughout much of the western U.S. and southern interior of western Canada. They are typically a year-round resident in much of California (Gervais et al. 2008). There is predicted occupied habitat present onsite in the DRECP suitable habitat model.

Little is understood about the migratory and post-breeding dispersal movements of burrowing owls. Breeding populations from the northern range of the species are apparently migratory, though southern California populations are probably year-round residents (Thomsen 1971). Increases in winter population sizes within southern California, particularly within the Imperial Valley, are probably the result of immigration of owls from more northerly areas (Coulombe 1971; Rosenberg and Haley 2004). Nesting burrowing owls banded in Idaho have been observed wintering in southern California (Brian W. Smith, personal communication, November 2006). A significant portion of the burrowing owl population in southern California includes year-round residents and short-distance dispersers. Male burrowing owls that are year-round residents may overwinter in burrows within their nesting areas, as this allows them to retain possession of burrows and territories, as well as maintain the burrows (Johnsgard 2002:165). Burrowing owls in southern California may winter in the nesting burrow or a nearby burrow following successful fledging of juveniles, but are more likely to disperse from the nesting area if the nest fails (Catlin et al. 2005; Rosier et al. 2006). Thus, burrowing owls may occur in the Project area as year-round residents and breeders, and/or as winter residents from populations that breed further north, and/or as transients during dispersal and migration. According to the CNDDB, there are 42 records for burrowing owl within five miles of the Project site (CDFW 2016).

In the Colorado Desert, burrowing owls generally occur in scattered populations, but they can have a higher affinity for agricultural lands where rodent and insect prey tend to be more abundant, including along the lower Colorado River (Gervais et al. 2008). This strong affinity to irrigated agricultural lands is evident in concentration of burrowing owls in the Imperial Valley, where it is estimated that approximately 70 percent of the species breeding population in California resides (Audubon 2017a). From this core population of owls, it is estimated that between 20 to 25 percent of the population remains within the Imperial Valley during the winter, with immigration likely occurring to the north (Coulombe 1971). This winter migration has the potential to provide a source of emigration into the Project area, since the Imperial Valley population is approximately 45 miles southwest of the Project area. Burrowing owls tend to be opportunistic feeders. Their diet consists primarily of large arthropods, mainly including beetles and grasshoppers. Small mammals, especially mice and voles (*Microtus*, *Peromyscus*, and *Mus* spp.), are also important food items for this species. Other prey animals include reptiles and amphibians, young cottontail rabbits, bats, and birds, such as sparrows and horned larks. Consumption of insects increases during the breeding season.

Western burrowing owls typically nest in mammal burrows, especially those created by California ground squirrels, kit fox, and coyote; although they may use Mojave desert tortoise burrows or man-made structures including culverts and debris piles. Burrowing owls have a strong affinity for previously occupied nesting and wintering habitats. They often return to burrows used in previous years, especially if they were successful at reproducing there in previous years (Gervais et al. 2008). The southern California breeding season, defined as from pair bonding to fledging, is from February to August*,* with a peak of breeding activity from April through July.

Survey Results

Focused western burrowing owl surveys were conducted in an effort to assess occupancy, abundance, site use and distribution. Burrowing owl surveys were conducted in Fall 2012, Spring 2013, and Spring 2014. Surveys performed in Fall 2012 and Spring 2013 were conducted in accordance to the *Staff Report on Burrowing Owl Mitigation* (CDFW 2012) and *Burrowing Owl Survey Protocols and Mitigation Guidelines* (California Burrowing Owl Consortium [CBOC] 1993). Surveys performed in Spring 2014 followed a Project-specific protocol. This Project-specific protocol incorporates guidance from CDFW (2012) and CBOC (1993) and is included as Appendix C of the BRTR. Focused surveys were performed across the portion of the Study Area administered by BLM (i.e., 4,885 acres) plus a 150-meter buffer during the Spring 2014 survey effort. Burrowing owl surveys in previous years were conducted on 4,885 acres with a 150-foot buffer (which included binocular surveys of a portion of the private inholding, and other private lands contiguous with the outer boundaries of the BLM lands surveyed). All burrowing owl sightings and burrows with burrowing owl sign (e.g., whitewash, tracks, pellets, feathers) were mapped and recorded. Burrows were ranked by class (i.e., Class 1 to 4) depending on the age and type of sign present.

During Fall 2012, Spring 2013, and Spring 2014, 70 burrows ranked Class 1 (2012, n = 3; 2013, n = 1; 2014, n = 0), Class 2 (2012, n = 2; 2013, n = 5; 2014, n = 5) and Class 3 (2012, n = 0; 2013, n = 15; 2014, n = 39) were detected within the Study Area (Figure 3.4-4). The burrow Class ranks are defined as follows: Class 1 – Excellent (usable burrow with burrowing owl present), Class 2 – Good (usable burrow, fresh sign but no owl present), and Class 3 – Fair (usable burrow, inactive with old sign, no burrowing owl present). One of these burrows was detected within the 150-meter survey buffer and indicated recent burrowing owl occupation/use (Figure 3.4-4). Monitoring surveys conducted during the 2013 breeding season documented live owls at two burrows. One of these burrows was potentially occupied (Class 2) during Fall 2012 surveys; the other was a previously undocumented rodent burrow. Young were not positively identified at either burrow during 2013 monitoring surveys. No live burrowing owls were detected during 2014 surveys.

Burrowing owls were also incidentally reported in and around the Study Area on four occasions between September 2014 and February 2015. Only one of these detections (made during the winter 2015) was within the Study Area (Figure 3.4-4). Finally, a burrow complex containing a pellet and feather was detected during a reconnaissance survey on the 160-acre private inholding.

Results from burrowing owl surveys suggest use of the Study Area changes temporally. Survey evidence suggests greater use of the Study Area outside of the breeding season, with only two pairs remaining to attempt reproduction in 2013 and none in 2014. Although burrowing owls exhibit high burrow fidelity, surveys documented dynamic occupancy of burrows, likely a factor of dynamic movement patterns.

Golden Eagle

Background

The golden eagle (*Aquila chrysaetos*) is protected by the BGEPA and MBTA, and is a California Fully Protected and BLM Sensitive species. This large eagle is found throughout the U.S. typically occurring in open country, prairies, tundra, open coniferous forest and barren areas, especially in hilly or mountainous regions. Throughout their western range, the golden eagle can be either a year-round resident, or migratory (Kochert and Steenhof 2002; Audubon 2017b). Migratory patterns are usually fairly local in California where adults are relatively sedentary, but dispersing juveniles sometimes migrate south in the fall. This species is generally considered to be more common in southern California than in the northern part of the state (U.S. Forest Service [USFS] 2008).

Within the desert regions, this species usually builds nests on cliff ledges. Breeding in southern California starts in January, nest building and egg laying in February to March, and hatching and raising the young eagles occur from April through June. Once the young eagles are flying on their own, the adult eagles will continue to feed them and teach them to hunt until late November (WRI 2010). Due to the large investment in energy and time that an adult golden eagle is required to provide in raising young, some eagles will forgo a season of reproduction even when food supply is abundant (WRI 2010).

Golden eagles need open terrain for hunting and prefer grasslands, deserts, savanna, and early successional stages of forest and shrub habitats. Golden eagles primarily prey on lagomorphs and rodents but will also take other mammals, birds, reptiles, and some carrion (Kochert et al. 2002).

Absent interference from humans, golden eagle breeding density is determined by either prey density or nest site availability, depending upon which is more limiting (USFWS 2009). A compilation of breeding season home ranges from several western United States studies showed an average home range of 20 to 33 square kilometers that ranged from 1.9 to 83.3 square kilometers (Kochert et al. 2002). Golden eagles in the Mojave Desert are believed to have large home ranges due to low prey densities.

Survey Results

Focused golden eagle surveys were conducted in December and January 2013/2014 and 2014/2015 following the Interim Golden Eagle Inventory and Monitoring Protocols (Pagel et al. 2010) and other recommendations. There is no potential golden eagle nesting habitat on the Project area; however, suitable nesting habitat exists within 10 miles of the Study Area in the Little Chuckwalla Mountains, the Mule Mountains, and the McCoy Mountains. DRECP documents one golden eagle nest occurrence in the McCoy Mountains within the 10 mile radius of the Project area. Therefore, focused golden eagle surveys were conducted within a 10-mile radius surrounding the Study Area. Eighteen observation points were established in the 10-mile radius and each was visited twice during the courtship/breeding season (Figure 3.4-5). Some of the closely-spaced observation points surveyed in 2013/2014 were re-located prior to the start of 2014/2015 surveys in order to provide a wider geographic range of coverage.

One adult golden eagle was recorded during focused surveys. This individual was detected on January 21, 2014 and was observed soaring low heading southwest (Figure 3.4-5). No golden eagles were detected during a follow up visit to the same location on February 11, 2014. There were no golden eagle sightings during the 2014/2015 surveys. In addition, there were no incidental golden eagle observations during other biological surveys, including migratory bird surveys and line transect sampling.

Although DRECP identifies one nesting site in the McCoy Mountains within the 10-mile radius, no active golden eagle nests were detected within the 10 mile radius surrounding the Study Area during surveys. The one historic golden eagle territory was occupied by a pair of red-tailed hawks during the 2013/2014 breeding season. Two nests were observed in the vicinity of the eagle sighting documented in January 2014. One nest was inactive and the other was occupied by red-tailed hawks.

To assess golden eagle prey abundance within the Study Area, surveys were conducted in Spring 2013 to estimate population densities of small mammals, including black-tailed jackrabbits and cottontail rabbits. In March and April 2013, a total of 17 black-tailed jackrabbits were detected across the 4,855 acre Project site, equating to an estimate of approximately 0.0035 black-tailed jack rabbits/acre. A total count of cottontail rabbits was not conducted, therefore, a density estimate cannot be established for the species.

Other Migratory Birds and Raptors

Background

In addition to special-status avian species for which species-specific surveys were conducted (i.e., burrowing owl and golden eagle), many other common and special-status migratory birds and raptors are expected to occur within the Study Area. Not only does the Study Area provide nesting habitat for species of migratory birds and raptors, it is located along a major migration corridor (i.e., the Pacific Flyway, which runs from Alaska to Patagonia and stretches inland from the Pacific Ocean to encompass parts of Montana, Wyoming, Colorado and New Mexico). The Study Area's proximity to the Colorado River increases the likelihood of migratory birds stopping over. Migratory birds and all raptors native to North America are afforded protection under the MBTA and FGC Sections 3503, 3503.5, and 3513. Therefore, general avian surveys were conducted to characterize avian use of the Study Area and assess Project risks to all species.

Survey Results

Avian surveys conducted for the Project used various sampling methodologies to depict the occurrence and habitat use by birds during all critical life stages. Sampling models and survey techniques were designed to maximize the detection of migratory birds and local residents; including all raptor, shorebird, waterfowl and passerine species. Three types of general avian surveys were conducted: (1) migratory bird surveys; (2) line transect sampling; and (3) nesting raptor and raven surveys. A summary of methods and results for these survey efforts follows.

Migratory Bird Surveys

Migratory bird surveys were performed to record observed avian migration and use patterns within and adjacent to, the Study Area. Data on diurnal bird migration provided information on: (1) seasonal and overall avian population pulses and individual species pulses within seasons; (2) range of daily behavior and movements; (3) flight elevation through and near the Project; and (4) duration of seasonal occurrence by migratory birds, including raptors.

Weekly migratory bird surveys were conducted during Spring and Fall migration periods in 2013 and 2014 using unlimited-distance bird migration survey methods. These surveys followed guidance provided by BLM, USFWS, and CDFW, and the protocol prescribed by the Hawk Migration Association of North America (HMANA). The HMANA protocol is now standard for hawk migration counts (Bird and Bildstein 2007, Bildstein et al. 2007). The protocol for migratory bird surveys is included as Appendix D of the BRTR.

Two migration points (i.e., MP01 and MP02) were initially established within the Study Area in Fall 2013 (Figure 3.4-6). These MPs bisected the Study Area along the central east-west axis, and exhibit near 360 degree views of the distant horizon to maximize detection of migrating birds passing over the area. After the Fall 2013 season, avian biologists determined that migration points should be adjusted due to the pattern of migratory movement prevalent in the area. Therefore, MP01 and MP02 were replaced with MP03 andMP04 at the start of Spring 2014 survey season (Figure 3.4-6).

A close inspection of the data collected during migratory bird surveys revealed two distinct peaks in migration in Fall 2013 (October 1 and October 9). Few observations were made in Spring 2013 and no peak in migration was apparent. Two peaks in migration were apparent for

2014. The first peak occurred in Spring 2014 around March 24; the second peak occurred in Fall 2014 around September 21.

Uncontrollable and variable factors including rainfall rates, temperatures, wind speed and wind direction could have an influence on these results and these peak migratory periods should be considered approximate due to the limited number of survey seasons represented. The greatest numbers of individual species detected at one time during the spring were flocks of unidentified swallows and tree swallows with numbers reaching 1000 and 950 birds respectively on a single day (all in 2014). Large number of turkey vultures (782 in one day for the highest count) and Swainson's hawks (620 in one day) were observed during fall migration.

Special-status species observed during migratory bird surveys include Swainson's hawk (state-listed as threatened), Cooper's hawk (designated by CDFW as a SSC), ferruginous hawk (a BLM Sensitive species), Vaux's swift (designated by CDFW as a SSC), northern harrier (designated by CDFW as a SSC), loggerhead shrike (designated by CDFW as a SSC), and Le Conte's thrasher (designated by CDFW as a SSC), both of which are year-round resident species.

Line Transect Sampling

Line transect sampling was conducted to depict avian use patterns within and adjacent to the Study Area. Data from line transect sampling provided information on the following: (1) sedentary and migratory populations; (2) species richness (number of different species present); (3) species diversity (species richness combined with species evenness); (4) species use, behavior and movements; and (5) species distribution across the Project.

Line transect sampling was conducted from Spring 2013 to Winter 2014/2015, not including the summer months. Surveys were timed to capture migrants, breeding birds, and local residents. Line transect sampling was conducted by traveling a pre-determined route and recording all bird detections (visual or aural) on either side of the transect line. The protocol for line transect sampling is included as Appendix D of the BRTR.

A total of eight 2,000-meter transects were established in Spring 2013 and eight more were added in Fall 2013 (Figure 3.4-6). To facilitate robust data analysis, eight of the 2,000-meter line transects were situated within the Study Area and eight were located outside the Study Area on public lands. Two 500-meter transects were added to survey the 160-acre inholding in October 2014 (Figure 3.4-6). Thus, a total of 18 transects were surveyed as part of line transect sampling.

A total of 3,534 detections were made during the 345 surveys. A total of 17,973 individuals were documented during line transect sampling. To maintain consistency with regards to the number of transects sampled per season, a random subsample of the data was pulled to facilitate analysis. The final subsample contained data from 259 transects, 2,253 detections, and 16,507 individuals. ProgramDistance (Thomas et al. 2010) was used to determine a total density of birds within and outside the Study Area. In every season, species diversity was greater outside the Study Area compared to within the Study Area. Commonly observed species include the barn swallow (*Hirundo rustica*), Swainson's hawk (*Buteo swainsoni*), and turkey vulture (*Cathartes aura*). In all but one season (i.e., Spring 2014), the density estimate was also greater outside the Project site. The greater species diversity and density along the transects outside of the Project site, relative to the transects within the site, are potentially associated with greater avian habitat diversity outside of the site. As shown in the vegetation map (Figure 3.3-2), and the location of the avian survey transects in the BRTR, the transects outside of the Project site boundary either cross through or are adjacent to patches of *Parkinsonia florida-Olneya tesota* alliance. This habitat provides a more diverse structure, which has the potential to result in more nesting/breeding, resting, and cover resources for migrating birds.

Nesting Raptor/Raven Surveys

Nesting raptor and raven surveys were conducted monthly in the spring of 2013 and 2014. This effort focused on the detection of all raptor and raven nests within 1-mile of the Study Area to collect baseline data on the number and distribution and success rates of raptor and raven nests prior to development. All nests (including the incidental detection of resident passerine species) were mapped and recorded. A total of 11 raptor/raven nests were recorded during the two years within the Project site and 1-mile buffer (Table 3.4-2). In 2013, there were four red-tailed hawk nests, and two common raven nests. 2014 data showed an increase in the overall number of nests, including five red-tailed hawk nests, two nests utilized by unknown species of hawk, and three common raven nests. The status of each nest at the time of the survey, and the number of young observed in a nest (if applicable) are shown in Table 3.4-2. Monthly monitoring efforts updated development stage and breeding status at each raptor and raven nest.

Table 3.4-2. Raptor/Raven Nests Detected on the Project Site, Spring 2013 and 2014

Nest ID	Species	Easting	Northing	Date	Status	# Young
BH0001	RTHA	708278	3718453	2013		
RKR0001/ QZNR-031214-03	RTHA/ UNHA	704893	3716895	4/22/2013/ 5/13/2014	Incubation/ Inactive	
RKR0002/ QZNR-021414-01	CORA/ RTHA	703684	3717850	4/22/2013/ 5/31/2014	Incubation/ Nest Cycle Complete	
RKR0004/ QZNR-031214-02	RTHA/ RTHA	706970	3715231	5/9/2013/ 5/13/2014	Fledgling/Nest Cycle Complete	?/ 2
RKR0006/ QZNR-031214-08	RTHA/ RTHA	711168	3716543	4/22/2013/ 5/31/2014	Hatchling/ Nestling/ Nest Cycle Complete	?/2
RKR0014/ QZNR-031214-01	CORA/ CORA	708293	3714185	5/9/2013/ 5/31/2014	Hatchling/Nestling/ Nest Cycle Complete	
QZNR-031214-04	UNHA	701,352	3,718,549	5/13/2014	Inactive	
QZNR-031214-05	RTHA	700,831	3,718,568	5/13/2014	Nest Cycle Complete	
QZNR-031214-06	CORA	702,793	3,717,202	5/31/2014	Nest Cycle Complete	
QZNR-031214-07	RTHA	709,555	3,713,171	5/31/2014	Nest Cycle Complete	1
QZNR-032624-01	CORA	708,530	3,718,554	5/30/2014	Hatchling/ Nestling	2

RTHA = red-tailed hawk UNHA = unknown hawk CORA = common raven

A total of 26 raptor or raven nests were documented during focused golden eagle surveys (Figure 3.4-7). All but one of the nests recorded were located beyond the survey area for nesting raptor/raven surveys (i.e., the Study Area plus a one-mile buffer). These nesting raptors included red-tailed hawk, prairie falcon, and undetermined raptor species. Sixteen of these nests were in cliff or rock outcrop substrates, nine were in power line support structures, and one was located in an ironwood tree (*Olneya tesota*). In 2013/2014, species associated with raptor nests included four red-tailed hawks (*Buteo jamaicensis*), two prairie falcons (*Falco mexicanus*), and 12 undetermined species of raptor. For undetermined designations, a nest or partially completed nest was observed that exhibited characteristics of a raptor nest, and may or may not have been associated with a species of raptor observed in the general vicinity (but not at or on the nest). Seven of the nests observed during focused golden eagle surveys were determined to be active, two were determined to be active and occupied, and nine were determined to be inactive. In 2014/2015, two nests were determined to be active: one red-tailed hawk and one prairie falcon.

Desert Kit Fox

Background

The desert kit fox (*Vulpes macrotis*) is protected by the FGC Section 4000 as a fur-bearing mammal. Desert kit foxes are fossorial mammals that occur in arid open areas, shrub grassland, and desert ecosystems. Desert kit fox typically consume small rodents, primarily kangaroo rats, rabbits, lizards, insects, and in some cases immature Mojave desert tortoises. Dens typically support multiple entrances, but desert kit fox may utilize single burrows for temporary shelter. Litters of one to seven young are typically born in February through April (Egoscue 1962; McGrew 1979).

Survey Results

Desert kit fox burrow surveys of the Study Area were conducted by walking transects at 10-meter spacing to ensure complete visual coverage of the site. All desert kit fox single-entrance dens and canid complexes that could be occupied without modification were recorded.

Full-coverage burrow surveys revealed 46 canid complexes and 45 single-entrance dens (91 potentially occupied dens/complexes) with some kit fox sign within the Study Area. Twenty-four of these dens/complexes had signs of recent activity, (i.e., desert kit fox tracks, or scat). Each of these 24 dens/complexes was revisited for further inspection of signs of activity. Upon re-inspection, eight dens/complexes were determined to be potentially active, all of which were in the southern portion of the Study Area (Figure 3.4-8). A camera station was set up at each of the eight dens and run for three consecutive days and nights. Six of the eight cameras captured images of nine total individual desert kit fox.

American Badger

Background

The American badger (*Taxidea taxus*) is a CDFW SSC. The species was once fairly widespread throughout open desert and grassland habitats of California. Badgers are now generally uncommon with a wide distribution across California, except from the North Coast area. Badgers inhabit burrows and often predate and forage on other small mammal burrows as evidenced by claw marks along the edges of existing burrows. This species is most abundant in the drier open stages of most shrub, forest, and herbaceous habitats with friable soils. Badgers are generally associated with treeless regions, prairies, parklands, and desert areas (Zeiner et al. 1990). Badgers feed mainly on various species of small mammals and capture some of their prey above ground, foraging on birds, eggs, reptiles, invertebrates, and carrion. According to the CNDDB, there are two records for American badger within five miles of the Project site (CDFW 2016). There is predicted occupied habitat present onsite in the DRECP suitable habitat model.

Survey Results

Focused surveys were not conducted for the American badger, and the species was not directly observed during other surveys or on imagery from camera stations around the Study Area. However, several badger digs and scat were found on the Study Area, mostly near the southwestern perimeter. The entire Study Area is considered suitable habitat for the American badger.

Bats

Background

Many bat species occurring in Southern California are considered to be regionally sensitive by BLM and CDFW. The Project site and vicinity supports suitable roosting and foraging habitat for several bat species, including some of those considered sensitive by BLM and CDFW. An assessment was conducted for the Study Area and surrounding area to determine the presence of suitable roosting and foraging habitat for bat species known from the region. Some bat species, such as the leaf-nosed bat, range throughout the southwestern U.S. However, other species, including the spotted bat, western mastiff bat, and the big free-tailed bat, have ranges that extend into Mexico and South America. Roosts and natal colonies are typically located in protected or sheltered areas, such as rocky outcrops, cliffs, caves, mines, and abandoned buildings. According to the CNDDB, there are four records for California leaf-nosed bat within five miles of the Project site and one record each for pallid bat, Townsend’s big-eared bat, hoary bat, Arizona Myotis, and cave myotis (CDFW 2016). Records for two species, California leaf-nosed bat and cave myotis, were recorded over a large polygon that includes portions of the Project site; however, these records are from a mine in the Mule Mountains located southwest of the Project site. There is predicted occupied habitat for the pallid bat, Townsend’s big-eared bat, and California leaf-nosed bat present onsite in the DRECP suitable habitat model.

Survey Results

Bat surveys consisted of acoustic monitoring within the Study Area and roost surveys of sites in the vicinity of the Study Area. A summary of methods and results for these survey efforts follows.

Acoustic Monitoring

Acoustic monitoring was conducted for three nights in May 2013 to sample bat species utilizing the Study Area. Twelve Anabat II monitors were deployed at sites with different vegetative components to identify bat species and document activity levels (Figure 3.4-9). Eleven monitors were located within the Project site; one monitor (i.e., Site 4) was located along a wash just outside the Project site. Half of the monitors had standard microphones and half had low frequency microphones with higher sensitivity to sounds in the audio range [4.5 to 20 kilohertz (kHz)]. This enhances recording of certain bat sounds (e.g., pallid and California leaf-nosed bat social calls, western mastiff and other free-tail bat calls) along with insect and bird calls.

Evaluation of acoustic monitoring results identified at least seven bat species: pallid bat (*Antrozous pallidus*), canyon bat (*Parastrellus hesperus*), California myotis (*Myotis californicus*), cave myotis (*Myotis velifer*), Mexican free-tailed bat (*Tadarida brasiliensis*), pocketed free-tail bat (*Nyctinomops femorosaccus*), and Western mastiff bat (*Eumops perotis*)) yielded multiple diagnostic call sequences. For 50 kHz Myotis sequences (calls ending at this frequency), two species (i.e., *Myotis californicus* and *Myotis yumanensis*) are often not distinguishable. California myotis is far more common in open desert habitats distant from surface water. Therefore, 50 kHz Myotis sequences were interpreted to be the California myotis. A small sample of 40 kHz Myotis sequences was obtained at four monitors. There are two *Myotis* in the region that produce similar calls at this frequency: the Arizona myotis (*Myotis occultus*) and the cave myotis. Given the low likelihood of occurrence of the Arizona myotis and the proximity to occupied cave myotis roosts, it was concluded that 40 Khz Myotis sequences were interpreted to be the cave myotis. Four of the acoustically detected species are considered special-status species: pallid bat, cave myotis, Western mastiff bat, and pocketed free-tailed bat. Canyon bat, California myotis, and Mexican free-tailed bat do not have a special-status species designation; therefore these three species were not included in Table 3.4-1.

In addition to the Yuma myotis and California myotis discussed above, another 2 bat species have the potential to occur at some time of the year, including western yellow bat (*Lasiurus xanthinus*), and hoary bat (*Lasiurus cinereus*). The western yellow bat and the hoary bat do not have any special-status species designations, but nonetheless appear on the California Special Animals List (CDFW 2016). Of the bats not detected during the acoustic surveys that have a potential to occur within the Study Area, the most likely species is the California leaf-nosed bat that roosts close to the Study Area. This species can hunt without emitting echolocation signals, relying solely on vision and prey-produced sounds. Therefore, the species may not be detected during acoustic monitoring.

Roost Surveys

Roost surveys were also conducted in May 2013 to examine the mines in the mountains adjacent to the Project site during the day and at night for evidence of bats and guano. Two mines, the Uvanum Mine and McCoy #3, in the southern McCoy Mountains (located approximately 4.4 miles northwest of the Study Area) had previously been identified by Patricia Brown, Ph.D. as supporting California leaf-nosed bat maternity colonies. These mines were gated with bat compatible closures by BLM in 2011. These mines were monitored on May 8 at dusk by surveyors with night vision equipment to obtain accurate exit and entry counts of bats and acoustic records with additional Anabat detectors. California leaf-nosed bats and pallid bats were recorded at these mines during monitoring. The Uvanum Mine is closest to the Study Area. Thirty-three bats exited and 26 entered this mine in the hour after dark. Seventy-one bats exited and 44 entered the McCoy #3 mine to the west of the Uvanum Mine, in another drainage. Non-resident bats may enter a mine to “night-roost”, so the exiting and entering bats may not be the same individuals or species.

Using topographic maps and Google Earth images, a ground reconnaissance was conducted of possible mine features on the north end of the Mule Mountains (1.8 miles south of the Study Area). No underground features that could shelter bats were discovered. The closest known bat colony in the Mule Mountains is the Hodge Mine (also referred to as Stonehouse; situated 3.4 miles south of the Study Area. This mine has been a research site for Dr. Brown since 1976 and contains the largest winter colony of California leaf-nosed bats (*Macrotus californicus*) in the United States, as well as a maternity colony. It is also one of four maternity colonies for the cave myotis (*Myotis velifer*) in California. A total of 3,348 bats exited this mine from five portals on the evening of May 9, 2013.

3.4.1.2 Wildlife Movement

Wildlife movement corridors, particularly in desert ecosystems that have relatively limited and patchy distribution of resources, are typically linear in nature. Wildlife movement corridors tend to follow geographic features, such as drainages or patches of vegetation that provide protective cover for animal species that move between resources (e.g., water, foraging areas, breeding grounds, etc.). The Study Area could be used by a variety of wildlife species for movement purposes. Wildlife movement activities typically fall into one of three movement categories: 1) dispersal (e.g., juvenile animals from natal areas, or individuals extending range distributions); 2) seasonal migration; and 3) movements related to home range activities (foraging for food or water, defending territories, or searching for mates, breeding areas, or cover).

The DRECP identifies wildlife corridors and linkages for use in evaluating the application of CMAs for the protection of biological resources. Figure D-1 of the DRECP identifies a desert linkage network for landscape wildlife linkages, Figure D-2 identifies multi-species linkages and ACEC boundaries within the East Riverside DFA, and Figure D-16 identifies Tortoise Conservation Areas and Linkages. The Project area is not situated within any of these linkages.

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3.5 Cultural Resources

A cultural resource is a location of human activity, occupation, or use identifiable through field inventory, historical documentation, or oral evidence. Cultural resources include archaeological, historic, or architectural sites, structures, or places with important public and scientific uses, and may include definite locations (sites or places) of traditional cultural or religious importance to specified social and/or cultural groups, e.g., "traditional cultural property" (BLM 2004). At both the state and Federal levels, cultural resources are defined as buildings, sites, structures, or objects, each of which may have historical, architectural, archaeological, cultural, and/or scientific importance (Office of Historic Preservation 1995, National Park Service 1990). State and Federal laws, however, use different terms for significant cultural resources. California state law discusses significant cultural resources as "historical resources," defining significant resources as those resources which have been found eligible for listing in the California Register of Historical Resources (CRHR) and National Register of Historic Places (NRHP), as applicable. Federal law uses the terms "historic properties" and "historic resources."

Prehistoric resources are associated with human occupation and use prior to sustained European contact. These resources may include sites and deposits, structures, artifacts, rock art, trails, and other traces of Native American human behavior. In California, the prehistoric period began over 12,000 years ago and extended through the 18th century until 1769, when the first Europeans permanently settled in California.

Ethnographic resources represent the heritage of a particular ethnic or cultural group, such as Native Americans or African, European, Latino, or Asian immigrants. They may include traditional resource-collecting areas, ceremonial sites, value-imbued landscape features, cemeteries, cremation sites, shrines, or ethnic neighborhoods and structures.

Historic-period resources, both archaeological and built environment (i.e., structures, buildings, or other built features) begin with those associated with early European and Euroamerican exploration and settlement of an area and the beginning of a written historical record, and continue to the evidence of activities dating to 50 years before the present. They may include archaeological deposits, sites, structures, earthworks, traveled ways, artifacts, or other material remnants of human activity.

The term "historic property" is used for the purposes of §106 of the National Historic Preservation Act of 1966 (NHPA), and is defined in 36 CFR Part 800, the implementing regulations for §106, as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the [NRHP] . . . , [which] includes artifacts, records, and remains that are related to and located within such properties" (36 CFR §800.16(*l*)(1)). The term also includes "properties of traditional religious and cultural importance to an Indian tribe . . . that meet the National Register criteria" pursuant to 36 CFR §60.4 (36 CFR §800.16(*l*)(1)). For definitions of other terms used in this section, please refer to Appendix B. Historic properties are categorized as buildings, sites, structures, objects, and districts for the purposes of complying with §106.

A BLM Class III Archaeological Survey Report has been completed by Statistical Research, Inc. (SRI), in support of this PA/EIS/EIR (Lerch et al. 2016 and Lerch 2017, provided in Appendix P). In addition, the BLM has initiated consultation with Native American tribes to identify places of traditional religious and cultural significance that may otherwise be left unidentified by these studies. Chapter 5 provides a discussion of the BLM's tribal consultation process.

3.5.1 Environmental Setting

Archaeological resources were inventoried and the results are described for the proposed Project and alternatives. This section describes the affected environment and regulatory setting for cultural resources. It also summarizes the results of a literature review, records searches, archaeological resource and historic built environment survey, and communications with Native American representatives regarding cultural resources that could potentially be impacted by the Project.

The information in this section is based on the Class III report generated by SRI for DQSP, the previously approved EIS for the MSEP (north of the DQSP) (BLM 2012b), and the Class III report created by AECOM also for the MSEP (Jordan et al. 2011).). In April 2018, SRI and BLM conducted archeological testing on three cultural resources to determine if there are subsurface deposits. On May 2, 2018, the BLM conducted additional Class III surveys near the Colorado River Substation (CRSS).

3.5.1.1 Geological Setting

The Project is located in the southern east-west-trending valley pass on the Palo Verde Mesa. The mesa is a series of ancient raised river terraces associated with the Pleistocene course of the lower Colorado River. The relatively flat topography of the mesa slopes gently down from the northwest to the southeast and is bounded by the McCoy Mountains to the northwest and the Mule Mountains to the southwest. The valley pass, through which modern I-10 was built adjacent to the Coco-Maricopa Trail (CA-RIV-53T), was an important prehistoric transportation corridor from points east of the Colorado River to the Pacific Coast.

The Palo Verde Mesa is part of the northern extent of the Colorado Desert, a subdivision of the greater Sonoran Desert. Encircling the northern Gulf of California, the Colorado Desert spans portions of northwest Mexico, southwest Arizona, and southeast California (Schaefer, 1994a). It is a subtropical desert that is periodically influenced by tropical weather conditions, including massive seasonal rain storms known locally as monsoons.

The Colorado River, which forms the border between California and Arizona, originates in the Rocky Mountains and flows generally south through the southwestern Unites States and into the Gulf of California, in Mexico. As the river flows south from the Colorado Plateau, it enters a shallow valley where it forms a broad floodplain (Jahns 1954) that can reach up to 18 km in width. Much of the floodplain has been converted to farmland, but before recent development, the area formed a large wetland that would have been home to a variety of flora and fauna. The river bottom also was used by the late prehistoric and ethnographic inhabitants of the region to practice floodplain agriculture that focused on maize, beans, squash and gourds, and melons, among other plants (Castetter and Bell 1951:97–130).

At the beginning of the Holocene, the Colorado River retreated to the east and began to cut deeply into the surrounding sediments. Periodically, though, the river dramatically flooded, changed course, and flowed into previously dry inland areas. After large flood episodes, water from the Colorado River was occasionally impounded and diverted into the Salton Trough, creating a vast inland freshwater lake in the area of the historical Lake Cahuilla. Impounded waters from the Colorado River would continue to flow into the Salton Trough for years or even centuries until another major flood event sufficiently reworked the river delta at the Gulf of California to allow the river to resume its typical course. At these times, numerous ethnically and linguistically distinct Native American groups converged on the newly formed lake. Some of the intermittent prehistoric use of the Palo Verde Mesa likely dates from these episodes of inland lake activity.

3.5.1.2 Paleoclimate

Identifying the kinds and distribution of resources necessary to sustain human life in an environment and the changes in that environment over time is central to understanding whether and how an area was used during prehistory and history. During the time that humans have lived in California, the region in which the Project is located, the Colorado Desert, has undergone several climatic shifts. These shifts have resulted in variable availability of vital resources, and that variability has influenced the scope and scale of human use of the vicinity of the site. Consequently, it is important to consider the historical character of local climate change, or the paleoclimate, and the effects of the paleoclimate on the physical development of the area and its ecology.

The Pleistocene (1.8 million to 10,000 years ago), and the Holocene (10,000 years ago to the present) environmental record from the Mojave Desert provides a model for the Colorado Desert. Summaries of the development and changes in vegetation in the Mojave Desert and surrounding region during these periods are provided by Grayson (2011, pp. 153-164, 217-219, 230, 239-242), Spaulding (1990, as cited in CEC, 2010), Tausch et al. (2004, as cited in CEC, 2010), and Wigand and Rhode (2002, pp. 332–342, as cited in CEC, 2010). All note the vegetation history of this region has been primarily studied by analysis of plant macrofossils contained in prehistoric packrat middens. Pollen studies from this region are largely lacking.

In general, Tausch et al. (2004, fig. 2.3; see also Wigand and Rhode, 2002, pp. 321–332, as cited in CEC, 2010) note the Early Holocene (8500 to 5500 BC) in the Mojave Desert was characterized by a post-glacial warming trend, accompanied by periods characterized by variable moisture. After about 10,000 years ago, temperatures increased overall, but summer temperatures remained cooler than present. There is some evidence of an increase in precipitation at this time, possibly resulting from more frequent and intense El Niño patterns (Spaulding 1995). First proposed by Antevs (1948), the reconstruction of an arid middle Holocene period (circa [ca.] 7,000–4,000 B.P.) is now supported by packrat midden, geomorphic, and pollen data (Byrne et al. 1979; Hall 1985; Holliday 1989; Mehringer 1986; Spaulding 1991). Although the middle Holocene was clearly warmer and more arid than present, the various lines of evidence suggest that the period was one of high climatic variability rather than unremitting heat and drought (Grayson 1993). Evidence from the late Holocene (after ca. 4000 B.P.) indicates at least three distinct climatic episodes that would have affected humans living in the desert. Studies of macrofossils from packrat middens and evidence for extended lacustral intervals in the Mojave Desert (Drover 1979; Enzel et al. 1992; Smith 1979; Wells et al. 1989), suggest that the period between circa 4000 and 2000 B.P. was generally cooler and notably wetter than present. Known as the Neoglacial, this period in the Mojave Sink region was marked by extensive desert lakestands supported by the flooding of the Mojave River, likely resulting from increased precipitation in the Transverse Ranges.

The Medieval Climatic Anomaly (MCA), which extended from about 1,200 to 700 years ago, was marked by generally warm temperatures and punctuated by extreme, extended droughts from A.D. 890 to 1100, and from A.D. 1210 to 1350 (Stine 1994). In the Mojave Desert, packrat middens provide evidence of effectively drier conditions associated with increased temperatures. Presently, there are no published records of increased spring activity or desert lake high stands throughout the Mojave during this period (Jones et al. 1999). In the Colorado Desert, though, Waters (1983) reports evidence for high stands of Lake Cahuilla during much of this interval. The sustained high water in Lake Cahuilla may have mitigated the effects of the droughts on local populations, although the Palo Verde Mesa surely would have been very dry.

The generally arid conditions of the MCA reversed sharply about 600 years ago, marking the beginning of the Little Ice Age (Grove 1988). A variety of data from the Mojave Desert indicate both lower temperatures and increased winter precipitation during this period. Cooler temperatures are suggested by the expansion of cold-loving blackbrush scrub into lower elevations at this time. Evidence for extended lakestands in the Mojave Sink (Enzel et al. 1989, 1992) indicates enhanced precipitation in the Transverse Ranges. Essentially modern climatic conditions only became established in the region about 150 years ago.

3.5.1.3 Prehistoric Background

The following overview of Colorado Desert culture history is a synthesis based on various studies. Importantly, it is grounded in the pioneering works of Malcolm J. Rogers and his studies on Colorado and Sonoran Desert archaeology (Rogers 1939, 1945, 1966). Since the early works of Rogers, other prehistorians have added new data and interpretations, refining understanding of the region's cultural sequence (Crabtree 1981; Schaefer 1994a; Schaefer and Laylander 2007; Warren 1984; Wilke 1976). The general cultural sequence for the Colorado Desert can be divided into four distinctive periods and extends back in age for a minimum of 12,000 years. The dates, provided here, represent estimates based on radiocarbon determinations corrected for changes in atmospheric carbon. They are shown as calibrated (cal) ages with calendar dates represented in years (B.P.) or the equivalent dates identified as B.C. or A.D.

Paleoindian Period (San Dieguito) (12,000 to 7,000 before present [BP])

The Paleoindian period experienced profound environmental changes, as the cool, moist conditions of the Pleistocene (from 2.5 million to 12,000 years ago) gave way to the warmer, drier climate of the Holocene (from 12,000 years ago to present). The earliest record of habitation in eastern Riverside County occurred during the Paleoindian Period. Locally, a fluted point base was recorded on the western bajada of the McCoy Mountains in 2012. Western Fluted Points post-date most eastern fluted points by several centuries but are likely at least 12,000 years before present. A result of the Solar development near Ford Dry Lake yielded several Lake Mojave Points (BLM 2010). In the Pinto Basin (Joshua Tree National Park) Elizabeth Campbell documented a fluted point base in 1935 (Campbell 1935). In the Colorado Desert, at the Salton Sea Test Base sites situated on the bed of ancient Lake Cahuilla some 30 m below sea level, a flaked stone assemblage was discovered that included points and artifacts diagnostic of the Early Holocene era and typological affiliation with the San Dieguito or Lake Mojave Complex. Two eccentric crescents and a Lake Mojave dart point, identified during surveys of this area, attest to early cultural activities in the region (Apple et al.1997; Wahoff 1999). Significant environmental changes, synchronous with broad shifts in regional temperature, occurred in the post-Pleistocene, with only minor changes in precipitation. Increased runoff from glacial melting resulted in the infilling of valleys and basins forming streams, marshes, and lakes. Initially these large bodies of water supported great amounts of biota, including big game animals (e.g., deer, pronghorn antelope, and bighorn sheep).

The San Dieguito archaeological assemblage consists exclusively of flaked stone materials, including percussion-flaked core and flake tools, crescents, domed and keeled choppers, planes, and scrapers. Other artifacts within the assemblage include less intensively flaked spokeshaves; leaf-shaped points; and large, stemmed lanceolate dart points of the Lake Mojave and Silver Lake types. Groundstone artifacts are characteristically rare or completely absent from the assemblage (Warren and Crabtree 1986). Studies of the sources of toolstone found at sites dating to this period attest to a pattern of relatively high residential mobility. Aboriginal settlements during this time coalesced around bodies of water and were especially frequent in association with large inland lakes. These aboriginal campsites exhibited a wide array of formal stone implements thought to be reflective of a specialized focus on hunting. Studies of the faunal remains discovered in prehistoric sites dating to this timespan in the Mojave Desert have revealed a broader spectrum subsistence pattern, including the procurement of many smaller game animals. Hence, lifeways during this time may have included a focus on highly ranked resources such as large mammals, but with the additional focus on a variety of small game.

Archaic Period (Pinto and Amargosa) (7,000 to 1,500 BP)

The climatic patterns of the late Paleoindian period continued into the early Archaic period. During this period, the climate was wetter than it is currently across much of the desert west (Antevs 1955; Grayson 1993; van Devender and Spaulding 1979). Regional populations during this era were generally expanding, leading to a diversification and intensification of subsistence, and regional communication and exchange networks were becoming well established. Groundstone tools, largely absent during the earlier occupation periods, become common during the Archaic. Archaic sites are typically identified by their diagnostic dart points (classified as members of the Pinto, Elko, and Gypsum series) and their lack of the pottery found only with later prehistoric sites (Crabtree 1980; Rogers 1939). Pinto points have been the subject of intense study, and much has been made concerning their typological affinities and dating. Pinto points have, until recently, been thought to date from 8000 to 4000 cal. B.P. However, recent research suggests that at least two traditions, an early and later dating expression, are represented and evidenced by robust and gracile versions of these point forms (Basgall and Hall 2000). It is also probable that Pinto points do, in fact, have considerably greater temporal overlap with Western Stemmed Series (Lake Mojave and Silver Lake) points and date, in part, to a much earlier time period than originally conceived. The latter supposition is based largely on the nearly identical suites of obsidian hydration readings made on Pinto and Western Stemmed Series (Lake Mojave and Silver Lake) points in the Mojave Desert (Gilreath and Hildebrandt 1997).

Late Prehistoric (Patayan Complex) (1,500 to 150 BP)

A period of even more persistent drought began by 1,500 years ago, and conditions became significantly warmer and drier (Jones et al. 1999; Kennett and Kennett 2000). The dry period continued until 750 years ago (Spaulding 2001).

Prehistoric sites dating to the Late Holocene era in the Colorado Desert are more frequently represented during the Late Prehistoric (also known as Yuman, Patayan, Hakataya) than any other time period. This period is marked by significant changes in the archaeological record, including shifts in subsistence practices and settlement patterns. Paddle and anvil pottery and floodplain farming first appear during this era, and it is believed that both practices were introduced either directly from Mexico or indirectly via the Hohokam, situated on the Gila River, in the American Southwest (McGuire and Schiffer 1982; Rogers 1945; Schroeder 1975, 1979). The bow and arrow is also introduced during this time, and is evidenced by Cottonwood and Desert Side-notched type points. Burial practices change from the former practice of inhumation to cremation. Flaked stone tools during this era are more perfunctory—being quickly fashioned and discarded after casual use—a radical shift from the former tradition of crafting more formalized and finely finished bifacial tools.

It is important to recognize that there is a definite correspondence between the indigenous Native Yuman cultures of the region and the archaeological complex known as the Patayan. The latter include the historically attested peoples identified as the Quechan, Mojave, and Halchidoma. Although not affiliated with the Yuman linguistic group, the Desert Cahuilla (Takic subgroup) and the Chemehuevi (Numic subgroup) are members of the large and widespread Uto-Aztecan language group, and are also part of this same cultural landscape. The Patayan cultural materials and archeological assemblage are recognized as directly ancestral to the contemporary Native American cultures of the region.

Harold S. Colton (1945) attempted to apply the direct historical method to define the cultural pattern for the Patayan region. Using surface collections of pottery, he suggested that the historical practices of intense warfare known for the area extended back into the late prehistoric. Colton opined that this situation had been fostered by high population concentrations of agriculturalists tied to the Colorado River and confined by the adjacent arid environment. Rogers' archaeological work in the area (1936, 1945) introduced an orderly cultural history and artifact typology to the Colorado Desert, but conflated the late prehistoric record with a single linguistic grouping, tying it to the moniker Yuman.

Expanding on Rogers' Yuman pattern, Albert H. Schroeder (1961) introduced the concept of the Hakataya. Schroeder's efforts linked Rogers' ceramic types with historically identified ethnolinguistic groups correlated with specific subdivisions of the Hakataya pattern. The effort has been criticized as being too all-inclusive and for overlooking the mobility patterns characteristic of the region (McGuire and Schiffer 1982). Yet the Patayan tag seems to have re-emerged with the publication of Hohokam and Patayan (McGuire and Schiffer 1982), which provides a critical review and history of the confusing terminology and varied cultural concepts applied to the region. Michael R. Waters (1982a, 1982b) used the Patayan label for his revisions to the local ceramic typology and chronology, and based his interpretations on Rogers' unpublished notes and a review of the artifact collections curated at the San Diego Museum of Man.

By the late Prehistoric period there appears to have been a transition to more mobile patterns of travel and trade between the Colorado River and Lake Cahuilla (Pendleton 1984). Long-range travel for resource procurement and trade resulted in a system of trails through the Colorado Desert. The increased mobility along the trail system allowed the opportunity for interaction between neighboring tribes. As the Spanish began to explore the area, native trails and trade routes were used and expanded.

Early research in the area noted recognizable trail types, including major long distance, minor long distance, and subsidiary trails between settlements and resource areas (Rogers 1941). McCarthy (1993) defines two types of trails, primary and secondary. Primary trails are based around a destination that is fixed on the landscape, such as a spring. A vital trail within the Project vicinity is the Coco-Maricopa Trail. One of the segments is just north of the Project area (Lerch et al. 2016). This heavily traveled east-west trail connected the Los Angeles Basin with the Colorado River at Palo Verde Valley and then continued east to Maricopa villages on the Gila and Salt rivers in the Phoenix vicinity. The California portion of the route went from the vicinity of modern-day Blythe, south through the Palo Verde Valley area, then curved south around the Palo Verde Mountains. This route then headed west along Milpitas Wash and Arroyo Seco along the north side of the Chocolate Mountains. It then passed south of the Orocopia Mountains and into the Coachella Valley and west over San Gorgonio Pass into the Los Angeles Basin. The portion of the trail that went east from the Coachella Valley to Arroyo Seco is followed today by what is known as the Bradshaw Trail. Garcés, writing in 1774, mentioned that the Halchidhomas in the Palo Verde area traded continuously with groups on the Pacific coast, and the trip took four days (Bolton 1930:242; Forbes 1965:109). Captain Jose Romero used the trail in the early 1820s to reach the Colorado River (von Till Warren and Roske 1981:2). Trade goods transported along the trail included gourd rattles and tobacco, and villages along the trail included those at Blythe, Mecca, Indio, Indian Wells, Palm Springs, White Water, and Cabazon (Norris and Carrico 1978:7). As noted in Bean and Toenjes (2010), the physical location of the entire Coco-Maricopa Trail is not known and only a few short segments have been recorded, based on earlier surveys (Johnston and Johnston 1957).

Ten prehistoric or historic trails are documented within the proposed Project solar facility site or within the vicinity of the Project. Three prehistoric trails fall within the Project boundaries; these include two previously documented trails, CA-RIV-343 (P-33-000343) and CA-RIV-772 (P-33-000772) and newly recorded CA-RIV-12012. The trails typically measured 15 to 30 cm wide and were identified by compacted sediment. CA-RIV-343 goes from the Palm Springs area to the Mule Mountains. It crosses through the southwestern portion of the Project area and heads toward the Mule Tank Discontiguous Rock Art District. CA-RIV-772 is visible on the south side of the Project. It leads to an intaglio site, P-33-000773, and is thought to be a part of the Coco-Maricopa Trail system. The new trail segment, CA-RIV-12012, is located in the central portion of the Project. It is not yet associated with any landscape features or artifacts (Lerch et al. 2016). The Xam Kwatsan Trail traverses south from the Project area along the eastern slopes of the Mule Mountains. This trail is in the process of recordation. Ethnographic studies within the Project area have identified trails as having an important economic and spiritual use in both prehistoric and historic times (Bean and Vane 1978).

Other trails lead toward canyons containing temporary water sources. In addition to water sources, other resource areas would include lithic quarries and assay areas. A line of pebble terraces line the southern flank of the McCoy Mountains. Several extremely large prehistoric lithic sources and assay sites have been recorded in these terraces. Trail segments between these sites have been documented. McCarthy speculates shorter trail segments in the area of McCoy Wash were used to connect specialized activity areas within larger habitation areas (McCarthy 1993).

This trail network connected not only major pilgrimage locations, but also villages, springs, and important resource collection areas. The trails in the McCoy Wash area were believed to connect the region to important spiritual locations north of the Maria Mountains (near the Blythe Intaglios); the Colorado River; pilgrimage locations in the Mojave Valley and near Yuma; and villages throughout the region, including village sites in the study area (see above) and elsewhere in the Chuckwalla Valley.

The Salt Song Trail is considered to be the path to the afterlife used by the Chemehuevi, Southern Paiute, and Hualapai. The Salt Song Trail is described in the Salt Songs, which are a series of songs sung at funerals. According to WCR (2003:71), the Salt Songs tell of a flock of many species of birds traveling around the territory of the Southern Paiute, including areas in Nevada, Arizona, and California. Its alignment is described as:

> The trail goes southwest through the Las Vegas Valley, along the Spring Mountains to the vicinity of Indian Springs, and then proceeds through Pahrump and Ash Meadows. It turns back south near Eagle Mountain, and goes down the Amargosa River past Shoshone, turns again at Dumont Dunes, and goes up through Baker and Soda Lake, and passes south to the Providence Mountains. It then proceeds to Twenty-nine Palms and the San Bernardino Mountains, turns east toward the Colorado River, and crosses into Arizona south of Blythe [WCR 2003:71].

The path of the Salt Song Trail connects many of the culturally and spiritually relevant places throughout the Chemehuevi territory (AITC 1999:E-47). The Salt Songs take an entire night of mourning to recite and the path of the songs places the Spring Mountains at approximately the halfway point, with Las Vegas occurring around midnight, Parker by early morning, and the entire trip ending by sunrise. It is noted that it is important for the Salt Songs to end by sunrise and that the songs can be truncated to serve this purpose, but only by those singers who are familiar with the songs, the trail, and the landscape (Laird 1976:17).

3.5.1.4 Ethnographic Background

A number of distinct Native American groups have historical and cultural ties to the Project area and vicinity. The Project area is located near the territories of several neighboring Native American groups, as described in Kroeber (1925). The Chemehuevi, Cahuilla, Mojave, Quechan, and Halchidoma may have all ranged into the Project vicinity. The following brief synopses provide overviews on the ethnology for these ethnolinguistic groups.

Halchidhoma

It is difficult to find studies focused exclusively on the Halchidhoma, as they are typically addressed in scholarly studies focusing on other Colorado River and American Southwest Tribes traditionally occupying nearby areas. The most extensive discussion is in Spier's (1933) ethnographic treatment of the Maricopa. Spier's primary consultant was a man named Kutox, who was himself of Halchidhoma ancestry and was 83 years of age during the 1929–1930 field season of anthropological fieldwork. Similarly, Harwell and Kelly's synthesis on the Maricopa (1983) provides some further limited, yet useful, information on the Halchidhoma. Other, more perfunctory and scattered, information on the Halchidhoma can be found in the works of Bean and Vane (1978), Castetter and Bell (1951), Coues (1900:423–430), Dobyns et al. (1963:112), Drucker (1941), Kelly (1972), and Kroeber (1925:802).

Juan de Oñate visited the Halchidhoma and recorded the name of this Native American group when he traveled to the eastern bank of the lower Colorado River near the confluence with the Gila River. He identified them as Halchedoma or Alebdoma (Bolton 1916:276; Ezell 1963; Hammond and Rey 1953). Garcés uses the name Halchedunes, Galchedunes, and Chidumas (Bolton 1930; Coues 1900). Miscopied forms of their identifier are Alebdoma (Hammond and Rey 1953) and the identification made by Hodge under the heading Alchedoma (Hodge 1907–1910). The Quechan name for the group is similar to the Halchidhoma self-identifier and perhaps means "those who turned or faced a different direction."

Bean and Vane (1978) identify the central Halchidhoma with the name Panya. Kahwan families, taking up residence in association with the Halchidhoma, north of the Quechan, self-identify with the Halchidhoma (Kroeber 1925:801). In the recent historic era, ca. 1980, the Lehmi community within the Salt River Reservation (especially those living at Laveen) are of Halchidhoma ancestry. These are the people referred to as the Lehi, Western Maricopa, or pipakves (Kelly 1972). They prefer to be identified as and call themselves pipa (meaning "people" in their Yuman language).

The Halchidhoma dialect is grouped with the River Yuman branch of the Yuman-Cochimi linguistic family. Three languages form this branch: Mojave, Quechan, and Maricopa. The Maricopa language grouping includes the dialects of Halchidhoma and Kavelchadom. Both of the latter dialects are now extinct. The Yuman linguistic group includes 10 distinct languages and other dialects, with native speakers living in Baja California, northern Sonora in Mexico, Southern California, and western Arizona. Yuman languages are identified by many linguists as members of a larger Hokan linguistic family.

Although no longer inhabiting the study area, the Halchidhoma lived along the Colorado River between Blythe and Needles, California, and above Parker, Arizona, until about 1825. Oñate identified eight villages on the Colorado River, south of the Gila River, with 160 homes and a population at the northernmost village alone approximating 2,000 people (Kroeber 1925:802). Relations were always tense and sometimes explicitly adversarial. The Quechan and Mojave drove out the Halchidhoma, forcing them to migrate to the east and replacing them with the Chemehuevi (Kroeber 1925:594). The Halchidhoma ultimately found good company with the Maricopa at the confluence of the Salt and Gila Rivers in southern Arizona (Kroeber 1925:801; Harwell and Kelly 1983:71).

Similar to other River Yuman groups who lived along the lower Colorado River, the Halchidhoma were horticulturalists who dry farmed and also followed a supplemental foraging subsistence pattern. Their hamlets were large habitation spaces located on river terraces elevated above the floodplain. Villages were regularly relocated when the river changed course. Plantings were made after the floodwaters receded, and river terrace plots were seeded into 2- to 3-acre parcels.

When floods were at their peak, areas of the Palo Verde Valley and Cibola were inundated. As the flood waters declined during the summer, seed crops could be planted. Maize, tepary beans, black eyed beans (cowpeas), squash, and pumpkins were standard foodstuffs. Mesquite and screwbean harvests supplemented the horticultural efforts. Dense groves of these trees appear to have been characteristic of the Colorado River riparian forests. Mesquite pods could be eaten fresh from the tree but more commonly were harvested in July or gathered after falling to the ground. The pods were then milled into flour and processed using wooden mortars and pestles of wood or stone (Castetter and Bell 1951; Gifford 1931).

Seeds of the ironwood (*Olneya tesata*) tree were also regularly gathered. These seeds were removed from the tree, parched, ground lightly on a milling slab, and leached to remove the bitter taste. The ironwood seeds were also roasted and made into a meal that was fashioned into thin loaves and baked. Ironwood seed harvests were conducted during the fall. Also targeted were the seeds of the Palo Verde (*Parkinsonia microphylla*). These seeds were processed in a similar fashion to that of the ironwood plant. Neither plant was considered an especially desirable food source. However, both were drought-tolerant species that inhabited areas away from the river. Hence, these economic plants could have been especially important for providing food in years when the Colorado River crops failed.

The Halchidhoma represented another example of the lower Colorado River Yuman tribe that was known for their habits of extensive long-distance travel and trade. Anthropologists have documented that the Halchidhoma traded with the Cahuilla, Hualapai, Papago, and Pima people, and partnered with the Maricopa (Bean and Vane 1978). One of the more prominent travel corridors was known as the Coca–Maricopa Trail; that footpath leads west and southwest from the Colorado River near Blythe and runs to the Pacific Coast. (Dobyns et al. 1963:109). The Halchidhoma received Hopi cotton blankets from the Hualapai of northern Arizona and traded those to the native peoples along their travel routes.

Warfare was a prominent factor for the Halchidhoma, and frequent conflicts occurred with neighboring tribes (Bean and Vane 1978; Kroeber 1925). An alliance system included the Halchidhoma and, as allies, incorporated the Maricopa, Pima, Hualapai, Havasupai, Serrano, Cahuilla, Paipai, and Ipai. Adversaries to the Halchidhoma were the Mojave, Quechan, Kumeyaay, Chemehuevi, Southern Paiute, Yavapai, and Western Apache (White 1974). The Halyikwamia and Kamias were at times friends or adversaries. Warfare was conducted as a means of recognizing tribal prestige, maintaining religious values, gaining individual honors, and acquiring supernatural power (Kelly 1977:129–131). The opposing war confederations would fight collaboratively against common enemies; this included, at times, the Spaniards.

Today, the Halchidhoma are part of the Salt River Pima–Maricopa Indian community that is recognized as a sovereign tribe and is located in the metropolitan Phoenix, Arizona, area. This reservation is bounded by the cities of Scottsdale, Tempe, Mesa, and Fountain Hills. This Tribal community encompasses 52,600 acres. Two distinct backgrounds and cultures are joined within this single community composed of the Pima: Akimel O'Odham (river people) and Maricopa Xalychidom Piipaash (people who live toward the water). Maricopa is currently spoken by a few hundred of the approximately eight hundred Maricopa living in Arizona. There is a language program in the town of Lehi in the Salt River Pima–Maricopa Indian community, where they refer to the language as "Piipaash" (Golla 2011). Approximately 12,000 acres are under cultivation in a variety of crops, including cotton, melons, potatoes, onions, broccoli, and carrots. Commercial development is reserved along the community's western boundary. The community owns and operates several business interests, including a golf course, financial services, gaming resort, recreational facility, and landfill.

Mojave

There is considerable published material on the Mojave. Primary ethnographic studies rely on the works of Castetter and Bell (1951), Kroeber (1902, 1920, 1925, 1948, 1972, 1974), Spier (1933, 1936, 1953, 1955), and Wallace (1947a, 1947b, 1948, 1953, 1955). An early overview and synthesis can be found in the work of Hodge (1907–1910). George Devereux was a prolific author and student of Mojave Indian culture, and published a number of articles on Mojave belief systems and psychology (Devereux 1937a, 1937b, 1941, 1942, 1948, 1950, 1951, 1956, 1957, 1961). Lorraine Sherer provides academic studies on various aspects of the sociopolitical organization of the Mojave (Sherer 1965, 1966, 1967; Sherer and Stillman 1994). Kenneth Stewart offers some early topical accounts on territory and subsistence, and the most recent overview of Mojave ethnography included in the Smithsonian's encyclopedic Handbook of North American Indians (Stewart 1947a, 1947b, 1947c, 1957, 1965, 1966, 1968a, 1968b, 1969a, 1969b, 1970, 1973, 1974a, 1974b, 1977, 1983a, 1983b). Historical data on the Mojave is reported by Euro-American religious and military men and found in works of Coues (1900), Ives (1861), and Whipple et al. (1855).

Most anthropologists identify this lower Colorado River tribe as either the Mojave or Mohave. The spelling was considered rather important, as the Mojave with a "j" was representative of a people and the Mohave with an "h" designated the geographical appellation. That is no longer the case, and some Mojave people prefer the same spelling as the place name. The name Mojave is derived from the Yuman words for three (homk) and mountain (avi). One of the national identifications was Hamakhava. Contemporary Mojave often refer to themselves as the Aha Makhav (aha meaning "water" and macav meaning "along or beside"); hence the designation "By the River" or Pipa Aha Macav (The People by the River).

The Mojave language is a member of the River Yuman branch of the Yuman-Cochimi linguistic family. The latter includes approximately 10 distinct languages and numerous dialects, and includes speakers from Baja California to northern Sonora in Mexico, and also has affiliated languages represented in Southern California and western Arizona. These Yuman languages are considered by some linguists to be members of a larger Hokan linguistic family. Structurally and lexically, the Mojave language is very similar to Quechan and Maricopa, but different enough to create difficulty in spoken communication between the tribes. The Mojave language has been influenced by long-standing connections with Upland Yuman language speakers, resulting in a sound shift dating to the 19th century (Golla 2011).

Native speakers of the Mojave language can be found in California and Arizona. A little more than 200 fluent speakers were tallied in the year 2000, with about 70 percent of the speakers living in Arizona and the remaining 30 percent living in California. Although the language has been in decline for many years, younger Mojaves are now being taught their ancestral language, and the number of fluent speakers is growing.

Mojave territory, according to the ethnographic literature, included both riverine and inland areas; their riverine settlement area was mainly north of the Bill Williams River up to the present Nevada border. This main area of Mojave occupation extended on both sides of the lower Colorado River from south of Davis Dam to Topock (Stewart 1983b:55). At one time, however, the Mojave also occupied Cottonwood Island farther to the north, and the Chemehuevi and Colorado valleys to the south (Stewart 1969a:257–276). The historical record indicates that the Mojave were encountered by the Juan de Oñate Spanish expedition as far south as the present

Colorado River Indian Reservation in 1604 (Stewart 1969a:257–276) and that they intermittently controlled areas as far south as Palo Verde valley. Sherer (1965:5) describes their settlement area as follows:

> Their river holdings stretched from Black Canyon, where the tall pillars of First House of Mutavilya loomed above the river, past Avi kwame or Spirit Mountain, the center of spiritual things, to the Quechan Valley, where the lands of the Indians began. Translated into present landmarks, their lands began in the north at Hoover Dam and ended about one hundred miles below Parker Dam. Their tribal name was Aha macave, meaning the people who lived along the water (the river).

Three groups made up the Aha-Macav and lived on both sides of the lower Colorado River from Davis Dam in the south to Topock in the north (Kroeber 1925). The northernmost element of the Mojave nation was the Matha lyathum, who lived from Black Canyon south to the Mojave Valley. The Hutto-pah settled in the central Mojave Valley. The Kavi lyathum resided in an area south of Mojave Valley to south of the current city of Needles. In addition to the Mojave occupation of the river, ethnographic accounts and archaeological evidence show that groups of Mojave also occupied interior regions in both California and Arizona for extended periods of time.

There is evidence that the historic distribution of the Mojave did not have great time depth, and that there was much movement and realignment of the various Lower Colorado River tribes. The Oñate expedition encountered the Mojave far south of their historic distribution in 1604 (Stewart 1969a). Stewart (1969a) also noted that the Mojave extended their territory into the Chemehuevi and Colorado Valleys, and, from time to time, even controlled areas as far south as the Palo Verde Valley. Significantly, after the Halchidhoma exited the Parker-Blythe region during the period from 1825 to 1830, the Mojave took up residence in the area, but they ultimately returned to their central homeland in the Mojave Valley (Bean and Vane 1978).

Subsistence for the Mojave was dependent partially on agriculture, with crops such as maize, tepary beans, pumpkins, and melons forming the foundation of their diet. Maize was by far the most principal of all the crops, however, with a family typically clearing between 1 and 2 acres. Silt deposited by river overflows fertilized the fields, and women did most of the planting and cultivation (Stewart 1983b:58). These cultigens were supplemented with the collection of wild native plants, including honey mesquite, screwbean, and sometimes pinyon. Mesquite and screwbean plants produced seed pods that could be eaten green but were typically processed with a wooden mortar and a stone or wooden pestle. The pods could be stored for lengthy periods and the resulting flour was an essential staple within the diet. Additional subsistence activities included hunting and fishing. Spring was considered the preferred time to obtain game animals, and rabbits were taken with traps and communal netting. Fish was the most important protein source for the Mojave, with dip nets, drag nets, traps, and large basketlike scoops used to catch fish out of the river (Kroeber 1925; Stewart 1957). Agriculture remains an important income source for the Mojave in the Fort Mojave and Colorado River Indian Tribes reservations.

Sociopolitical organization for the Mojave consisted of a true chieftainship with hereditary leadership in the male line. Farmland and individual mesquite trees were owned. Tribal organization was quite distinct, and the Mojave identified themselves as a national identity—thinking of their land as a country with an infinite array of places (Kroeber 1925). The total population of the Mojave in 1776 was estimated at 3,000 (Coues 1900) and in 1834 as 4,000

(Whipple et al. 1855). Their numbers dropped dramatically so that by the 20th century, fewer than 1,600 were identified. Contemporary residents of the Fort Mojave Indian Reservation numbered less than 1,477 in the year 2010. However, there were 8,764 residents of the Colorado River Indian Tribes Reservation in 2010, which includes members with Chemehuevi, Navajo, and Hopi ancestry.

The Mojave were noted for their physical stamina and ability as runners, and they participated in an elaborate and formalized long distance trade network. The Mojave exchanged goods as far east as the Hopi town of Oraibi in Arizona and as far west as the coastal Pacific villages of the Chumash. The well-known Mojave Trail was one of their principal trade routes. Mojave men would travel at night, with a typical journey to the coast from the Colorado River taking some 15 to 16 days (Bean and Vane 1978; McCawley 1996).

Mojave religious beliefs were especially well developed and emphasized a basic connection between the natural world and the world of the supernatural. Every Mojave was recognized as having an ability to connect with the spirit world through dreams, and this was the principal means of identifying their personal calling in life. In dream states, the Mojave identified a way of traveling and journeying back through time to the beginning of the world. During these travels, the Mojave would see important places and identify key geographical locations where certain important springs or mountains were situated.

Traditional Mojave religion places special emphasis on the experience of and interpretation of dreams, with dreams affecting nearly all facets of life and behavior. Stewart (1983b:65) states:

> Mohave religion featured an unusual conception of dreaming, which was in fact a pivotal concept in their culture as a whole, permeating almost every phase of Mohave thought and endeavor. All special talents and skills, and all noteworthy successes in life, whether in warfare, lovemaking, gambling, or as a shaman, were believed to be dependent upon proper dreaming.

Oral traditions of the Mojave people are generally rich with detail, with mythical occurrences commonly associated with identifiable places and landmarks. Mojave stories typically recount journeys and/or the transformation of mythical persons into animals or landmarks. Many stories are part of traditional song cycles, and the landmarks identified in the stories include those within traditional Mojave territory as well as places in the surrounding region (Kroeber 1925:756). This strong identification with the landscape of traditional Mojave territory continues today.

Additionally, Mojave tradition involves the naming of clans. Clan names were given by Mutavilya, The Creator, based on aspects of the natural world, including (but not limited to) the sun, rain, small birds, the coyote, prickly pear cactus, and the frog. According to oral tradition, each clan went in different directions from Avikwame (Spirit Mountain) after receiving their name. Each clan has a song commemorating the journey and various encounters experienced during that journey.

The Mojave successfully resisted Spanish attempts at colonization and maintained traditional lifeways and political systems until the U.S. military gained control of the area in the 1850s. Subsequently, many Tribal members relocated to an area south of Parker in 1859. Additional Mojave settled there when the Colorado River Indian Tribes Reservation was founded in 1865. Many Mojave, however, remained in Mojave Valley. The Fort Mojave Reservation was founded there in 1870.

Today, many of the descendants of the indigenous Mojave reside on or near one of two reservations located on the Colorado River. The Fort Mojave Indian Reservation includes areas of California, Arizona, and Nevada. The reservation covers 42,000 acres, with its headquarters in Needles, California. Two Tribal casinos are operated on the reservation, and there are also a variety of recreational facilities and a resort.

The Colorado River Indian Tribes Reservation is composed of land in California and Arizona and is shared by the Mohave, Chemehuevi, Hopi, and Navajo nations. This reservation includes almost 300,000 acres of land and has business interests centering on agriculture, a casino, outdoor recreation, and light industry. The original Colorado River and Fort Mojave reservations were established in 1865 and 1870, respectively. Although the four combined groups are united within the Colorado River Indian Tribes Reservation and act as a single geo-political unit, each Colorado River Indian Tribe continues to maintain and observe its individual traditions, distinct religions, and culturally unique character.

Quechan

In a report to the Secretary of War relating to the challenges of creating Fort Yuma, Heintzelman (1857) provides some slight ethnographic information on the Quechan. However, Trippel's (1889) accounts form the earliest extensive treatment of Quechan lifeways, capturing the manner of Native American culture at the close of the 19th century. Forde (1931) presents the single most authoritative description of precontact Quechan culture by an anthropologist but lacks discussion of reservation life in more recent times. Bee (1963, 1967, 1970, 1981, 1982, 1983,) provides information on Quechan kinship organization, social and cultural changes, Tribal politics, and the impact of government programs on the Native American community. Most recently, Bee (1983) provides an updated overview and synthesis in a chapter for the Southwest volume in the Smithsonian's Handbook of American Indians. Castetter and Bell (1951) provide a thorough treatment of the horticultural methods and specific cultigens within the domain of Yuman agriculture.

In the 1940s, Halpern (1942, 1946, 1976, 1980, 1984, and 1997) conducted research with the Quechan, visiting their settlements and assembling further information on their language and kinship terminology. Returning in the 1970s, he amassed more data, specifically gathering oral history and material on folklore. Historical accounts by Spanish explorers and religious figures provide short accounts of traditional Quechan culture. The most detailed of these is the material provided by Pedro Font (1951). Fortunately, a significant number of these early historic accounts have been reassembled in a recent work by Forbes (1965).

The identifier Quechan is derived from the name the Quechan apply to themselves. It translates as "those who descended" (Forde 1931; Kroeber 1943). This descriptor references the native oral tradition of the creation of the Quechan and their neighbors on the sacred prominence, a mountain known to them as Avikwame (also known as Spirit Mountain). Their name for themselves is variously expressed in other discussions in an abbreviated fashion as xam kwacan, meaning "those who descended in a different way." Alternatively, another translation is provided for these same words as "those who descended by way of the water." Formerly, anthropologists identified them as the Yuma.

The Quechan speak a language also known as Yuma and are members of the Yuman linguistic subfamily, a member of the broader Hokan linguistic stock. In 1980, it was estimated that there were fewer than 700 speakers of the language. It is the most documented of Yuman languages, with several published grammatical sketches, ethnographic texts, and vocabularies (Golla 2011). Hinton's 1994 survey estimated the number of speakers between 150 and 500, while Golla's research in 2011 estimated that Quechan was spoken by 150 to 200 of the 3,000 members of the Quechan Indian Tribe. The majority of Quechan speakers are older, but some younger people are now learning the language and working to keep their ancestral tongue alive. Fluency in this language retains high social prestige for its speakers, especially in ceremonial context. Although no current systematic attempt is made to teach the language in schools, Quechan culture courses are taught at a local high school that incorporate the language (Golla 2011).

Quechan territory is now divided by the states of Arizona and California and is located near the confluence of the Gila and Colorado Rivers. Their traditional territory ranged from Blythe in the north to the United States/Mexico boundary in the south. Significantly, the Quechan reservation lies within their traditional homeland. Four to six locations were identified as ethnohistoric Native villages, all situated along the lower Colorado River. These included Avi Kwotapai between Palo Verde Valley and Blythe on the west side of the river. Also, Xenu mal vax was another Native American settlement that was near the contemporary town of Ehrenberg on the east side of the Colorado River.

The Quechan subsisted mainly on domesticated cultigens, wild plant foods, and fish (Bee 1983; Forde 1931). They planted seeds in the rich silt of the Colorado River floodplain after its waters had ebbed, and did so routinely and regularly with little risk and high returns. In some instances, seeds were planted several times during the year. Maize and melons were February plantings. Adding to the mix were teparies, corn, watermelon, black-eyed beans, pumpkins, and musk-melons. Winter wheat was a postcontact addition and would be gathered just before spring floods. Wild grasses were also seeded in the less fertile areas of ground. Up to 20 percent of the Native American diet consisted of fish from the lower Colorado River, including razorback, sucker, pike minnow, and bony tail. These were harvested through communal efforts with seine nets when the river was low.

The fields were cared for by the extended family, with men performing the heavier weeding chores and women sowing seed and storing the harvest. Wild native foods were also gathered; the principal targets for these efforts were the seed pods of mesquite and screw bean trees. The pods were crushed and the pulp eaten. This ground material served as a base for flour, was formed into cakes, or steeped in water to fashion a beverage.

Quechan religious beliefs traditionally involved the acquisition of spiritual power derived from special dreams and continuing interaction with the souls of the dead. This dream power is bestowed by the first people, created by Kukumat (their Creator), but imbued with spiritual power through Kukumat's son Kumastamxo. Dream power was critical to success as a leader, doctor, warrior, or religious specialist. Traditionally, the Quechan also had guardian spirits identified by the unique voices that spoke to them from time to time. Spirits and agents of the ancient ones, the first people, reside on the sacred mountain of Avikwame or other prominences in their territory. Only special speakers or singers had esoteric knowledge of religious matters. The singular collective Tribal ritual where these religious specialists held sway was the karuk. This Mourning Ceremony was fashioned to revere relatives who had passed away. The ritual was recognized as a reenactment of the original Mourning Ceremony following the Creator's death.

The learning of songs was—and continues to be—an important aspect of religious belief and practice. This included the learning of sacred songs, through dreaming, about the events that occurred at the time of the creation of the world. The singing of these songs by individuals was, and remains, a principal avenue of religious expression. The dreaming experience meant that sacred places could be visited, and the sacred landscape traversed, through dreaming rather than through conventional travel, although physical travel along trails to sacred places was also an important aspect of the religious experience. Travel on key Native American trails continues to be a cultural practice today to commemorate and experience traditional culture. The geography of sacred places related to the sacred song cycles of Yuman groups is a major cultural feature of the lower Colorado River region. Kroeber (1925:786) collected large quantities of information on places mentioned in Mojave song cycles, from as far afield as the Pacific Ocean and the Tehachapi Mountains, the Gulf of California, Tucson, and southern Nevada. Modern Quechan have stated that a similar geography of sacred places is important in their culture, but place names have not been compiled to the same extent.

The contemporary Quechan community is concentrated in the lands of the Fort Yuma-Quechan Reservation and has its main headquarters in Fort Yuma, Arizona. The reservation is approximately 45,000 acres and is located along the lower Colorado River in both Arizona and California just north of the United States/Mexico border. The U.S. Census tallied the number of residents on the Quechan reservation as 2,197 people in 2010. The economic basis for the Tribe consists of farming, a sand and gravel operation, recreational vehicle parks, a grocery store, a museum, a utility company, a fish and game department, and a resort/casino.

Chemehuevi

The name used by most anthropologists to identify this ethnolinguistic entity is Chemehuevi. However, this tag is of Yuman linguistic origin and was perhaps first applied by Father Garcés in 1776 (Coues 1900, 1:219, 224, 2:353, 444; Kroeber 1925:593). Such a moniker (Chemebet, Chemeguaba, Chemeguagua, and Chemegue) was most likely a term used by the padre's Mojave guides as a marker to describe a number of different Southern Paiute bands. Hodge (1907–1910, 1:243) identifies the term Tan'-ta' wats. Tan-ta-waits is also identified as an appellation by Fowler and Fowler (1971:156). Both terms mean "southern men" or "people who live in the south." The Serrano apparently identified the Chemehuevi as Yuakayam (Kroeber 1925:595), and the Quechan knew them as Mat-hate-vatch (Hodge 1907–1910, 1:243). The Pima recognized them by the name Ah'aalakat (Hodge 1907–1910, 1:242).

The Chemehuevi are the southernmost of 16 distinct groups of Southern Paiute speakers (Kelly and Fowler 1986). The latter groups all spoke a single language, with the various subgroups representing different dialectical divisions. These languages are members of the Southern Numic family of Uto-Aztecan linguistic stock. The Chemehuevi are distinct from their Southern Paiute linguistic kin in that they borrowed heavily from their neighbors, the Mojave, and, hence, have, in some instances, similar subsistence and religious cultural elements.

The traditional territory of the Chemehuevi included a large area southwest of what is now Las Vegas, Nevada, and an enormous expanse of land within the eastern Mojave Desert of California. Halmo (2001:45) described the range of the Chemehuevi as:

> …territory that extended in the north from roughly (east to west) Indian Springs through Ash Meadows in Nevada to the Funeral and Black Mountains immediately east of Death

> Valley; the western boundary encompassed the San Bernardino Mountains and Barstow, and extended from (north to south) Death Valley and the Panamint Range to the western flanks of the Avawatz Mountains, just east of Soda Lake south to the western flank of the Old Dad Mountains, near to or encompassing Cadiz Dry Lake, to the Big Maria and Little Maria Mountains, and to the area around Blythe, California. In the east, Chemehuevi territory included alluvial floodplain lands east of the Colorado River and up along the Bill Williams River and northward….

Kroeber (1925:595) noted that this was the largest piece of land held by any single ethnolinguistic group in California, and was one of the most thinly populated Native American territories anywhere in the state. He estimates that between 500 and 800 Chemehuevi were living within their territory during the precontact era (Kroeber 1925:595). Californian ethnographers Lowell Bean and Sylvia Brakke Vane disagree with Kroeber's population estimate and argue that a minimum of 13,000 Southern Paiutes inhabited a territory from what is now Las Vegas south to Palo Verde Valley and from the Colorado River into the Iron Mountains (Bean and Vane 1978:5–20).

It appears that, throughout much of prehistory, the Chemehuevi practiced a foraging subsistence strategy. They were hunter-gatherers who moved seasonally, taking advantage of the differential availability of key economic plant and animal resources. Their territory was a vast desert biome, and so they located their more permanent settlements near reliable sources of potable water.

Upland hunting parties traveled to more distant areas (away from villages) to acquire bigger game animals, principally bighorn sheep and deer. Antelope and jack rabbits were also hunted communally with drives using lengthy nets and constructed diversion fences. The Chemehuevi also collaborated with neighboring tribes in the pursuit of large game. Hunting parties traveled to the San Bernardino Mountains for cooperative efforts with their allies, the Serrano and Vanyume.

The Chemehuevi, who the earliest Euro-American explorers came to know, were living on irrigated horticultural lands along the Colorado River. In this part of their territory, their numbers were greater and permanent villages existed. It appears that the Chemehuevi adopted this pattern of floodplain agriculture from the Mojave. Plants that were amenable to this type of agricultural practice and were grown by the Chemehuevi included gourds, winter wheat, yellow maize, and certain semi-cultivated grasses (Kelly and Fowler 1986:371). The collection of wild plants supplemented the Chemehuevi diet, including the collection of blazing star, chia, rice grass, goosefoot, pinyon pine nuts, and acorns. Communal hunting parties generally hunted rabbits, antelope, and mountain sheep, with deer, bear, mountain lion, water fowl, small rodents, fish, lizards, and some insects rounding out the menu of Chemehuevi protein sources (Kelly and Fowler 1986:370).

Material culture for the Chemehuevi was similar to other Californian and Great Basin hunter-gatherers. Prior to their expansion into the lower Colorado River area, they did not have or use pottery. The Chemehuevi had a well-developed tradition in basketry and were also well known for their recurved, sinew-backed bows (Laird 1976:6). The latter were especially accurate and powerful and exceptionally well suited for hunting large game animals such as deer and bighorn sheep. Bands of Chemehuevi, who lived away from the river and without horticulture, typically fashioned conical brush structures or dome-shaped residences that were covered with grass or bark. Bands living closer to their cultivated fields adopted the use of pottery and, when living nearer to the river, fashioned more substantial dwellings of wood and mud without a front wall (Kelly and Fowler 1986:371).

Historical accounts suggest that the Chemehuevi belief systems include a form of shamanism where power was bestowed upon a person through dreams. A prospective shaman would be visited in his dream by one or more guardians—usually in animal form—who would give him instructions, teach him songs, and bestow upon him shamanistic power (Kelly and Fowler 1986:383). The songs passed on through dreams were, and remain, of great importance culturally and include the Funeral, Deer and Mountain Sheep, Bird, Salt, Quail, and Coyote songs. These songs are generally descriptions of travels, complete with place names, important landmarks, natural phenomena, and environmental conditions (including the animals present). The recitation of important songs is common at Chemehuevi cultural events even today, again reflecting the importance of tribal history and tribal territory in modern Chemehuevi culture.

The Chemehuevi have a rich record of oral traditions, and their stories tell of the genesis of the world and emergence of their people from a place near Mount Charleston (*nuvant*)—the highest peak and a sacred place located near what is now Las Vegas, Nevada. As with much Great Basin and Mojave Desert mythology, Coyote is a principal figure in their stories and is a central divine being, an animal/human immortal responsible for providing the names of the animals, inventing agriculture, initiating various customs, teaching people about the bow and arrow, and training people on how to fashion pottery (Kelly and Fowler 1986:385). Coyote and his brother Wolf or Panther had their home at the beginning of the world on Charleston Peak (Kroeber 1908a; Laird 1984; Stoffle and Dobyns 1983; Stoffle et al. 2000; Sutton 1993).

The Chemehuevi borrowed and adopted certain cultural elements from their neighbors the Mojave, with whom they traditionally held rather amicable relations. Evidence of this is suggested by Chemehuevi language use. Chemehuevi speech has a number of Mojave loanwords and is often treated separately from the other varieties of Southern Paiute. All varieties spoken in the dialect chain from Chemehuevi to Northern Ute remain intelligible and constitute a single language, with the differences between these tribal groups considered social and cultural, not linguistic (Golla 2011). Nevertheless, there appears to have been a slight undercurrent of sometimes tense or adversarial interactions, and Kroeber notes that an armed conflict occurred between the Mojave and the Chemehuevi in 1867 (Kroeber 1925:594). It has generally been accepted by anthropologists that the Chemehuevi migrated into the Parker and Blythe area after the Halchidhoma left the area. However, other researchers (Roth 1976:81) believe that the Chemehuevi might have settled earlier in the Palo Verde Valley, before the out-migrations of the Halchidhoma.

Mojave tradition claims that the Chemehuevi were formally invited by the Mojave to come to the Colorado River after 1830. Other ethnographers claim that the Chemehuevi were residing at Cottonwood Island and in the Chemehuevi Valley prior to that date in the 18th century (Laird 1976:123). Kelly (1934:556) thought that the southern expansion of the Chemehuevi dated to the early 1800s. The recent historic and protohistoric population movements along the Colorado River are a subject of some continuing disagreement among anthropological scientists, historians, and the living descendants of the Chemehuevi and Mojave people.

The Chemehuevi lost their traditional lands to the U.S. government in 1853. A little more than a half-century later (in 1907), the Chemehuevi Valley reservation was established. The Tribe received formal Federal recognition and was reinstated in 1970. The Chemehuevi have a contemporary land base of 32,000 acres of trust land that incorporates 30 miles of Colorado River frontage. The descendants of the Chemehuevi live on the Chemehuevi Indian Reservation (population of 308 in 2010) and Colorado River Indian Tribes (CRIT) Reservation, as well as on several other reservations, including the Twentynine Palms Indian Reservation (located in Coachella, California). The Chemehuevi dialect is currently spoken on the Colorado River Indian Tribes Reservation at Parker, Arizona, and on the neighboring Chemehuevi Indian Reservation. Although the Arizona Chemehuevis have started a language-revitalization program, there are few materials and no agreement on orthography. Currently, fewer than 20 first-language speakers are found on all reservations combined (Golla 2011). A Chemehuevi dictionary by June Leivas has been published as a part of the mitigation for the Genesis Solar Energy Project, and is available through the Chemihuevi Tribe.

Cahuilla

The Cahuilla call themselves Ivitem or Iviluwenetem. This means “people who speak iviat or iviluat.” The name used by anthropologists, Cahuilla, is of uncertain origin but might be from their own word for boss or master, kawiya. Their neighbors, the Cupeño, call the Cahuilla the wolves in their language, which is one of their clans. The Cupeño also refer to the Cahuilla as the people of the east. The Luiseño identify them as “the easterners” in their language. Other names for the Cahuilla that have been applied are Cowela, Cowillas, Dancers, Danzarines, Gecuiches, Hakwiche, Jecuches, Jecueche, Jecuiches, Kahuilla, Kahweaks, Kah-we-as, Kahweyahs, Kauvuyas, Kau-yai-chits, Kavayos, Kavwaru-Maup, and Koahualla, as well as Tecuiche (Hodge 1907–1910, 1:669), Cahahaguillas (Bean and Mason 1962), and Coahuillas (Barrows 1900).

The Cahuilla language is a member of the Cupan subgroup of the Takic family of Uto-Aztecan stock. There are four members of the Cupan subgroup, and Cahuilla is more similar to Cupeño than to Luiseño. The territory of the Cahuilla covers much of central Southern California and includes the inland valleys of western Riverside County across the San Jacinto and Santa Rosa Mountains and into the Coachella Valley and the northern Colorado Desert. The Cahuilla landscape included the territory from the Orocopia Mountains in the east to San Gorgonio Pass and the area near the City of Riverside. Anthropologists have subdivided the Cahuilla into three geographical divisions: the Mountain, Pass, and Desert Cahuilla. The Desert Cahuilla lived closest to the study area. This subgroup focused their activities in the region of the Coachella Valley, Chuckwalla Valley, and areas west of the Colorado River.

Although dialectical differences existed between the three communities of Cahuilla, these differences did not prevent mutual understanding and intelligibility, and the communities maintained social and ceremonial ties with one another. The Cahuilla language is very well documented and grammars, dictionaries, and collections of narrative texts are available. Though there are no longer any speakers of Pass Cahuilla, there are five native speakers of Mountain Cahuilla as of 2004, and a dozen or so speakers of Desert Cahuilla. The Malki Museum at the Morongo Reservation in Banning has played an important role in language preservation and provides visitors with extensive information about the Cahuilla language (Golla 2011).

The Desert Cahuilla gathered wild plant foods from the lowland environments and emphasized mesquite, screwbean, cactus fruit, and hard seeds (Bean and Vane 1978:578). It has been suggested that the desert groups retained access rights to upland environments as well. Precontact Cahuilla subsistence/settlement patterns appear to have incorporated village sites situated near a reliable source of water. These hamlets were occupied year-round by a single lineage group. Springs and resource patches might be owned by a specific lineage. Additionally, by 1824, the Desert Cahuilla were practicing irrigation agriculture and growing foods similar to the Colorado River Yuman groups. Those foodstuffs included maize, beans, squash, pumpkins, melons, and wheat.

Traditional subsistence patterns involved the movements of parts of the Cahuilla community to areas where they would collect and harvest plant resources as they became available. The agave, yucca, mesquite, cactus fruit, and certain grass seeds were targeted. As occasions allowed, the Cahuilla also hunted various game animals. Rabbits, deer, and bighorn sheep were favored quarry. Upland excursions were focused on harvesting key nut crops, including acorns and pinyon nuts. Both nut crops were storable and could last for many months.

Basketry arts were well developed and coiled wares of four types were fashioned: flat plates, food bowls, pack baskets, and storage containers. Stone mortars, pestles, and milling slabs; bowls of willow or mesquite, arrows; charmstones; bull-roarers; clappers; rattles; feathered headdresses and skirts; sandals; women’s skirts; and rabbit skin blankets were included in their material technology.

The Cahuilla recognize the universe as an interacting system, and saw people as an important part of that world. However, they also respected the existence of powerful supernatural beings that were active in the affairs of the Tribe. Soul spirits inhabited the living and yet had another existence after a person’s death. These spirits would travel to the land of the dead and this was the place where the first people lived. Messages from these spirits to the living aided those here on Earth.

Many rituals were prominent in Cahuilla life, and both Strong (1929) and Bean (1972) have identified at least 10 or more types of rituals. The most important of these ceremonies were the annual mourning ceremony, eagle ceremony, rites of passage (particularly birth, naming, adolescent initiation, and marriage), status changes of adults, and increase rites (inducing supernatural beings to provide increased number of animals or plants ensuring an adequate and abundant food supply). The emphasis in many of these rituals was the performance of song cycles, setting the place of the Cahuilla in the universe and affirming the relationship of the past to the present, one to another, and to all things.

Cahuilla leaders Juan Antonio and Cabeson, among others, acted as negotiators for the treaties between the Cahuilla and the U.S. Government in 1851. Reservations were established for the Cahuilla in 1875 and they were able to maintain their traditional patterns in combination with wage labor until about 1891, when Federal supervision of the 10 Cahuilla reservations increased. This supervision included enrollment in government schools and cultural suppression of traditional Cahuilla lifeways. Today, Cahuilla reside on eight different reservations in and around the San Jacinto Mountains and Coachella Valley.

Agua Caliente Band of Cahuilla Indians. The Federally recognized Agua Caliente Band of Cahuilla Indians was granted land at Tahquitz Canyon, Riverside County, in 1876. From 1891 until the 1930s, Indian Service (Bureau of Indian Affairs) personnel lived on-reservation and closely controlled tribal politics. The Indian Reorganization Act of 1934 gave more political autonomy to the Cahuilla, permitting, among other rights, the authority to reestablish tribal governments. Currently, the tribe is based out of Palm Springs, California, and its members constitute the largest single landowner in Palm Springs. The Agua Caliente Band is governed by a tribal council consisting of a chairperson, vice-chairperson, secretary/treasurer, and two council members. The council members are elected by the tribe, and elected members appoint four proxy members. The tribe maintains a cultural resources department directed by a Tribal Historic Preservation Officer. The tribe has numerous business ventures including the Agua Caliente Casino, Resort and Spa in Rancho Mirage; the Spa Resort Casino in Palm Springs; a golf resort, and real estate.

Augustine Band of Cahuilla Indians. The Augustine Tribe and their Reservation are both named after Captain Vee-Vee Augustine, a Cahuilla leader born in 1820. There were at least 22 village sites noted by early explorers in the Coachella Valley, one of which ended up being the Augustine Reservation. The Reservation was established by Congress in 1891 at the Temal Wakhish village site near Thermal, California. In 1972 there was only one last surviving member of the tribe, Roberta Augustine the great-granddaughter of Captain Augustine. Roberta had three children who, along with their descendants, constitute the official tribal membership today. This Federally recognized tribe is based out of Coachella, California, and is governed by a tribally elected chairperson. Economic ventures for the tribe include the Augustine Casino, and the Augustine Solar Energy Park, a 1.1 MW solar photovoltaic (PV) plant at the Augustine Solar Energy Park built on reservation land.

Cabazon Band of Mission Indians. The Cabazon Reservation was established in 1876 and is a Federally recognized tribe based in Indio, California. The primary economic resource on the 1,153 acre reservation is agriculture. As Mission Indians, the Cabazon Reservation associates and interacts closely with the network of other reservations of Mission Indians in the region. The tribal government of the Cabazon Band of Mission Indians consists of five tribally elected officials; a chairperson, a vice chairperson, a secretary/treasurer, a liaison/general counsel, and a member at large. Elections are held every four years for these positions. The tribe employs a cultural resources director to handle cultural resource issues. The Fantasy Springs Casino and Resort in Palm Springs is operated by the tribe.

Cahuilla Band of Mission Indians. The Cahuilla Indian Reservation is located about 25 miles east of Temecula and 35 miles west of Coachella Valley, based out of Anza. The Federally recognized reservation was established in 1875 and today consists of about 60 homes on 18,884 acres of land. There are currently 325 enrolled Cahuilla members. The Cahuilla tribal government consists of a five-member tribal council elected by the general membership. The Council consists of a tribal chairperson, a vice chairperson, a secretary, and two council members. In addition, various tribal committees are appointed to address specific government functions within the tribe. Major sources of income for the tribe include the Cahuilla Casino, the Cahuilla Travel Website, and the Cahuilla Smoke Shop. In addition, the tribe has recently allocated 2,000 acres for future economic development, including renewable energy development, commercial warehousing, and a gas station/convenience store.

Morongo Band of Mission Indians. The Morongo Reservation was established in 1876, and is located in Banning, California. Members of the reservation are of the Serrano, Cupeño, and Cahuilla groups. In terms of area, at 35,000 acres, the Morongo Reservation is the largest of the Cahuilla reservations. The Morongo Band of Mission Indians is a Federally recognized group governed by a tribal council consisting of a chairperson and vice chairperson, as well as five council members. The tribe is the largest private-sector employer in the Banning region, and its economic resources include agriculture, cattle, recreation, the Four Diamonds Resort, the Morongo Casino Resort and Spa, restaurants, and a golf course, among other businesses. The tribe maintains a cultural heritage program to promote the tribe's history, language, and connection to the land.

Ramona Band of Cahuilla Indians. The Ramona Indian Reservation was established in 1893 at the base of Thomas Mountain, in Anza, California. In 1970, there were only two members of the tribe, neither of whom lived on the 560-acre reservation. The members of the Ramona Tribe are direct descendants of the Apapatchem clan, known as the "Medicine People." The reservation is located in the area where historically this clan gathered food, water, and medicine, and held spiritual ceremonies and celebrations. The tribal government of the Federally recognized Ramona Band of Cahuilla Indians consists of a tribally elected tribal chairperson and vice chairperson. One of the major economic vehicles for the tribe is the Ramona ecotourism project. This is a Department of Energy funded project to develop renewable energy projects in remote locations. The tribe will be one of the first "off-grid" reservations, using wind, solar photovoltaic/propane generator hybrid systems to generate between 65-80 kWh/day to power the reservation's housing, offices, and business ventures.

Soboba Band of Luiseño Indians. The Federally recognized Soboba Indian Reservation was established in 1883 on a 3,172-acre parcel that included the village of Soboba. A non-Indian individual also claimed ownership of some of this land. After several legal battles, the private land was purchased by the Federal government and was then held in trust for the people of the Soboba band by the Department of the Interior. Today the Reservation encompasses almost 7,000 acres and there are about 1,200 enrolled tribal members. The Soboba Indian Reservation is located in San Jacinto, California. The Tribal Council consists of a tribally elected chairperson, and a vice chairperson, a secretary, a treasurer, and a sergeant-at-arms who are elected by the Tribal Council.

Torres-Martinez Desert Cahuilla Indians. The Torres and Martinez Reservations were established independently in 1876. Later, under the Relief of Mission Indians Act of 1891, these two reservations were combined. The Federally recognized Reservation encompasses about 18,223 acres near Thermal, California. The tribal government of the Torres Martinez Tribe consists of eight tribal council members who are elected by the general membership. The Council members consist of a chairperson, a vice chairperson, a secretary, a treasurer, and four non-office holding members. The tribe employs over 150 people in positions within various tribal departments (e.g., accounting and finance, environmental protection, planning, security), and owns and operates the Red Earth Casino.

3.5.1.5 Historical Background

European exploration of the Colorado Desert began in 16th century, but sustained Euro-American settlement of the region did not occur until the mid-19th century. This extended period of exploration without expansion creates a long Proto-historic period in the region, during which Europeans and local Native American groups knew of one another but interacted very little. This time period is discussed above from the point of view of Native American history. Below, the Euro-American expansion into the region and subsequent historical developments are described.

European Exploration

By 1539, the Spanish had begun to explore parts of what they named Alta California. Early explorers such as Francisco de Ulloa (1539), Hernando de Alarcon (1540), and Francisco de

Coronado (1540) led expeditions into the Gulf of California, reaching the mouth of the Colorado River and continuing up the river past the Gila confluence. However, little exploration of the interior deserts was undertaken until much later. Spanish exploration of the interior deserts for the next 200 years was intermittent, as the region was considered desolate, remote, and filled with staunch indigenous adversaries such as the Mojave and Quechan.

The first recorded explorer of the interior Colorado Desert region was Father Eusebio Francisco Kino, a Jesuit missionary, cartographer, and explorer. Starting in 1691, Kino established a string of missions in northern Mexico and southern Arizona, finally reaching the Colorado River in 1702. Almost 70 years later, Father Francisco Garcés followed Kino's route, reaching the villages of the Quechan at the junction of the Gila and Colorado Rivers in 1771. Garcés's party crossed the Colorado River and traveled west through the desert until they could see the San Jacinto Mountains in the distance, before returning to Sonora. Three years later, Father Garcés and a Spanish border captain named Juan Bautista de Anza attempted an overland route to Monterey. When they reached the Colorado River, Anza found the local Quechan to be surprisingly friendly. The Quechan assisted the Spanish in fording the river, locating wells and trails, and ultimately rescuing an exploring party lost in the desert. In the 1800s, most of the travel from Arizona to central California followed Anza's route.

Transportation

Sustained economic development in the Colorado Desert region only began in the 1870s, and came to fruition in the early part of the 20th century. Development was dependent largely on two things: transportation and water. The first of these came in the form of a series of overland trails and stagecoach lines created to service the emerging mining towns. Early in the 1860s, Hank Brown and John Frink independently developed routes to access the gold mines in the vicinity of La Paz, Arizona (von Till Warren et al. 1980). Frink's route was an east/west road established as an alternative to the more southern Butterfield Stage. This was apparently the first development across the Palo Verde Mesa, although it has since all but disappeared (von Till Warren and Roske 1981:17–18). In 1862, William D. Bradshaw opened a route, later known eponymously as the Bradshaw Trail. This route crossed the desert to the La Paz mining district. Bradshaw also operated a ferry across the Colorado River near Providence Point, opposite a small community that would become Ehrenberg, Arizona.

Bradshaw developed his road partly along Brown's and Frink's previous routes, although Bradshaw's trail headed more directly east from the Salt Creek Pass to the southern slopes of the Orocopia and Chuckwalla Mountains. Bradshaw, like the majority of early trailblazers, used Native American routes that predated Spanish exploration. Part of Bradshaw's Trail may have been the Coco–Maricopa Trail, which intersected the Colorado River near Blythe. The Bradshaw Trail, like many other cross-country routes, became largely obsolete with the arrival of rail service in the desert and the depletion of the La Paz gold fields in the late 1870s. The railroads reoriented the development of trails and wagon roads that connected new mining communities to major routes of transportation. Railroad stops became destinations for wagon roads, allowing points of access to develop the remote desert interior (von Till Warren et al. 1981).

The first railroad came to the Colorado Desert in 1877, with the construction of the Southern Pacific Railroad. The Southern Pacific line began on the west coast and reached Yuma on September 30, 1877. The railroad was the single most important boost to mining in the southeastern Colorado Desert, offering convenient transportation of heavy mining equipment, supplies, personnel, and, when the miners were lucky, bullion. By 1880, the Southern Pacific Railroad was providing access to new gold and silver ore deposits in the Chocolate Mountains, Cargo Muchacho, and Palo Verde Mountains. Water remained a scarce resource in the desert, with most water for mining enterprises coming from highly localized sources such as springs, wells, and streams.

Mining

After the Treaty of Guadalupe-Hidalgo in 1848, the United States took control of the U.S. Southwest in the same year that gold was discovered in California. Mining camps were established in the desert as early as 1850, with the beginning of gold mining at Salt Creek in the Amargosa Desert. Along the eastern bank of the Colorado River, the town of La Paz, once known as Pot Holes, developed when gold was discovered nearby. The subsequent mini-gold rush in the area made La Paz an instant boomtown whose population peaked at 1,500 in the 1860s (Wilson 1961:25). Along the stage line between San Bernardino and the Colorado River, La Paz was an important stop, serving as the county seat for Yuma County until 1870 (Thompson 1985). The La Paz mining district yielded placer gold for only a short period, though, and by the end of the 19th century, La Paz passed from boomtown to ghost town.

The first Euro-Americans to arrive in the Colorado Desert in any numbers were prospectors hunting for the next big gold strike. Regionally, mining and prospecting activity was most intense in the mountains and high deserts of the Mojave, but small-scale mining has been a consistent feature of the Colorado Desert from the 1800s to the present day. By 1863, between "2,500 and 3,000 [Euro-]Americans and Mexicans were on the river between Palo Verde Valley and El Dorado Canyon," most of them engaged in mining (Poston 1863:387, cited in Bean and Vane 1978:5–21). Generally speaking, mining productivity in the Colorado Desert was greatest between 1890 and 1910, with a brief resurgence during the Great Depression in the 1930s, when a hard-scrabble existence in the desert seemed preferable to unemployment in the cities (Morton 1977; Rice et al. 1996). In the vicinity of the Project area, manganese and gypsum mining were particularly intense during the initial years of World War I (WWI) and World War II (WWII), when other mining activities were reduced or curtailed entirely.

In the 1820s, limited placer mining began in the eastern Colorado Desert. In the early 1800s, prospectors were some of the only Euro-Americans traveling in the California deserts, and they frequently came into conflict with Native American groups. From the 1840s through the 1880s, the U.S. Cavalry established a series of camps and forts throughout the Arizona, Nevada, and California deserts to protect settlers and immigrants from the often hostile tribes whose territories they were invading. In 1848, the discovery of gold at Sutter's Mill brought a tremendous influx of Euro-American and European settlers to California. Between 1849 and 1860, an estimated 8,000 emigrants crossed the Colorado Desert on their way to California (Laflin 1998:10). In the 1850s, some would-be miners tried their luck in the eastern Colorado Desert, but found very little gold. Most miners simply passed through the desert on their way to the larger strikes to the west and north.

By the early 1900s, the glory days of mining were over. In the Palo Verde Valley area, mining remained a relatively small part of the economy, never becoming the economic boon that early town planners might have hoped. Several modestly successful copper mines such as the Crescent

Mine and Smith-Hopkins Mine were located in the northern McCoy Mountains, but the less-glamorous gypsum and manganese deposits became more important in the region. In the northern extent of the McCoy Mountains, several mines produced significant quantities of manganese, the ore being used to harden steel for armaments (Butler 1998:44; Shumway et al. 1980:44). During WWI, the Blackjack Mine employed one to two dozen men at a time to extract 45% pure manganese ore, which was shipped east for use in armament factories. A brief mention of the mine in the Blythe Herald optimistically proclaimed the "outlook" at the Blackjack Mine "unusually good" due to the inflated war-time price of manganese ore (Blythe Herald, October 11, 1917). With the end of the war in 1918, though, the price of manganese fell to pre-war levels, and manganese mines lay largely dormant until the onset of WWII in the 1940s.

When the United States formally entered WWII, manganese mines in the McCoy Mountains became active once again. Of the dozen or so manganese mines active in the vicinity of the McCoy Mountains north of Blythe during WWII, the largest was the Arlington Mine along the northeastern flank of the McCoy range (Shumway et al. 1980:44). From 1942 to 1945, the Arlington Mine shipped roughly 8,500 tons of ore via the Santa Fe Railroad at the Inca (Cox) siding (Shumway et al. 1980:44; see also Palo Verde Valley Times, November 19, 1942, and June 24, 1943). In 1945, the government created new, more-stringent specifications for manganese ore that none of the McCoy deposits could meet, leading to a near total shutdown of the mines in a matter of months.

Homesteading and Agriculture

The passage of the Homestead Act in 1862 and the Desert Land Act in 1877 were instrumental in the settlement of the Lower Colorado River area. The Homestead Act offered the opportunity for United States citizens to file a claim on 160 acres or less of land for $1.25 per acre. The Act stipulated that the claim be for purposes of actual settlement and cultivation, and the claimant was required to "improve" the plot by building a dwelling and cultivating the land. After five years on the land, the original filer was entitled to the property (National History Day n.d.).

On the Palo Verde Mesa, agriculture remained a challenging pursuit due to poor soils and lack of water. These impediments, though, did not stop a few enterprising souls from attempting to raise plants and livestock on the land. The incredible success of the irrigated fields in the Palo Verde Valley surely encouraged expansion onto the inhospitable mesa. In 1929, the Palo Verde Mesa and Chuckwalla Valley Development Association proposed a large-scale irrigation project for the Palo Verde Mesa. The irrigation project was further explored in 1931, and the main project canal was proposed to follow a contour line around the mesa. Ultimately, the project did not come to fruition. In 1936, the Palo Verde Irrigation District proposed another irrigation project following the mesa contour lines and centered on the McCoy Wash within the Project. Several tracts of land were claimed as Homestead Entries and Desert Land Entries in the area. These were developed as part of the new Palo Verde Irrigation District. Despite high hopes and good intentions, most of the originally developed fields lay fallow now.

World War II Desert Training Center/California-Arizona Maneuver Area

Early in 1942, shortly after the bombing of Pearl Harbor and the U.S. entry into WWII, the Director of Army Ground Forces and Combat Training for the War Department, Lt. General Lesley J. McNair, ordered the creation of the Desert Training Center (DTC) in California, Arizona, and Nevada. The DTC was to be a training facility where U.S. troops could become acclimated to the rigors of desert fighting, and desert tactics and military equipment could be tested before the inevitable confrontation with the Germans in North Africa. General McNair believed in greater "realism in training," which he equated with "large maneuvers and live-fire exercises" of a kind rarely seen in U.S. military training up to that point (Gorman 1992:1). The DTC was, thus, also intended to function as an enormous mock theater of war in which McNair's ideas about "realism in training" could be put into action.

One man who shared McNair's abiding belief in training realism was General George S. Patton, Jr., who had only recently been placed in command of the first tank unit in U.S. military history, the 1st Armored Corps. Early in his military career as a cavalry man, Patton had observed first-hand the importance of large, realistic training maneuvers. In 1916, as part of the punitive expedition against Pancho Villa, the cavalry amassed in the western deserts a "war strength regiment of infantry and some artillery … in the midst of an unrestricted maneuver and hundreds of square miles of varied terrain," and the training benefits were, in Patton's words, "almost UNIMAGINED" (Patton 1917, in Province 2002:19; capitals in original). Therefore, when General Patton was tasked with overseeing the creation of the DTC in the western deserts of California, Arizona, and Nevada, he was fully aware of the hardships and "unimagined" benefits of the deserts. Patton scouted the region by plane, jeep, and horseback beginning in March 1942. The area he eventually chose was well suited to military training because of several features, such as the general lack of human habitation, the difficult and varied terrain, the established railroads and highways, the presence of several military installations throughout the region, and the fact that much of the land was owned by the U.S. government (Henley 1989:5–7).

Desert Training Center

Patton established his base of operations near Shaver's Summit (now Chiriaco Summit) at Camp Young. Troops began arriving at the DTC in April 1942 and endured harsh physical training that included limited water, physical endurance training, and lack of sleep. Life at the DTC was so difficult that the officers and enlisted men came to refer to the facility as "the place that God forgot" (Henley 1989:22–24). Patton commanded the DTC for only 3 months, and in July 1942, he was placed in charge of the Allied invasion of North Africa, code named Operation Torch. When General Patton left the DTC, his units were replaced by 12,000 new troops, and he was replaced by Major General Alvan Gillem, Jr. All of the maneuvers that took place in the Project vicinity were likely under the direction of Major General Gillem and his successors. Patton's exercises were largely confined to the desert reaches around Camp Young, many miles to the west. The first large-scale maneuvers reported in the local Palo Verde Valley Times newspaper began in August 1942, and were under the direction of Major General Gillem; maneuvers eventually spilled onto the Palo Verde Mesa.

California-Arizona Maneuver Area

After the resounding success of the Allied troops in North Africa, the need for desert training evaporated, but the perceived benefits of the DTC as a vast theater of war ensured the center's survival. In 1943, after 19 months of operations and expansion, the DTC was home to almost 200,000 troops and had grown in size to an area larger than the whole of England. At its largest, the DTC/California-Arizona Maneuver Area encompassed some 18,000 square miles in California, Arizona, and Nevada. On October 20, 1943, the DTC was officially renamed the

California-Arizona Maneuver Area (C-AMA), in recognition of the evolving purpose and scope of the facility (Meller 1946). The facility, though, continues to be better known as the Desert Training Center, and most researchers today refer to the facility by the somewhat cumbersome name, Desert Training Center/California-Arizona Maneuver Area, or DTC/C-AMA (Bischoff 2000). A contemporary account of the DTC/C-AMA, dated November 19, 1943, by Captain Herbert Chase, Public Relations Officer, describes the mission of the facility:

> The mission of the California-Arizona Maneuver Area is to train, maintain, and supply troops realistically as in a Theatre of Operations. The training is designed to harden troops physically and to train soldiers mentally for the shock of battle. Much of the firing is conducted under realistic battle conditions. Other objectives are the development of tactics, techniques, and training methods suitable for desert warfare, and to test and develop equipment and supplies [as quoted in Baty and Maddox 2004:88].

In addition to the command center at Camp Young, the DTC/C-AMA eventually contained 12 divisional camps in California and Arizona, including the top-secret Camp Bouse where specially equipped tanks and their crew were readied for action against the Germans (Baty and Maddox 2004; see also Henley 1989:9). Of the California camps, Camps Iron Mountain, Essex/Clipper, and the short-lived Camp Rice (40 miles north of the Project) were constructed in the spring of 1942. Shortly thereafter, Camps Coxcomb and Ibis were constructed in the summer of 1942 and the winter of 1942/1943, respectively (Bischoff 2000). Camp Pilot Knob, the farthest south camp located roughly 60 miles due south of the Project, was constructed in the spring of 1943. Camps Laguna, Horn, Hyder, and Bouse, in Arizona, were constructed after the Arizona land known as “Area B” was added to the DTC/C-AMA in the summer of 1943 (Bischoff 2000:23). These camps are the most visible remains of the enormous flurry of military activity in the DTC/C-AMA between 1942 and 1944, but they were not the true focus of that activity. None of the DTC/C-AMA camps were located in or near the DQSP, although there is evidence that the Project area was used for training.

Blythe Army Air Base

To support the mission of the DTC/C-AMA, several desert airfields were commandeered and significantly improved by the Army from 1942 through 1944. One of these wartime training bases was the Blythe Army Air Base, which was originally constructed by the Civil Aeronautics Administration (CAA) in 1940 as the Intermediate Flying Field Site 21 (Wilson 2008:4). With the development of the DTC/C-AMA, the little airfield west of Blythe was identified as an excellent candidate for Army use, and it was officially taken over by the Army in April 1942, under the direction of General Henry H. Arnold, Commanding General of the Army Air Forces (Wilson 2008:12). One month later, the 46th Bombardment Group was deployed to the Blythe Army Air Base, and the men immediately went to work building base housing, bringing in utilities, and improving the airfield facilities.

By September 1942, the airfield was formally designated the Blythe Army Air Base, with paved runways suitable for military aircraft. In the spring of 1943, the airfield was further improved, and an “unusually large taxi strip, of a type heavy enough to accommodate the largest four-motored bombers,” was constructed (Palo Verde Valley Times, June 4, 1943; see also May 13, 1943). From the fall of 1942 to 1945, the Blythe Army Air Base supported numerous training exercises in the DTC/C-AMA, and became known for its excellent training of heavy bomber crews who went on to complete hundreds of successful bombing missions in Europe and the Pacific (Wilson 2008).

Ultimately, the size of the DTC/C-AMA training exercises became too large to manage, as all available fighting troops were needed on the fronts in Europe and the Pacific. After training hundreds of thousands of enlisted men and officers, and aiding in the formulation of numerous tactical advances, the DTC/C-AMA was closed in April 1944. As a heavy-bombing training facility, the Blythe Army Air Base remained in operation for another year. At the end of 1945, though, after months of slow down-staffing and dismantling, the Blythe Army Air Base was decommissioned and returned to the people of Blythe as a community airport (Palo Verde Valley Times, October 11, 1945, December 20, 1945).

City of Blythe

From 1855 to 1884, the U.S. General Land Office registered many new settlers in the Palo Verde Valley (Setzler 1998:iv). The first large-scale venture to develop land in the valley began in the 1870s with the arrival of Thomas H. Blythe, “the father of the Palo Verde Valley.” Blythe was the visionary developer of the seasonally inundated lands on the west bank of the Colorado River, directly across from the established portage point at Ehrenberg, Arizona. Born Thomas Williams in England in 1822, Thomas changed his name after a series of business failures, and came to the U.S. for a new start in 1849. He eventually moved to San Francisco in 1855, and gained some success in a wide range of ventures, including mining, promotion, and general investment. Although he never married, Blythe had one daughter named Florentine Blythe, also known as Flora and Florence, who was born in 1873 and raised without him in England.

In 1875, Blythe traveled with an engineer named William Calloway to Ehrenberg, Arizona, along the Colorado River. Calloway had previously been engaged in building many of the desert roads of San Diego County, which at that time included most of current Riverside County. Calloway’s knowledge of the land and engineering acumen impressed Blythe and encouraged him to consider investing in development along the Colorado River. Blythe and Calloway envisioned the development of the river-fed lands, and Blythe had a particular dream of constructing an elaborate hacienda in his newly developed riverside retreat (Setzler 1998:10). To realize his dream, Blythe hired Calloway as a project engineer and George S. Irish as project manager. In 1876, Blythe was introduced to Mexican General Guillermo Andrade, a promoter of colonization of the Colorado River on behalf of the Mexican government. Andrade became a silent partner in Blythe’s scheme for development. In the coming years, Blythe’s venture to clear and develop 40,000 acres of land west of the Colorado River became an obsession for him, although he spent very little time there (Setzler 1998:10).

In 1875, the venture filed for 400,000 acres of Swamp Land District No. 310, as designated by the California Swamp and Overflow Act (Palo Verde 2005:7). By late 1875, Blythe named his fledgling town, “Blythe City, in compliment to myself” (Setzler 1998:10). Initially the town consisted of tent houses, a corral, and a general store. Thomas Blythe made the first filing in California for water rights in 1877 when he requested rights to Colorado River water for his venture (Setzler 1998:v). He was granted 190,000 miner’s inches. Together, Calloway and Irish developed experimental ditch and canal irrigation systems, hiring local Native American laborers who had been farming the floodplains successfully for centuries. The major project of their irrigation system was the construction of a masonry head gate in the riverbank to control flow to the system (Palo Verde 2005:7). By 1878, a 40-acre experimental farm, known as the Colorado Company, was planted. In 1880, Calloway was killed in an altercation with two of the Native American workers, resulting in a delay in the completion of the main canal intake until he was replaced by C. C. Miller (Setzler 1998:11). Two years later, the canal was almost complete, and Blythe made his second and last visit to the site. Blythe was enthusiastic about the progress, but fatefully, he would never see the fruition of his $82,000 investment. Just 1 year later, on April 4, 1883, Thomas Blythe died of a heart attack in San Francisco (Setzler 1998:11). After years of convoluted legal battles, Blythe's daughter Florence inherited the property in 1904.

Almost immediately, the Mutual Water Company, the precursor to the Palo Verde Irrigation District, was formed to purchase the land from Florence Blythe. Later in 1904, the land was transferred to the Mutual Water Company. During this time, pioneering settlers continued to pour into the valley, and the town of Blythe grew from a tent city into a proper town, finally incorporating in 1916 with 600 residents on 832 acres of land (Palo Verde 2005:7). The first residents were "desert characters, homesteaders, pioneer settlers who wanted land of their own, fugitives from the law, and adventurers who met the accepted challenge to help tame the area and make it civilized" (Setzler 1998:ii). Mining activities and then homesteading and experimental farming continued to attract new residents and commerce via steamboat and railroad. Most of the early homes throughout the Palo Verde Valley were tent houses, although there were also a few adobe buildings in the region (Setzler 1998:1). Blythe and the Palo Verde Valley prospered in the 1910s, with high demands for crops related to wartime activities, most of all cotton. With a new cotton gin in 1911, and settlers clamoring for homestead lots, the town of Blythe experienced a small boom, peaking with high cotton production in 1919 and the end of WWI. Several civil projects were constructed during this period of prosperity, which set the foundation for the continuing growth of the city.

In transforming arid land into productive farming and grazing lands, water was the key. Long after Blythe had incorporated and residents began to farm the productive Palo Verde Valley with Colorado River water, the Metropolitan Water District was created in the 1930s to transport water from the Colorado River to the Los Angeles basin. The Metropolitan Aqueduct was constructed from Parker Dam, north of the Project, through the mountains east of Indio to Riverside and then to Los Angeles. It was the largest construction project in the world at the time, and as it developed, the Metropolitan Aqueduct provided much-needed jobs during the Depression (Pittman 1995). The diversion of water to the Los Angeles basin, though, was of little import to the farming communities of Blythe and the greater Palo Verde Valley, as they retained their water rights originally granted to the quixotic town founder, Thomas Blythe.

3.5.1.6 Identified Cultural Resources

This subsection provides the results of cultural resource inventories conducted by SRI and described in Lerch et al. 2016 to identify cultural resources within the Project area, including literature and records searches (California Historical Resources Information System [CHRIS] and local records), archival research, Native American consultation, and field investigations. The BLM found no additional resources within the Direct APE during the May 2, 2018 Class III survey.

For purposes of this discussion, the Project area for NEPA is equivalent to the Area of Potential Effects (APE) under the NHPA and CEQA. The regulations implementing NHPA §106 define the APE as the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist. The APE is influenced by the scale and nature of the undertaking and may be different for different kinds of effects caused by the undertaking (36 CFR §800.16(d)). In addition, the APE may be buffered for purposes of cultural resources inventory to facilitate the identification of resources that may be located in proximity to the APE and indirectly affected by a proposed project or to allow for redesign of project components to avoid direct effects to cultural resources. The direct APE for this analysis is defined by the boundaries of the Proposed Action. Within the direct APE, ground-disturbing activities would range in depths from 12–18 cm (5–7 inches) for the site surface preparation to 3.7 m (12 feet) for the solar-panel-support posts to 1.2 m (4 feet) for electrical-conduit trenches and to approximately 3 m (10 feet) for electrical vaults (First Solar Development, LLC 2014:35–38). These depths of disturbance, or the vertical APE, will be distributed across the project site at various locations within the direct APE. The indirect APE includes a one-mile buffer surrounding the direct APE, as well as expanded area to incorporate the Mule Tanks Discontiguous Rock Art District. The APE is illustrated on Figure 3.5-1. SHPO agreed with the APE in 2014.

3.5.1.6.1 Previous Research

Numerous studies have been completed in the vicinity of the Project area. Recent projects with archaeological studies include Southern California Edison's Devers to Palo Verde II Transmission Line, Genesis Solar Energy Project, Blythe Solar Energy Project, McCoy Solar Energy Project, and the Blythe Mesa Solar Energy.

A Class III survey report for the current Project was conducted by SRI in 2016. SRI completed the records search at the at the CHRIS Eastern Information Center (EIC) in 2014 of the entire Project area as well as an approximate one-mile buffer around the Project area that may be subject to indirect impacts (Lerch et al. 2016). The following information is taken from the Class III report generated by SRI for DQSP. The records search identified 20 previous cultural resource studies that have been conducted in the Project area and 20 that had been conducted within the vicinity of the Project. The studies conducted included 35 archaeological surveys, three site evaluations, one records search, and one special study. Twenty-two percent of the Project area had been previously examined for cultural resources. SRI also consulted a regional ethnographic overview of the Colorado Desert written by Bean and Vane (1978), unpublished field notes taken by Rogers (1953), and a sample inventory for the Riverside East SEZ by Millington et al. (2013). This last study resulted in ten additional sites being identified within the vicinity of the Project. SRI also utilized ASM Affiliates' site sensitivity model developed in 1998 (McDonald and Schaefer 1998), to hypothesize the expected likelihood of buried cultural resources within the Project area. The ASM report previously reviewed a large portion of the Project area and ascribed a mostly low sensitivity for buried resources to the Project area.

The records search identified 33 previously identified archaeological sites and 12 isolates within the Project area, and an additional 220 archaeological sites and 84 isolates in the vicinity of the Project for a total of 253 archaeological sites and 96 isolates within the one mile search radius of the Project area. The site types present within the Project area and vicinity include 112 prehistoric sites, 104 historic sites, 37 multicomponent sites, 64 prehistoric isolates, 29 historic isolates, and three multicomponent isolates. Prehistoric sites consisted of artifact concentrations, habitation sites, geoglyphs, rock art sites, quarries, thermal features, and trail segments. Historic sites types previously recorded were artifact concentrations, military activity sites, roads, survey markers, and transmission lines. Multicomponent site types documented were artifact concentrations, one structure, one habitation site, one quarry with military activity present, and trail segments.

Only three sites were previously determined eligible for listing on the NRHP. These include P-33-000773, the Mule Canyon site, and P-33-000504, the Mule Tank site, which together are listed in the NRHP as the Mule Tank Discontiguous Rock Art District. Both these sites are located outside the Project area in the nearby vicinity. Site P-33-000504 is a rock art site located west of the Project, while P-33-000773 is a geoglyph and associated features present within the Mule Tank NRHP District. The third eligible site is P-33-000053, the Coco-Maricopa Trail, which passes near the north side of the Project (Lerch et al. 2016).

3.5.1.6.2 Prehistoric Site Types

Habitation Sites

Habitation sites are characterized by a wide variety of occupation debris and, occasionally, the remains of domestic architecture. These sites can contain living areas (see also rock rings and cleared circles, below), cooking hearths, subsistence remains (faunal bone and plant remains), midden deposits, and artifact scatters. Within the habitation site type, a range of subtypes exist, distinguished primarily by the intensity and longevity of the use of the site as a living space.

Habitation sites can range from very large, permanent villages occupied year round by several families, to small, temporary camp sites occupied once for a matter of days or weeks. Even temporary habitation sites can contain discrete activity areas devoted to a variety of activities such as lithic reduction, milling, butchery, cooking, and other subsistence-related activities.

Prehistoric habitation sites are mainly found within the Colorado River floodplain outside of the Project area. However, four habitation sites were located within the vicinity of the current Project (Lerch et al. 2016). Many of the prehistoric sites include small to large artifact scatters associated with a thermal rock feature.

Thermal Rock Features

The Project area contains numerous thermal rock features consisting of a concentration of fire-affected rocks that may be partially buried. Most of the thermal rock feature sites also contain an artifact scatter. Only one of the sites contained a rock feature that was not fire affected. It consisted of a collection of manuports. Thermal rock features are often interpreted as the remains of roasting pits are occasionally found away from domestic debris as isolates or in groups. Roasting pits sometimes occur in association with natural stands of specific food resources, such as agave, pinyon nuts, and saltbush seeds. These plant foods were often harvested, processed, and roasted before consumption or transport to established habitation sites (Lightfoot and Parrish 2009:347, 354). A roasting pit is a type of earth oven constructed by digging an oval to circular hole and lining it with vegetation or cobbles and small boulders. A fire may be built over the rocks to heat them before placing the plant food materials in the earth oven, or the foodstuffs may be placed directly on the cobbles and then covered with other materials (e.g., green plants, rocks, soil) before a fire is built over the entire feature.

The remains of roasting pits are typically 1 m to 3 m in diameter, roughly circular concentrations of fist-sized cobbles, most showing evidence of thermal alteration. These may be the in situ remains of earth ovens, or they may be "clean out" concentrations of stones removed from an oven to access the roasted foods within. Several examples of this site type were identified along the pebble terraces 8 miles northeast of the Project. Similar features, identified as "agave baking pits" were excavated by Steven Shackley (1984) approximately 94 miles southwest of the Project in the In-ko-pah Gorge area. However, as no agave grows in the DQSP region, the thermal rock features identified on the Project area are believed to have been used to process locally abundant geophytes (plant with underground bulbs, corms, or tubers) such as *Hesperocallis undulata,* desert lily (Lerch et al. 2016).

Ceramic Scatters and Pot Drops

"Ceramic scatter" refers to a dispersed surface distribution of ceramics, typically from multiple vessels. A "pot drop" is traditionally defined as a small, distinct concentration of sherds from a single vessel. As early as the 1930s, Malcolm Rogers recognized that shrines along trails and other ceremonially significant sites in the Colorado Desert frequently contain concentrations of prehistoric ceramics (Rogers n.d.).

Lithic Scatters and Flaking Stations

Lithic scatters and flaking stations can range from single-use flaking stations to large scatters that contain numerous flaking episodes with a light background scatter of debitage. Discrete flaking stations, where a single episode of lithic reduction occurred, often include cores and debitage, but rarely finished tools or useable flakes. When tools are found in lithic scatters, they are usually broken blanks from early in the manufacturing process, or expedient tools. The debitage in lithic scatters may be the result of various core and biface reduction technologies.

Debitage size and character is often associated with the size of the parent material. A lithic study in the nearby McCoy Wash included a detailed in-field analysis of reduction techniques as reconstructed from the preserved debitage and cores (Flenniken and Spencer 2001). The researchers concluded that four discrete reduction technologies were represented in the wash, all of them apparently contemporaneous and directly related to the size and shape of the source materials chosen for reduction (Flenniken and Spencer 2001:61). Although lithic scatters are generally interpreted by archaeologists as places where toolstone acquisition and tool manufacture occurred, Native American representatives have pointed out that certain ritual activities also result in the production of scatters of flaked stone materials (Altschul and Ezzo 1994; Cachora 1994).

Trails

Trails are generally tamped into stable surfaces, sometimes with larger gravel and pebbles pushed to the sides to form slight berms along the edges of the trail. In the desert, trails are typically found along the tops of ridge systems, on stable alluvial fans, on desert pavements, and in upland areas where they often disappear into washes. Prehistoric trails can follow washes for considerable distances. Several trails have been documented along the lower Colorado River where they are often associated with petroglyphs, ground figures, and cairns (Altschul and Ezzo

1994; Cachora 1994; Johnson 1985; McGuire and Schiffer 1982; Pendleton et al. 1986; Pigniolo et al. 1997; Rogers 1939; Schaefer 1994a, 1994b; von Werlhof 1987).

Cremations and Human Remains

All cultures maintain specific practices and profound beliefs concerning the treatment and disposition of the dead. For that reason, the disturbance of human remains is always a sensitive issue culturally, ethically, and legally. Traditionally, the Late Prehistoric and Proto-historic peoples of the Colorado River area practiced cremation, although other practices, including burial, are known archaeologically. In situ burials and cremations in the Colorado Desert are frequently associated with small collections of artifacts such as ceramics, lithic artifacts, basketry, faunal and botanical materials, and shell ornaments and beads. Very often, cremations and burials were placed in depressions or holes specifically dug for the purpose of interring the dead. For that reason, burials and cremations may be minimally evident or completely imperceptible on the present-day ground surface.

While relatively rare, sites with cremations or burials have been recorded in the Colorado Desert. Burials and cremations are more common in and near habitation sites, and relatively uncommon in non-habitation, resource procurement areas. Nevertheless, special circumstances and special individuals, such as shamans or suspected witches, sometimes necessitated burial far from habitation and in unexpected locales. Human remains are subject to special protection under Federal and state law. Within the Project, the disposition of any Native American human remains and associated funerary objects would be subject to state law and the requirements of the Native American Graves Protection and Repatriation Act (NAGPRA).

3.5.1.6.3 Historic Site Types

Debris Scatters and Dumps

This feature type ranges from small discrete deposits to large debris concentrations. Several of the sites consist of communication wire placements from military use of the Project area. Other debris includes household or military related debris. Often these are found along trails or roads, complicating temporal and cultural assignments. The Project is located within the former boundaries of the DTC/C-AMA, which was a large-scale military training facility during WWII. Debris scatters dating to the early 1940s, and particularly the period from 1942 to 1945, are likely representative of DTC/C-AMA activities, including ground maneuvers and aircraft training. Other debris scatters falling outside of this time period are likely associated with sporadic mining activities in the vicinity, homesteading, or use of the area after the closure of DTC/C-AMA.

Roads/Trails

Transportation routes consist of historical trails and roads. The condition of the roads may vary from faint two-tracks to graded or paved alignments where the route, not the road, is significant. Several unimproved roads run through and adjacent to the Project area, most associated with the initial survey of the land and the transport of goods and people to mining activities in the region. Most of these roads were likely also used during the WWII-era military training activities of the DTC/C-AMA. One set of tank tracks was also recorded within the Project area.

Historic Camps

Temporary historical camps are found throughout the Colorado Desert. These camps often include features such as campfire/hearths and debris scatters, as well as rectangular cleared areas, often called "tent pads," that may have been cleared to create a more comfortable sleeping area for sleeping bags and tents. Specific types of temporary historical camps in the Project may include construction camps for linear facilities (railroads, transmission lines, water conveyance, etc.), mining camps, and military camps and bivouacs, and early land and resource surveys.

Water Wells

Formal structures built of wood, stone, concrete, metal, and other materials are not common in the Palo Verde Valley pass owing to the harsh environment, which inhibited homesteading. In the Project vicinity, three sites contain historic water well sites; no other structures have been recorded within the Project area.

Survey Markers

Survey makers were found throughout the Project area and are associated with the 1917 GLO survey. Some of these markers included associated linear disturbances that consist of two feet wide clearings around the survey markers; they were most likely made by the surveyors. A few campsites possibly identified by the GLO surveyors were also identified within the Project vicinity. Only one USGS survey marker was observed (Lerch et al. 2016). The survey markers were recorded as archaeological sites and they represent a single use event of the area.

Emplacements

The Project vicinity also contains remnants of various landscape modifications likely associated with active battles during the training maneuvers of WWII. Most appear to be fortified positions consisting of shallow dug-out depressions surrounded by low earthen berms and, occasionally, low walls of dry-stacked stones, and usually including only a few emplacements in a small area. One site within the Project area contains circular pits dug in a straight line that may have been used as tank emplacements during training activities (Lerch et al. 2016).

Multicomponent Sites

Several multicomponent sites were identified within the Project area. These sites were ones that no definitive temporal association could be assigned due to the presence of both historic and prehistoric period artifacts. Archival research was used to attempt to designate a period assignment to, but in some cases it was not possible. There are numerous sites within the DQSP Project area that contain both prehistoric and historical-period resources; however, if the majority of one resource type was present, SRI typically attempted to assign the site a prehistoric or historic designation. In these cases, the site description includes a mention of the other resources present.

Isolated Finds

Isolated finds consist of single, occasionally multiple, prehistoric or historical artifacts. Isolates have been found on a variety of surfaces, including desert pavement, gravel beds, and washes. For this Project, isolated finds were defined as two or fewer artifacts separated from other sites or artifacts by at least 30 m, or any group of artifacts more than three, if these artifacts could refit (e.g., a ceramic "pot drop" or a broken glass bottle). Isolated artifacts are typically determined not eligible for listing on the NRHP or CRHR, as they often lack integrity of location, setting, feeling, and association. However, some isolates may exhibit such integrity, and thus could be determined NRHP- or CRHR-eligible.

3.5.1.6.4 Archival and Library Research

Prior to conducting the field investigation, SRI completed archival research to fully investigate the background of the Project area. They consulted historical documents, historical maps, General Land Office (GLO) plat maps, aerial photographs, land patents, and land-entry files. Repositories and agencies visited included BLM, the County of Riverside, Transportation Survey Division, the Los Angeles Public Library, Nationwide Environmental Title Research, Palo Verde Irrigation District, U.S. Geological Survey, U.S. National Archives and Records Administration, National Archives at Riverside California, and Ancestry.com. Using the information gathered from archival resources, SRI was able to establish a historical context for the Project area that was useful for evaluating the historical resources present in DQSP.

3.5.1.6.5 Native American Coordination

SRI contacted the Native American Heritage Commission (NAHC) for a search of their Sacred Land Files during the 2016 Phase I study (Lerch et al. 2016). The search indicated that no known Native American Traditional Cultural Places (TCPs) were recorded within the Project area. The NAHC requested that SRI contact 36 tribal representatives to inquire about TCPs that might be known to the representatives and to solicit comments on the Project. An additional 15 contacts with traditional-use areas within the Project area were given to SRI by the BLM. SRI contacted all 51 individuals by sending them a letter with Project information. Responses from four tribes were received and three wished to engage in consultation. The contact program did not result in the identification of any previously known TCPs within the Project area. All contact with tribes was summarized in a separate ethnographic literature review (Kremkau, Whelan, et al. 2014) and responses were not included in the Phase I report. The BLM sent the consulting tribes a copy of the ethnographic literature review, as well as the research design (Kremkau, Stanton, et al 2014) for the Project prior to the field survey.

Representatives from the CRIT Office of Attorney General and CRIT Museum in Parker, Arizona met with SRI and First Solar on September 10, 2014 to discuss tribal participation in the field survey. On September 11, 2014, the BLM hosted a Project meeting that SRI, the CRIT Office of Attorney General, and the Mohave Elders Group attended. The field investigation was planned at this time and it was determined that a CRIT tribal monitor would be present throughout the field survey.

County consultation under Assembly Bill 52 (AB 52) is not applicable to the Project because the date of the NOP for the DQSP was March 12, 2015, prior to the effective date of AB 52 on July 1, 2015. Although formal consultation under AB 52 is not required, the County did consult with interested Tribes. Notices regarding the Project were mailed to 11 Tribes who had requested notifications regarding projects located within their Traditional Use Areas. No responses were received from the Cabazon Band of Mission Indians, the Cahuilla Band of Indians, Ramona Band, Rincon Band of Luiseno Indians, Colorado River Indian Tribes, Morongo Band or the Torres Martinez Band of Cahuilla Indians. A response was received dated September 12, 2016 from the Pechanga Band of Luiseno Indians deferring to closer tribes. Three Tribes requested consultation. Details of this consultation are presented in Section 6.3.4.

3.5.1.6.6 Field Inventory Investigations

The SRI field investigation of the DQSP Project area occurred from October 2014 to December 2014. SRI conducted an intensive pedestrian survey of the 5,010 acre Project area. Following the guidelines in Section 8110 of the BLM Manual, the Class III survey was an intensive pedestrian survey designed to identify all cultural properties “locatable from surface and exposed profile indications” within the “target area” defined by the Project disturbance areas (BLM 2004:19); this included the direct APE. The indirect APE was surveyed for built environment resources. The survey of the direct APE was conducted by qualified seven-person survey teams, each led by a qualified crew chief. A maximum survey interval of 15 m was employed, although crew members frequently walked between transect lines to record isolated artifacts and sites. After the initial pedestrian survey phase, site-recording teams of three people returned to the identified sites to record them in greater detail. A tribal monitor from CRIT was present throughout the survey and the site recordation.

During the field survey, SRI identified 277 archaeological sites and 620 isolated sites (isolates) within the Project area (Table 3.5-1). An archaeological site was defined as any three or more artifacts found in association with one another. Isolates were defined as one or two artifacts or any group of artifacts more than three, if these artifacts could refit (e.g., a ceramic “pot drop” or a broken glass bottle), or from a cluster of shell casings from emptying a clip. One or two artifacts found in association with one another were treated as isolated finds. All sites were recorded on Department of Parks and Recreation (DPR) forms and submitted to the EIC for assignment of permanent trinomials. All isolated finds were recorded using DPR 523 forms, and at least one photograph was taken of each.

The archaeological sites include 88 prehistoric sites, 181 historical-period sites, and 8 multicomponent sites. Of the prehistoric sites, these contained 59 thermal features, 7 ceramic scatters, 2 combined ceramic/lithic scatters, 16 lithic scatters, 1 rock feature, and 3 trail segments. The majority of the thermal features included associated artifacts. The historical-period sites consist of 2 temporary camps, 9 trails/roads, 3 wells, 157 debris scatters, 5 communication wire dump sites, 2 survey marker sites, 1 guy wire, 1 set of tank tracks, and 1 military emplacement. Of the multicomponent sites, 7 were prehistoric artifact and historic debris scatters, and 1 was a prehistoric rock feature with a historic debris scatter.

In addition to the surveyed sites, an additional 10 sites and one isolate previously surveyed and located in the Project vicinity were identified. The 10 additional sites are also listed in Table 3.5-1. This includes 4 prehistoric sites, 5 historic sites, and 1 multicomponent site. Of the prehistoric sites, these contained 1 thermal feature, 1 rock feature, and 2 geoglyph/petroglyph sites. The historical-period sites consist of 3 debris scatters and 2 transmission lines. The multicomponent site was a trail with debris scatter. Of the 10 additional sites, 2 are listed, 5 are determined to be eligible, 3 are determined to be not eligible.

According to the current ROW configuration, 19 eligible sites fall within the Project area and may also be impacted by the Project through direct or indirect impacts. All of the archaeological sites are located on land managed by the BLM. Based on Appendix B in the Addendum of the SRI report, two of the sites which make up the Mule Tank Discontiguous Rock Art District are listed on the NRHP.

Table 3.5-1. Archaeological Sites Within the APE

Primary Number	Trinomial	Temporary Number	Age	Description	Land Ownership	NRHP / CRHR Eligibility Status
33-000673	CA-RIV-673	Not surveyed by SRI	Multicomponent	Trails; debris scatter	BLM	Eligible
33-001822	CA-RIV-1822	Not surveyed by SRI	Prehistoric	Thermal rock feature with ceramic scatter	BLM	Eligible
33-011110	-	Not surveyed by SRI	Historic	Transmission Line	BLM	Eligible
33-012532	CA/RIV-7127H	Not surveyed by SRI	Historic	Transmission Line	BLM	Eligible
33-014148	-	Not surveyed by SRI	Historic	Debris scatter	BLM	Not eligible
33-014174	-	Not surveyed by SRI	Historic	Debris scatter	BLM	Not eligible
33-019797	CA-RIV-10080	Not surveyed by SRI	Historic	Debris scatter	BLM	Not eligible
33-000504	CA-RIV-504	Not surveyed by SRI	Prehistoric	petroglyph	BLM	Listed
33-000773	CA-RIV-773	Not surveyed by SRI	Prehistoric	Geoglyph/intaglio	BLM	Listed
33-23456	CA-RIV-011990		Prehistoric	Rock feature with artifact scatter	BLM	Eligible
33-024804	CA-RIV-12294	SRI-2	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024678	CA-RIV-12209	SRI-3	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024805	CA-RIV-12295	SRI-7	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024810	CA-RIV-12300	SRI-9	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024719	CA-RIV-12240	SRI-17	Prehistoric, Patayan II	Thermal rock features with lithic scatter	BLM	Eligible

Table 3.5-1. Archaeological Sites Within the APE

Primary Number	Trinomial	Temporary Number	Age	Description	Land Ownership	NRHP / CRHR Eligibility Status
33-024806	CA-RIV-12296	SRI-18	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024807	CA-RIV-12297	SRI-19	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024808	CA-RIV-12298	SRI-21	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024809	CA-RIV-12299	SRI-25	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024270	CA-RIV-11924	SRI-26	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024271	CA-RIV-11925	SRI-27	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024272	CA-RIV-11926	SRI-29	Prehistoric	Rock feature with associated artifacts	BLM	Not eligible
33-024273	CA-RIV-11927	SRI-36	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024308	CA-RIV-11962	SRI-42	Historic, Post-1944	Wells and associated artifacts	BLM	Not eligible
33-024274	CA-RIV-11928	SRI-52	Prehistoric, Patayan I/II	Ceramic and lithic scatter	BLM	Not eligible
33-024275	CA-RIV-11929	SRI-58	Prehistoric	Thermal rock features with associated artifacts	BLM	Not eligible
33-024276	CA-RIV-11930	SRI-61	Prehistoric	Thermal rock feature with associated artifact	BLM	Not eligible
33-024277	CA-RIV-11931	SRI-63	Historic, Pre-1942	Debris scatter	BLM	Not eligible
33-024278	CA-RIV-11932	SRI-65	Prehistoric, Patayan III	Thermal rock features with associated artifacts	BLM	Not eligible
33-024279	CA-RIV-11933	SRI-69	Historic, Pre-1942	Debris scatter	BLM	Not eligible
33-024280	CA-RIV-11934	SRI-71	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024281	CA-RIV-11935	SRI-75	Prehistoric	Thermal rock features with associated artifact	BLM	Not eligible
33-024282	CA-RIV-11936	SRI-81	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024283	CA-RIV-11937	SRI-83	Prehistoric, Patayan II/III	Thermal rock features with associated artifacts	BLM	Eligible
33-024284	CA-RIV-11938	SRI-96	Historic	Road/Trail	BLM	Not eligible
33-024309	CA-RIV-11963	SRI-119	Historic, 1942-1944	Communication wire	BLM	Not eligible
33-024310	CA-RIV-11965	SRI-120	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024311	CA-RIV-11966	SRI-121	Historic	Road/Trail	BLM	Not eligible
33-024312	CA-RIV-11967	SRI-122	Historic	Road/Trail	BLM	Not eligible

Table 3.5-1. Archaeological Sites Within the APE

Primary Number	Trinomial	Temporary Number	Age	Description	Land Ownership	NRHP / CRHR Eligibility Status
33-024285	CA-RIV-11939	SRI-124	Prehistoric, Patayan II	Thermal rock feature with ceramic scatter	BLM	Not eligible
33-024286	CA-RIV-11940	SRI-125	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024287	CA-RIV-11941	SRI-129	Historic	Road/Trail	BLM	Not eligible
33-024288	CA-RIV-11942	SRI-132	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024289	CA-RIV-11943	SRI-133	Prehistoric, Patayan III	Thermal rock feature with associated artifacts	BLM	Not eligible
33-024290	CA-RIV-11944	SRI-134	Prehistoric	Thermal rock feature with lithic scatter	BLM	Not eligible
33-024291	CA-RIV-11945	SRI-137	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024292	CA-RIV-11946	SRI-138	Historic	Debris scatter	BLM	Not eligible
33-024293	CA-RIV-11947	SRI-147	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024294	CA-RIV-11948	SRI-1001	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024295	CA-RIV-11949	SRI-1009	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024296	CA-RIV-11950	SRI-1011	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024297	CA-RIV-11951	SRI-1014	Prehistoric, Patayan II	Thermal rock feature with associated artifacts	BLM	Not eligible
33-024298	CA-RIV-11952	SRI-1021	Historic	Debris scatter	BLM	Not eligible
33-024299	CA-RIV-11953	SRI-1024	Historic, Pre-1942	Campfire with artifact concentration	BLM	Not eligible
33-024300	CA-RIV-11954	SRI-1025	Prehistoric	Fire affected rock (FAR) scatter	BLM	Not eligible
33-024301	CA-RIV-11955	SRI-1035	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024302	CA-RIV-11956	SRI-1037	Historic, Pre-1942	Debris scatter	BLM	Not eligible
33-024303	CA-RIV-11957	SRI-1043	Prehistoric	Thermal rock feature with associated artifact	BLM	Not eligible
33-024304	CA-RIV-11958	SRI-1049	Historic, Pre-1942	Debris scatter	BLM	Not eligible
33-024305	CA-RIV-11959	SRI-1053	Prehistoric, Patayan III	Thermal rock features with associated artifacts	BLM	Not eligible
33-024306	CA-RIV-11960	SRI-1056	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024307	CA-RIV-11961	SRI-1058	Prehistoric, Patayan I/II	Thermal rock features with associated artifacts	BLM	Not eligible

Table 3.5-1. Archaeological Sites Within the APE

Primary Number	Trinomial	Temporary Number	Age	Description	Land Ownership	NRHP / CRHR Eligibility Status
33-024357	CA-RIV-11991	SRI-1061	Prehistoric, Patayan I/II	Ceramic scatter	BLM	Not eligible
33-024358	CA-RIV-11992	SRI-1070	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024313	CA-RIV-11968	SRI-1076	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024314	CA-RIV-11969	SRI-2001	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024315	CA-RIV-11970	SRI-2007	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024316	CA-RIV-11971	SRI-2008	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024317	CA-RIV-11972	SRI-2009	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024359	CA-RIV-11993	SRI-2014	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024360	CA-RIV-11994	SRI-2017	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024361	CA-RIV-11995	SRI-2021	Prehistoric, Patayan II/III	Thermal rock features with associated artifacts	BLM	Eligible
33-024362	CA-RIV-11996	SRI-2023	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024363	CA-RIV-11997	SRI-2029	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024318	CA-RIV-11973	SRI-2030	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024319	CA-RIV-11974	SRI-2034	Prehistoric	Thermal rock feature	BLM	Not eligible
33-024364	CA-RIV-11998	SRI-2035	Historic, Pre-1942	Debris scatter	BLM	Not eligible
33-024365	CA-RIV-11999	SRI-2042	Prehistoric	Lithic scatter	BLM	Not eligible
33-024366	CA-RIV-12000	SRI-2051	Historic	Road/Trail	BLM	Not eligible
33-024320	CA-RIV-11975	SRI-2066	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024367	CA-RIV-12001	SRI-2067	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024368	CA-RIV-12002	SRI-2068	Multicomponent	Artifact and debris scatter	BLM	Not eligible
33-024321	CA-RIV-11976	SRI-2082	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024322	CARIV-11977	SRI-2088	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024323	CA-RIV-11978	SRI-2094	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024324	CA-RIV-11979	SRI-2098	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024325	CA-RIV-11980	SRI-2100	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024369	CA-RIV-12003	SRI-2128	Historic, Pre-1942	Debris scatter	BLM	Not eligible
33-024370	CA-RIV-12004	SRI-2135	Historic, 1942-1944	Military pits	BLM	Not eligible
33-024371	CA-RIV-12005	SRI-2136	Prehistoric, Patayan I/II	Ceramic scatter	BLM	Not eligible
33-024372	CA-RIV-12006	SRI-2329	Prehistoric, Patayan II	FAR scatter with associated artifacts	BLM	Not eligible
33-024355	CA-RIV-11989	SRI-2333	Historic, Pre-1942	Debris scatter	BLM	Not eligible
33-024373	CA-RIV-12007	SRI-2582	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024326	CA-RIV-11981	SRI-3007	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024327	CA-RIV-11982	SRI-3010	Historic, Post-1944	Debris scatter	BLM	Not eligible

Table 3.5-1. Archaeological Sites Within the APE

Primary Number	Trinomial	Temporary Number	Age	Description	Land Ownership	NRHP / CRHR Eligibility Status
33-024374	CA-RIV-12008	SRI-3014	Historic, Pre-1942	Campfire with debris scatter	BLM	Not eligible
33-024375	CA-RIV-12009	SRI-3015	Multicomponent	Artifact and debris scatter	BLM	Not eligible
33-024376	CA-RIV-12010	SRI-3017	Prehistoric	Thermal rock feature	BLM	Not eligible
33-024377	CA-RIV-12011	SRI-3019	Prehistoric, Patayan II	Thermal rock features with associated artifacts	BLM	Not eligible
33-024378	CA-RIV-12012	SRI-3020	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024379	CA-RIV-12013	SRI-3022	Prehistoric	Thermal rock feature with associated artifact	BLM	Not eligible
33-024380	CA-RIV-12014	SRI-3027	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024381	CA-RIV-12015	SRI-3029	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024382	CA-RIV-12016	SRI-3031	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024383	CA-RIV-12017	SRI-3037	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024384	CA-RIV-12018	SRI-3038	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024385	CA-RIV-12019	SRI-3039	Prehistoric	Thermal rock features	BLM	Eligible
33-024386	CA-RIV-12020	SRI-3040	Prehistoric	Thermal rock features with lithic scatter	BLM	Not eligible
33-024387	CA-RIV-12021	SRI-3041	Prehistoric	Thermal rock features with associated artifacts	BLM	Not eligible
33-024388	CA-RIV-12022	SRI-3042	Prehistoric	Thermal rock features with associated artifacts	BLM	Not eligible
33-024389	CA-RIV-12023	SRI-3045	Prehistoric	Thermal rock feature with associated artifacts	BLM	Not eligible
33-024390	CA-RIV-12024	SRI-3047	Prehistoric	Thermal rock feature	BLM	Not eligible
33-024423	CA-RIV-12055	SRI-3054	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024424	CA-RIV-12056	SRI-3057	Prehistoric	Lithic scatter	BLM	Not eligible
33-024425	CA-RIV-12057	SRI-3059	Prehistoric, Patayan II/III	Ceramic scatter	BLM	Not eligible
33-024426	CA-RIV-12058	SRI-3078	Historic, 1942-1944	Debris scatter	BLM	Not eligible

Table 3.5-1. Archaeological Sites Within the APE

Primary Number	Trinomial	Temporary Number	Age	Description	Land Ownership	NRHP / CRHR Eligibility Status
33-024349	CA-RIV-11983	SRI-3101	Prehistoric, Patayan I/II	Thermal rock feature with associated artifacts	BLM	Not eligible
33-024350	CA-RIV-11984	SRI-3103	Historic	Debris scatter	BLM	Not eligible
33-024351	CA-RIV-11985	SRI-3108	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024352	CA-RIV-11986	SRI-3115	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024353	CA-RIV-11987	SRI-3116	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024354	CA-RIV-11988	SRI-3117	Historic	Debris scatter	BLM	Not eligible
33-024427	CA-RIV-12059	SRI-3119	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024428	CA-RIV-12060	SRI-3123	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024429	CA-RIV-12061	SRI-3124	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024430	CA-RIV-12062	SRI-3127	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024431	CA-RIV-12063	SRI-3135	Prehistoric	Lithic scatter	BLM	Not eligible
33-024432	CA-RIV-12064	SRI-3147	Prehistoric	Lithic scatter	BLM	Not eligible
33-024433	CA-RIV-12065	SRI-3155	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024434	CA-RIV-12066	SRI-3156	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024435	CA-RIV-12067	SRI-3158	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024391	CA-RIV-12025	SRI-3175	Prehistoric	Thermal rock features	BLM	Not eligible
33-024436	CA-RIV-12068	SRI-3186	Prehistoric, Patayan II/III	Ceramic scatter	BLM	Not eligible
33-024437	CA-RIV-12069	SRI-3205	Prehistoric	Thermal rock feature	BLM	Not eligible
33-024392	CA-RIV-12026	SRI-3211	Prehistoric	Thermal rock features with associated artifacts	BLM	Not eligible
33-024438	CA-RIV-12070	SRI-3224	Prehistoric	Thermal rock feature	BLM	Not eligible
33-024439	CA-RIV-12071	SRI-3228	Prehistoric, Patayan II/III	Ceramic and lithic scatter	BLM	Not eligible
33-024393	CA-RIV-12027	SRI-3237	Prehistoric	Thermal rock features	BLM	Eligible
33-024394	CA-RIV-12028	SRI-3255	Prehistoric	Trail	BLM	Eligible
33-024395	CA-RIV-12029	SRI-3256	Multicomponent	Artifact and debris scatter	BLM	Not eligible
33-024396	CA-RIV-12030	SRI-3260	Multicomponent	Artifact and debris scatter	BLM	Not eligible
33-024440	CA-RIV-12072	SRI-3306	Prehistoric	Lithic scatter	BLM	Not eligible
33-024441	CA-RIV-12073	SRI-3331	Prehistoric	Thermal rock feature	BLM	Not eligible

Table 3.5-1. Archaeological Sites Within the APE

Primary Number	Trinomial	Temporary Number	Age	Description	Land Ownership	NRHP / CRHR Eligibility Status
33-024442	CA-RIV-12074	SRI-3487	Prehistoric	Thermal rock features with associated artifacts	BLM	Not eligible
33-024397	CA-RIV-12031	SRI-4004	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024398	CA-RIV-12032	SRI-4005	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024443	CA-RIV-12075	SRI-4014	Prehistoric	Thermal rock features	BLM	Not eligible
33-024444	CA-RIV-12076	SRI-4016	Prehistoric, Patayan II	Thermal rock feature with associated artifacts	BLM	Not eligible
33-024445	CA-RIV-12077	SRI-4017	Multicomponent	Rock feature and debris scatter	BLM	Not eligible
33-024446	CA-RIV-12078	SRI-4019	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024447	CA-RIV-12079	SRI-4024	Prehistoric	Lithic scatter	BLM	Not eligible
33-024448	CA-RIV-12080	SRI-4028	Historic	Debris scatter	BLM	Not eligible
33-024449	CA-RIV-12081	SRI-4034	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024450	CA-RIV-12082	SRI-4041	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024399	CA-RIV-12033	SRI-4045	Historic, Pre-1942	Debris scatter	BLM	Not eligible
33-024451	CA-RIV-12083	SRI-4054	Prehistoric	Thermal rock feature with associated artifacts	BLM	Not eligible
33-024452	CA-RIV-12084	SRI-4056	Prehistoric	Thermal rock features with lithic scatter	BLM	Not eligible
33-024453	CA-RIV-12085	SRI-4060	Multicomponent	Artifact and debris scatter	BLM	Not eligible
33-024454	CA-RIV-12086	SRI-4063	Prehistoric	Thermal rock feature with associated artifacts	BLM	Not eligible
33-024455	CA-RIV-12087	SRI-4078	Prehistoric, Patayan II	Ceramic scatter	BLM	Not eligible
33-024456	CA-RIV-12088	SRI-4079	Prehistoric	Thermal rock features with associated artifacts	BLM	Not eligible
33-024457	CA-RIV-12089	SRI-4080	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024458	CA-RIV-12090	SRI-4084	Prehistoric	FAR scatter with associated artifacts	BLM	Not eligible
33-024459	CA-RIV-12091	SRI-4085	Prehistoric, Patayan III	Thermal rock features	BLM	Eligible
33-024460	CA-RIV-12092	SRI-4098	Historic	Debris scatter	BLM	Not eligible

Table 3.5-1. Archaeological Sites Within the APE

Primary Number	Trinomial	Temporary Number	Age	Description	Land Ownership	NRHP / CRHR Eligibility Status
33-024400	CA-RIV-12034	SRI-4116	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024401	CA-RIV-12035	SRI-4127	Historic	Debris scatter	BLM	Not eligible
33-024402	CA-RIV-12036	SRI-4145	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024403	CA-RIV-12037	SRI-4151	Historic	Debris scatter	BLM	Not eligible
33-024404	CA-RIV-12038	SRI-4160	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024405	CA-RIV-12039	SRI-4162	Historic, 1942-1944	Communication wire	BLM	Not eligible
33-024406	CA-RIV-12040	SRI-4167	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024461	CA-RIV-12093	SRI-4175	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024462	CA-RIV-12094	SRI-4178	Historic	Debris scatter	BLM	Not eligible
33-024463	CA-RIV-12095	SRI-4180	Historic, 1942-1944	Guy wire	BLM	Not eligible
33-024464	CA-RIV-12096	SRI-4182	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024465	CA-RIV-12097	SRI-4185	Historic, Pre-1942	Debris scatter	BLM	Not eligible
33-024466	CA-RIV-12098	SRI-4186	Historic	Debris scatter	BLM	Not eligible
33-024467	CA-RIV-12099	SRI-4191	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024468	CA-RIV-12100	SRI-4196	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024469	CA-RIV-12101	SRI-4208	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024470	CA-RIV-12102	SRI-4217	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024471	CA-RIV-12103	SRI-4222	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024472	CA-RIV-12104	SRI-4229	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024473	CA-RIV-12105	SRI-4231	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024474	CA-RIV-12106	SRI-4235	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024475	CA-RIV-12107	SRI-4236	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024476	CA-RIV-12108	SRI-4241	Prehistoric	Thermal rock features with lithic scatter	BLM	Eligible
33-024477	CA-RIV-12109	SRI-4242	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024478	CA-RIV-12110	SRI-4248	Historic	Debris scatter	BLM	Not eligible
33-024479	CA-RIV-12111	SRI-4250	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024407	CA-RIV-12041	SRI-5000	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024408	CA-RIV-12042	SRI-5003	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024409	CA-RIV-12043	SRI-5006	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024410	CA-RIV-12044	SRI-5008	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024480	CA-RIV-12112	SRI-5029	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024481	CA-RIV-12113	SRI-5034	Prehistoric	Thermal rock feature with associated artifacts	BLM	Not eligible
33-024482	CA-RIV-12114	SRI-5035	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024483	CA-RIV-12115	SRI-5054	Prehistoric	Thermal rock feature with associated artifact	BLM	Not eligible
33-024411	CA-RIV-12045	SRI-5063	Historic	Survey marker	BLM	Not eligible

Table 3.5-1. Archaeological Sites Within the APE

Primary Number	Trinomial	Temporary Number	Age	Description	Land Ownership	NRHP / CRHR Eligibility Status
33-024412	CA-RIV-12046	SRI-5067	Prehistoric	Thermal rock features with lithic scatter	BLM	Not eligible
33-024413	CA-RIV-12047	SRI-5070	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024414	CA-RIV-12048	SRI-5073	Historic, Pre-1942	Debris scatter	BLM	Not eligible
33-024415	CA-RIV-12049	SRI-5076	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024484	CA-RIV-12116	SRI-5083	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024485	CA-RIV-12117	SRI-5087	Historic	Debris scatter	BLM	Not eligible
33-024486	CA-RIV-12118	SRI-5099	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024487	CA-RIV-12119	SRI-5106	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024488	CA-RIV-12120	SRI-5132	Historic	Debris scatter	BLM	Not eligible
33-024489	CA-RIV-12121	SRI-5135	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024416	CA-RIV-12050	SRI-6003	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024417	CA-RIV-12051	SRI-6005	Historic	Debris scatter	BLM	Not eligible
33-024490	CA-RIV-12122	SRI-6011	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024491	CA-RIV-12123	SRI-6017	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024492	CA-RIV-12124	SRI-6018	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024493	CA-RIV-12125	SRI-6021	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024494	CA-RIV-12126	SRI-6022	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024495	CA-RIV-12127	SRI-6023	Prehistoric, Patayan II	Thermal rock features with associated artifacts	BLM	Not eligible
33-024496	CA-RIV-12128	SRI-6033	Prehistoric	Thermal rock features with lithic scatter	BLM	Eligible
33-024497	CA-RIV-12129	SRI-6034	Prehistoric, Patayan II/III	Thermal rock features with associated artifacts	BLM	Eligible
33-024498	CA-RIV-12130	SRI-6046	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024418	CA-RIV-12052	SRI-6053	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024499	CA-RIV-12131	SRI-6059	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024419	CA-RIV-12053	SRI-6075	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024500	CA-RIV-12132	SRI-6081	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024501	CA-RIV-12133	SRI-6087	Historic	Debris scatter	BLM	Not eligible
33-024502	CA-RIV-12134	SRI-6096	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024503	CA-RIV-12135	SRI-6100	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024504	CA-RIV-12136	SRI-6104	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024505	CA-RIV-12137	SRI-6114	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024506	CA-RIV-12138	SRI-6115	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024507	CA-RIV-12139	SRI-6119	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024508	CA-RIV-12140	SRI-6471	Prehistoric	FAR scatter	BLM	Not eligible

Table 3.5-1. Archaeological Sites Within the APE

Primary Number	Trinomial	Temporary Number	Age	Description	Land Ownership	NRHP / CRHR Eligibility Status
33-024509	CA-RIV-12141	SRI-6491	Prehistoric	Lithic scatter	BLM	Not eligible
33-024510	CA-RIV-12142	SRI-7008	Prehistoric, Patayan II	Thermal rock features with associated artifacts	BLM	Not eligible
33-024511	CA-RIV-12143	SRI-7009	Prehistoric	Thermal rock feature	BLM	Not eligible
33-024512	CA-RIV-12144	SRI-7010	Prehistoric	Thermal rock feature with associated artifacts	BLM	Not eligible
33-024513	CA-RIV-12145	SRI-7018	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024514	CA-RIV-12146	SRI-7019	Prehistoric	Lithic scatter	BLM	Not eligible
33-024515	CA-RIV-12147	SRI-7020	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024420	CA-RIV-12054	SRI-7024	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024516	CA-RIV-12148	SRI-7029	Prehistoric	Thermal rock feature	BLM	Not eligible
33-024517	CA-RIV-12149	SRI-7031	Prehistoric, Patayan II	Thermal rock features with associated artifacts	BLM	Not eligible
33-024518	CA-RIV-12150	SRI-7040	Prehistoric	Thermal rock feature with associated artifact	BLM	Not eligible
33-024519	CA-RIV-12151	SRI-7060	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-024520	CA-RIV-12152	SRI-7065	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024521	CA-RIV-12153	SRI-7066	Prehistoric	Thermal rock features with lithic scatter	BLM	Not eligible
33-024522	CA-RIV-12154	SRI-7072	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024523	CA-RIV-12155	SRI-7074	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-024524	CA-RIV-12156	SRI-7076	Historic, 1942-1944	Communication wire	BLM	Not eligible
33-024525	CA-RIV-12157	SRI-7087	Historic, 1942-1944	Communication wire	BLM	Not eligible
33-024526	CA-RIV-12158	SRI-8085	Historic, Pre-1942	Survey markers with associated linear features and artifacts	BLM	Not eligible
33-024818	CA-RIV-12307	SRI-9016	Historic, Post-1944	Well	BLM	Not eligible
33-024813	CA-RIV-12303	SRI-9018	Historic, Post-1944	Well	BLM	Not eligible
33-024817	CA-RIV-12306	SRI-9020	Historic	Road/Trail	BLM	Not eligible
33-000343	CA-RIV-343	SRI-9003	Prehistoric	Trail	BLM	Eligible
33-000772	CA-RIV-772	SRI-110	Prehistoric	Trail	BLM	Eligible

Table 3.5-1. Archaeological Sites Within the APE

Primary Number	Trinomial	Temporary Number	Age	Description	Land Ownership	NRHP / CRHR Eligibility Status
33-001821	CA-RIV-1821	SRI-8020	Prehistoric	Thermal rock features with associated artifacts	BLM	Eligible
33-002795	CA-RIV-2795	SRI-3149	Prehistoric	Lithic scatter	BLM	Not eligible
33-002796	CA-RIV-2796	SRI-6523	Prehistoric	Lithic scatter	BLM	Not eligible
33-008133	CA-RIV-6043	SRI-16	Prehistoric	Lithic scatter	BLM	Not eligible
33-008134	CA-RIV-6044	SRI-6025	Prehistoric, Patayan II	Ceramic scatter	BLM	Not eligible
33-013660	-	SRI-3273	Prehistoric	Thermal rock features with associated artifacts	BLM	Not eligible
33-014147	-	SRI-101	Historic, 1942-1944	Communication wire	BLM	Not eligible
33-014151	-	SRI-3408	Prehistoric, Patayan II/III	Ceramic scatter	BLM	Not eligible
33-014173	CA-RIV-9097	SRI-9013	Historic	Road/Trail	BLM	Not eligible
33-014198	-	SRI-1073	Historic, Pre-1942	Debris scatter	BLM	Not eligible
33-014199	CA-RIV-9098	SRI-107	Historic	Road/Trail	BLM	Not eligible
33-017317	CA-RIV-9007	SRI-6519	Prehistoric	Lithic scatter	BLM	Not eligible
33-017328	-	SRI-1068	Historic, Pre-1942	Road/Trail	BLM	Not eligible
33-018675	CA-RIV-10077	SRI-2668	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-018852	CA-RIV-9648	SRI-5108	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-018853	CA-RIV-9649	SRI-146	Historic	Debris scatter	BLM	Not eligible
33-019021	CA-RIV-9810	SRI-5109	Prehistoric	Lithic scatter	BLM	Not eligible
33-019618	CA-RIV-9935	SRI-127	Multicomponent	Artifact and debris scatter	BLM	Eligible
33-019733	CA-RIV-10047	SRI-4207	Prehistoric	Lithic scatter	BLM	Not eligible
33-019734	CA-RIV-10048	SRI-4173	Multicomponent	Artifact and debris scatter	BLM	Not eligible
33-019735	CA-RIV-10049	SRI-4172	Prehistoric	Lithic scatter	BLM	Not eligible
33-019736	CA-RIV-10050	SRI-4211	Historic	Debris scatter	BLM	Not eligible
33-019739	CA-RIV-10053	SRI-139	Prehistoric	Lithic scatter	BLM	Not eligible
33-019740	CA-RIV-10054	SRI-2113	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-019741	CA-RIV-10055	SRI-4203	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-019742	CA-RIV-10056	SRI-4209	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-019743	CA-RIV-10057	SRI-5122	Historic, 1942-1944	Debris scatter	BLM	Not eligible
33-021132	CA-RIV-10964	SRI-1010	Historic, Post-1944	Debris scatter	BLM	Not eligible
33-021264	CA-RIV-11057	SRI-2322	Historic, 1942-1944	Tank tracks	BLM	Not eligible
33-078916	CA-RIV-10078	SRI-140	Historic, 1942-1944	Debris scatter	BLM	Not eligible

SRI recorded 620 isolated finds within the Project area, and 1 additional isolate was identified by BLM. The isolates included 463 historical-period isolates and 158 prehistoric isolates. Due to the large number of isolates, they were not listed in detail in the Phase I report, only summarized in tabular form. Historical-period isolates observed included ration cans, food/beverage cans, jars, bottles, shell shirt buttons, ammunition, a grenade, an ammunition door, tools, wire, utensils, and oil filters. The prehistoric isolates consist of 86 pot drops and 71 flaked stone artifacts, such as flakes, tested cobbles, a projectile point, hammerstones, and choppers. One chert projectile point, possibly a Gypsum point, was recorded on the southeastern edge of the Project. The pot drops contained a range of ceramic types and they consisted of anywhere from two to 87 sherds. If additional ceramic sherds are located in a shallow subsurface context, that would not change the eligibility determination.

Isolated artifacts are usually not eligible for listing on the NRHP due to their limited potential for further research and their lack of context and integrity. However, in some cases isolated resources could be a clue for construction monitors' awareness to possible hidden subsurface cultural resources.

Survey for Built-Environment Resources

Fourteen built-environment resources were identified, including two transmission lines, nine trails/roads, and three wells. The two transmission lines were identified within the indirect APE along the southeastern boundary of the DQSP. These lines are the Pilot Knob–Blythe 161-kV transmission line (P-33-11110) and the Blythe–Niland 161-kV transmission line (P-33-012532/CA-RIV-7127H). The Pilot Knob–Blythe 161-kV transmission line (P-33-11110) is a 64.4-mile-long line made of H-frame wooden poles built in 1951 that parallels the 2-mile-long boundary of the DQSP. The Blythe–Niland 161-kV transmission line (P-33-012532/CA-RIV-7127H) is a line of similar wooden-pole H-frame construction built in the 1940s and 1950s and located in the same corridor. Both transmission lines have been determined eligible for listing in the NRHP and CRHR. The nine trails/roads and three wells have been determined to not be eligible for listing in the NRHP and CRHR.

Landscape-level Studies and Georchaeological Investigations

SRI utilized soil survey maps, landform age, landscape features, depositional environments, and a previous geoarchaeological investigation and site sensitivity mapping project to analyze the sensitivity for buried deposits within the Project area. The project used was ASM's 1998 Class II survey of the Palo Verde Mesa and Palo Verde Valley Catellus/BLM Land Exchange Project, which covered a portion of the current Project area (McDonald and Schaefer 1998). ASM examined geomorphology and site density from their study area to create a site sensitivity model for the region. The model has four levels of sensitivity- high, medium, low, and none. ASM assigned the high level to area near rock outcroppings in the upland areas of the valley, roads, and springs. Medium level of sensitivity included slopes near the high level. The late Holocene alluvial formations were assigned a low level of sensitivity. Finally, no sensitivity levels were given to active dunes or areas disturbed by agriculture.

SRI employed the ASM model when analyzing the DQSP Project area. However, after factoring in the soil survey map, landform ages, and landscape features, such as arroyos or playas, ASM's model was found to be inaccurate within DQSP. SRI identified five soil series types within the Project area: Aco, Carrizo, Chuckawalla, Orita, and Rositas. The Chuckawalla series retains a low sensitivity, while the Aco and Carrizo series have a moderate sensitivity. The majority of the

Project area contains the Aco soil series, while the Chuckwalla and Carrizo soil series are limited to the north of the Project. The Orita and Rositas soil series were identified with a high potential for buried deposits. The highly sensitivity Orita soil series was found within the central portion of the Project site, while the Rositas series is only within the northern portion of the Project. Within the Rositas soil series, buried cultural deposits may be found at 150 cm or more below the surface, while cultural deposits may be encountered at 50 to 60 cm below the surface in the Orita series (Lerch et al. 2016). Further investigations, such as geoarchaeological trenching of the Rositas and Orita soil series, would be completed to confirm the subsurface sensitivity assessments for cultural resources.

Tribal Cultural Resources

Tribal cultural resources (TCRs) include sites, features, places, cultural landscapes, and sacred places or objects that have cultural value or significance to a Tribe. To qualify as a TCR, the resource must either: (1) be listed on, or be eligible for listing on, the California Register of Historical Resources or other local historic register; or (2) constitute a resource that the lead agency, at its discretion and supported by substantial evidence, determines should be treated as a TCR (PRC § 21074(a)(2)). Native American tribes that are traditionally and culturally affiliated with a geographic area can provide lead agencies with expert knowledge of TCRs.

Although formal consultation under Assembly Bill 52 (AB 52) is not required, the County did consult with interested Tribes. In a letter dated November 18, 2016, the Tribal Historic Preservation Office (THPO) of the Twenty-Nine Palms Band of Mission Indians described the Project as being located within the boundary of its Traditional Use Area. The Tribe requested ongoing consultation associated with the archaeological sites determined to be eligible and possibly eligible for the NRHP and CRHR, as well as a culturally sensitive site crossed by the Project, and a culturally sensitive area in the vicinity of the Project. In a letter dated May 16, 2018, the Tribe described the culturally sensitive site and the culturally sensitive area as TCRs that have a cultural value to the Tribe.

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3.6 Environmental Justice

This section provides an overview of the applicable policies, regulations, and existing conditions for environmental justice, or ". . . the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies" (BLM 2005). The study area is defined by the boundaries of several planning areas for which demographic data are available and which encompass the potentially affected area for environmental justice, including communities for which human health and safety impacts may exist. Data on minority populations and low income populations who may be impacted by the Project are provided for these planning areas, including the City of Blythe, nearby Census County Divisions (Chuckwalla Valley and Blythe), and Riverside County for regional context.

3.6.1 Environmental Setting

The Project site is located in Chuckwalla Census County Division (CCD) (a county subdivision defined by the U.S. Census) in eastern Riverside County, approximately 2.75 miles west of the City of Blythe. The site and its immediately adjoining areas are vacant, with no existing population. Data on minority populations and incidence of poverty are provided for Riverside County, Chuckwalla Valley CCD, Blythe CCD, and the City of Blythe. Chuckwalla Valley CCD and Blythe CCD together correspond generally to "Eastern Riverside County," as defined in the Riverside County General Plan (Riverside County 2015a).

Chuckwalla Valley CCD is a sparsely populated, rural area of Riverside County, bordered by the Coachella Valley to the west and Blythe CCD and the California-Arizona border to the east. Its largest population center consists of two state prisons (Ironwood and Chuckawalla Valley State Prisons), which have been annexed to the City of Blythe, and its largest non-institutional community is Desert Center, located approximately 37 miles west of the Project site. Blythe CCD includes the City of Blythe, community of Ripley, and the surrounding agricultural areas, but excludes the two state prisons.

La Paz County in Arizona is located east of Blythe CCD. Its largest cities are Parker and Quartzsite; the community of Ehrenberg is also located in the County, 4 miles east of Blythe and across the Colorado River. The Colorado River Indian Reservation is located mostly in La Paz County and partly in Riverside County. The Reservation extends along the river north of Ehrenberg and includes the City of Parker. Although most of the Reservation would be unaffected by the Project, demographic and income data have been included, since sections of the Reservation are located in Blythe CCD.

The environmental justice analysis discusses the populations residing in U.S. Census tracts 459, 461.01, 461.02, 461.03, 462, 469, 9810, Blythe City, Blythe CCD, Chuckwalla CCD, and the Colorado River Indian Reservation (see Figure 3.6-1).

3.6.1.1 Minority Populations

According to the Council on Environmental Quality (CEQ), minority individuals are defined as members of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black/African-American, not of Hispanic origin; or Hispanic (of any race). A minority population, for the purposes of environmental justice, is identified when the minority population of the potentially affected area is greater than 50 percent or meaningfully greater than the percentage of the minority population in the general population or other appropriate unit of geographical analysis (CEQ 1997). According to the CEQ guidelines, "minority" is defined as all persons except non-Hispanic whites. In other words, minority is defined as all racial groups other than white, and all persons of Hispanic origin, regardless of race.

Table 3.6-1 presents the minority population composition of the planning areas surrounding the Project site and other regional data for context, based on the 2009-2013 American Community Survey. Data are provided for U.S. Census tracts 459, 461.01, 461.02, 461.03, 462, 469, 9810, Blythe City, Blythe CCD, Chuckwalla CCD, and the Colorado River Indian Reservation, as well as Riverside and La Paz Counties.

The Chuckwalla Valley CCD, in which the Project is located, has a minority population, defined as racial or ethnic groups other than non-Hispanic White, of 76.7 percent of the population. This percentage is higher than Riverside County as a whole (61.7 percent) and the Blythe CCD (68.5 percent), but is similar to the percentage for the City of Blythe (71.9 percent). Only one of the areas, CT470, had a minority population lower than 50 percent of the total population.

Table 3.6-1. Racial and Income Characteristics for Residents within the Study Area

	Riverside County, CA	**CT459**	**CT461.01**	**CT461.02**	**CT461.03**	**CT462**	**CT469 (a)**	**CT470**	**CT9810 (b)**	**Blythe City, CA (c)**	**Blythe CCD, CA (d)**	**Chuck-walla Valley CCD, CA**	**La Paz County, AZ**	**Colorado River Indian Reser-vation, AZ-CA (e)**
Total Population	2,266,899	1,577	3,525	2,205	2,904	3,857	2,684	1,711	6,224	20,101	15,779	9,056	20,348	9,188
Hispanic or Latino (All Races)	46.5%	71.3%	48.1%	69.3%	52.0%	70.1%	46.5%	30.0%	52.3%	53.9%	57.5%	49.8%	24.8%	35.5%
Non-Hispanic														
White	38.3%	27.1%	39.9%	18.4%	39.0%	14.8%	33.5%	60.6%	17.4%	28.1%	31.5%	23.3%	60.9%	32.8%
Black or African American	5.9%	1.5%	10.6%	11.0%	3.0%	14.0%	14.3%	6.0%	22.2%	13.6%	8.7%	19.5%	0.2%	0.5%
American Indian and Alaska Native	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.0%	2.0%	0.6%	0.0%	1.7%	12.4%	27.7%
Asian	5.9%	0.0%	0.7%	1.0%	6.0%	0.5%	1.5%	2.4%	2.0%	2.1%	1.8%	1.8%	0.7%	1.2%
Native Hawaiian And Other Pacific Islander	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	1.2%	0.5%	0.3%	0.1%	0.1%	0.6%	0.2%	0.3%
Some Other Race	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Two or More Races	2.4%	0.0%	0.7%	0.3%	0.1%	0.7%	2.5%	0.4%	3.8%	1.5%	0.4%	3.3%	0.9%	2.0%

Table 3.6-1. Racial and Income Characteristics for Residents within the Study Area

	Riverside County, CA	CT459	CT461.01	CT461.02	CT461.03	CT462	CT469 (a)	CT470	CT9810 (b)	Blythe City, CA (c)	Blythe CCD, CA (d)	Chuck-walla Valley CCD, CA	La Paz County, AZ	Colorado River Indian Reser-vation, AZ-CA (e)
Percent Minority (Other Than Non-Hispanic White)	61.7%	72.9%	60.1%	81.6%	61.0%	85.2%	66.5%	39.4%	82.6%	71.9%	68.5%	76.7%	39.1%	67.2%
Percent of People Below Poverty Level	16.9%	58.9%	19.8%	38.7%	5.5%	36.9%	20.1%	20.8%	n.a.	23.2%	24.3%	19.2%	18.4%	21.5%

Note:
n.a. – The American Community Survey does not define poverty for institutionalized persons.
(a) Excludes Ironwood and Chuckawalla Valley State Prisons.
(b) Census tract covers Ironwood and Chuckawalla Valley State Prisons only.
(c) Incorporated Blythe City; includes the state prisons.
(d) Excludes the state prisons.
(e) Includes portions of California and Arizona.
Source: U.S. Census Bureau 2014a and 2014b.

3.6.1.2 Low-Income Populations

For the purposes of this analysis, the density used to identify minority populations (i.e., 50 percent or greater) was also used as a minimum to identify low-income populations. In addition, a local population is judged to be "meaningfully greater" than the general population (i.e., Riverside County as a whole) if the proportion of individuals living under the poverty line is simply greater than that of the general population, providing for a conservative analysis.

For this analysis, proportions of people living in poverty were obtained from the 2009-2013 American Community Survey. The U.S. Census Bureau defines poverty using standards set by the U.S. Office of Management and Budget's Statistical Policy Directive 14 (U.S. Office of Management and Budget 1978; U.S. Census Bureau 2016). Family income is compared to thresholds that vary according to family size, age, and number of children under 18 years old. If a family's total income is less than the applicable threshold, then every person in the family is considered to be in poverty. Poverty thresholds are the same for all geographic areas and are adjusted annually by the Consumer Price Index. The U.S. Census Bureau does not define poverty status for institutionalized persons and others living in group quarters.

In 2013, the poverty threshold for a single person under 65 years of age was $12,119 and for a person 65 years and over was $11,173. For a four-person family with two children under 18 years of age, the poverty threshold was $23,624. Other thresholds are defined for different family sizes and compositions (U.S. Census Bureau 2014b).

As shown in Table 3.6-1, the Chuckwalla Valley CCD, in which the Project is located, has 19.2 percent of the population with income below the poverty level. This percentage is higher than Riverside County as a whole (16.9 percent), but lower than that of the Blythe CCD (24.3 percent) and the City of Blythe (23.2 percent). While none of the areas included in the analysis had a poverty rate exceeding 50 percent of the total population, all areas had a greater percentage of the population with income below the poverty level than Riverside County as a whole.

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3.7 Geology and Soil Resources

This section describes the existing regional and local geology and soil conditions, as well as regulatory framework in regards to geology and soil resources for the proposed Project and alternatives. This section identifies seismic hazards that could potentially affect structures associated with the Project to assist decision-makers in addressing regulatory concerns. The study area relevant to geology, soils, and geologic hazards is the physical footprint that would be associated with Project construction, operation and maintenance, and decommissioning. The study area relevant to faulting and seismic hazards includes the larger Southern California region, because distant faults can produce ground shaking and secondary seismic hazards at the Project area. The information in this section is based on existing maps and reports developed by the U.S. Geological Survey (USGS), California Geological Survey (CGS), U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), and the California Division of Mines and Geology (CDMG). This information was reviewed and summarized by the Applicant in their *Preliminary Geotechnical Investigation Report for the First Solar Development, Inc., Desert Quartzite Solar Project, Riverside County, California*, prepared by URS, 2011.

3.7.1 Environmental Setting

3.7.1.1 Regional Geology and Seismicity

The Project would be located on the Palo Verde Mesa in the Mojave Desert Geomorphic Province in Riverside County, California. This geomorphic province encompasses an area that extends from the Colorado River on the east, the San Andreas Fault on the west, and the Garlock Fault on the northwest. The province is generally characterized by broad alluvial valleys separated by steep, discontinuous, sub-parallel mountain ranges that generally trend northwest-southeast.

3.7.1.2 Local Geology

General Site Geology

A topographic map of the Project area is shown in Figure 2-7. The Palo Verde Mesa is characterized by a nearly level surface flanked by gently to moderately sloping alluvial fans. The geomorphology of the area is controlled by fluvial erosion and deposition.

The bedrock of the Palo Verde Mesa in the vicinity of the Project site is composed of Pre-Cretaceous metamorphosed sedimentary rocks in the northern portion of the site, and Precambrian granite, Jurassic volcanic rocks, and Jurassic plutonic rocks in the southern portion. Previous investigators (CGS 1994) mapped a pre-Quaternary thrust fault immediately to the southwest of the Project site, while more recent investigators (USGS 2006) present the geology of that area as consisting of Quaternary alluvial terraces of varying ages. The Precambrian to Mesozoic bedrock in the southwestern portion of the site is overlain by Tertiary age volcanics which were deposited between 5.3 and 34 million years before present. In the southeastern corner of the site, the bedrock is overlain by Pleistocene non-marine sediments.

A geologic map of the surficial geologic units is shown in Figure 3.7-1. Pleistocene and Holocene alluvium and dune sand overlays the older rocks throughout the site. Generalized descriptions of the surficial units encountered are described below.

- The largest portion of the site consists of Pleistocene age alluvial deposits of the ancestral Colorado River (designated Qpv). This unit consists of moderately indurated, poorly graded sand, gravel, boulders, silt, and clay.
- Holocene age alluvium associated with modern washes (designated Qw) has been mapped in the southwestern corner of the site. These deposits are comprised of unconsolidated sand and gravel eroded from nearby mountain ranges.
- Holocene age aeolian sand (designated Qs) has been mapped in the northwestern portion of the site, along the proposed route of the gen-tie line.
- Holocene age alluvial-fan and alluvial-valley deposits (designated Qa6) comprise the western portion of the Project site. This unit is characterized by unconsolidated sand, gravel, silt, and clay.

Soil Resources

The soil types present on the Project site are shown in Figure 3.7-2. The site is generally underlain by Quaternary age alluvium consisting of silty sands and gravels. The predominant soil types mapped by the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) are the Rositas, Orita, Carrizo, and Aco series. These are generally coarse-grained soils, composed of gravel, sand, fine sand, and loam.

All soil types mapped on the site have a low potential for expansive soil characteristics, and for corrosion of concrete. The soils have a high risk for corrosion of uncoated steel. The Rositas-Orita-Carrizo-Aco map unit is characterized by soils with high sand percentages and moderate susceptibility to wind erosion. Most of the soil types are classified as somewhat limited with respect to suitability for septic systems (USDA 1969).

The Applicant's investigations for Federal jurisdictional waters and wetlands included an assessment of the presence of hydric soils. The investigation found that soil indicators were not found that meet the criteria for hydric soils, as defined by the USACE regulatory guidance, including the 2008 Arid West Supplement (Huffman-Broadway Group 2015).

Figure 3.7-3 shows the Hydrologic Soil Groups present in the Project area. Hydrologic soil grouping is a measure of the infiltration rate of the onsite soils. Soils with a high infiltration rate (Group A) would be expected to have low runoff rates, and therefore would not be prone to erosion by surface water runoff. Soils with a low infiltration rate (Group C) would be expected to have higher runoff rates, and may be prone to erosion by surface water runoff.

Figure 3.7-4 shows the Wind Erodibility Groups present in the Project area, in tons per acre per year. The areas of highest potential wind erodibility (160 to 310 tons per acre per year) correspond to the sand dune areas in the northern and western parts of the Project area. The bulk of the Project area is classified as having moderate wind erodibility potential.

Evaluation of the potential risk of exposure to valley fever, through inhalation of site soils, is presented in Sections 3.9 and 4.9.

Groundwater Conditions

A detailed description of groundwater conditions in the Project area is provided in Section 3.20. Based on the elevation difference between the site and the adjacent Colorado River floodplain, and the depth to groundwater found at adjacent sites, the depth to groundwater at the site is expected to be more than 100 feet.

3.7.1.3 Geologic Hazards

Geologic and seismic hazards are site characteristics which could affect the stability or integrity of Project-related structures, or could result in offsite impacts to adjacent properties. These hazards include potential instability due to seismic activity, unstable soils, corrosive soils, or flooding and erosion.

Faulting and Seismicity

Hazards which can be potentially associated with active seismic activity could include surface fault rupture, ground shaking, liquefaction, settlement, and landslides. The Project site is located in a seismically active region of Southern California. The San Andreas Fault is the boundary between the North American and Pacific crustal plates, with the North American Plate moving southeastward relative to the Pacific plate at a rate of about 40 to 50 millimeters per year. Most of this movement occurs on the San Andreas Fault, while a smaller amount of movement occurs on shorter active faults in the region. Seismic hazards can occur from both the San Andreas Fault, and from the smaller faults.

The California Geological Survey (CGS) defines an active fault as one that has had surface displacement during the Holocene age (roughly the last 11,000 years). Potentially active faults are those that show evidence of surface displacement during the Quaternary age (roughly the last 1.6 million years) but for which evidence of Holocene movement has not been established. An inactive fault is one that has not shown evidence of surface displacement during the Quaternary age.

The Project site has not been mapped by the State of California for the purpose of defining Seismic Hazard Zones. There are no known active, sufficiently active, or well-defined fault traces identified on the Project site, and the site has not been delineate by the CGS as being within an Earthquake Fault Zone. Mapping by Jennings (CGS 1994) shows a Tertiary age fault to the southwest of the site, but more recent mapping by the USGS identifies this feature as Quaternary terraces of varying ages, rather than terraces offset by faulting (USGS 2006)

The closest active faults to the Project are the Brawley Seismic Zone, Elmore Ranch, and the San Andreas Fault. All of these active faults are located 58 miles or more west of the Project site (CGS 2010). The closest potentially active fault (defined as a Quaternary-age fault that lacks evidence of Holocene-age displacement) is located approximately 20 miles north of the Project site (CGS 2010).

Surface Fault Rupture

Seismically induced ground rupture is defined as the physical displacement of surface deposits in response to an earthquake's seismic waves. The magnitude and nature of fault rupture can vary for different faults, or even along different strands of the same fault. Ground rupture is considered most likely along active faults.

As discussed above, there are no active or potentially active faults mapped within the Project site (CGS 2010). The closest active faults are more than 58 miles away. Therefore, the potential for surface fault rupture within the Project site is low.

Ground Shaking

Generally, the greater the earthquake magnitude and the closer the fault rupture to a site, the greater the intensity of ground shaking. The amplitude and frequency of ground shaking are related to the size of an earthquake, the distance from the causative fault, the type of fault, and the response of the geologic materials at the site. Ground shaking can be described in terms of acceleration, velocity, and displacement of the ground.

A common measure of ground motion during an earthquake is the peak ground acceleration (PGA). The PGA for a given component of motion is the largest value of horizontal acceleration obtained from a seismograph. PGA is expressed as the percentage of the acceleration due to gravity (g), which is approximately 980 centimeters per second squared. Unlike measures of magnitude, which provide a single measure of earthquake energy, PGA varies from place to place, and is dependent on the distance from the epicenter and the character of the underlying geology (e.g. hard bedrock, soft sediments, or artificial fills).

The Modified Mercalli (MM) Intensity Scale assigns an intensity value based on the observed effects of ground-shaking produced by an earthquake. Unlike measures of earthquake magnitude, the MM intensity scale is qualitative in nature (i.e. it is based on actual observed effects rather than measured values). MM intensity values for an earthquake at any one place can vary depending on its magnitude, the distance from its epicenter, and the type of geologic material. The MM values for intensity range from I (earthquake not felt) to XII (damage nearly total), and intensities ranging from IV to X could cause moderate to significant structural damage. Because the MM Intensity Scale is a measure of ground-shaking effects, intensity values can be related to a range of PGA values.

As discussed above, the Project site is located over 58 miles from the closest active faults in the region. Relative to the more seismically active areas to the west and northwest, the Project site will experience lower levels of shaking less frequently (CGS 2008). The estimated site intensity is a Modified Mercalli Intensity (MMI) value of V, which corresponds to a moderate shaking severity. Such an earthquake would be strong enough to be felt by nearly everyone, and would likely break windows and overturn unstable objects. The peak ground acceleration which has a 10 percent Probability of Exceedance in 50 years is approximately 0.0373g (URS 2011).

Liquefaction

Liquefaction is the significant and sudden reduction in stiffness and sheer strength of saturated sandy soils caused by a sudden increase in pore water pressure caused by an earthquake. The susceptibility of a site to liquefaction is related not only to the potential for ground shaking, but the water content, depth, and density of granular sediments. Liquefaction can intensify ground shaking, and therefore increase the amount of damage that could occur due to a seismic event.

Because of the depth to groundwater of approximately 100 feet, the Project site is unlikely to have saturated soils which could be susceptible to liquefaction.

Settlement

Settlement of soils can occur if site soils are composed of unconsolidated sediments and/or artificial fill. Settlement can be intensified during ground shaking seismic events. The geotechnical study of the site did not identify any potential for artificial fill materials at the Project site. However, the site is underlain by alluvial fan deposits of relatively unconsolidated, medium-dense materials. These may be unstable to support structures in the vicinity of the operations and maintenance facility and the On-Site Substation, and could be susceptible to settlement.

Landslides

The potential for landslides, slope instability, or debris flows at the Project site is insignificant, due to the relatively flat terrain.

Subsidence

Subsidence of the land surface can be caused by seismic events, withdrawal of subsurface fluids, collapse of underground cavities, or consolidation or hydrocompaction of unconsolidated sediments. Consolidation can occur naturally, or can be increased by the placement of foundation or fill loads above unconsolidated sediments.

No subsidence has been reported in the Project area (USGS 2002; DWR 1978). There is no petroleum or natural gas withdrawal which could result in subsidence. The EIS prepared for the Blythe Solar Power Project (BSPP) concluded that no regional subsidence due to the historic groundwater withdrawal has been reported in the vicinity (BLM 2010). This includes localized or regional subsidence during the 1980's and 1990's, when regional groundwater extraction was at its historic maximum of approximately 48,000 AFY in the general area (BLM 2010).

Collapsible soils can undergo subsidence when exposed to water in a process called hydrocompaction. This can occur in areas associated with alluvial fans, windblown materials, or colluvium. Because the Project site is associated with alluvial fans, the potential for hydrocompaction of collapsible soils could exist.

Expansive Soils

Expansive soils can expand or contract in response to moisture content, resulting in movements that can damage and/or distress to structures and equipment with shallow foundations. Based on the NRCS maps and descriptions, the soils on the Project site are not expected to have expansive characteristics (USDA 1969). This would be confirmed through additional geotechnical investigation prior to construction.

Corrosive Soils

Corrosivity refers to potential soil-induced electrochemical or chemical action that could corrode or deteriorate concrete, reinforcing steel in concrete structures, and bare-metal structures exposed to these soils. All soil types mapped on the site have a low potential for corrosion of concrete. However, the soils have a high risk for corrosion of uncoated steel (USDA 1969). This would be confirmed through additional geotechnical investigation prior to construction.

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3.8 Greenhouse Gas Emissions and Global Climate Change

This section describes the environmental setting and regulatory framework with regard to greenhouse gas (GHG) emissions for the proposed Project and alternatives. Emissions and impacts associated with criteria air pollutants were addressed in Section 3.2.

3.8.1 Environmental Setting

3.8.1.1 Characteristics and Definition

Global climate change refers to changes in average climatic conditions on Earth as a whole, including temperature, wind patterns, precipitation, and storms. Global temperatures are moderated by naturally occurring atmospheric gases, including water vapor, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), which are known as GHGs. These gases allow solar radiation (sunlight) into the Earth's atmosphere, but prevent radiative heat from escaping, thus warming the Earth's atmosphere. Gases that trap heat in the atmosphere are often called greenhouse gases, analogous to a greenhouse, and are emitted by both natural processes and human activities. GHGs in the atmosphere influence regulation of the Earth's temperature. Emissions from human activities, such as burning fossil fuels for electricity production and vehicle use, have elevated the concentration of these gases in the atmosphere.

Scientific evidence indicates a trend of increasing global temperature over the past century, which a number of scientists attribute to an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce negative economic and social consequences across the globe.

Recent observed changes due to global warming include shrinking glaciers, thawing permafrost, a lengthened growing season, and shifts in plant and animal ranges (IPCC 2007). Generally accepted predictions of long-term environmental impacts due to global warming include sea level rise, changing weather patterns with increases in the severity of storms and droughts, changes to local and regional ecosystems, including the potential loss of species, and a significant reduction in winter snowpack.

Global climate change refers to any significant change in measures of climate, such as average temperature, precipitation, or wind patterns over a period of time. Global climate change may result from natural factors, natural processes, and/or human activities that change the composition of the atmosphere and alter the surface and features of land.

The United Nations Intergovernmental Panel on Climate Change (IPCC) developed several emission trajectories of GHGs needed to stabilize global temperatures and climate change impacts. The IPCC concluded that a stabilization of GHGs at 400 to 450 ppm CO_2 equivalent concentration is required to keep global mean warming below 3.6ºF (2º Celsius [2ºC]), which is assumed to be necessary to avoid dangerous climate change (AEP 2007).

The State of California has been at the forefront of developing solutions to address global climate change. State law defines greenhouse gases as any of the following compounds: CO_2, CH_4, N_2O, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) (California Health and Safety Code Section 38505(g)). CO_2, CH_4, and N_2O are the most common GHGs that result from human activity.

In addition, the State of California manages emission of "short-lived climate pollutants." Among these pollutants are methane, fluorinated gases including hydrofluorocarbons (HFCs), and black carbon. As of January 1, 2018, ARB is implementing a Shor-lived Climate Pollutant Strategy, with the aim of setting statewide 2030 emission reduction targets for methane, HFCs, and anthropogenic black carbon. The initial emphasis of the Strategy is to address methane emissions from dairies, other livestock operations, and landfills. Solar energy installations are not a focus of the Strategy.

3.8.1.2 Greenhouse Gases

Greenhouse Gases

Gases that trap heat in the atmosphere are often referred to as Greenhouse Gases (GHGs), which are emitted into the atmosphere through natural processes and human activities. GHGs are so named because of their ability to prevent heat from the surface of the earth from escaping into space. Many GHGs have lifetimes of decades or even centuries in the atmosphere; so the problem cannot be eliminated quickly. Thus, the problems we are experiencing today do not accurately represent the full effects we may see years from now based on current levels of GHGs (CARB 2009).

The principal GHGs contributing to climate-change and resulting from human activity are carbon dioxide (CO_2), methane (CH_4), and fluorinated gases, such as hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Carbon dioxide enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement).

When quantifying GHG emissions, the different global warming potentials of GHG pollutants are usually taken into account by normalizing their rates to an equivalent CO_2 emission rate. Global warming potential is a relative measure of a compound's residence time in the atmosphere and ability to warm the planet. For example, SF_6, while representing a small fraction of the total GHGs emitted annually worldwide, is a very potent GHG with 23,900 times the global warming potential of CO_2. Therefore, an emission of one metric ton of SF_6 would be reported as an emission of 23,900 metric tons CO_2e. Large emission sources are reported in million metric tons of CO_2e. A metric ton is 1,000 kilograms; it is equal to approximately 1.1 U.S. tons and approximately 2,204.6 pounds.

Other greenhouse gases include water vapor, ozone, and aerosols. Water vapor is an important component of our climate system and is not regulated. Ozone and aerosols are short-lived greenhouse gases; global warming potentials for short-lived greenhouse gases are not defined by the IPCC. Aerosols can remain suspended in the atmosphere for about a week and can warm the atmosphere by absorbing heat and cool the atmosphere by reflecting light. Black carbon is formed by incomplete combustion of fossil fuels, biofuels, and biomass. Black carbon is not a gas but an aerosol—particles or liquid droplets suspended in air. Black carbon only remains in the atmosphere for days to weeks, as opposed to other greenhouse gases that can remain in the atmosphere for years.

GHG emissions from the electricity sector are dominated by CO_2 emissions from carbon-based fuels. Other sources of GHG emissions are small and also are more likely to be easily controlled or reused or recycled, but are nevertheless documented here as some of the compounds that have very high global warming potentials. These air pollutants are considered to be GHGs because their presence in the atmosphere results in increased solar absorbance, and/or prevents heat from the surface of the Earth from escaping to space. The principal GHGs resulting from human activity that enter and accumulate in the atmosphere are described below.

Carbon Dioxide (CO_2)

CO_2 is a naturally occurring gas that enters the atmosphere through natural as well as anthropogenic sources. Key anthropogenic sources include: the burning of fossil fuels (e.g., oil, natural gas, coal, etc.); solid waste; trees, wood products, and other biomass; and industrially relevant chemical reactions such as those associated with manufacturing cement. CO_2 is removed from the atmosphere when it is absorbed by plants as part of the biological carbon cycle.

Methane (CH_4)

Like CO_2, CH_4 is emitted from both natural and anthropogenic sources. Key anthropogenic sources of CH_4 include gaseous emissions from landfills, releases associated with mining and materials extraction industries, in particular coal mining, and fugitive releases associated with the extraction and transport of natural gas and crude oil. CH_4 emissions also result from livestock and agricultural practices. Small quantities of CH_4 are released during fossil fuel combustion.

Nitrous Oxide (N_2O)

N_2O is also emitted from both natural and anthropogenic sources. Important anthropogenic source activities include industrial activities, agricultural activities (primarily application of nitrogen fertilizer), the use of explosives, combustion of fossil fuels, and decay of solid waste.

Fluorinated Gases

HFCs, PFCs, and SF_6 are synthetic gases that are emitted from a variety of industrial processes and contribute substantially more to the greenhouse effect than the GHGs described previously. Fluorinated gases are often used as substitutes for ozone-depleting substances (i.e., chlorofluorocarbons, hydrochlorofluorocarbons, and halons). These gases are typically emitted in small quantities, but because they are potent GHGs, they are sometimes referred to as high global warming potential gases.

GHG Inventory Methodology

Total GHG emissions from a source are often reported as a CO_2 equivalent (CO_2e). The CO_2e is calculated by multiplying the emission of each GHG by its global warming potential and adding the results together to produce a single, combined emission rate representing all GHGs. GHG emissions are typically quantified in metric tons (MT) or millions of metric tons (MMT).

GHGs have varying global warming potential. The global warming potential is the potential of a gas or aerosol to trap heat in the atmosphere; it is the "cumulative radiative forcing effect of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas" (EPA 2016a). The global warming potential rating system is standardized to CO_2, which has a value of one. For example, CH_4 has a global warming potential of 21, which means that it has a global warming effect 21 times greater than CO_2 on an equal-mass basis. Table 3.8-1 presents the global warming potential and atmospheric lifetimes of common GHGs.

Table 3.8-1. Global Warming Potentials and Atmospheric Lifetimes of GHGs

GHG	Formula	100-Year Global Warming Potential	Atmospheric Lifetime (Years)
Carbon Dioxide	CO_2	1	Variable
Methane	CH_4	28-36	12 ± 3
Nitrous Oxide	N_2O	265-298	120
Sulfur Hexafluoride	SF_6	23,900	3,200

Source: EPA 2016a.

Human-caused sources of CO_2 include combustion of fossil fuels (coal, oil, natural gas, gasoline, and wood). Data from ice cores indicate that CO_2 concentrations remained steady prior to the current period for approximately 10,000 years. Concentrations of CO_2 have increased in the atmosphere since the industrial revolution.

CH_4 is the main component of natural gas and also arises naturally from the anaerobic decay of organic matter. Human-caused sources of natural gas include landfills, fermentation of manure, and cattle farming. Human-caused sources of N_2O include combustion of fossil fuels and industrial processes such as the production of nylon or nitric acid.

Other GHGs are present in trace amounts in the atmosphere and are generated from various industrial or other uses.

National GHG Emissions

Anthropogenic GHG emissions in the United States derive mostly from the combustion of fossil fuels for transportation and power production. Energy-related CO_2 emissions, resulting from fossil fuel exploration and use, account for approximately three-quarters of the human-generated GHG emissions in the United States, primarily in the form of CO_2 emissions from burning fossil fuels. Approximately 31 percent of US GHG emissions come from electricity production; 27 percent derive from transportation; while industrial processes, agriculture, forestry, other land uses, and waste management compose a majority of the remaining of sources (EPA 2016b). Approximately one-third of GHG emissions come from motor vehicle transportation, including motorized vehicles using the transportation network on public lands (EPA 2016b).

According to the Environmental Protection Agency's inventory of GHG emissions from 1990 to 2013 (EPA 2018), U.S. greenhouse gas emissions in 2016 were measured as 6,611 million metric tons of carbon dioxide equivalent. This is a 2.4 percent increase in GHG emissions from 1990 to 2016, but an 11.4 percent decrease from the peak of 7,351 million metric tons in 2007. In terms of the overall trend from 1990 to 2016, total transportation CO_2 emissions rose by 21.4 percent due, in large part, to increased demand for travel as fleet wide light-duty vehicle fuel economy was relatively stable. The number of vehicle miles traveled by light-duty motor vehicles (passenger cars and light-duty trucks) increased 44 percent from 1990 to 2016, as a result of a confluence of factors including population growth, economic growth, urban sprawl, and low fuel prices during the beginning of this period. Some of the recent emissions increases are attributed to increased energy consumption due to colder winter conditions in some parts of the country.

Anthropogenic emissions of volatile organic compounds (VOCs) include fuel production, distribution, and combustion, with the largest source being emissions from motor vehicles due to either evaporation or incomplete combustion of fuel, and from biomass burning. Thousands of different compounds with varying lifetimes and chemical behavior have been observed in the atmosphere, so most models of tropospheric chemistry include some chemical speciation of VOCs. Generally, fossil VOC sources have already been accounted for as release of fossil carbon in the CO_2 budgets and thus VOCs are not included as a component of GHG emission calculations.

State GHG Emissions

The State of California GHG Inventory performed by the CARB compiled statewide anthropogenic GHG emissions and sinks. It includes estimates for CO_2, CH_4, N_2O, SF_6, HFCs, and PFCs. The current inventory covers the years 2000 to 2013, and is summarized in Table 3.8-2. Data sources used to calculate this GHG inventory include California and Federal agencies, international organizations, and industry associations. The calculation methodologies are consistent with guidance from the IPCC. The 2000 emissions level is the sum total of sources and sinks from all sectors and categories in the inventory. The inventory is divided into seven broad sectors and categories in the inventory. These sectors include electricity generation (both generated in-state and imported from out of state), transportation, industrial, commercial, residential, agriculture, and not specified (solvents and chemicals).

Table 3.8-2. State of California GHG Emissions by Sector, 2000-2013

Sector	Total 2000 Emissions (MMT CO_2e)	Percent of Total 2000 Emissions	Total 2013 Emissions (MMT CO_2e)	Percent of Total 2013 Emissions
Electricity Generation (in state)	59.19	12.7	50.58	11.0
Electricity Generation (imported)	45.99	9.8	40.05	8.7
Transportation	178.12	38.0	172.53	37.6
Industrial	105.40	22.5	104.16	22.7
Commercial	14.95	3.2	22.63	4.9
Residential	31.82	6.8	32.32	7.0
Agriculture	32.1	6.8	36.21	7.9
Solvents and Chemicals	1.2	0.3	0.79	0.2
Total California Emissions	468.8	NA	459.3	NA

Source: CARB 2015

In 2013, California's GHG emissions were calculated as 459.3 million metric tons of carbon dioxide equivalent; incorporating broad GHG-producing sectors throughout the state. The CARB 2015 Greenhouse Gas Emission Inventory: 2000 – 2013 shows that California's gross emissions of greenhouse gases decreased by 2.0 percent from 468.8 million metric tons of CO_2e in 2000 to 459.3 million in 2012, with a maximum of 495.3 million tons in 2004. During the same period, California's population grew by 11 percent from 34 to 37.8 million people. As a result, California's per capita GHG emissions have generally decreased from 13.7 in 2000 to 12.2 tons of CO_2e per person in 2013.2

In 2015, the transportation sector remained as California's largest source of GHG emissions, accounting for 37.6 percent of GHG emission inventory. Contributions from the transportation sector include emissions from on-road and off-road vehicles, aviation, rail and water-borne vehicles, and some other minor sources. Transportation-related GHG emissions have dropped 10 percent since reaching a maximum of 191.94 million tons in 2007. Emissions from on-road sources, which consist of light-duty vehicles (cars, motorcycles, and light-duty trucks), heavy-duty trucks, and buses, accounted for over 92 percent of transportation sector GHG emissions in 2013. Of the on-road vehicles, light duty vehicles accounted for approximately 69 percent of emissions in 2013. On-road emissions declined each year since 2006, until they increased by 0.8 percent in 2013. Total transportation sector emissions also decreased each year since 2007, until they increased from 2012 to 2013.

In California, renewable electricity sources have been given preference over fossil fuel fired electricity sources. This means that when renewable energy is available on the grid, the California Independent Systems Operator (CAISO) requests turndown of fossil power production. When the renewable facility goes off-line, if there is still demand, the CAISO requests turn-up of fossil power production. Some fossil fuel load-following plants will adjust automatically as renewable sources come on- and off-line. As a result of these operating scenarios, new renewable energy power plants operating in California offset the production of electricity from fossil fuel fired power plants.

Local GHG Emissions

Several regional and local governments and air districts have developed climate and or GHG reduction plans and initiatives, like that of Riverside County, which provide a step-down from state regulations. In addition, local air quality districts have adopted various levels of significance for carbon dioxide emissions and county and city governments are developing climate change and greenhouse gas emissions guidance and strategies. For example, the MDAQMD has adopted a significance threshold of 100,000 tons per year of CO_2e for the district, which is equivalent to 90,718.47 metric tons of CO_2e (MT CO_2e). The MDAQMD has adopted greenhouse gas emissions thresholds in its CEQA Guidelines, but has not adopted a comprehensive strategy for reducing greenhouse gas emissions.

The DRECP analyzed the direct greenhouse gas emissions of renewable energy projects within the planning area. The project-specific estimates used excluded external or life-cycle emissions, such as those from raw materials and manufacturing. The combined construction emissions of the existing projects were amortized over the life of each project, and were added to the operational and maintenance emissions. The analysis calculated a GHG emission rate ranging from about 1 to 39 MT CO_2e per year for each megawatt of built capacity, with an average of less than 10 MT CO_2e per year. Based on those estimates, the construction, operation and maintenance, and decommissioning activities for the 50 existing renewable energy projects in the DRECP area, with a combined generation capacity of 6,250 MW, may emit about 62,500 MT CO_2e per year. The development of renewable energy sources in the DRECP is expected to offset some of the use and or dependency for fossil fuel energy, thereby reducing greenhouse emissions through mitigation.

Existing Greenhouse Gas Emissions at the Project Site

No industrial, residential, or other emitters of GHGs are currently located or operating at the Project site. No other existing on-site operations result in the combustion of fossil fuel, or otherwise result in direct anthropogenic emissions of GHGs on-site. There is, however, existing vegetation located on-site, and this vegetation is expected to provide ongoing natural carbon uptake. Wohlfahrt et al. (2008) completed an evaluation of carbon uptake by natural vegetation in Mojave Desert systems. The study indicates that desert plant communities may result in the uptake of carbon in amounts as high as 102 to 110 grams per square meter per year; however, the study showed a high degree of uncertainty around these amounts. This analysis assumes that on-site vegetation could uptake as much as 100 grams per square meter per year as a conservative estimate. Under existing conditions, this would equate to a natural carbon uptake, expressed in CO_2, of approximately 1.48 metric tons (MT) of CO_2 per acre per year.

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3.9 Hazards and Hazardous Materials

This section describes the environmental setting and regulatory framework in regards to hazards and hazardous materials for the proposed Project and alternatives. The affected environment for hazards and hazardous materials includes evaluation of potential accidents and spills, potential site contamination, public health, transmission line safety and nuisance, emergency response capability, aircraft operations, intentionally destructive acts, and abandoned mine lands.

3.9.1 Environmental Setting

3.9.1.1 Hazardous Materials

The hazardous materials associated with Project construction and operation are discussed in Section 2.3.4.9 and 2.3.5, respectively. Procedures to be used for management and disposal of sanitary wastes are discussed in Section 2.3.3.9. Procedures to be used for management and disposal of other wastes are discussed in Section 2.3.7.1. The potential for releases of hazardous materials, and the risks associated with potential releases, are discussed in Section 4.9.3. This section discusses the current conditions on the Project area that are relevant to potential hazardous materials impacts, including the proximity of the Project area to potential receptors, as well as known information regarding current hazardous conditions.

Environmental Site Assessment

Environmental Data Resources, Inc. (EDR) prepared the EDR DataMap™ Area Study, which contains a summary of environmentally affected sites and other sites that are within a one-mile radius surrounding the Project area. The EDR report (included as an appendix to URS 2015) includes descriptions of each agency database, site names and addresses, and status, with some repetition existing among the different databases. There were no hazardous sites identified within the Project site, nor within the one-mile search radius of the Project site.

Existing Environmental Site Contamination

The Phase I Environmental Site Assessment conducted for the Project site in 2015 found two Recognized Environmental Conditions (RECs) per the ASTM definition (URS 2015, provided in Appendix Q). The two RECs were both suspected groundwater supply wells, which were observed to be open and unsecured. There was no evidence of any releases of hazardous substances or petroleum products on the BLM portion of the Project site or in the immediate vicinity based on records searches and visual surveys. De minimis conditions identified on the BLM land during the site reconnaissance included trash and debris. Hazardous substances, in the form of partially-filled oil and lubricant containers and other trash and debris, were observed on the private land parcel. There have been no subsequent response actions, including securing of the groundwater wells or sampling of environmental media, to verify whether site contamination currently exists.

Unexploded Ordnance

The Project site is located within General Patton's World War II Desert Training Center opened by the Army Ground Forces in 1942. In 1943 it was renamed California-Arizona Maneuver Area (CAMA). The CAMA was the largest military training center ever established, stretching from west of Pomona, California, to Yuma, Arizona, and north to Nevada, encompassing approximately 12 million acres. Seven camps were set up in the CAMA for divisional use and for combat and supply units. The camps were widely spaced to prevent groups from interfering with each other during training exercises, but all were interconnected with a network of railroad lines and roads. After the camps closed in 1944, efforts began to salvage material and dismantle the sites. The land was returned to private and government holdings.

The former Blythe Army Airfield is located approximately 1.5 north of the Project site. The airfield opened as Bishop Army Airfield in 1940. The airport later became a part of Muroc Army Air Field, now known as Edwards Air Force Base. The airfield was a second Army Air Forces heavy bombardment crew training base during World War II. Multiple bombardment groups were active at the airfield in 1942 and 1943, and up to 75 B-17 bombers were flown and maintained at this site. Historical records and drawings indicate that bombs and explosive materials, and possibly incendiary and pyrotechnic materials, were stored on airfield grounds in up to five magazines or bunkers. A gunnery range, skeet range, and jeep type target range, all with ammunition storage, were constructed and used by Army personnel (California State Military Museum 2008).

During the Phase I Environmental Site Assessment, no indication was found suggesting these materials were presented on the Project area. However, because of the former use of public lands in the area for military training, there is potential for discarded military munitions, other explosives, and unexploded ordnance (collectively, UXO) to be encountered on the surface, or in subsurface excavations. The BLM has conducted investigations at several of the known camps, but has not completed a UXO survey of the entire training ground. UXO discoveries have been reported during cultural resource studies in the area, and as part of construction efforts at the Modified BSPP site north of I-10.

Pesticide Use

Pesticides are used to control living organisms that cause damage or economic loss, or that transmit or cause disease. Pests include insects, fungi, weeds, rodents, nematodes, algae, viruses, and bacteria. Pesticides include herbicides, fungicides, insecticides, rodenticides, and disinfectants, as well as insect growth regulators. In California, adjuvants (substances added to enhance the efficacy of a pesticide) also are subject to the regulations that control pesticides. Based on historical information and existing conditions identified in the Phase I Environmental Site Assessment (URS 2015), the portion of the Project site on BLM land has not been used for agriculture and therefore would not have been subject to pesticide applications.

Based on the historical agricultural use of the private land parcel, there is the potential for residual pesticides to be present in surface and subsurface soils on that part of the Project area.

Sensitive Receptors

The hazards associated with the Project are considered within the context of the proximity of residential and other sensitive receptors, including schools, daycare centers, emergency response facilities, and long-term care facilities. The closest resident is located approximately 0.7 miles north of the Project. Two other residences are located approximately one mile north of the Project, on the southwest corner of the Nichols Warm Springs/Mesa Verde community, which is a community of approximately 300 single family homes and mobile homes. The remainder of the residences in Nichols Warm Springs/Mesa Verde, including the Mesa Verde Park and Roy Wilson Community and Child Center, are located just outside of the 1-mile boundary. No schools, hospitals, or long-term care facilities are located within one mile of the proposed Project (URS 2015).

3.9.1.2 Public Health

Location of Exposed Populations and Sensitive Receptors

The general population includes sensitive subgroups that could be at greater risk from exposure to hazardous materials or emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in the area surrounding a project site may have a major bearing on health risk. The closest resident is located approximately 0.7 miles north of the Project. Two other residences are located approximately one mile north of the Project, on the southwest corner of the Nichols Warm Springs/Mesa Verde community, which is a community of approximately 300 single family homes and mobile homes. The remainder of the residences in Nichols Warm Springs/Mesa Verde, including the Mesa Verde Park and Roy Wilson Community and Child Center, are located just outside of the 1-mile boundary. No schools, hospitals, or long-term care facilities are located within one mile of the proposed Project (URS 2015).

Existing Public Health Concerns

Analyses of existing public health issues typically are prepared in order to identify the current status of respiratory diseases (including asthma), cancer, and general health in the population located near proposed action sites to provide a basis on which to evaluate any additional health impacts from the proposed action. No data regarding existing health concerns specific to the local area has been identified.

Vector-Borne Diseases

Mosquitoes and other arthropods are known to be carriers of many serious diseases. Arthropod-borne viruses ("arboviruses") are viruses that are transmitted by blood-feeding arthropods, such as mosquitoes and ticks, when they bite susceptible humans and animals. There are four main virus agents of encephalitis in the United States: eastern equine encephalitis, western equine encephalitis, St. Louis encephalitis, and La Cross encephalitis, all of which are transmitted by mosquitoes. Most human infections are asymptomatic or result in nonspecific flu-like symptoms such as fever, headache, nausea, and tiredness. However, infection may lead to encephalitis, an inflammation of the brain, with a fatal outcome or permanent neurologic damage in a small proportion of infected persons. West Nile Virus (WNV) is closely related to the SLE virus and causes similar symptoms.

Of these diseases, only the WNV was reported in California in 2015. One hundred and twenty five cases of WNV were reported in Riverside County and 729 cases were reported in the state during 2015 (USGS 2015).

Valley Fever

Coccidioidomycosis, commonly known as valley fever, is primarily a disease of the lungs that is common in the southwestern U.S. and northwestern Mexico. Valley fever is caused by the fungus *Coccidioides*, which grows in soils in areas of low rainfall, high summer temperatures, and moderate winter temperatures. These fungal spores become airborne when the soil is disturbed by winds, construction, farming, and other activities. In susceptible people and animals, infection occurs when a spore is inhaled. Valley fever symptoms generally occur within 3 weeks of exposure. Valley fever is not a contagious disease, that is, people do not contract the disease from each other, and secondary infections are rare.

Riverside County has an average annual incidence rate for valley fever of 2.2 to 3.9 cases per 100,000 people for the years 2007 to 2011 (MacLean 2014), which is relatively low compared to the highest incidence rate for California in Kern County, with an average annual incidence rate of 205.1 cases per 100,000 people for the years 2009 to 2012 (CDPH 2016). The Blythe area was identified as being endemic for valley fever as early as the 1940s (Maclean 2014).

People working in certain occupations such as construction, agriculture, and archaeology have an increased risk of exposure and disease because these jobs result in the disturbance of soils where fungal spores are found. Valley fever infection is highest in California from June to November. In addition, many domestic and native animals are susceptible to the disease, including dogs, horses, cattle, coyotes, rodents, bats, sea otters, lizards, and snakes. Most valley fever cases are very mild. It is estimated that 60 percent or more of infected people either have no symptoms or experience flu-like symptoms and never seek medical attention. The disease has 1.3% mortality rate in California (CDPH 2016).

3.9.1.3 Transmission Line Safety and Nuisance

The potential receptors for hazards associated with transmission line safety and nuisance would be the same as those associated with hazardous materials. The closest resident is located approximately 0.7 miles north of the Project. Two other residences are located approximately one mile north of the Project, on the southwest corner of the Nichols Warm Springs/Mesa Verde community, which is a community of approximately 300 single family homes and mobile homes. The remainder of the residences in Nichols Warm Springs/Mesa Verde, including the Mesa Verde Park and Roy Wilson Community and Child Center, are located just outside of the 1-mile boundary. No schools, hospitals, or long-term care facilities are located within one mile of the proposed Project (URS 2015).

3.9.1.4 Emergency Response

The Office of Emergency Services maintains two fully functional emergency operations centers in the cities of Riverside and Indio for coordination of response and recovery to extraordinary emergencies and disasters affecting Riverside County. The Riverside County Operational Area Emergency Operations Plan (RCFD 2006) addresses the planned response to extraordinary emergency situations associated with natural disasters, technological incidents, and national security emergencies in or affecting Riverside County and establishes the framework for coordinating various Riverside County departments and other agencies in their emergency response activities.

The 2010 California Fire Code and 2010 CBC regulate and govern the safeguard of life and property from fire and explosion hazards arising from the storage, handling, and use of hazardous substances, materials, and devices and from conditions hazardous to life or property in the occupancy of buildings and premises. Accordingly, emergency services access roads must be installed and made serviceable prior to and during the time of construction. The grade of the fire department access road must be within the limits established by the Fire Chief and may not exceed 15 percent.

3.9.1.5 Airport Operations

The Blythe Airport is located approximately 1.5 miles northeast of the proposed solar facility site. The airport is a public facility, owned by Riverside County. The 3,094-acre facility is the largest airport serving eastern Riverside County and serves primarily general aviation demand in the Blythe area. The Airport is classified in the National Plan of Integrated Airport Systems as a general aviation transport airport, designed to accommodate business jets, cargo-type aircraft, light private planes, and flight school training activities. The Blythe Airport currently has two runways (8/26 and 17/35). The primary runway is Runway 8/26, which is oriented generally east-west. Aircraft operations average 69 flights per day (AirNav 2016). The airport is often used as a base for crop spraying operations, flight rental, and flight instruction.

The Project would be partially located within the area covered by the Riverside County Airport Land Use Compatibility Plan (RCALUCP), which was adopted by the Riverside County ALUC and replaced the compatibility plans for individual airports. The RCALUCP identifies Airport Influence Areas (AIAs) to protect the public from the adverse effects of aircraft noise, ensure that facilities and people are not concentrated in areas susceptible to aircraft accidents, and ensure that no structures or activities adversely affect or encroach upon the use of navigable airspace (ALUC 2004).

The Project would be partially located within the Blythe AIA. According to the RCALUCP, electrical facilities (such as power plants, electrical substations, and transmission lines) located in airport land use compatibility zones must meet the restrictions designated for each zone so that they are generally compatible or potentially compatible. This is to ensure that electrical facilities do not create obstructions to the navigable air space and safe operations at the airport. Land uses that create hazards to air navigation are prohibited in all Airport Land Use Compatibility Zones. Such hazards include physical (e.g., tall objects), visual, and electronic forms of interference with the safety of aircraft operations. Land uses that may increase the attraction of birds to the area are also prohibited. Potential hazards to aviation from solar energy projects located in sufficient proximity to airports include potential electromagnetic interference from the power plant and transmission lines, potential glare from the PV panels used to collect solar energy, and bird attraction from ponds.

The airport land use compatibility zones within the Project area are illustrated in Figure 3.9-1. As shown in Figure 3.9-1, a portion of the Project area would fall within airport Compatibility Zone E (ALUC 2012). The compatibility criteria of projects with Compatibility Zone E are shown in Table 3.9-1. In Zone E, airspace review is required for structures greater than 100 feet in height, but there are no other specific land use restrictions. The provisions of Part 77 of the FAA Regulations govern whether a proposed project requires the submittal of Form 7460-1 to the FAA for preparation of an aeronautical study. Portions of a transmission line that are not in an AIA still could potentially be subject to FAA review through the Form 7460-1 process if within 20,000 feet (3.8 miles) of a runway, especially if located at a higher elevation than the runway.

Yuma Proving Ground is located approximately 47 miles from the Project site, and is the site of military air navigation activities. Appendix E of the DRECP (BLM 2016) states that "photovoltaic systems on or near SUAs [Special Use Airspace] or MTRs [Military Training Routes] present little to no conflict to military operations, testing, or training."

Table 3.9-1. Basic Compatibility Criteria with Compatibility Zone E

Zone	Locations	Maximum Densities/Intensities (People per Acre)		Required Open Land	Prohibited Uses	Other Development Conditions
		Average	Single Acre			
E	Other Airport Environs	No Limit	No Limit	No Requirement	Hazards to flight	• Airspace review required for objects >100 feet tall • Major spectator-oriented sports stadiums, amphitheaters, concert halls discouraged beneath principal flight tracks

Source: Riverside County Airport Land Use Compatibility Plan Policy Document Table 2A, October 2004.

Notes:

1 - Usage intensity calculations shall include all people (e.g., employees, customers/visitors) who may be on the property at a single point in time, whether indoors or outside.

2 - The total number of people permitted on a project site at any time, except rare special events, must not exceed the indicated usage intensity times the gross acreage of the site. Rare special events are ones (such as an air show at the airport) for which a facility is not designed and normally not used and for which extra safety precautions can be taken as appropriate.

3 - Clustering of nonresidential development is permitted. However, no single acre of a project site shall exceed the indicated number of people per acre.

4 - Open land requirements are intended to be applied with respect to an entire zone. This is typically accomplished as part of a community general plan or a specific plan, but may also apply to large (10 acres or more) development projects.

5 - The uses listed here are ones that are explicitly prohibited regardless of whether they meet the intensity criteria. In addition to these explicitly prohibited uses, other uses will normally not be permitted in the respective compatibility zones because they do not meet the usage intensity criteria.

6 - As part of certain real estate transactions involving residential property within any compatibility zone (that is, anywhere within an airport influence area), information regarding airport proximity and the existence of aircraft overflights must be disclosed. This requirement is set by state law.

3.9.1.6 Intentionally Destructive Acts

The number and high profile of international and domestic terrorist attacks during the last decade presents a new and realistic threat to the safety and security of the people of the U.S., infrastructure, and resources. There is a potential for intentional destructive acts, such as sabotage or terrorism events, to cause impacts to human health and the environment. As opposed to industrial hazards, collisions, and natural events, where it is possible to estimate event probabilities based on historical statistical data and information, it is not possible to accurately estimate the probability of an act of terrorism or sabotage; therefore, related analysis generally focuses on the consequences of such events. In general, the consequences of a sabotage or terrorist attack on a solar facility would be expected to be similar to accidental and natural events that could result in an interruption of power service, fire, or hazardous materials release.

The energy generation sector is one of 14 areas of Critical Infrastructure listed by the U.S. Department of Homeland Security. Nearly all of the other areas of Critical Infrastructure are reliant, at least in part, on the energy sector. The level of security needed for any particular facility depends on the threat imposed, the likelihood of an adversarial attack, the likelihood of success in causing a catastrophic event, and the severity of consequences of that event.

The Department of Homeland Security Interim Final Rule setting forth Chemical Facility Anti-Terrorism Standards (6 CFR Part 27) requires facilities that use or store certain hazardous materials to conduct vulnerability assessments and implement certain specified security measures. Although the proposed facility would not be covered by the standards, the BLM's position is that the Applicant should implement a minimum level of security consistent with the Standards. The DOE published a draft Vulnerability Assessment Methodology for Electric Power Infrastructure in 2002 (DOE 2002). Energy sector members also are leading a significant voluntary effort to increase planning and preparedness, including infrastructure protection and cyber security. The North American Electric Reliability Corporation (NERC) has established a Critical Infrastructure Protection Program to coordinate and improve physical and cybersecurity for the bulk power system of North America as it relates to reliability (NERC 2014).

3.9.1.7 Abandoned Mine Lands

The Applicant's Phase I Environmental Site Assessment did not identify any abandoned mine lands within one mile of the Project site.

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3.10 Lands, Realty, and Agricultural and Forestry Resources

This section describes the environmental setting and regulatory framework in regards to land use and planning for the Project and alternatives. The environmental setting described includes current land activities, land ownership, and land use designations in adopted land use plans and policies.

Land uses within the Project site are managed by the BLM and are governed by the CDCA Plan, which is based on the concepts in the FLPMA. Specifically, the purpose of the CDCA Plan is to "provide for the immediate and future protection and administration of the public lands in the California desert within the framework of a program of multiple use and sustained yield, and the maintenance of environmental quality." The principle of multiple use is defined in the FLPMA §103(c) as follows:

> *The term "multiple use" means the management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and non-renewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output.*

A portion of the Project is located within BLM Utility Corridor J, the Project borders Corridor K, and the entire Project site is located within the Riverside East Solar Energy Zone (SEZ). BLM-administered lands are not zoned, and may be encumbered by easements, rights-of-way (ROWs), mining claims, and permits. Information regarding BLM ROW authorizations and easements were obtained from the Land & Mineral Legacy Rehost 2000 System of automated records (LR2000; BLM 2016). Applicable Federal land use plans include the CDCA Plan (BLM 1980), as amended, and the Northern and Eastern Colorado Desert Coordinated Management Plan (BLM 2002). The CDCA Plan was amended by the Approved Resource Management Plan Amendments/Record of Decision for Solar Energy Development in Six Southwestern States (Western Solar Plan) (BLM and DOE 2012) to identify all SEZ lands within the CDCA as sites associated with power generation or transmission.

Applicable local land use plans for lands around the Project site include the General Plans and Zoning Ordinances/Codes for Riverside County and the Riverside County ALUCP. The Project area is located outside the City of Blythe's General Plan area. Portions of the Project area are located within Blythe Airport compatibility Zone E. Please see Section 3.9, *Hazards and Hazardous Materials*, for a discussion of compatibility with the ALUCP.

3.10.1 Environmental Setting

3.10.1.1 Regional Setting

The Project area is located on the Palo Verde Mesa, a portion of the Palo Verde Valley on the western edge of the Colorado River in the Colorado Desert. The topography on the Palo Verde Mesa is relatively flat and slopes toward the southeast. Elevations range from 260 to 400 feet above mean sea level (amsl). The Project area is near the Big Maria Mountains on the northeast, the McCoy Mountains on the northwest, the Mule Mountains on the southwest, and the Colorado River on the east. Development in the surrounding area consists of open space, rural residences, the Blythe Airport, the Blythe Generating Plant, electrical transmission lines, and commercial businesses. The Project area includes undeveloped open desert that is managed by the BLM (see Figure 1-1). The Project area would be located approximately nine miles west of the Colorado River and 37 miles east of Desert Center. The Project would be located south of I-10 and west of State Route 78.

3.10.1.2 General Characteristics

The Project would be located primarily on BLM-administered lands in eastern Riverside County (see Figure 3.10-1). The BLM portion of the site currently consists of vacant and undeveloped desert land. The private land parcel is the site of a former jojoba farm. Development in the surrounding area includes the City of Blythe to the northeast. The Project encompasses BLM-administered land within Sections 3-7, 9-15, and 22-24, Township 7 South, Range 21 East, San Bernardino Base and Meridian.

3.10.1.3 Land Ownership/Management

BLM Land Use Designations

CDCA Plan

The CDCA encompasses 25 million acres in southern California designated by Congress in 1976 through the FLPMA. The BLM manages about 10 million of those acres. Congress directed the BLM to prepare and implement a comprehensive long-range plan for the management, use, development, and protection of public lands within the CDCA. The CDCA Plan (BLM 1980, as amended) is based on the concepts of multiple-use, sustained yield, and maintenance of environmental quality. The CDCA Plan provides overall regional guidance for BLM-administered lands in the CDCA and establishes long-term goals for protection and use of the California desert.

The CDCA Plan developed a classification system that places BLM-administered public lands in the CDCA into one of four Multiple-Use Classes, based on the sensitivity of the resources and types of uses for each geographic area. The Project site is classified as MUC-M (Moderate Use) in the CDCA Plan. Multiple-Use Class M (Moderate Use) is based upon a controlled balance between higher-intensity use and protection of public lands. This class provides for a wide variety of present and future uses such as mining, livestock grazing, recreation, energy, and utility development. Class M management is also designed to conserve desert resources and to mitigate damage to those resources that permitted uses may cause.

As discussed in Section 1.6.2 and Appendix E, the DRECP replaced Multiple Use Classes with a different system of land use and conservation classifications. However, because the DQSP is not subject to the land use planning decisions made under the DRECP, the requirements of Multiple-Use Class M still apply to the application.

Western Solar Plan

As discussed in Section 1.6, the Project area is located within the Riverside East Solar Energy Zone (SEZ). The Riverside East SEZ was designated through the Final Solar PEIS (also known as the Western Solar Plan) (BLM and DOE 2012). A SEZ is defined by the BLM as “an area well-suited for utility-scale production of solar energy within which the BLM will prioritize and facilitate utility-scale production of solar energy and associated transmission infrastructure development”. The Western Solar Plan and ROD recognize the DQSP as a “pending” ROW application (Western Solar Plan §9.4.22.2, p. 9.4-133). Pending applications like the DQSP are not subject to the land use planning decisions in the Western Solar Plan ROD (Western Solar Plan ROD Section B.1.2) or to the CDCA Plan amendments made in that decision.

Desert Renewable Energy Conservation Plan

BLM issued the DRECP in September 2016. The DRECP amends the CDCA Plan, specifically with respect to natural resource conservation and renewable energy development. The DRECP establishes Ecological and Cultural Conservation and Recreation Designations, and Renewable Energy Activities, Policies, and Allocations. These land use designations replace the Multiple-Use Classes that were previously in effect under the CDCA Plan. In addition, the DRECP establishes Visual Resource Management (VRM) Classifications.

In the DRECP, the Project site is designated as a Development Focus Area (DFA), which is an area where activities associated with solar, wind, and geothermal energy are allowed, streamlined, and incentivized. The DRECP also designates the Project area as VRM Class IV.

Because the application is not subject to the land use planning decisions in the DRECP, the Project is evaluated within the context of the multiple-use class designations of the CDCA Plan. The Project site is classified as Multiple Use Class M (Moderate Use) in the CDCA Plan. The Moderate Use classification is based upon a controlled balance between higher intensity use and protection of public lands. This class provides for a wide variety of present and future uses such as mining, livestock grazing, recreation, energy, and utility development. Class M management is also designed to conserve desert resources and to mitigate damage to those resources which permitted uses may cause.

Donated Lands

The BLM can be the recipient and trustee of land donated by individuals or groups. Often such lands are donated with the express interest of preserving the resources that characterize these lands. In so doing, a restrictive instrument such as a conservation easement or deed restriction is attached to the donation and land that would control its use, often in terms of prohibiting development or change to the landscape. There is no record of such a donation and accompanying restrictive instrument associated with the Project site.

Riverside County

The 160 acre privately-owned inholding within the Project site is under Riverside County jurisdiction, and land uses are governed by Riverside County plans and policies.

3.10.1.4 Existing Uses

On-Site Land Uses

The Project would be situated south of I-10, a major regional transportation corridor extending east-west through the area. The site is located generally west of Neighbors Boulevard, off of 16th Avenue/Seeley Boulevard. The Project site is located within unincorporated Riverside County, primarily on undeveloped BLM-managed lands. The proposed 450 MW PV electrical generating facility and 2.79-mile gen-tie line to the CRSS would occupy a total of 3,616 acres of BLM-managed lands and 154 acres of private land. The portion of the Project area located on BLM land is currently undeveloped. The 160-acre private parcel was previously the location of a jojoba farm.

The current BLM easements and rights-of-way on and adjacent to the Project site are listed in Table 3.10-1. The Project site is situated just outside of the intersection of two designated utility corridors, so it bounded on its northern, southwestern, and southeastern sides by linear ROWs, including transmission line, pipelines, communications lines, and roads. On December 16, 2014, the BLM sent letters to the existing ROW holders notifying them of the Project.

Table 3.10-1. Existing Easements and ROWs On and Adjacent to Project Site

Owner	Location Relative to the Preferred Project Site	Use(s)	Width (feet)	BLM Serial File Number
Western Area Power Administration	Adjacent to southeastern border of Project site.	Access Road	50 ft	CAAZLA 77757
Imperial Irrigation District	Adjacent to southeastern border of Project site.	Nyland Blythe transmission line	50 ft	CACA-008974
Southern California Edison	Adjacent to southwestern border of Project site.	Devers-Palo Verde 1 transmission line	100 ft	CA 04163
Southern California Edison	Adjacent to southwestern border of Project site.	Devers-Palo Verde 2 transmission line	130 ft	CA 17905
Imperial Irrigation District	Within CRSS	Desert Southwest transmission line	NA	CA 044491
Southern California Edison	Within CRSS	Transmission line	NA	CA 053059
SCE	Within CRSS	Transmission line	20	CA 020241
Frontier Communications of the Southwest	Adjacent to southeastern border of Project site.	Underground telephone line	10 ft	CA 21597
FPL Energy Cabazon Wind, LLC	Adjacent to southwestern border of Project site.	Transmission line	95 ft	CA 46331
North Baja Pipeline, LLC	Adjacent to southeastern border of Project site.	30 inch oil and gas pipeline	NA	CA 42662
Palo Verde Irrigation District	Blanket easement throughout T 7S, R 21E, which overlaps the Project site.	Build, construct, and maintain telephone line and irrigation ditches	NA	CA 106688

Table 3.10-1. Existing Easements and ROWs On and Adjacent to Project Site

Owner	Location Relative to the Preferred Project Site	Use(s)	Width (feet)	BLM Serial File Number

Source: BLM LR2000

The portion of the Project area located on BLM land is currently undeveloped. The Project site is a relatively flat area on the Palo Verde Mesa. The Palo Verde Mesa region is located to the north of the Mule Mountains; east of the Chuckwalla Valley; approximately 9 miles west of the Colorado River; and south of the McCoy Mountains and the Big and Little Maria Mountains. There are no Wilderness Areas, Areas of Critical Environmental Concern (ACECs), Desert Tortoise ACECs, or Wildlife Habitat Management Areas (WHMAs) within or adjacent to the solar plant site. The Mule Mountains ACEC is located less than one mile southwest of the Project boundary.

The 160-acre private parcel was previously the location of a jojoba farm. The private parcel is currently zoned Controlled Development Areas (W-2-10) (10-acre minimum) (Riverside County 2015b).

Prime Farmland, Unique Farmland, or Farmland of Statewide Importance are not present in the Project area. Williamson Act contracts are also not present (California Department of Conservation 2012; 2014). No forestlands, timberlands, or timberland zoned Timberland Production occur within the Project area.

Surrounding Land Uses

The land adjacent to the Project area includes the 200 acre, 21 MW, NRG-owned solar project which shares a boundary approximately 0.75 miles long on the northeast side of the Project area. The recently-approved 485 MW, 3,660 acre Blythe Mesa Solar Project (BMSP) is also adjacent to the Project on its eastern side.

The existing Devers-Palo Verde Transmission Line Number 1 (DPV1) and DPV2 form the southwestern boundary of the Project site, and an additional transmission line, the Ten West Link, is proposed in that same location. The 7.5 MW, 200 acre NRG Blythe PV Solar Power Plant is located adjacent to the northern boundary of the Project site. A portion of the 485 MW, 3,660 acre BMSP, approved by the County in 2014 and by the BLM in 2015, is located on a parcel of land which is surrounded on three sides, the north, west, and south, by the Project site.

Two gen-tie lines are already authorized by BLM within the Corridor K/30-52, which runs roughly in parallel with the alignment of 16th Avenue/Seeley Avenue along the southern edge of Sections 3 and 4, T 7S, R 21E, San Bernardino Base and Meridian. The ROW for the gen-tie line for the BMSP was approved by BLM in August, 2015 (CACA-05313), but has not yet been constructed. A portion of this ROW crosses the northern portion of the DQSP filing area. The gen-tie line for the MSEP is co-located with that for the BSPP. These gen-tie lines share a single set of poles.

Other land uses in the area include the unincorporated community of Mesa Verde/Nicholls Warm Springs, Blythe Airport, Blythe Energy Center, Blythe Substation, CRSS, ancillary agricultural facilities, and dirt roads.

The residential development known as Nicholls Warm Springs/Mesa Verde is located approximately 4,800 feet north of the northeast corner of the Project site boundary. This community is mainly composed of single-family dwellings and mobile homes. A small number of dispersed farm and rural residences are located near the solar facility, mostly located to the north and east. The nearest residence is located approximately 3700 feet north of the proposed solar facility.

The Blythe Airport is located 1.5 miles northeast of the Project site. Commercial uses are located at the highway interchange south of the Airport, on the north side of I-10. The 3,904-acre airport is the largest in eastern Riverside County and serves general aviation demand in the Blythe area. The airport is classified as a general aviation transport airport, designed to accommodate business jets, cargo type aircraft, light private planes, and flight school training activities (Riverside County 2015b). The Blythe Airport currently has two runways (8/26 and 17/35). The primary runway is Runway 8/26, which is oriented generally east-west. The airport is a public facility, owned by Riverside County and leased by the City of Blythe. The airport is often used as a base for crop spraying operations, flight rental, and flight instruction (Riverside County Airport Land Use Commission 2004; Riverside County 2015b). Aircraft operations average 69 per day (AirNav.com 2015). The Blythe Airport has been designated as a County redevelopment area with the intent to encourage expansion of airport facilities and commercial and industrial development at the airport (Riverside County Redevelopment Agency 1988).

The area is also served by a spur line of the Arizona and California Railroad, I-10, and two state highways. State Highway 95 runs north from Blythe to Needles and Las Vegas. State Highway 78 traverses the desert southwest from Blythe to the Imperial Valley.

Table 3.10-2 summarizes the existing land uses and general and area plan land use designations for the Project and surrounding area.

Table 3.10-2. Surrounding Land Uses and Designations

Direction from Project Site	Existing Land Use	Existing Land Use Designation
North	Open Space	Agriculture
		Medium Density Residential
		Open Space Rural
East	Open Space	Agriculture
		Rural Residential
South	Open Space	Open Space Rural
West	Open Space	Open Space Rural

Source: Riverside County 2015b.

Utility Corridors

The CDCA Plan identifies "planning" and "contingency" utility corridors on BLM-administered land. One of the broad goals of the BLM system of utility corridors is to implement the network of joint-use planning corridors to meet projected utility needs. The CDCA Plan designates utility corridors for "multi-modal use," allowing the following types of facilities:

- New electrical gen-tie towers and cables of 161 kV or above;
- all pipelines with diameters greater than 12 inches;
- coaxial cables for interstate communications; and
- major aqueducts or canals for interbasin transfers of water.

Numerous authorized and proposed BLM ROWs are located adjacent to the Project site. The relationship of the Project site to designated utility corridors is shown in Figure 3.10-2. The Project site partially overlies two CDCA-designated corridors. Corridor J, a 2-mile-wide, north-south corridor is on the eastern edge of the Project site, and Corridor K, a 2- to 4-mile-wide, east-west corridor is parallel to the northern boundary of the Project site. Additionally, Section 368 of the EPAct (Public Law 109-58) requires the DOI to examine and designate energy transportation corridors in the West. In response, the BLM issued the "*Approved Resource Management Plan Amendments/Record of Decision (ROD) for Designation of Energy Corridors on Bureau of Land Management-Administered Lands in the 11 Western States*" (January, 2009) which designated Section 368 Corridors in the western United States. Section 368 corridors are identified with a numeric designation and are often overlain on locally designated corridors. In the Project area, the 2-mile wide, east-west Section 368 Corridor 30-52 overlies Corridor K.

Two gen-tie lines are already authorized by BLM and installed within the Corridor K/30-52, which runs roughly in parallel with the alignment of 16th Avenue/Seeley Avenue along the southern edge of Sections 3 and 4, T 7S, R 21E. The ROW for the gen-tie line for the BMSP was approved by BLM in August, 2015 (CACA-05313). This ROW crosses the northern portion of the DQSP filing area. The gen-tie line for the MSEP is co-located with that for the BMSP, occupying the same set of poles.

In addition to the two CDCA-designated corridors on the northern and eastern boundaries of the Project area, the southwestern boundary of the Project area is also paralleled by transmission lines, including the existing DPV1 and DPV2 lines, and the proposed Ten West Link.

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3.11 Mineral Resources

This section discusses mineral resources relevant to the proposed DQSP. The study area for the purpose of assessing direct effects on mineral resources includes the footprint of the Project because the area would be unavailable for mineral exploration and/or extraction during the 30-year term of the BLM ROW grant. The study area for indirect effects on minerals would be any land area for which future mineral resource exploration or extraction would be precluded by Project-related closure or blockage of public roads or access routes.

3.11.1 Environmental Setting

Riverside County contains diverse mineral resources, which include extensive deposits of clay, limestone, iron, sand, and aggregates. Geologic and economic factors restrict mining operations to the relatively few locations where mineral extraction is feasible.

The BLM groups minerals on Federal lands into three distinct categories: (1) locatable resources (subject to the General Mining Law of 1872, as amended); (2) leasable resources (subject to various Mineral Leasing Acts); and (3) mineral materials resources (subject to disposal (contract sale or free-use permit) under the Materials Act of 1947, as amended) (BLM 2011). Locatable minerals include metals such as gold, silver, copper and zinc, and certain non-metallic mineral resources including high-grade limestone, gypsum, and gems and semi-precious stones. Leasable minerals include oil, gas, coal, potash, salt and geothermal resources. Mineral materials include common variety of earth materials such as sand, stone, and gravel (BLM 2010). Review of available BLM records has determined there are no active mining claims, mineral leases or disposals of mineral materials within the Project Area. There is no record of any previous or current BLM authorization for mineral production within the project area.

The State Mining and Geology Board (SMGB) have established Mineral Resource Zones (MRZs) to designate lands that contain mineral deposits, and the state has also designated Aggregate Mineral Resource areas. The Project site is designated as MRZ-4, an area where there is not enough information available to determine the presence or absence of mineral deposits. The state also designates Aggregate Mineral Resource areas within Riverside County. These designated areas are in the southwestern part of the County, and are not found on or near the Project site (Riverside County 2015a).

The Palo Verde Area Plan does not designate any areas within its boundaries for Open Space – Mineral Resources (Riverside County 2015b).

The Project area is underlain by sand and gravel, which could potentially represent a source of saleable minerals or mineral materials if local demand for construction aggregate is sufficient. Sand and gravel deposits are ubiquitous throughout the Quaternary geologic deposits in the vicinity of the Project area and the region.

The Mineral Resources Data System (MRDS), administered by the USGS, provides data to describe metallic and nonmetallic mineral resources, including deposit name, location, commodity, deposit description, production status and references. According to review of the MRDS online database, metallic resources and occurrences (such as gold, silver, manganese, and copper) are located in the Mule Mountains to the southwest, but metallic resources are not located in the Project area (USGS 2016).

A review of the California Department of Conservation, Division of Oil, Gas, and Geothermal Resources, indicates that oil, gas, or geothermal resources are not present within or in the vicinity of the Project area (DOGGR 2016). The State Division of Oil and Gas does not report any significant or active oil or gas production in the County (Riverside County 2015a).

The use of the site for rockhounding is addressed in Section 3.14.

3.12 Noise

This section describes the environmental setting in regards to noise for the proposed Project and alternatives.

3.12.1 Environmental Setting

3.12.1.1 General Information on Noise

Noise can be defined as unwanted sound. Human response to noise is most commonly expressed as an annoyance, the level of which may be affected by the amplitude (intensity or energy content) of the noise, its frequency (pitch), its duration of exposure, and/or its recurrence. Environmental noise is measured in decibels (dB). The A-weighted decibel scale (dBA) is used to approximate the range of sensitivity of the human ear to sounds of different frequencies. A noise level is a measure of noise at a given instance in time. A change in level of at least 5 dBA is noticeable to most people, and a 10-dBA increase is judged by most people as a doubling of the sound level. Typical noise sources and noise environments for common indoor and outdoor activities are listed in Table 3.12-1.

Table 3.12-1. Typical Noise Sources and Noise Environments

Common Outdoor Activities	Noise Levels (dBA)	Common Indoor Activities
Jet Fly-over at 1,000 feet	110-120	Rock Band
Gas Lawn Mower at 3 feet	90-100	N/A
Diesel Truck at 50 feet, at 50 mph	80-90	Food Blender at 3 feet
Commercial Area, Gas Lawn Mover at 100 feet	70	Vacuum Cleaner at 10 feet
Heavy Traffic at 300 feet	60	Normal Speech at 3 feet
Quiet Urban Area (daytime)	40-50	Large Business Office
Quiet Urban Area/Suburban Nighttime	30-50	Theater, large Conference Room (background)
Quiet Rural Nighttime	20-30	Library, Bedroom at Night, Concert Hall (background)
N/A	20-10	Broadcast/Recording Studio

Source: Caltrans 2009.
mph = miles per hour
N/A = not available

The decibel scale is based on logarithms, and two noise sources do not combine in a simple additive fashion; rather, they combine logarithmically. For example, if two identical noise sources produced noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

Noise Exposure and Community Noise

Community noise is primarily the product of many distant noise sources, which change gradually throughout a typical day. During the nighttime, exterior background noises are generally lower than the daytime levels. Most household noise also decreases at night and exterior noise becomes more noticeable. Further, most people sleep at night and are more sensitive to noise intrusion during evening and nighttime hours. To account for human sensitivity to noise levels at differing times of day, the Community Noise Equivalent Level (CNEL) was developed. CNEL is a noise index that accounts for the greater annoyance of noise during the evening and nighttime hours. CNEL values are calculated by averaging hourly Leq (equivalent continuous noise level) sound levels for a 24-hour period, and apply a weighting factor to evening and nighttime Leq values. To account for the fluctuation in noise levels over time, noise impacts are commonly evaluated using time-averaged noise levels. The weighting factor, which reflects increased sensitivity to noise during evening and nighttime hours, is added to each hourly Leq sound level before the 24-hour CNEL is calculated. For the purposes of assessing noise, the 24-hour day is divided into three time periods with the following weighting:

- Daytime: 7 a.m. to 7 p.m., weighting factor of 0 dB
- Evening: 7 p.m. to 10 p.m., weighting factor of 5 dB
- Nighttime: 10 p.m. to 7 a.m., weighting factor of 10 dB

Effect of Noise

People experience a wide range of sounds in the environment. Excessive noise can be not only undesirable, but may also cause physical and/or psychological damage. The amount of annoyance or damage caused by noise is dependent primarily upon the amount and nature of the noise, the amount of ambient noise present before the intruding noise, and the activity of the person working or living in the area. Environmental and community noise levels rarely are of sufficient intensity to cause irreversible hearing damage, but disruptive environmental noise can interfere with speech and other communication and be a major source of annoyance by disturbing sleep, rest, and relaxation.

Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, the higher noise levels nevertheless are considered to be adverse to public health. The surrounding land uses dictate what noise levels would be considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments tend to be about 7 dB lower than the corresponding daytime levels. In rural areas away from roads and other human activity, the day-to-night difference can be considerably less. Areas with full-time human occupation that are subject to nighttime noise are often considered objectionable because of the likelihood of disrupting sleep. Noise levels above 45 dBA at night can result in the onset of sleep interference effects. At 70 dBA, sleep interference effects become considerable (USEPA 1974).

In some cases, noise can also disrupt the normal behavior of wildlife. Although the severity of the effects varies depending on the species being studied and other conditions, research has found that wildlife can suffer adverse physiological and behavioral changes from intrusive sounds and other human disturbances (National Park Service [NPS] 2009).

Noise Attenuation

Sound level naturally decreases as one moves farther away from the source. The ground surface (reflective or absorptive) is also a factor in the sound levels. Point sources of noise, such as stationary mobile equipment or on-site construction equipment, attenuate (lessen) at a rate of 6.0 dBA per doubling of distance from the source when in an area with a reflective ground surface (e.g., parking lots). In areas where the ground is absorptive (e.g., soft dirt, grass, or scattered bushes and trees), noise attenuation from a point source is 7.5 dBA for each doubling of distance due to ground absorption (Caltrans 1998).

Widely distributed noises, such as a street with moving vehicles (a "line" source), typically would attenuate at a lower rate of approximately 3.0 dBA for each doubling of distance between the source and the receiver. If the ground surface between source and receiver is absorptive, the excess ground attenuation rate would be 4.5 dBA for each doubling of distance (Caltrans 1998).

Noise from large construction sites would have characteristics of both "point" and "line" sources, so attenuation would generally range between 4.5 and 7.5 dBA per doubling of distance. Noise attenuation rates for both line and point sources of noise may also be influenced by atmospheric effects, such as wind and temperature gradients. Trees and vegetation, buildings, and barriers reduce the noise level that would otherwise occur at a given receptor distance.

Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as a maximum instantaneous peak of the vibration signal and is typically expressed in units of inches per second (in/sec). The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is the average of the squared amplitude of the signal. Decibel notation (VdB) is commonly used to measure RMS. The decibel notation acts to compress the range of numbers required to describe vibration. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration.

3.12.1.2 Project Setting

The Project setting and ambient noise conditions were provided in the Applicant's Noise Technical Report (URS 2015, provided in Appendix R). The Project site is located in the Colorado Desert in eastern Riverside County. Most of the surrounding land is covered by desert scrub. The site is approximately 2.75 southwest of the City of Blythe and just south of I-10. The land use of the Project site is undeveloped open space, and the surrounding land uses include undeveloped open space and agriculture.

Sensitive Receptors

In general, residences, schools, hotels, hospitals, and nursing homes are considered to be the most sensitive to noise. Places such as churches, libraries, and cemeteries are also sensitive to noise. Commercial and industrial uses are considered the least noise-sensitive.

The nearest noise sensitive receptors are shown illustrated in Figure 3.12-1, along with the 11 locations were ambient noise levels were measured. There are no residences within 0.5-mile of the Project area. The nearest noise sensitive receptor (NNSR) is located approximately 4,800 feet north of the northeastern Project boundary (where it coincides with 16th Avenue/Seeley Avenue) in between the Project site and the community of Nicholls Warm Springs/Mesa Verde. The receptor appeared to be an occupied mobile home/trailer at the time of the field reconnaissance in August 2014. The next two closest potentially affected sensitive receptors are located approximately 4,800 feet (ST03 and ST05) from the Project site's northeast boundary, respectively. These two locations are representative of the homes in the community of Nicholls Warm Springs/Mesa Verde closest to the northeastern site boundary. No schools, hospitals, libraries, or convalescent homes are located within one mile of the proposed Project.

Existing Ambient Noise Conditions

The primary noise sources in the proposed Project area are traffic from I-10 and nearby roadways; airplane noise from the Blythe Airport; sounds from the agricultural operations; sounds emanating from neighborhoods (e.g., voices, radio and television broadcasts); and naturally occurring sounds (e.g., winds, wind-generated noises).

I-10 is a major transportation artery and the primary noise source in the area. Noise measurements within 300 feet of I-10 range from 65 dBA to levels exceeding 82 dBA caused by the passage of heavy trucks. During peak use periods, traffic noise levels can range from 80 to 90 dBA at 50 feet from the shoulder of the interstate. State Route 78 experiences lower traffic volumes and vehicle speeds and therefore likely has somewhat lower associated noise levels. Agricultural activities are conducted on land near the proposed Project boundary. Noise associated with farming activities includes that generated by heavy equipment used for cultivation and harvesting. Maximum noise levels associated with farm equipment typically range from 75 to 85 dBA at a distance of 50 feet. Noise impact contours for the Blythe Airport range from 65 CNEL, 60 CNEL, to 55 CNEL. The most stringent noise contour boundary (55 CNEL) is approximately 1,000 feet from the runways (RCALUCP 2004).

In August, 2014, the Applicant measured existing outdoor ambient sound levels at a set of 11 representative receiver locations for 20 minutes at each location. The dominant noise source at and around the vicinity of the site is vehicular traffic from local roadways and I-10. Noise levels ranged from 39 to 63 dBA (Table 3.12-2). Locations within Blythe (ST07 and 08), closer to I-10 (ST04, 06, 10) and along 16th Avenue/Seeley Avenue (ST09) generally had higher ambient noise levels than sites within or south of Nicolls Warm Springs/Mesa Verde and closer to the Project area (ST03, 05, 11).

Table 3.12-2. Short-Term Sound Level Measurement Results[1]

Measurement Location[2]	Date (m/dd/yyyy)	Start Time (hh:mm)	Stop Time (hh:mm)	Duration (Minutes)	Leq (dBA)
ST01	8/19/2014 8/19/2014	18:20 23:17	18:40 23:37	20 20	44 41
ST02	8/19/2014 8/19/2014 8/20/2014	18:47 23:43 11:59	19:07 00:03 12:19	20 20 20	45 46 45
ST03	8/19/2014 8/20/2014	22:46 10:59	23:06 11:19	20 20	39 39
ST04	8/20/2014	11:29	11:49	20	52
ST05	8/20/2014	12:29	12:49	20	40
ST06	8/20/2014	12:58	13:18	20	63
ST07	8/20/2014	14:33	14:53	20	54
ST08	8/20/2014	15:04	15:24	20	59
ST09	8/20/2014	15:34	15:54	20	51
ST10	8/20/2014	16:10	16:30	20	57

Table 3.12-2. Short-Term Sound Level Measurement Results[1]

Measurement Location[2]	Date (m/dd/yyyy)	Start Time (hh:mm)	Stop Time (hh:mm)	Duration (Minutes)	Leq (dBA)
ST11	8/20/2014	17:46	18:06	20	41

Notes
1 Source: Ambient noise field measurements by URS personnel in August 2014.
2 Refer to Figure 3.12-1 for measurement locations.

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3.13 Paleontological Resources

Paleontological resources, or fossils, are the remains of extinct organisms, and provide the only direct evidence of ancient life. They are considered to be non-renewable resources because they cannot be replaced once they are destroyed. For the purpose of this analysis, and in accordance with existing BLM policy, scientifically significant paleontological resources are defined as vertebrate fossils that are identifiable to taxon and/or element, noteworthy occurrences of invertebrate and plant fossils, and vertebrate trackways. The study area associated with paleontological resources would be the land disturbance area of the Project associated with construction, operation and maintenance, and decommissioning.

3.13.1 Environmental Setting

3.13.1.1 Geologic Setting

Geology

A surficial geologic map of the Project area is presented in Figure 3.7-1. As presented in Table 3.13-1, there are differences in terminology between the maps presented in the Applicant's Preliminary Geotechnical Report (URS 2011, provided in Appendix S) and in the Applicant's Preliminary Paleontological Resources Assessment Technical Report (Reynolds and Lander 2016, provided in Appendix T). The Geotechnical Report is generally based on mapping by Stone (2006), while the Paleontological Report is based on a map complied by Hayhurst and Bedrossian (2010), and modified by Reynolds et al. (2008). Although the maps are very similar, they use different terminology, and there is at least one difference in interpretation of age that has been considered in the evaluation of impacts to paleontological resources. The geologic map presented in Figure 3.7-1 is the one from the Preliminary Geotechnical Report, and the terminology used in this section is derived from that report. However, the descriptions of the geologic units below are also cross-referenced to the terminology used in the map from the Preliminary Paleontological Resources Assessment Technical Report.

Table 3.13-1. Correlation of Geologic Units Between Applicant's Preliminary Geotechnical Report and Applicant's Paleontological Resources Assessment Technical Report

Age of Geologic Unit	Name and Abbreviation from Preliminary Geotechnical Report[1]	Name and Abbreviation from Paleontological Resources Assessment Technical Report[2]
Late Holocene	Qw – alluvium of modern washes	Qw – active alluvial wash deposits
Late Pleistocene to late Holocene	Qs – eolian sand	Qe – stabilized/active eolian/dune deposits
Late Holocene	Qa6 – alluvial fan and alluvial valley deposits	Qf-1 – active alluvial fan deposits
Late Pleistocene to Holocene		Qf-2 – stabilized alluvial fan deposits
Middle to late Pleistocene	Qpv – alluvial deposits or Palo Verde Mesa	Qot – old terrace deposits
Pliocene or Pleistocene to Holocene[3]	Qa3 – alluvial fan and valley deposits	Tba – Bullhead Alluvium

Table 3.13-1. Correlation of Geologic Units Between Applicant's Preliminary Geotechnical Report and Applicant's Paleontological Resources Assessment Technical Report

Age of Geologic Unit	Name and Abbreviation from Preliminary Geotechnical Report[1]	Name and Abbreviation from Paleontological Resources Assessment Technical Report[2]

1 – Source is Figure 3 of the Preliminary Geotechnical Report (Appendix S). This map is included in the PA/EIS/EIR as Figure 3.7-1.
2 – Source is Figure 2 of the Paleontological Resources Assessment Technical Report (Appendix T).
3 – The two authors disagree on the age and assignment of this unit, which is found at the extreme northern end of the ROW application area. Because this area is not included within any of the Project alternatives, the disparity between the names and age does not affect the impact analysis.

Pliocene, Pleistocene, and Holocene alluvium and dune sand overlays the older bedrock throughout the Project site. The oldest geologic unit within the Project study area is a unit identified as Unit 3, Holocene to Pleistocene alluvial fan and valley deposits, in Hayhurst and Bedrossian (2010) and URS (2011), and as the Pliocene Bullhead Alluvium in Reynolds and Lander (2016). This unit is found at the very northern end of the proposed ROW area. If interpreted as the Bullhead Alluvium, these sediments were deposited between 3 and 4 million year (Ma) ago. This unit is outside of the footprint of any of the Project alternatives, so the question of its correct age and potential for significant paleontological resources is likely to be moot.

The remainder of the Project site is underlain by alluvial and dune sand units of later Quaternary age. The largest portion of the site consists of Pleistocene age alluvial deposits of the ancestral Colorado River, designated Qpv in URS (2011), and Qot in Reynolds and Lander (2016). This unit consists of moderately indurated, poorly graded sand, gravel, boulders, silt, and clay.

The Qot unit is overlain by Holocene age alluvial-fan and alluvial-valley deposits, designated Qa6 in URS (2011), and split into two separate units, Qf1 and Qf2, in Reynolds and Lander (2016). This unit comprises the western and northern portion of the Project site, and is characterized by unconsolidated sand, gravel, silt, and clay derived from the Big Maria and the Mule Mountains. This unit comprises the Upper Terrace of Palo Verde Mesa. It is the oldest terrace surface in the region, and underlies the southeastern two thirds of the Project area at elevations between 400 and 364 feet. Palo Verde Mesa and the Upper Terrace slope to the south to an elevation of about 335 feet near the Rio Mesa Project area.

Aeolian sand, designated Qs in URS (2011) and Qe in Reynolds and Lander (2016) is found in the northwestern portion of the site, along the proposed route of the gen-tie line. This unit is thought to be composed of wind-blown sand derived from Ford Dry Lake to the west in Chuckwalla Valley. The unit is mapped as late Holocene by Hayhurst and Bedrossian (2010). However, Reynolds and Lander (2016) interpret this unit to include stabilized deposits of late Pleistocene age in the shallow subsurface, overlain by active aeolian and sand dune deposits of late Holocene age.

A very localized occurrence of Holocene age alluvium associated with modern washes, designated Qw in both URS (2011) and Reynolds and Lander (2016), has been mapped in the southwestern corner of the site. These deposits are comprised of unconsolidated sand and gravel eroded from nearby mountain ranges.

Paleontological Resources

The Bullhead Alluvium in the Project study area has a moderate potential for containing significant vertebrate fossils. This unit is reported to have produced the fossilized rib of a horse south of Topock, Arizona (Reynolds and Lander 2016).

The paleontological resources of the Pleistocene sedimentary units in the area were studied in association with the proposed Rio Mesa Solar Project site, located 6 miles southeast of the DQSP, in 2012 (Stewart 2012; Stewart et al. 2012). The Qot unit of Hayhurst and Bedrossian (2010) that is present at the DQSP Project site is also present at the Rio Mesa Project area, and vertebrate fossils were recovered from a 12-foot-thick paleosol (preserved soil horizon) at the Rio Mesa Project site (Stewart 2012). Fossils recovered from the "Palo Verde Mesa paleosol" include more than 800 vertebrate specimens representing birds, snakes, lizards, *Gopherus* (Mojave desert tortoise), *Sylvilagus* (cottontail), *Lepus* (jackrabbit), rodents, *Taxidea* (badger), bighorn sheep, *Odocoileus* (deer), *Equus* (horse), and *Mammuthus* (mammoth). These fossil occurrences suggest that similar deposits in the DQSP Project area have a high potential for producing scientifically important vertebrate fossil remains of late Pleistocene age. The level of potential is to be determined during the pre-construction field survey.

If stabilized aeolian and alluvial sand dune deposits of Pleistocene age are present in the shallow subsurface, then they may contain vertebrate fossils from the end of the latest Pleistocene pluvial period, less than 17 thousand years (ky) ago (Reynolds 2004). Vertebrate fossils have been identified in similar stabilized dune fields of Pleistocene age in Colton, on the western side of the Old Dad Mountains, west of Kelso at Flynn, and north of Baker at Silver Lake. The active portion of the dune field may contain reworked Pleistocene fossil remains, similar to those found at the Rio Mesa Project area (Stewart 2012). These fossil occurrences suggest that the older, stabilized dune field in the Project area has a potential for producing scientifically important vertebrate fossil remains of latest Pleistocene age.

The active late Holocene alluvial wash deposits have produced no fossil remains in the region. However, fan deposits have been deposited in the region for more than a million years and, consequently, these deposits might overlie fossils in the shallow subsurface.

3.13.1.2 Paleontological Resource Classifications

Potential Fossil Yield Classification System

The BLM uses the Potential Fossil Yield Classification (PFYC) system to assess the potential for discovery of significant paleontological resources or the impact of surface disturbing activities to such resources by using a five-class ranking system (BLM 2007):

1. **Class 1 – Very Low.** Geologic units that are not likely to contain recognizable fossil remains. This class usually includes units that are igneous or metamorphic, excluding reworked volcanic ash units; or units that are Precambrian in age or older. Management concern for paleontological resources in Class 1 units is usually negligible or not applicable and assessment or mitigation is usually unnecessary except in very rare or isolated circumstances. The probability for impacting any fossils is negligible and assessment or mitigation of paleontological resources is usually unnecessary.
2. **Class 2 – Low.** Sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically significant nonvertebrate fossils. This class typically includes vertebrate

or significant invertebrate or plant fossils not present or very rare, units that are generally younger than 10,000 years before present, recent aeolian deposits, or sediments that exhibit significant physical and chemical changes (i.e., diagenetic alteration). Management concern for paleontological resources is generally low. Assessment or mitigation is usually unnecessary except in rare or isolated circumstances and the probability for impacting vertebrate fossils or scientifically significant invertebrate or plant fossils is low. Localities containing important resources may exist, but would be rare and would not influence the overall classification. These important localities would be managed on a case-by-case basis.

3. **Class 3 – Moderate or Unknown.** Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence; or sedimentary units of unknown fossil potential. This class includes sedimentary rocks that are marine in origin with sporadic known occurrences of vertebrate fossils or other rocks where vertebrate fossils and scientifically significant invertebrate or plant fossils are known to occur intermittently. The predictability of fossils within these units is known to be low or the units have been poorly studied and/or poorly documented. Potential yield cannot be assigned without ground reconnaissance. This class is subdivided into two groups: Class 3(a) and Class 3(b).
    a) Class 3(a) is assigned to rock units where sufficient information has been developed to know that the unit has widely scattered occurrences of vertebrate fossils and/or scientifically significant invertebrate or plant fossils. Common invertebrate or plant fossils may be found in the area, and opportunities may exist for hobby collecting.
    b) Class 3(b) is assigned to rock units that exhibit geologic features and preservational conditions that suggest significant fossils could be present, but little information about the paleontological resources of the unit or the area is known. This may indicate the unit or area is poorly studied, and the field survey may uncover significant finds. The units in this Class may eventually be placed in another Class when sufficient survey and research is performed.
4. **Class 4 – High.** Geologic units containing a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but may vary in occurrence and predictability. Surface disturbing activities may adversely affect paleontological resources in many cases. This class is subdivided into two groups, based primarily on the degree of soil cover: Class 4(a) and Class 4(b):
    a) Class 4(a) is assigned to rock units that are exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two acres. Paleontological resources may be susceptible to adverse impacts from surface disturbing actions and illegal collecting activities may impact some areas.
    b) Class 4(b) is assigned to areas underlain by geologic units with high potential but have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity.

5. **Class 5 – Very High.** Highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils, and that are at risk of human-caused adverse impacts or natural degradation. This class is subdivided into Class 5(a) and Class 5(b) in the same manner as Class 4 above.

Society of Vertebrate Paleontology

The County of Riverside uses the Society of Vertebrate Paleontology (SVP) definitions for four categories of paleontological resource potential (potential for rock units: high, low, undetermined, and no potential) (SVP 2010):

High Potential. Rock units from which vertebrate or significant invertebrate fossils or suites of plant fossils have been recovered and are considered to have a high potential for containing significant non-renewable fossiliferous resources. These units include, but are not limited to, sedimentary formations, volcanic formations, and sedimentary rock units. Sensitivity comprises both (a) the potential for yielding significant vertebrate, invertebrate, or botanical fossils, and (b) the importance of recovery evidence for new and significant taxonomic, phylogenetic, ecologic, or stratigraphic data. Areas that contain potentially datable organic remains older than Recent are also classified as significant.

Low Potential. Reports in the paleontological literature or field surveys by a qualified vertebrate paleontologist may allow determination that some areas or units have low potential for yielding significant fossils. Such units will be poorly represented by specimens in institutional collections.

Undetermined Potential. Specific areas underlain by sedimentary rock units for which little information is available are considered to have undetermined fossiliferous potentials.

No Potential. Metamorphic and granitic rock units do not yield fossils and therefore have no potential to yield significant non-renewable fossiliferous resources.

3.13.1.3 Paleontological Resources Assessment

Reynolds and Lander (2016) prepared a Paleontological Resources Assessment Technical Report in support of this Draft PA/EIS/EIR (Appendix T).

Literature Review

The inventory and assessment included review of surficial geologic maps of the Project area by Stone (2006) and Hayhurst and Bedrossian (2010), supplemented by previous research in the local area by Reynolds (Reynolds 2004; Reynolds et al. 2008), and information from the field surveys at the proposed Rio Mesa Solar Project site, located 6 miles southeast of the DQSP (Stewart 2012; Stewart et al. 2012). Information from the literature review was compared to Google Earth aerial imagery covering the Project site. Paleontological and geologic literature associated with the geologic units in the Project area was reviewed to determine the potential for the occurrence of paleontological resources on the Project site. Archival searches were conducted by the Natural History Museum of Los Angeles County Department of Vertebrate Paleontology (LACM), and the San Bernardino County Museum (SBCM), to identify additional information on fossil localities, and to document the occurrence of any other previously recorded but unpublished fossil locality from stratigraphic units in or near the Project site. The results of the data searches were used to compile a paleontological resource inventory of the Project area by stratigraphic unit and to assess the paleontological productivity of each unit using the BLM PFYC system.

Records Search Results

The review of museum collection records at the LACM and SBCM did not identify any vertebrate fossil localities in the Project area. Vertebrate fossil localities were reported within similar alluvial deposits in the region, but not within close proximity to the Project site. The assessment determined that shallow excavations in the younger Quaternary Aeolian and alluvial fan sediments were unlikely to encounter significant vertebrate fossil remains. Excavations within the older Quaternary deposits could uncover significant vertebrate fossils. Therefore, both the LACM and SBCM reports recommended monitoring and mitigation during any excavation activities.

Field Survey

The Paleontological Resources Assessment did not include a field survey. Based on the results of the literature and records search, a field survey was recommended to be conducted in order to complete the BLM PFYC evaluation prior to construction.

Preliminary Potential Fossil Yield Classifications

Table 3.13-2 presents the preliminary potential fossil yield (PFY) classifications of the geologic units present at the Project site.

Table 3.13-2. Preliminary PFY Classifications at the Project Site

Stratigraphic Unit	Preliminary PFYC[1]	Description and Basis (BLM IM 2008-009; see Appendix C of Reynolds and Lander 2016)
Bullhead Alluvium (Tba) (Pliocene) (unit Qa3 in Figure 3.7-1)	3a (Moderate) or 4a (high)	• These sediments contain vertebrate fossils, but occurrences are widely scattered.
Old terrace deposits (Qot) (middle to late Pleistocene) (unit Qpv in Figure 3.7-1)	5a (Very High)	• Highly fossiliferous geologic units that regularly and predictably produce vertebrate fossils, and that are at risk of human-caused adverse impacts or natural degradation. • Vertebrate fossils are known and documented to occur consistently, predictably, at one locality/five acres. • Unit is exposed. Paleontological resources are highly susceptible to adverse impacts from surface-disturbing actions.
Stabilized Alluvial Fan Deposits (Qf2) (late Pleistocene to Holocene) (unit Qa6 in Figure 3.7-1)	3b (Unknown)	• Unit interfingers with old terrace deposits (unit Qot) and, therefore, might contain a similar fossil vertebrate fauna.
Active Alluvial Fan Deposits (Qf1) (late Holocene) (unit Qa6 in Figure 3.7-1)	2 (Low)	• Sedimentary geologic units that are not likely to contain vertebrate fossils. • Units younger than 10,000 years before present.

Table 3.13-2. Preliminary PFY Classifications at the Project Site

Stratigraphic Unit	Preliminary PFYC[1]	Description and Basis (BLM IM 2008-009; see Appendix C of Reynolds and Lander 2016)
Stabilized Aeolian and Dune Deposits (Qe) (late Pleistocene) (unit Qs in Figure 3.7-1)	3b (Unknown)	• Unit exhibits geologic (stratigraphic) features and preservational conditions that suggest significant fossils could be present.
Active Aeolian and Dune Deposits (Qe) (late Holocene) (unit Qs in Figure 3.7-1)	2 (low)	• Sedimentary geologic units not likely to contain vertebrate fossils or scientifically significant nonvertebrate fossils. • Units younger than 10,000 years before present. • Recent aeolian deposits.
Active Alluvial Wash Deposits (Qw) (late Holocene) (unit Qw in Figure 3.7-1)	2 (Low)	• Sedimentary geologic units that are not likely to contain vertebrate fossils. • Units younger than 10,000 years before present.

Note:
1 – Preliminary PFYC is pending a field survey.

Preliminary SVP Categories

The privately-owned parcel within the Project area is assessed using the Riverside County guidelines for determining the sensitivity of sedimentary units at a project site. The private parcel is entirely underlain by the old terrace (Qot) deposits. Based on its documented paleontological productivity (Stewart 2012; Stewart et al. 2012), the old terrace deposits are assigned High A and B productivity ratings, indicating that the unit has a high potential for containing fossil remains at the surface and in the subsurface.

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3.14 Recreation and Public Access

The following discussion addresses existing recreational resources within the vicinity of the Project and describes existing laws and regulations relevant to those resources. For the purposes of this analysis, “vicinity” has been defined as the area within 20 miles of the Project site. This is an appropriate study area for recreation because it captures all major recreation resources that contribute to baseline conditions and could potentially be affected by activities related to the Project.

For the purpose of this section, the terms o*ff-road vehicles* and *off-highway vehicles* (OHV) are used interchangeably (OHV is the term most used in BLM and other Federal land use planning).

3.14.1 Environmental Setting

3.14.1.1 Recreation Resources on the Project Site

The types of recreational uses that may occur at the site are governed by the CDCA Plan (BLM 1980); and the NECO Plan Amendment to the CDCA Plan (BLM 2002). The site is designated in the CDCA Plan for Multiple-use Class M, or Moderate Use (BLM 1980). Class M lands are suitable for a wide range of recreation activities which may involve moderate to high user densities, including backpacking, primitive unimproved site camping, hiking, horseback riding, rockhounding, nature study and observation, photography and painting, rock climbing, spelunking, hunting, landsailing on dry lakes, noncompetitive vehicle touring, mountain and trail biking, and competitive motorized-vehicle events only on “existing” routes of travel (BLM 1980; BLM 2002). Stopping, parking, and vehicle camping are allowed to occur within 300 feet of a route, except within sensitive areas such as Areas of Critical Environmental Concern (ACECs), where the limit is 100 feet (BLM 2002). Trails are open for non-vehicular use and new trails for non-motorized access may be allowed (BLM 1980). Recreational vehicle use, including OHV use, is discussed below in Sections 3.14.1.2 and 3.14.1.3. There are no recreation facilities, developments, or specific recreational attractions on the site. There are no specifically known resources or deposits that attract rockhounding onsite. Visitor numbers are expected to be low within the Project area, due to the availability and accessibility of recreation opportunities in the surrounding area.

3.14.1.2 Recreation Resources In the Vicinity of the Project Site

The Palo Verde Valley offers multiple outdoor recreational opportunities for boating, water skiing, jet skiing, swimming, fishing, canoeing, camping, rock hounding, hiking, mountain and trail biking, archery, hunting, horseback riding, trapping, trap and skeet shooting, and OHV use.

BLM-Administered Recreation Resources

The CDCA Plan and the NECO Plan Amendment to the CDCA Plan govern the types of recreational uses on BLM lands within the Project area. The BLM-managed lands within the Project area are designated in the CDCA Plan as Multiple-Use Class M (Moderate Use), which provides for a wide variety of present and future uses such as mining, livestock grazing, recreation, energy, and utility development. Given the desert’s vast expanse and great distances to recreation sites, it is difficult, if not impossible, in many circumstances, to engage in recreational activities in this region without employing a motorized vehicle in some fashion. In accordance with the CDCA Plan, motorized-vehicle access would be managed with Multiple-Use Class guidelines. Vehicle access in Multiple-Use Class M areas would be allowed on existing routes unless it is determined that use must be further limited. Designated Class L lands are located north of I-10, just north of the Project area. These lands are suitable for recreation activities that generally involve low to moderate user densities, including backpacking, primitive unimproved site camping, hiking, horseback riding, rockhounding, nature study and observation, photography and painting, rock climbing, spelunking, hunting, landsailing on dry lakes, noncompetitive vehicle touring, mountain and trail biking, and events only on "approved" routes of travel (BLM 1980 and 2002). Stopping, parking, and vehicle camping are allowed to occur within 300 feet of a route, except within sensitive areas such as ACECs, where the limit is 100 feet (BLM 2002). Trails are open for non-vehicular use and new trails for non-motorized access may be allowed (BLM 1980).

The BLM administers wilderness areas, Long Term Visitor Areas (LTVAs), ACECs, and other recreational opportunities in the vicinity of the Project, which are listed in Table 3.14-1 and illustrated in Figure 3.14-1. ACECs and wilderness also provide dispersed recreation opportunities in the region. Overall, recreation use on BLM lands in the vicinity of the Project is limited to the cooler months of September through May, with little or no use in the summer. Popular recreation activities include car and recreational vehicle (RV) camping, OHV riding and touring, hiking, photography, hunting (dove, quail, deer), sightseeing, and visiting cultural sites. Local residents and long-term winter visitors make up the majority of the use. For detailed information on the ACECs and wilderness areas, please see Section 3.16, *Special Designations and Lands with Wilderness Characteristics*.

Table 3.14-1. BLM-Administered Recreational Areas and Opportunities in the Project Vicinity

Recreational Area	Distance from Project (miles)
ACEC	
Mule Mountains	1.0
Chuckwalla Desert Wildlife Management Area	13.1
Chuckwalla Valley Dune Thicket	7.2
Big Marias	14.4
Palen Dry Lake	19.6
Wilderness Areas	
Palen/McCoy	18.5
Big Maria Mountains	12.5
Little Chuckwalla Mountains	11.4
Chuckwalla Mountains	19.0
Palo Verde Mountains	10.5
Rice Valley	19.1
Trigo Mountain	19.4
Long Term Visitor Area (LTVA)	
Midland LTVA	11.4
Mule Mountains LTVA	8.3
Campground	
Wiley's Well Campground	8.0

Table 3.14-1. BLM-Administered Recreational Areas and Opportunities in the Project Vicinity

Recreational Area	Distance from Project (miles)
Coon Hollow Campground	10.7
Trail	
Bradshaw Trail	4.2

Source: Compiled by AECOM in 2015.

Wilderness Areas

Seven wilderness areas are located in the vicinity of the Project: the Palen-McCoy Wilderness, Big Maria Mountains Wilderness, Little Chuckwalla Mountains Wilderness, Chuckwalla Mountains Wilderness, Palo Verde Mountains Wilderness, Rice Valley Wilderness, and Trigo Mountain Wilderness. The Wilderness Act limits allowable types of recreation on wilderness lands to those that are primitive and unconfined, depend on a wilderness setting, and do not degrade the wilderness character of the area. Motorized or mechanized vehicles or equipment are not permitted in wilderness. The BLM regulates such recreation on such lands within its jurisdiction in accordance with the policies, procedures and technologies set forth in 43 CFR Part 6300, BLM Manual 6340 (Management of Designated Wilderness Areas) (BLM 2012d), and BLM's Principles for Wilderness Management in the California Desert (BLM 1995).

These wilderness areas in the vicinity of the Project have no developed trails, parking/trailheads, or other visitor use facilities (BLM 2014a-g). These areas are generally steep, rugged mountains, with no permanent natural water sources, thus limiting extensive hiking or backpacking opportunities. BLM does not collect visitor use counts in these areas, but BLM staff estimated, in 2011, that there are approximately 100 to 200 hikers per year within each of the wilderness areas. More popular is vehicle camping along roads that are adjacent to the wilderness areas. RV camping near wilderness areas, with associated hiking, OHV use, photography, sightseeing, etc. accounts for up to 2,000 visitors per year (BLM 2011, as cited in BLM 2012b).

Long Term Visitor Areas (LTVAs)

The BLM manages LTVAs, which accommodate visitors who wish to camp for as long as seven consecutive months. Winter visitors who wish to stay in an LTVA must purchase either a long-term permit for $180 that is valid for the entire season or any part of the season (which runs from September 15 through April 15), or a short visit permit for $40 that is valid for 14 consecutive days. Between the dates of April 15 to September 15, there is no trash pick-up and toilets are closed. Permit holders may move from one LTVA to another within the permitted timeframe without incurring additional fees. Activities in and use of LTVAs are regulated by the rules of conduct set forth in 43 CFR subpart 8365 and the 35 supplemental rules that the BLM has determined are necessary to provide for public safety and health and to reduce the potential damage to natural and cultural resources of the public lands (BLM 2015a).

Two LTVAs are located in the vicinity of the Project area: Midland LTVA and Mule Mountains LTVA. Both provide long-term camping opportunities. In addition to long-term camping, recreational opportunities at LTVAs include hiking; OHV use; rockhounding; viewing cultural sites, wildlife, and unique desert scenery; and solitude. The landing or take-off of aircraft, including ultra-lights and hot air balloons, is prohibited in LTVAs (BLM 2015b).

Two campgrounds are located within the boundaries of the Mule Mountains LTVA: Wiley's Well and Coon Hollow Campgrounds. Both are year-round facilities with campsites, picnic tables, grills, shade armadas, and handicapped-accessible vault toilets (BLM 2015c; BLM 2015d). In fiscal year 2015, the Midland LTVA received 16,545 individual visits, totaling 24,818 visitor days. The Mule Mountain LTVA received 16,752 individual visits, totaling 25,896 visitor days (BLM 2016).

Under DRECP, LTVAs and campgrounds are classified as Level 1 recreation facilities.

Dispersed camping is allowed on public lands for no more than a period of 14 days in any 30-day period. The 14-day limit may be reached either through a number of separate visits or through 14 days of continuous overnight occupation during the 30-day period; campers must relocated to another site at least 25 miles away for forty-eight hours, before returning.

Areas of Critical Environmental Concern

Five ACECs are within 20 miles of the Project area: Mule Mountains, Chuckwalla Valley Dune Thicket, Chuckwalla Desert Wildlife Management Area, Big Marias, and Palen Dry Lake. Recreation activities allowed in ACECs are determined by the resources and values for which the ACECs were established, and by the associated ACEC Management Plan. Most ACECs allow low-intensity recreation use that is compatible with protection of the relevant values.

Mule Mountains ACEC primarily protects cultural resources. The Chuckwalla Desert Wildlife Management Area was designated to protect Mojave desert tortoise and significant natural resources. Chuckwalla Valley Dune Thicket and Palen Dry Lake ACECs protect both natural and cultural resources. These ACECs do not have recreation use facilities, but have signage to inform visitors of the special values of the areas and associated protection measures. Under DRECP, these areas are classified as Level 3 recreation facilities.

The Bradshaw Trail

The BLM-administered portion of the Bradshaw Trail is a 70-mile Back Country Byway that begins about 35 miles southeast of Indio, California and ends about 14 miles southwest of Blythe (BLM 2010; BLM 2012e). The Riverside County PVVAP Trails and Bikeway map shows a route for the Bradshaw Trail that continues east of this location through Blythe to the Colorado River (Riverside County 2010). The trail was the first road through Riverside County, created by William Bradshaw in 1862 as an overland stage route beginning in San Bernardino, California, and ending at Ehrenberg, Arizona. The trail was used extensively between 1862 and 1877 to transport miners and passengers. The trail is a graded dirt road that traverses mostly public land between the Chuckwalla Mountains and the Chocolate Mountain Aerial Gunnery Range.

Regional Recreation Resources

The Riverside County Regional Park and Open-Space District also provides several recreational facilities in the Project vicinity. A regional trail is proposed by the County along an existing railroad line (Riverside County 2010). The Regional Park and Open-Space District also owns Mayflower Park, Riviera Marina Park, and McIntyre Park, which all provide long- and short-stay

RV and tent camping, showers, picnicking, fishing, and boat launching (Riverside County Regional Park and Open-Space District 2015a and b, Desert USA.com 2015). Riverside County Regional Park and Open-Space District also owns and operates the Goose Flats Wildlife Area, which provides boating and fishing opportunities (Desert USA.com 2015). The aforementioned facilities are illustrated in Figure 3.14-2.

There is also one regional park in Imperial County, Palo Verde Park, which is located just south of the town of Palo Verde on the Colorado River adjacent to the Cibola National Wildlife Refuge (Desert USA.com 2015; Imperial County 2016).

Other Recreational Areas and Opportunities

The City of Blythe provides year-round sporting activities. The Blythe Parks Department oversees eight parks (approximately 74 acres total), including five neighborhood parks, two community parks, and one regional park (See California.com 2015). The "Big Foot Skate-board Park" is located at Todd Park (See California.com 2015), which is approximately 8 miles from the Project area. Other nearby City of Blythe parks include Appleby Park and Miller Park, (See California.com 2015). The Blythe Municipal Golf Course is approximately eight miles from the Project area. The Mesa Verde Park, located just south of the Nicholls Warm Springs/Mesa Verde residential area, is approximately 0.4 mile (2,200 feet) from the proposed solar facility. Other recreational opportunities in Blythe include soccer, football, track and volleyball leagues; indoor racquetball; basketball; aerobic activities; weight room; and summer swimming (See California.com 2015). Various nearby privately-owned RV parks and campgrounds also provide recreational facilities, including a boat dock, launch ramp, fishing, swimming, horseshoe pits, wildlife observation, and other active and passive recreation opportunities. The aforementioned facilities are illustrated in Figure 3.14-2.

The Cibola National Wildlife Refuge, administered by the USFWS, can be reached from the California side of the Colorado River, just south of Blythe, or, from the Arizona side, south of Quartzsite. This refuge was established in 1964 as mitigation for dam construction on the Colorado River, and provides important habitat for migratory birds, wintering waterfowl, and resident species. Recreational opportunities include hunting, fishing, wildlife viewing, and a nature trail (USFWS 2014). The refuge is approximately 12 miles from the Project area.

Agricultural areas, including those near the Project area (including the 160-acre inholding within the Project area), may be used for recreational activities; however, these activities are not assumed to occur with high frequency.

3.14.1.3 Public Access

The CDCA Plan and the NECO Plan Amendment to the CDCA Plan state that vehicle access is among the most important recreation issues in the desert. A primary consideration of the recreation program is to ensure that access routes necessary for recreation enjoyment are provided (BLM 2002).

Recreation and motorized travel opportunities are determined, in part, by the CDCA Plan multiple-use class and by OHV area designations. The multiple-use class is based on the sensitivity of resources and kinds of uses for each geographic area. Each of the four multiple-use classes describes a different type and level or degree of use that is permitted within that particular geographic area (refer to Section 3.10 for a detailed discussion regarding CDCA Plan multiple-use classes). The proposed Project and alternatives would be located in BLM Designated Multiple-Use Class M, in which vehicle access in areas would be allowed on existing routes unless it is determined that use must be further limited.

During the CDCA and NECO planning process, a detailed inventory and designation of routes was developed. This route designation system, along with other land management actions such as setting aside ACECs and the congressional designation of wilderness areas, has resulted in a significant loss of OHV recreation opportunities in eastern Riverside County. Currently, there are no BLM-designated "open" OHV areas in Riverside County.

Under the CDCA Plan, travel routes are classified as Open, Limited, or Closed, with the following definitions:

1) Open Route: Access by motorized vehicles is allowed.
2) Limited Route: Access by motorized vehicles is limited to use by number of vehicles, type of vehicle, time or season, permitted or licensed, or speed limits.
3) Closed Route: Access by motorized vehicles is prohibited except for authorized use.

As required by the CDCA Plan, the NECO Plan Amendment to the CDCA Plan created a detailed inventory of existing routes within the NECO planning area (see Figure 3.14-3). A route has high significance if it provides access to other routes, historical sites, or recreational areas.

In their Assessment of NECO Coordinated Management Plan (CMP) Designated Open Routes (URS 2015, provided in Appendix L), the Applicant has identified several BLM designated Open routes within the Project area. These routes of travel are shown in Figure 3.14-3. Routes within the Project area boundary include three routes that provide access to the 160-acre private inholding within the Project boundary (660862, 660866, and 661501). Because these routes are spur routes, BLM determined that they would be classified as Tier 3 routes under the route definitions specified in DRECP. There are also three routes that provide access to the Mule Mountains (660863, 661092, and 661102). Because these routes are through routes, BLM determined that they would be classified as Tier 2 routes under the route definitions specified in DRECP. On the perimeter of the Project area, there is a maintained dirt route along the powerline on the southeastern Project boundary (660868) and the southwestern Project boundary (660703).

The BLM has no traffic counters or other means to accurately determine use of routes in the immediate Project area. Traffic counters and visitor use data are available in the region, including for the Bradshaw Trail (located 4.2 miles away), and for the Red Cloud Road access to the Wiley Well LTVA and Hauser Geode Beds.

Recreation and vehicle use is generally limited to the cooler months of September through May. Use is nearly non-existent during the summer months. Recreational vehicle use consists of touring in passenger cars, SUVs, motorcycles, and ATVs. Some camping may occur in the vicinity of the site, but most use is of short duration and by local residents. More attractive recreation opportunities occur in areas where BLM has provided facilities such as the Midland LTVA, ACECs, or other scenic, natural, or cultural attractions.

3.15 Social and Economic Setting

This section describes the population and housing, and social and demographic background and existing conditions in areas surrounding the Project site, including the City of Blythe and the broader eastern Riverside County and neighboring Imperial County California and La Paz County, Arizona. Information in this section is based on data obtained from national and regional sources, including the United States Census Bureau, the United States Bureau of Economic Analysis (BEA), the California Department of Finance (DOF) and the California Employment Development Department (EDD).

3.15.1 Environmental Setting

The Project site is located in eastern Riverside County, approximately 10 miles west of the City of Blythe. The site and its immediately adjoining areas are vacant, with no existing population or housing. Areas of potential social and economic effects include Riverside County and the City of Blythe, as well as small nearby communities, in California. In Arizona, the areas of potential social and economic effects include La Paz County and the relatively small communities of Ehrenberg and Quartzite.

The Project includes the construction, operation, maintenance, and decommissioning of a solar energy generating facility. The expected source area for the Project's construction workforce is the primary determinant of the affected social and economic environment associated with the Project. The direct benefits of employment and higher personal incomes will primarily benefit the communities where workers and their families reside, since that would likely be where they spend the majority of their earnings. Workers' spending for goods and services also would have an indirect impact on the communities and economies where that spending occurs.

If there is an insufficient number of suitable workers to staff the Project locally or in the region, then the Project could attract individuals to relocate to the area (either temporarily or permanently), which consequently could result in increased demand for housing and local services. That increased demand could result in decreased availability, or increased prices, for other area residents.

There is little available research and analysis providing guidance for determining the socioeconomic impact area boundaries for power facilities. The widely referenced Electric Power Research Institute (EPRI) analysis (EPRI 1982) is generally cited as showing that workers may commute as much as two hours each direction from their communities rather than relocate. However, the study reports 1.42 hours as the average "construction workers maximum daily commuting time" observed in 12 case studies, and acknowledges a prevalence of weekly commuting for power projects. Large scale utility solar facilities have been constructed in the area in recent years, and anecdotal information from City of Blythe representatives, alternative energy company representatives, and area business leaders have suggested weekly commuting is relatively common among the majority of construction personnel, although some construction personnel stay in the area for multi-week stints if their construction role is of a relatively short duration (e.g., 2-3 weeks). Housing used by weekly or multi-week commuters typically includes hotel rooms near the Project site, recreational vehicle (RV) parks, and/or campgrounds. Construction management and other personnel who are employed in at the site for the entirety (or large majority) of the construction duration may choose to relocate their families and buy/rent more permanent housing (as opposed to staying at a hotel or an RV park).

For purposes of socioeconomic analysis, and as a conservative assumption recognizing the rural nature of eastern Riverside County, a 2-hour travel radius is used to define the outer limits of the study area. It is likely that most construction workers would come from western Riverside County, which has the largest concentration of construction workers close to the Project site (see Section 3.15), and some of those workers may commute up to 2 hours each way. However, as described in the EPRI report, many workers are also likely to engage in weekly commuting or otherwise temporarily relocate to the Blythe area while working at the Project site.

Figure 3.15-1 depicts a map of areas within 60, 90, and 120 minutes of travel time from the Project site. To simplify the analysis by focusing on the most likely communities of residence for commuters, those cities and communities within 30 minute drive times are specifically included in the analysis, as are all cities and communities with populations over 20,000 individuals within 60 minutes, and all cities with populations over 40,000 individuals within a 120 minute drive time. For San Bernardino, Mohave, and Yuma counties, no cities or communities with populations over 40,000 individuals are within a two-hour drive, so therefore no communities in these counties are specifically discussed. However, the counties are included in some accompanying tables because rural locations and some smaller communities in these counties are within the two-hour commute radius.

Figure 3.15-1 depicts the counties and communities relevant to this analysis along with approximate drive times from the Project site. These cities and communities include Blythe, Cathedral City, Coachella, El Centro, Indio, Mesa Verde, Palm Desert, Palm Springs, Palo Verde, and Ripley, in California; and Buckeye, Cibola, Ehrenberg, and Quartzsite in Arizona.

Economic and employment data are generally available only for counties or metropolitan statistical areas (MSAs) consisting of whole counties. For this analysis, therefore, the socioeconomics regional study area consists of Imperial and Riverside counties (California), and La Paz and Maricopa counties (Arizona), with special attention paid to Riverside and La Paz counties, as they are more likely affected by the Project than the more distant Imperial and Maricopa counties. Where important additional data are available for Riverside-San Bernardino-Ontario MSA, consisting of Riverside and San Bernardino counties, they are used for reference. With respect to housing analysis, data for counties are supplemented with those for cities and communities identified above.

Per guidelines shown in BLM Land Use Planning Handbook, the analysis of a proposed action of this type needs to consider existing socioeconomic conditions and impacts on several geographic scales. As noted above, at the regional scale, this analysis examines data for Imperial, Riverside, Maricopa, and La Paz counties, as well as Riverside-San Bernardino-Ontario MSA, where appropriate. At the local scale, the analysis examines the communities identified above within the 2-hour travel area, although particular consideration is given to the nearest communities of Blythe, California (approximately 10 miles east of the site) and Ehrenburg, Arizona (approximately 13 miles east of the site).

3.15.1.1 Population

Population estimates and recent growth trends for both the regional and local study areas are summarized in Table 3.15-1. Historical data (2000, 2010 U.S. Census data) and 2016 estimates are shown for the two counties and the states of California and Arizona, for context (Cal DOF 2016a; ADAO 2016a). Projections for future growth (through 2050) are prepared for counties by the respective states (California Department of Finance [Cal DOF 2016b] and Arizona Department of Administration [ADOA 2016b]), but not for cities.

Riverside County is the fourth most populous county in California. The population of Riverside County grew from 1,545,387 in 2000 to 2,347,828 in 2016, a 3.2 percent average annual increase, according to the California Department of Finance (Cal DOF 2016a). Between 2000 and 2016, Riverside County grew at a much faster rate than San Bernardino County (1.6 percent average annual growth), and California as a whole (1.0 percent average annual growth). In Arizona, La Paz County had the lowest average annual growth from 2000 to 2015 (0.5 percent) of all counties within the study area, which includes Maricopa (1.9 percent average annual growth), Mohave (2.0 percent average annual growth), and Yuma (2.0 percent average annual growth) counties (ADOA 2016a).

Population growth in Riverside County is expected to decrease from current rates over the next few decades. The growth rate is projected to be 1.2 percent per year between 2010 and 2020, 1.5 percent per year between 2020 and 2030, and 1.0 percent per year between 2030 and 2050. Growth rates across both states and in La Paz County are expected to decrease through 2050, with a 0.6 percent per year rate between 2030 and 2050 in California and a 1.2 percent per year rate for the same time period in Arizona (Cal DOF 2016b ADOA 2016b). It is possible these projections may be modified as a result of increased or decreased economic activities, as the economic recession that occurred between December 2007 and June 2009 had a substantial effect on population projections in the region.

Table 3.15-2 shows the populations of the affected cities and communities in 2000, 2010, and 2014, along with annual average growth rates from 2000-2014. The cities that experienced the highest rates of population growth between 2000 and 2014 were Buckeye (17.0 percent annually), Coachella (4.8 percent annually) and Indio (3.8 percent annually). The communities of Blythe and Quartzite had average annual growth rates of -0.5 percent and 0.9 percent, respectively.

Table 3.15-1. Population Estimates, Projections, and Average Annual Growth Rates, 2000-2050

Geography	2000	2010	2015/2016[1]	Average Annual Growth Rate 2000-2015/2016[1]	2020 Projection	Average Annual Growth Rate 2010-2020	2030 Projection	Average Annual Growth Rate 2020-2030	Total 2050 Projection	Average Annual Growth Rate 2030-2050
California										
Imperial County	142,361	174,528	185,831	1.9	211,973	2	252,300	1.8	314,346	1.1
Riverside County	1,545,387	2,189,641	2,347,828	3.2	2,478,059	1.2	2,862,915	1.5	3,480,980	1
San Bernardino County	1,710,139	2,035,210	2,139,570	1.6	2,227,066	0.9	2,515,972	1.2	2,997,446	0.9
California	33,873,086	37,253,956	39,255,883	1.0	40,619,346	0.9	44,085,600	0.8	49,779,362	0.6
Arizona										
La Paz County	19,715	20,489	21,183	0.5	21,500	0.5	22,000	0.2	22,900	0.2
Maricopa County	3,072,149	3,817,117	4,076,438	1.9	4,480,900	1.6	5,280,100	1.7	6,698,400	1.2
Mohave County	155,032	200,186	205,716	2	220,700	1	250,600	1.3	310,900	1.1
Yuma County	160,026	195,751	214,991	2	232,800	1.7	269,700	1.5	345,700	1.2
Arizona	5,130,632	6,392,017	6,758,251	1.9	7,346,800	1.4	8,535,900	1.5	10,820,900	1.2

Note:

1- Most recent available population estimates are 2016 for California, and 2015 for Arizona.

Sources: Cal DOF 2016a - http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-1/
Cal DOF 2016b - http://www.dof.ca.gov/Forecasting/Demographics/Projections/
ADOA 2016a - https://population.az.gov/population-estimates
ADOA 2016b - https://population.az.gov/population-projections

Table 3.15-2. Study Area Communities Population Estimates and Average Annual Growth Rates, 2000-2014

Geography	2000	2010	2014	Average Annual Growth Rate 2000-2014
California				
Blythe	20,465	20,817	18,982	-0.5
Cathedral City	42,647	51,200	52,571	1.5
Coachella	22,724	40,704	43,601	4.8
El Centro	38,025	42,598	44,847	1.2
Indio	49,116	76,036	82,375	3.8
Mesa Verde	no data	1,023	no data	--
Palm Desert	41,155	48,445	50,424	1.5
Palm Springs	42,805	44,552	46,135	0.5
Palo Verde	236	171	no data	--
Ripley	no data	692	no data	--
Arizona				
Buckeye	6,537	50,876	58,795	17
Cibola	172	210	no data	--
Ehrenberg	1,357	1,470	no data	--
Quartzsite	3,354	3,677	3,801	0.9

Sources: http://www.dof.ca.gov/research/demographic/Estimates/
https://population.az.gov/population-estimates
http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml###

3.15.1.2 Housing

Table 3.15-3 presents the housing resources in the study area, including the counties of Imperial, Riverside, Maricopa, and La Paz, and the major communities within the 2-hour drive area. The data are compiled from the U.S. Census American Community Survey, which provides an estimate for each geography for 2013. In 2013, Riverside County had 805,142 total housing units. The total vacancy rate was 15.2 percent, and 2.3 percent of the units were available for rent. La Paz County had a relatively high percentage of vacant housing units (36.4 percent), with 1.8 percent of the total housing units available for rent. Of the communities in the region, Ehrenberg and Cibola had the highest vacancy rates (both at 48.2 percent); however, Cibola had no housing units for rent whereas Ehrenberg had one of the highest percentages of vacant housing units available for rent (5.1 percent). Of the communities closest to the proposed Project site, Blythe had a total vacancy rate of 16.7 percent, with 3.2 percent of housing units available for rent; Mesa Verde had 4.5 percent of all housing units available for rent.

Table 3.15-3. Study Area Housing Characteristics, 2009-2013 Averages

Geography	Total Housing Units	Occupied Housing Units			Vacant Housing Units			
		Total	Owner Occupied	Renter Occupied	Total		For Rent	
California	**13,726,869**	**12,542,460**	**6,939,104**	**5,603,356**	**1,184,409**	**8.60%**	**292,195**	**2.10%**
Blythe	6,087	5,072	2,787	2,285	1,015	16.70%	196	3.20%
Cathedral City	20,925	16,639	10,414	6,225	4,286	20.50%	468	2.20%
Coachella	10,113	9,238	5,955	3,283	875	8.70%	150	1.50%
El Centro	14,225	12,925	6,529	6,396	1,300	9.10%	397	2.80%
Indio	30,171	24,371	15,442	8,929	5,800	19.20%	692	2.30%
Mesa Verde	401	369	286	83	32	8.00%	18	4.50%
Palm Desert	39,534	23,904	15,452	8,452	15,630	39.50%	1,335	3.40%
Palm Springs	35,876	22,650	12,994	9,656	13,226	36.90%	1,216	3.40%
Palo Verde	91	19	0	19	72	79.10%	0	0.00%
Ripley	255	216	46	170	39	15.30%	0	0.00%
Imperial County	56,234	48,099	27,107	20,992	8,135	14.50%	1,226	2.20%
Riverside County	805,142	683,144	454,455	228,689	121,998	15.20%	18,183	2.30%
Arizona	**2,859,768**	**2,370,289**	**1,527,475**	**842,814**	**489,479**	**17.10%**	**95,514**	**3.30%**
Buckeye	18,385	14,703	9,982	4,721	3,682	20.00%	432	2.30%
Cibola	224	116	108	8	108	48.20%	0	0.00%
Ehrenberg	826	428	169	259	398	48.20%	42	5.10%
Quartzsite	3,221	2,142	1,959	183	1,079	33.50%	0	0.00%
La Paz County	16,062	10,221	7,566	2,655	5,841	36.40%	286	1.80%
Maricopa County	1,648,392	1,411,727	882,862	528,865	236,665	14.40%	62,970	3.80%

Source: http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml

Temporary housing in the Project area includes rental homes, hotel and motel rooms, which are present throughout the study area and are typically concentrated in urban areas or near major transportation facilities. Other types of temporary housing units within the study area that may be used include campgrounds and RV parks.

Rental Homes

As discussed above in Table 3.15-3, vacancy rates are high in the study area, but overall rental rates are much lower. Estimates for 2013 state that 1,015 units in the City of Blythe were vacant and that 196 units were for rent. An additional 42 units in Ehrenberg were vacant for rent. Of the relatively larger communities in the study area, the largest proportion of housing units available for rental were in the communities of Palm Desert and Palm Springs, although these communities are over 60 minutes away from the proposed Project site.

Hotel and Motel Accommodations

In addition to existing residential units, construction workers and operational workers could use other local lodging facilities as temporary housing. Temporary housing in the form of hotel/motel rooms are typically concentrated in urban areas or near major transportation nodes. For the purposes of this analysis, only those hotels in the communities closest to the proposed action were tabulated under the assumption that construction and operations workers would congregate in this area for ease of commuting.

In the community of Blythe, 21 hotels and motels were identified with an estimated total of 1,040 rooms (HotelGuides 2015; Hotels.com 2015; YP.com 2015). One hotel was identified in Ehrenberg, which had 84 rooms. Three hotels were identified in the nearby community of Quartzsite, with a total of 70 rooms. Airbnb rentals near the community of Blythe numbered five, although only one property was in Blythe and the other four were located in either Ehrenberg or Quartzsite.

The extent that the local motel and hotels within the local study area could provide temporary housing for DQSP construction workers would depend both on current room rates and occupancy rates. Typical room rates for most of the hotel/motels are currently relatively inexpensive during the off-season with quoted rates of $60 to $95 per night (not including tax). Provided operators maintain comparable rates, these local hotel and motel rooms would provide an option for temporary housing, particularly for workers that might be willing to share accommodations.

Considerable additional hotel and motel facilities are available in the other communities located within 1 to 2 hours’ drive of the DQSP site, including Indio, Palm Desert, Indian Wells, Rancho Mirage, Desert Hot Springs, Palm Springs, and several other small communities. Another 165 hotels with a total of 14,842 rooms were identified in these communities (Smith Travel Research 2008, as cited in Genesis Solar, LLC 2009).

Although eastern Coachella Valley (Palm Desert, Indio, and points east) has a substantial number of hotel and motel accommodations, the attractiveness of these resources for construction workers is low, due to the great distance of nearly 2 hours of travel time from the Project site. Furthermore, given their location near business and recreation centers, it is likely that these hotels and motels would have higher room rates and, therefore, would not be as suitable temporary housing for DQSP workers.

Campgrounds and RV Parks

In addition, other housing opportunities are available in the form of RV facilities, mobile home sites, and campgrounds. Under some circumstances, these types of facilities could be usable by DQSP construction workers as temporary housing. Generally their lower costs for overnight use could make them attractive as a potential temporary housing resource. Particularly for construction workers who may own their own RV or trailers, RV parks with utility hook-ups and other amenities could serve as a longer-term rental for workers who prefer a weekly commute.

There are at least 11 RV parks located in the vicinity of Blythe (including Ehrenberg). In Blythe, at least seven RV parks are present, with a combined total of approximately 1,000 spaces. At least four RV parks are located in Ehrenberg, with a combined total of approximately 400 spaces. (RV Park Reviews 2015; Google 2015). RV parks in Blythe and Ehrenberg tend to be located along the Colorado River and receive higher levels of use during the summer. Research on small sample of these RV parks suggests that, while they have a large number of spaces, many are occupied by year-round residents or are privately owned and, therefore, would not be available for use by construction workers (Genesis Solar, LLC 2009). Additional RV parks are located in Quartzsite, Arizona, approximately 20 miles east of Blythe. The Quartzsite Chamber of Commerce states there are more than 70 campgrounds in the vicinity of the community that are typically occupied between October and March, with visitors attracted to the gem, mineral, and swap meet shows which are popular tourist attractions in the area (Quartzsite Business Chamber of Commerce 2016).

BLM operates two campgrounds in the general vicinity of the local study area: Wiley's Well Campground and Coon Hollow Campground, both located south of I-10 on Wiley's Well Road within the Mule Mountain LTVA. Both are year-round facilities with campsites, picnic tables, grills, shade armadas, and handicapped-accessible vault toilets (BLM 2011b). Except for "special areas" with specific camping regulations, vehicle camping is allowed anywhere on BLM-administered land within 300 feet of any posted Open Route. However, there are no facilities in these locations, and there is a 14-day limit for camping in any one location. After 14 days, campers wishing to stay in the area longer are required to move 25 miles from their original camp site. Long-term camping is available by permit in LTVAs on BLM lands between September 15 and April 15 (from April 16 to September 14, there is a 14-day limit within any 28-day period). Between the dates of April 15 to September 15, there is no trash pick-up and toilets are closed. There are two LTVAs located in the vicinity of Blythe and the Project site: Mule Mountain, within which camping is only allowed at designated sites within the Wiley's Well and Coon Hollow campgrounds, and Midland, located north of the City of Blythe. BLM also operates another LTVA within the study area at La Posa, south of I-10 near Quartzsite, Arizona (BLM 2007).

3.15.1.3 Economic Conditions

Study area employment statistics by industry sector and county for 2009-2013 are summarized in Table 3.15-4. Educational and health services industries are the largest employers in Riverside County. This sector accounts of over 20 percent of the total jobs in Riverside County. Additional industries with high proportions of total employees in the County include retail trade; arts, entertainment, recreation, accommodation, and food service; and professional and business services. Educational and health services industries are also the largest employers in La Paz County. This sector accounts for nearly 18 percent of the total jobs in La Paz County. Additional industries with high proportions of total employees in the County include government; agriculture, forestry, fishing, and hunting, and arts, entertainment, recreation, accommodation, and food service.

In Riverside and La Paz counties, the construction industries account for 8.2 percent and 4.5 percent of employment, respectively. In Imperial and Maricopa counties, the construction industries account for 5.1 and 6.7 percent of employment, respectively. The sector with the lowest number of persons employed is mining, quarrying, and oil and gas extraction, with approximately 4,000 employees across all four counties.

Table 3.15-4. Employment by Industry Group, 2009-2013 Averages

Industry Group	Imperial County		Riverside County		California		La Paz County		Maricopa County		Arizona	
	Total	Percent	Total	Percent	Total	Percent	Total	Percent	Total	Percent	Total	Percent
Agriculture, forestry, fishing and hunting	5,252	9	13,032	1.5	358,412	2.2	1,034	15.6	7,696	0.4	25,427	0.9
Mining, quarrying, and oil and gas extraction	289	0.5	690	0.1	29,099	0.2	13	0.2	3,050	0.2	14,968	0.5
Construction	2,994	5.1	72,017	8.2	996,922	6	298	4.5	116,069	6.7	181,102	6.7
Manufacturing	3,228	5.5	81,173	9.3	1,659,850	10	186	2.8	139,514	8	204,219	7.5
Wholesale Trade	1,685	2.9	29,676	3.4	525,795	3.2	152	2.3	47,134	2.7	66,440	2.4
Retail Trade	7,600	13.1	114,208	13	1,850,696	11.1	751	11.3	211,807	12.2	332,224	12.2
Transportation, Warehousing, and Utilities	4,023	6.9	47,094	5.4	773,145	4.6	345	5.2	88,809	5.1	133,643	4.9
Information	724	1.2	14,384	1.6	471,345	2.8	17	0.3	34,154	2	49,891	1.8
Financial Activities	2,345	4	47,236	5.4	1,068,711	6.4	284	4.3	165,175	9.5	215,268	7.9
Professional and Business Services	3,392	5.8	87,990	10	2,099,358	12.6	224	3.4	222,834	12.8	316,142	11.6
Educational and Health Services	14,017	24.1	181,003	20.6	3,497,445	21	1,168	17.6	367,711	21.2	605,203	22.2
Arts, Entertainment, Recreation, Accommodation, and Food Service	3,887	6.7	96,865	11	1,628,085	9.8	783	11.8	170,914	9.9	290,762	10.7
All Other Services	2,306	4	45,966	5.2	893,566	5.4	336	5.1	83,247	4.8	131,979	4.8
Government	6,427	11	45,696	5.2	783,425	4.7	1,044	15.7	76,527	4.4	154,598	5.7
Total	58,169	100	877,030	100	16,635,854	100	6,635	100	1,734,641	100	2,721,866	100

Source: http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml

Table 3.15-5 presents the total projected new jobs by occupation for Riverside and San Bernardino counties. For the purposes of employment data tabulation, the California Employment Development Department (EDD) groups Riverside and San Bernardino counties as one statistical area; hence, they are presented in Table 3.15-4 together. Data for projected jobs were not available for Arizona counties; however, long-term industry employment projections are available for the state. The highest number of new jobs projected in Riverside and San Bernardino counties is expected to be in retail sales. Job growth is also anticipated for laborers and material movers, food preparers, and cashiers. The projected job growth for construction laborers was 8,510 from 2012-2022. In Arizona, the construction sector is forecast to gain 60,100 jobs, with the largest employment gains expected in the "specialty trades" sub-sectors (ADOA 2015). Table 3.15-6 presents the percentage change of projected new jobs for Riverside and San Bernardino counties for the same period. Many occupations with high rates of job growth (by percentage) are related to construction, including brick masons and block masons, iron workers, and cement masons.

Table 3.15-5. Occupational Employment Projections: Top 10 Occupations by Total Increased Number, Riverside and San Bernardino Counties, 2012-2022

Occupation	Number of New Jobs Projected
Retail Salespersons	24,590
Laborers and Freight, Stock, and Material Movers, Hand	21,060
Combined Food Preparation and Serving Workers, Including Fast Food	20,750
Cashiers	20,200
Personal Care Aides	17,980
Waiters and Waitresses	13,700
Heavy and Tractor-Trailer Truck Drivers	9,950
Office Clerks, General	9,250
Stock Clerks and Order Fillers	8,830
Construction Laborers	8,510

Source: http://www.labormarketinfo.edd.ca.gov/file/occproj/rive$occmost.xlsx

Table 3.15-6. Occupational Employment Projections: Top 10 Occupations by Percent Increased Change, Riverside and San Bernardino Counties, 2012-2022

Occupation	Estimated Employment 2012	Projected Employment 2022	Percent Change	Annual Average Change
Brick masons and Block masons	710	1,420	100	0.1
Helpers – Brick masons, Block masons, Stone masons, and Tile and Marble Setters	460	890	93.5	0.09
Reinforcing Iron and Rebar Workers	480	800	66.7	0.07
Cement Masons and Concrete Finishers	1,960	3,220	64.3	0.06
Fence Erectors	570	930	63.2	0.06
Tile and Marble Setters	1,140	1,840	61.4	0.06
Cost Estimators	2,100	3,350	59.5	0.06
Painters, Construction and Maintenance	3,440	5,450	58.4	0.06

Table 3.15-6. Occupational Employment Projections: Top 10 Occupations by Percent Increased Change, Riverside and San Bernardino Counties, 2012-2022

Occupation	Estimated Employment 2012	Projected Employment 2022	Percent Change	Annual Average Change
Personal Care Aides	27,620	43,630	58	0.06
Roofers	1,280	2,020	57.8	0.06

Source: http://www.labormarketinfo.edd.ca.gov/file/occproj/rive$occfastest.xlsx

Table 3.15-7 presents county employment figures for those skilled workers (by craft) likely required for construction and operation of the Project. Employment figures for 2012 are provided, as well as employment projections for the selected occupations for 2022. As stated above, the EDD groups Riverside and San Bernardino into one statistical area for data presentation purposes; thus, these two counties are presented together in Table 3.15-7. As of 2012, there were relatively high numbers of skilled workers in Riverside and San Bernardino County, including construction workers (49,660), maintenance and repair workers (48,730), and construction laborers (12,310). Relevant specialized positions were generally fewer in number for Riverside and San Bernardino counties, including paving, surfacing, and tamping equipment operators, power plant operators, and metal/plastic workers. Employment figures for all occupations presented are anticipated to either remain constant or grow by 2022. The two occupations with the largest anticipated growth (by absolute number) are construction workers (24,210 new positions) and maintenance/repair workers (10,870 new positions); the two occupations with the largest anticipated growth by percentage are construction helpers (66.5 percent increase) and cement masons (64.3 percent increase).

As of September 2015, Riverside County had a labor force of 1,016,700 workers, of which 952,800 were employed. In Arizona, La Paz County had a labor force of 8,011 workers, of which 7,374 were employed. As presented in Table 3.15-8, the highest unemployment rate in study area communities was in Ripley (23.6 percent), followed by Mesa Verde (22.4 percent). Of the larger communities in the study area, the communities with the highest rates of unemployment were El Centro (22.0 percent) and Coachella (9.7 percent). The community of Blythe had 6,600 workers in its labor force, of whom 6,200 were employed, for an unemployment rate of 7.0 percent. Per capita income was highest in Palm Desert (over $40,000) and was lowest in Ripley (almost $8,800). In the nearby communities of Blythe and Ehrenberg, the per capita income estimates were $16,329 and $22,205, respectively.

While no municipal figures exist for projected unemployment, a recently published report by the U.S. Federal Reserve projected that the national unemployment rate will decrease to 4.8 percent in 2016 and remain under 5.0 percent through 2018 (U.S. Federal Reserve 2015).

3.15.1.4 Government Tax Revenues

A summary of Riverside County's revenues and expenditures for fiscal years (FY) 2012-13 and 2013-14 is provided in Table 3.15-9. As the Project would be constructed in unincorporated Riverside County, it would be the local agency receiving most of the direct fiscal impacts from the DQSP in the form of additional expenses or revenues.

Table 3.15-7. Occupational Employment Projections: Project-Relevant Occupations, Riverside and San Bernardino Counties, 2012-2022

Occupation	Annual Average Employment		Employment Change			Average Annual Job Openings		
	2012	2022	Number	Percent (2012-2022)	Annual Average Percent Change	New Jobs	Net Replacements	Total
Construction Managers	4,040	5,380	1,340	33.20%	3.30%	134	64	198
Construction Workers	49,660	73,870	24,210	48.80%	4.90%	2,422	828	3,250
Carpenters	9,610	14,030	4,420	46.00%	4.60%	442	118	560
Cement Masons and Concrete Finishers	1,960	3,220	1,260	64.30%	6.40%	126	23	149
Construction Laborers	12,310	18,180	5,870	47.70%	4.80%	587	264	851
Paving, Surfacing, and Tamping Equipment Operators	750	900	150	20.00%	2.00%	14	11	25
Operating Engineers and Other Construction Equipment Operators	2,990	3,920	930	31.10%	3.10%	93	66	159
Drywall and Ceiling Tile Installers	2,320	3,630	1,310	56.50%	5.60%	131	22	153
Electricians	3,920	5,590	1,670	42.60%	4.30%	167	74	241
Painters, Construction and Maintenance	3,440	5,450	2,010	58.40%	5.80%	201	52	253
Plumber, Pipefitters, and Steamfitters	2,520	3,620	1,100	43.70%	4.40%	110	31	141
Metal Workers and Plastic Workers	510	540	30	5.90%	0.60%	3	6	9
Helpers - Construction Trades	1,820	3,030	1,210	66.50%	6.60%	122	28	150
Maintenance and Repair Workers, General	48,730	59,600	10,870	22.30%	2.20%	1,090	1,140	2,230
Welders, Cutters, Solderers, and Brazers	2,590	2,960	370	14.30%	1.40%	38	63	101
Plant and System Operators	2,090	2,130	40	1.90%	0.20%	9	71	80
Power Plant Operators	510	520	10	2.00%	0.20%	0	16	16
Architects, Surveyors, and Cartographers	910	1,140	230	25.30%	2.50%	24	20	44
Engineering Managers	1,020	1,170	150	14.70%	1.50%	15	25	40
Supervisors of Construction and Extraction Workers	4,280	6,350	2,070	48.40%	4.80%	207	46	253
Machinists	3,370	3,840	470	13.90%	1.40%	48	77	125

Source: http://www.labormarketinfo.edd.ca.gov/file/occproj/rive$occproj.xlsx

Table 3.15-8. Study Area Communities Employment Statistics and Per Capita Income, September 2015

Geography	Civilian Labor Force	Total Employment	Number Unemployed	Unemployment Rate	Per Capita Income*
California					
Blythe	6,600	6,200	500	7.00%	$16,329
Cathedral City	25,000	23,800	1,300	5.10%	$19,815
Coachella	18,000	16,200	1,700	9.70%	$11,874
El Centro	21,500	16,800	4,700	22.00%	$18,877
Indio	36,400	33,900	2,500	6.80%	$20,607
Mesa Verde*	490	380	110	22.40%	$12,541
Palm Desert	22,900	21,900	1,000	4.50%	$40,266
Palm Springs	21,700	20,600	1,100	5.10%	$35,578
Palo Verde*	19	19	0	0.00%	--
Ripley*	216	165	51	23.60%	$8,765
Imperial County	79,700	60,800	18,800	23.60%	$16,763
Riverside County	1,016,700	953,000	63,700	6.30%	$23,591
Arizona					
Buckeye	22,993	21,558	1,435	6.20%	$20,318
Cibola*	78	73	5	6.40%	$26,722
Ehrenberg*	430	380	50	11.60%	$22,205
Quartzsite*	1,011	811	200	19.80%	$24,514
La Paz County	7,712	7,079	633	8.20%	$22,200
Maricopa County	2,013,838	1,905,798	108,040	5.40%	$27,256

Sources: *taken from FactFinder 2009-2013 American Community Survey 5-Year Estimates
**taken from azstats.gov 2014
http://www.labormarketinfo.edd.ca.gov/cgi/dataanalysis/areaselection.asp?tablename=labforce
http://azstats.gov/laus-data-query-tool/
Arizona towns come from: http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml
Per Capita income comes from: http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml

Table 3.15-9. Riverside County Revenues and Expenses, 2012-2015

Category	2012-2013	2013-2014	2014-2015 (Adopted)
Revenues			
Taxes	301,659,506	314,135,999	314,057,747
Licenses, Permits, and Franchises	18,798,544	20,376,429	21,224,480
Fines, Forfeitures, and Penalties	85,583,933	81,488,872	72,631,740
Revenues from Use of Money and Property	16,530,929	24,977,255	19,029,344
Intergovernmental Revenues	1,610,104,565	1,699,347,379	1,921,670,146
Charges for Current Services	585,939,607	608,667,661	781,519,984
Other In-Lieu and other Governments	6,369,710	11,375,829	12,277,423
Other Revenue	248,260,280	241,022,153	247,002,743
Total	2,873,247,074	3,001,391,577	3,389,413,607
Expenditures			
General Government	470,009,756	331,627,307	413,715,912
Public Protection	1,128,003,047	1,204,077,243	1,260,671,787
Public Ways and Facilities	191,617,433	189,569,440	239,581,311
Health and Sanitation	403,013,005	429,370,012	485,261,035
Public Assistance	814,977,120	868,422,787	975,714,648
Education	23,120,303	21,909,602	22,178,862
Recreation and Cultural Services	824,582	758,657	351,072
Debt Service	34,626,943	39,855,533	43,779,831
Total	3,066,192,189	3,085,590,581	3,441,254,458

Source: http://countyofriverside.us/Portals/0/Government/Budget%20Information/2014-2015%20Adopted%20Budget/FY15AdoptedBudgetWeb.pdf

For FY 2013-14, new revenues for governmental funds (General Fund and other funds for general governmental functions, excluding proprietary and special district funds) of Riverside County totaled approximately $3.00 billion, and expenditures totaled $3.09 billion (Riverside County 2015d). The excess of expenditures over revenues was funded through the use of reserves and designations from previous fiscal years. The largest sources of revenue are intergovernmental revenues (state and Federal; $1.70 billion), charges for current services ($0.61 billion), and taxes (property, sales, and other taxes; $0.31 billion). The largest expenditure categories are public protection (sheriff, corrections, courts, and fire protection; $1.20 billion) and public assistance ($0.87 billion).

Without access to property taxation on most components of a new solar energy project, the County must rely principally on sales tax revenues on construction materials and supplies to fund expenditures for public services related to the Project. Riverside County's key expenditures were on public assistance, public safety, and health. The County acknowledges that the economic slowdown may result in revenues lower than past projections which may lead to cutbacks in services.

3.15.1.5 Stakeholders

Affected Groups and Attitudes

This section discusses some groups of individuals who could be affected by the Project, based on BLM's previous experience during the environmental review processes for other utility-scale solar projects in eastern Riverside County. Social effects to these groups and other stakeholders are discussed under Section 4.15, *Social and Economic Effects*.

Identification of these groups does not imply that other stakeholders may not be affected by the Project or are outside of the social and environmental review process. Discussion of the affected groups is a means of highlighting and facilitating review of issues of potential significance for those stakeholders who have a particular local or regional relationship to the Project site or Proposed Action.

Blythe Area Chamber of Commerce

The Blythe Area Chamber of Commerce provides a forum for local businesses and residents on important community issues. The Chamber of Commerce maintains a directory of all the businesses in Blythe and promotes the city's business economy. The purpose of the Blythe Area Chamber of Commerce is to encourage and facilitate activities that improve the economic viability of this community, provide a forum for guidance and support, provide opportunities to inform, and seek funds necessary for implementing compatible activities that would improve this agricultural community. The Chamber of Commerce has supported other utility-scale solar projects in the Blythe area and would likely support the Project.

Environmental Groups

Several national and local groups, including the Sierra Club, Wilderness Society, Natural Resources Defense Council, Defenders of Wildlife, Center for Biological Diversity, and Western Watersheds Project, have expressed concerns about the siting criteria used for renewable energy projects proposed for development in sensitive biological resource areas. Environmental groups also have concerns regarding impacts on wildlife movement corridors, impacts on special status species associated with the implementation of solar panels (e.g., shading effects on species), climate change/GHG emission-related impacts on plants and wildlife, and impacts on desert hydrology and landscapes.

Local Private Land Owners and Residents

Although the Project would be developed mostly on BLM land, a portion of the solar plant would be located on private land surrounded by BLM land. This land is currently vacant, and no comments in opposition to the Project have been received from local land owners during the scoping process for this Project.

Native American Tribes and Tribal Representatives

Native American tribal representatives have commented on the development of other large-scale solar projects in the area regarding the inadvertent discovery of cultural resources and the development of desert landscapes that contain evidence of their ancestors' use. Common concerns include the disturbance of cultural resources, the final disposition of recovered cultural materials, and the monitoring of ground disturbing activities during construction phases. Tribes in the area have successfully litigated against industrial developments in the region.

Project Workers and Suppliers to the Renewable Energy Industry

The DQSP has the potential to affect both local and non-local labor force from surrounding areas in Riverside and La Paz counties. Construction and operation of the Project would require both temporary and long-term workers, which would increase demand for labor, and would present an opportunity for the sale of materials and supplies by firms in the renewable energy industry.

Recreational Users

Recreational users include OHV users, hikers, campers, and wildlife viewing enthusiasts. The recreational user group has a deep appreciation for the natural desert landscape, and their social attitudes are participatory and protective of this resource. This group is concerned with the indirect impacts associated with the displacement of recreational lands by solar energy facilities, including the cumulative loss of land available for OHV recreational uses.

3.16 Special Designations and Lands with Wilderness Characteristics

This section describes special designations and lands with wilderness characteristics in the vicinity of the proposed Project (Figure 3.16-1). Most special areas are either designated by an Act of Congress or by Presidential Proclamation, or are created under BLM administrative procedures.

BLM's National Landscape Conservation System (NLCS) designations include: National Monuments, National Conservation Areas, Wilderness Areas, Wilderness Study Areas, National Scenic and Historic Trails, Wild and Scenic Rivers, Outstanding Natural Areas, Forest Reserves, or any other special designations lands described in the Omnibus Public Lands Management Act of 2009 (PL 111-11 §2002(b)). Other BLM special designations include Areas of Critical Environmental Concern (ACECs), Cooperative Management and Protection Areas, Scenic and Back Country Byways, watchable wildlife viewing sites, wild horse and burro ranges, and other special designations identified in BLM Handbook H-1601 – Land Use Planning Handbook, Chapter III (BLM 2005).

Land use plan and management direction for such designations must comply with the purposes and objectives of the proclamation or act of Congress regardless of any conflicts with the FLPMA's multiple-use mandate (BLM 2009).

The following discussion explains the relationship between the Project and the existing special designations within the vicinity of the Project, which include Wilderness Areas, ACECs, lands with wilderness characteristics, and a Back Country Byway.

3.16.1 Environmental Setting

3.16.1.1 Regional Setting

The Project would be located within the Palo Verde Mesa of the Sonoran Desert region of southeastern California, an alluvial-filled basin that is bounded by the Mojave Desert to the north and by the McCoy Mountains, Little Maria Mountains, and Big Maria Mountains to the west, northwest, and northeast, respectively, extending southwest to the Palo Verde Mountains. The Palo Verde Mesa is bounded by the Palo Verde Valley to the east, which is generally formed by the flood plain deposits of the Colorado River.

Special designations within this regional setting, as shown in Figure 3.16-1, include seven components of the National Wilderness Preservation System: Palen-McCoy Wilderness (approximately 18 miles northwest), Rice Valley Wilderness (approximately 19 miles north), Big Maria Mountains Wilderness (approximately 12 miles northeast), Palo Verde Mountains Wilderness (approximately 10 miles south), Trigo Mountain Wilderness (approximately 19 miles southeast), Chuckwalla Mountains Wilderness (approximately 19 miles west), and Little Chuckwalla Mountains Wilderness (approximately 11 miles southwest).

Five ACECs have been administratively designated within the vicinity of the Project: Mule Mountains ACEC (approximately one mile southwest), Chuckwalla Valley Dune Thicket ACEC (approximately seven miles west), Palen Dry Lake ACEC (approximately 19 miles northwest), Chuckwalla Desert Wildlife Management Area ACEC (approximately 13 miles southwest), and Big Marias ACEC (approximately 14 miles northeast).

The eastern terminus of the Bradshaw Trail Back Country Byway is located approximately 4 miles south of the Project, and traverses westerly for approximately 70 miles.

There are also two LTVAs within the Project vicinity; please see Section 3.14*, Recreation and Public Access*, for a detailed discussion of these two designated areas.

3.16.1.2 Project Setting

No Congressional or Administrative special designations, Wilderness Areas, or Wilderness Study Areas exist at or are immediately adjacent to the Project. In addition, no lands with wilderness characteristics exist on or adjacent to the Project site.

3.16.1.3 Wilderness Characteristics Review

Pursuant to §201(a) of the FLPMA, the BLM is required to maintain an inventory of all public lands and their resource and other values, which includes wilderness characteristics. All Public Lands within the California Desert District were analyzed in the 1979 wilderness inventory process to determine whether they possessed appropriate wilderness characteristics of size, naturalness, outstanding opportunities for solitude or primitive and unconfined type of recreation and other supplemental values.

The land area associated with the Project site is included within two different units inventoried for wilderness characteristics. These two units, unique identifier CDCA 1351-1 and CDCA 1351A-1, were found to have no wilderness characteristics in the 1979 inventory, because neither unit included 5,000 acres of contiguous land area. Both units were re-inventoried in 2016 and again found to have no wilderness characteristics. The nearest land found to have wilderness characteristics is located on the eastern end of the Little Chuckwalla Mountains Wilderness Area, approximately 10 miles southwest of the Project site.

3.16.1.4 Designated Wilderness Areas

Designated Wilderness Areas in the vicinity of the Project are shown on Figure 3.16-1. Wilderness areas are congressionally designated and are managed pursuant to the Wilderness Act of 1964 (PL 88-577; 16 USC 1131-1136), and/or the specific legislation designating the wilderness area. In addition to the Wilderness Act of 1964, wilderness areas in the CDCA were designated and are managed through the CDPA of 1994 (PL 103-433) and the Omnibus Public Lands Management Act of 2009 (PL 111-11). A designated wilderness area is defined as having four primary characteristics, including the following:

1. Generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable;
2. Has outstanding opportunities for solitude or a primitive and unconfined type of recreation;
3. Has at least 5,000 acres of land or is of sufficient size to make practicable its preservation and use in an unimpaired condition; and
4. May also contain ecological, geological or other features of scientific, educational, scenic, or historical value.

Six of the seven wilderness areas located in the vicinity of the Project site and were designated by Congress through enactment of the CDPA (16 USC §§ 410aaa et seq.) and formally incorporated in the CDCA Plan through the NECO Plan Amendment to the CDCA Plan (BLM 2002a). The Trigo Mountain Wilderness was designated under the Arizona Desert Wilderness Act of 1990.

According to the CDPA §103(d), "The Congress does not intend for the designation of wilderness areas in §102 of this title to lead to the creation of protective perimeters or buffer zones around any such wilderness area. The fact that non-wilderness activities or uses can be seen or heard from areas within a wilderness area shall not, of itself, preclude such activities or uses up to the boundary of the wilderness area," (Govtrack.us 2015).

The Wilderness Areas in the vicinity of the Project site are:

- The Palen-McCoy Wilderness Area, located approximately 7 miles northwest of the Project area, encompasses approximately 236,488 acres (BLM 2014a).
- The Big Maria Mountains Wilderness, located approximately 10 miles northeast of the Project area, is 45,384 acres in size (BLM 2014b).
- The Rice Valley Wilderness, located approximately 25 miles northwest of the Project area, is 41,777 acres in size (BLM 2014c).
- The Little Chuckwalla Mountains Wilderness, located approximately 10 miles southwest of the Project area, is 28,034 acres in size (BLM 2014d).
- The Chuckwalla Mountains Wilderness, located approximately 20 miles west of the Project area, is 99,548 acres in size (BLM 2014e).
- The Palo Verde Mountains Wilderness, located approximately 10 miles south of the Project area, is 30,605 acres in size (BLM 2014f).
- The Trigo Mountain Wilderness, located approximately 19 miles south of the Project area, is 30,300 acres in size (BLM 2014g).

Users of these wilderness areas are seeking opportunities to experience naturalness, solitude, and unconfined recreation. The areas have no developments other than sparse trails and any routes that have not been reclaimed since the wilderness designation. Little data exist on the amounts, types, and trends of visitor use experiences such as camping, hiking, or sightseeing. Recreation uses are discussed in Section 3.14, *Recreation and Public Access,* and include hunting, fishing, and non-commercial trapping. Pets are allowed, and the use of horses is permitted. Camping is permitted, but is limited to a period of 14 days. After 14 days, campers must relocate at least 25 miles from the previous site (BLM 2014a-g).

Motorized-vehicle access is prohibited in wilderness areas except as specifically provided for in the Wilderness Act and by reference in subsequent wilderness legislation (i.e., where access is required to private property, and where necessary to meet minimum requirements for the administration of the area for the purpose of the Act, including measures required in emergencies involving the health and safety of persons within the area).

3.16.1.5 Areas of Critical Environmental Concern

ACECs in the vicinity of the site are shown on Figure 3.16-1. ACECs are BLM-specific, administratively designated areas within the public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources; or other natural systems or processes; or to protect life and safety from natural hazards (FLPMA, 43 USC 1702(a); 43 CFR 1601.0-5(a)). By itself, the designation does not automatically prohibit or restrict uses in the area; instead, it provides a record of significant values that must be accommodated when BLM considers future management actions and land use proposals.

There are five ACECs located in the vicinity of the site. The closest ACEC to the Project site is the 4,092-acre Mule Mountains ACEC, located approximately one mile southwest of the site. This ACEC was established to manage cultural resources, with the goal of protecting cultural values while providing for compatible public uses.

The four other ACECs range in distance from 7 to 19 miles from the Project site. The 2,273-acre Chuckwalla Valley Dune Thicket ACEC is located approximately 7 miles west of the site. This ACEC is managed as Multiple Use Class M, for wildlife habitat, specifically that of the Mojave desert tortoise. Similarly, the Palen Dry Lake ACEC is located approximately 19 miles northwest of the site and was established to protect prehistoric values (BLM 1980). The Chuckwalla Desert Wildlife Management Area ACEC is located approximately 13 miles southwest of the Project site and was established to protect Mojave desert tortoise and significant natural resources (BLM 2002a). The Big Marias ACEC, located in Arizona, is approximately 14 miles northeast of the site and was established to protect prehistoric archaeological features, including a high concentration of internationally significant intaglio features, and sensitive plant species (BLM 2010b). Recreation uses allowed in ACECs are discussed in Section 3.14, *Recreation and Public Access*.

3.16.1.6 Back Country Byways

The BLM-administered portion of the Bradshaw Trail is a 70-mile Back Country Byway that begins about 35 miles southeast of Indio, California and ends about 14 miles southwest of Blythe (BLM 2010a; BLM 2012e). The trail was the first road through Riverside County, created by William Bradshaw in 1862 as an overland stage route beginning in San Bernardino, California, and ending at Ehrenberg, Arizona. The trail was used extensively between 1862 and 1877 to transport miners and passengers. The trail is a graded dirt road that traverses mostly public land between the Chuckwalla Mountains and the Chocolate Mountain Aerial Gunnery Range. Recreational opportunities on the trail primarily include camping and OHV use (BLM 2012e; Anderson 2015).

3.17 Transportation and Traffic

This section describes the environmental setting in regard to transportation and traffic for the proposed Project and alternatives. The information in this section is based on the *Traffic Impact Analysis for the Desert Quartzite Solar Project* prepared by URS Corporation 2016 (Appendix K).

Because the Project site is located in a remote area, all materials and personnel would be brought to the site from surrounding communities within Riverside County, such as Blythe and Indio, as well as regions of Los Angeles County and towns in Arizona, such as Quartzite, Ehrenberg, and Cibola. Consequently, it is expected that all DQSP-related traffic would utilize Interstate 10 (I-10) for regional travel, and local roads between I-10 and the site for site access. Therefore, this analysis of transportation and traffic focuses on the local roads and I-10 in the vicinity of the Project site.

3.17.1 Environmental Setting

The Project area would be located in Riverside County approximately 2.75 miles southwest of the City of Blythe and 37 miles east of Desert Center (refer to Figure 1-1). The Project would be located south of I-10 and west of State Route (SR) 78. It is anticipated that most workers would be drawn from the Blythe/Palo Verde Valley region and the Desert Center region, with a smaller portion drawn from the Imperial Valley or eastern Riverside County region. Workers and delivery trucks would access the site using the SR-78 (Neighbours Boulevard) off-ramp from I-10. The roadways and intersections that would be used for the Project, and for which potential impacts have been evaluated, are shown in Figure 3.17-1. It is anticipated that the following four intersections within the traffic study area are likely to experience an increase in traffic volume during construction, and thus were selected for capacity evaluation:

- Intersection 1 – SR-78 (Neighbours Boulevard) and I-10 Westbound Ramps
- Intersection 2 – SR-78 (Neighbours Boulevard) and I-10 Eastbound Ramps
- Intersection 3 – SR-78 (Neighbours Boulevard) and 14th Avenue
- Intersection 4 – SR-78 (Neighbours Boulevard) and 16th Avenue

Similarly, the following four roadway segments were also selected for capacity evaluation:

- I-10 West of SR-78
- I-10 East of SR-78
- SR-78 South of I-10
- 16th Street West of SR-78

3.17.1.1 Regional and Local Roadway Facilities

In the Project area, I-10 is classified as a freeway with two lanes in each direction. Access to the site from I-10 is via the SR-78 (Neighbours Boulevard) interchange (Exit 236). Local access to the Project site is from 16th Avenue/Seeley Avenue.

3.17.1.2 Existing Traffic Volumes and Levels of Service

The level of service (LOS) is defined as a qualitative measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. LOS indicators for the highway and roadway system are based on specific characteristics of traffic flow on designated sections of roadway during a typical day. For mainline freeway and roadway segments, these include overall traffic volume, speed, and density.

Several physical and operational characteristics of the roadway, such as lane configuration and flow speed (i.e., the typical speed along a roadway segment) are used to determine the vehicular capacity of the roadway segment. When these two sets of data are compared, a volume-to-capacity ratio is calculated. These factors then are converted to a letter grade identifying operating conditions and expressed as LOS A through F. The *Highway Capacity Manual 2000*, published by the Transportation Research Board, includes six levels of service for roadways or intersections ranging from LOS A (best operating conditions characterized by free-flow traffic, low volumes, and little or no restrictions on maneuverability) to LOS F (worst operating conditions characterized by forced traffic flow with high traffic densities, slow travel speeds, and often stop-and-go conditions) (Transportation Research Board 2000).

Intersections

Table 3.17-1 shows the relationship between LOS and the performance measures for signalized and unsignalized intersections, and lists the *Highway Capacity Manual 2000* delay criteria for signalized intersections.

Table 3.17-1. Intersection Level of Service Definitions

Level of Service	Signalized Intersection Control Delay (in seconds/vehicle)	Unsignalized Intersection Control Delay (in seconds/vehicle)
A	0 – 10	0 – 10
B	10.1 – 20	10.1 – 15
C	20.1 – 35	15.1 – 25
D	35.1 – 55	25.1 – 35
E	55.1 – 80	35.1 – 50
F	80.1 or more	50.1 or more

Source: National Research Council 2000, Exhibits 16.2 and 17-2.

Traffic data were collected by the Applicant during typical weekdays in July 2011 for the two SR-78 and I-10 ramp intersections and in September 2014 for the other two SR-78 intersections (14th and 16th Avenues). The traffic counts include morning (7 to 9 am) and afternoon (4 to 6 pm) peak hour study intersection counts. The traffic counts collected in 2011 for the two SR-78 (Neighbours Boulevard) and I-10 ramp intersections have been updated to 2015 conditions (based on 2 percent annual growth).

Table 3.17-2 shows the intersection LOS and average delay results for the four key intersections under existing conditions, and in the peak year condition. All four intersections are unsignalized and are currently operating at LOS A.

Table 3.17-2. Peak Hour Intersection Conditions

Intersection	Existing		Peak Year	
	Average Delay (seconds/vehicle)	LOS	Average Delay (seconds/vehicle)	LOS
Morning (AM) Peak Hour				
1. SR-78 (Neighbours Blvd)/I-10 Westbound Ramps	9.1	A	9.2	A
2. SR-78 (Neighbours Blvd)/I-10 Eastbound Ramps	9.1	A	9.1	A
3. SR-78 (Neighbours Blvd)/14th Avenue	9.4	A	9.4	A
4. SR-78 (Neighbours Blvd)/16th Avenue	9.7	A	9.7	A
Afternoon (PM) Peak Hour				
1. SR-78 (Neighbours Blvd)/I-10 Westbound Ramps	9.2	A	9.2	A
2. SR-78 (Neighbours Blvd)/I-10 Eastbound Ramps	9.4	A	9.4	A
3. SR-78 (Neighbours Blvd)/14th Avenue	9.7	A	9.9	A
4. SR-78 (Neighbours Blvd)/16th Avenue	9.7	A	9.8	A

Source: URS 2016

Roadway Segments

Roadway segment counts for a 24-hour period were conducted during September 2014 for the four key road segments. Table 3.17-3 provides a summary of the existing and peak year road segment conditions, including existing average daily traffic (ADT), percentage of traffic from trucks, and LOS under existing and peak year conditions. As shown in the table, all roadway segments are below capacity with 30-38 percent of traffic from trucks. All study roadway segments are currently operating at LOS C.

Table 3.17-3. Roadway Segment Conditions

Roadway	Cross-section Classification	Roadway Capacity	Truck Percent	Existing Average Daily Traffic	Existing LOS	Peak Year Average Daily Traffic	Peak Year Base LOS
I-10 west of SR-78	4-lane freeway	68,900	38%	26,000	C	28,080	C
I-10 east of SR-78	4-lane freeway	68,900	37%	27,500	C	29,700	C
SR-78 south of I-10	2-lane undivided	16,200	30%	2,105	C	2,273	C
16th Avenue west of SR-78	2-lane collector	11,700	30%	117	C	126	C

Source: URS 2016

3.17.1.3 Project Access

Regional Access

I-10 is the nearest freeway to the Project site. It provides regional east/west travel throughout the state, beginning in Santa Monica, continuing through Los Angeles and east past the California state border to Arizona and beyond. In the vicinity of the Project area, I-10 has two lanes per direction. The posted speed limit is 70 miles per hour (mph), and trucks comprise 37 to 38 percent of traffic on I-10 (URS 2016b). SR-78 (Neighbours Boulevard, Exit 236) provides a full interchange with this freeway; the east and west I-10 ramps at SR-78 are stop sign controlled.

Local Access

The local roadway facilities in the vicinity of the Project area include SR-78 (Neighbours Boulevard) and 16th Avenue/Seeley Avenue.

SR-78 (Neighbours Boulevard) is a two-lane roadway running on a north/south alignment connecting to I-10 via an existing interchange (Exit 236). SR-78 contains one 12-foot-wide travel lane per direction and is divided by a double-yellow center line with paved shoulders. The posted speed limit on SR-78 is 55 mph, except through the Town of Ripley, where the speed limit is 45 mph. Land uses along SR-78 in the Project vicinity include rural residential, agricultural, and industrial land uses. SR-78 is also referred to by local street names including Neighbours Boulevard, 28th Avenue and Rannells Boulevard. SR-78 has been identified as a key critical segment by the Riverside County’s Congestion Management Program.

16th Avenue/Seeley Avenue is a two-lane roadway running on an east/west alignment connecting to SR-78 (Neighbours Boulevard). The proposed access route to the Project site is via 16th Avenue, which approximately 1.5 miles west of SR-78 becomes Seeley Avenue. Seeley Avenue is a generally unpaved dirt road providing access to local farms and the Project site.

Site Access

Access to the site would be from 16th Avenue/Seeley Avenue via SR-78. The Project site would be accessed directly from 16th Avenue/Seeley Avenue.

3.17.1.4 Public Transportation within the Vicinity of the Project

Public transportation within the vicinity of the Project consists of an airport, rail and bus services, and pedestrian facilities. Information about these forms of public transportation is provided below.

Airport Service

The nearest airport facility to the Project site is the Blythe Airport. Blythe Airport is a public facility located approximately 6 miles west of the City of Blythe and approximately 1.5 miles northeast of the Project site. The airfield has been open since 1940, when it was known as Bishop Army Airfield. The airport later became a part of Muroc Army Air Field, now known as Edwards Air Force Base.

Blythe Airport has two operating runways. Runway 8-26 (oriented east-west), the primary runway, is 6,543 feet long and 150 feet wide. Runway 17-35 (oriented north-south) is 5,800 feet long and 100 feet wide (AirNav.com 2015). Today, Blythe Airport is primarily used for general aviation (i.e., flights other than military and regularly-scheduled airline service and regular cargo flights).

Bus and Rail Service

Bus service is offered by the Palo Verde Valley Transit Agency (PVVTA) along SR-78 (Neighbours Boulevard) north and south of I-10. Bus route 3 runs along SR-78 (Neighbours Boulevard) south of I-10 towards Town of Ripley; this is the closest bus route to the Project site (Palo Verde Valley Transit Agency 2016).

There is no passenger rail service to Blythe.

Bicycle and Pedestrian Facilities

Bicycle facilities are generally classified as Class I (bicycle paths separated from roads), Class II (striped bicycle lanes within the paved areas of roadways), or Class III (signed bike routes that allow cyclists to share streets with vehicles). There are no bicycle facilities on or adjacent to the Project site (Riverside County 2010).

Pedestrian facilities include sidewalks, crosswalks, curb ramps, pedestrian signals, and streetscape amenities. The local roadways described above do not include any pedestrian facilities.

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3.18 Utilities and Public Services

This section describes the existing utilities and public services relevant to the Project. No utilities are available on-site. However, this section provides an overview of available infrastructure in the vicinity of the Project, as relevant to its construction, operation and maintenance, and decommissioning.

3.18.1 Environmental Setting

3.18.1.1 Utilities

A variety of sources in Riverside County and the City of Blythe provide and maintain utility and service system facilities associated with water, solid waste, electricity, and natural gas. Underground Service Alert (also known as USA or “Dig Alert”), a non-profit organization supported by utility firms, provides specific information on the location of underground utilities to contractors upon request, prior to ground-disturbing construction activities.

3.18.1.1.1 Water and Wastewater

The water supplies used for the Project area’s agricultural irrigation and the water supplies underlying the Project area (Palo Verde Mesa Groundwater Basin), are under the jurisdiction of the Palo Verde Irrigation District (PVID). Colorado River water, supplied through PVID canals, is lifted onto the mesa by private pumps to irrigate a portion of the acreage in the PVID. The remaining mesa irrigated acreage is irrigated from deep wells developed by the landowners. An investigation of the property identified two wells located on BLM land within the proposed Project area. These two wells were unsecured and open, and BLM has no knowledge of their origin or use. A third well was identified in the northeast corner of the private land parcel. This well was capped and located near irrigation piping, and may have formerly been used to provide irrigation for agricultural activities on the parcel (URS 2015).

The Project is located near the City of Blythe. The City of Blythe currently provides nearly 3,300 water service connections to customers, which are located within the City’s municipal boundaries. The City of Blythe is served by four individual water systems: City of Blythe proper water system, Mesa Bluffs water system, Hidden Beaches water system, and East Blythe County water district. Some rural residences within the City’s corporate boundary obtain their water from private wells (City of Blythe 2007). The City’s water supply is dependent upon a part of the Colorado River entitlement of the PVID. The City of Blythe lies entirely within the PVID service area, and the City’s water use is almost entirely accounted for as a part of PVID’s water use. PVID’s water supply is unique in California. The District holds the Priority 1 rights to California’s share of Colorado River water, and a shared portion of the Priority 3 rights, and their rights are not quantified by volume. Rather, their water rights are for irrigation and potable water needed to serve a total of 131,298 acres in the Palo Verde Valley, 26,798 of which are on the Palo Verde Mesa (PVID 2012).

The Project would require the use of water during both construction and operations. During construction, water would be used for fugitive control, soil compaction associated with site preparation and grading activities, sanitary purposes, and fire control. The Applicant estimates that the 25-month construction timeframe would require a total of approximately 1,400 AF of water, or 700 AFY, and that a 48-month construction timeframe would require approximately 1,800 AF of water, or 450 AFY. Water for construction would be supplied either through existing local wells, or through two newly installed wells. In the event an off-site water supply is required, construction water would be transported to the site by truck.

The City of Blythe owns and operates the Regional Wastewater Reclamation Facility, a Class III Facility, located at 15901 South Broadway in the City of Blythe. The City of Blythe also owns a sewage collection, treatment, and disposal system that provides sewage services to the City. The facility treats approximately 1.3 million gallons per day of dry weather flow. The facility is permitted to discharge up to 2.4 million gallons per day of treated wastewater to percolation / evaporation ponds (City of Blythe 2016).

Sanitary needs during construction would be served by the use of portable toilets. Portable toilets would be serviced by licensed contractors, and waste would be regularly pumped and hauled to proper disposal facilities. During operations, sanitary needs would be supplied by a septic system and leach field located near the O&M Building. The onsite sanitary system would require construction and annual operating Onsite Wastewater Treatment System (OWTS) permits from the County.

3.18.1.1.2 Solid Waste Management

The Riverside County Waste Management Department operates seven landfills, seven transfer stations, and a grinding facility within the County. The nearest landfills that serve the Project area include the Blythe Landfill at 1000 Midland Road, which is approximately 17 miles north of the Project site, and Desert Center Landfill at 17-991 Kaiser Road in Desert Center, which is approximately 40 miles west of the Project site (Riverside County Waste Management Department 2016).

3.18.1.1.3 Natural Gas and Electricity

Southern California Gas Company (SCGC) provides gas service to the City of Blythe and surrounding Riverside County. SCGC's service territory encompasses approximately 20,000 square miles in diverse terrain throughout Central and Southern California, from Visalia to the Mexican border.

Southern California Edison (SCE) provides electric service to residences and businesses in the City of Blythe and surrounding area. Currently, SCE has transmission lines ranging from 500 kV to local distribution service lines of 12 kV. A major 500 kV transmission corridor passes through Palo Verde Valley and connects the Southern California market with generating plants located in Blythe and in the state of Arizona.

3.18.1.1.4 Stormwater

At present there are no stormwater facilities located on-site or in the immediate vicinity of the Project. Construction of the Project would include development of stormwater controls to manage runoff around and/or within the Project site.

3.18.1.2 Public Services and Facilities

This subsection describes public services and facilities in the Project area, which includes education; law enforcement; fire protection; hazardous materials emergency response; hospital facilities and emergency response; utilities; natural gas and electricity; water and wastewater; and solid waste.

3.18.1.2.1 Education

The Project area is located within the Palo Verde Unified School District. Palo Verde Unified School District serves Blythe and other remote areas of Riverside County and consists of three elementary schools, two middle schools, one high school, and a continuation high school. Palo Verde Unified School District is the district with authority to assess school impact fees from the Project. Table 3.18-1 includes the schools and enrollment in Palo Verde Unified School District.

Table 3.18-1. Summary of Schools and Enrollment in Palo Verde Unified School District, 2014-2015

School Name	Community	Grades	Location	Number of Students
Felix J. Appleby Elementary School	Blythe	K – 6	401 S. Third Street	555
Margaret White Elementary School	Blythe	K – 6	610 N. Broadway	607
Ruth Brown Elementary School	Blythe	K – 6	241 N. Seventh Street	625
Blythe Middle School	Blythe	7 – 8	825 N. Lovekin Blvd.	499
Palo Verde Valley Community Day	Blythe	6 - 10	190 North Fifth Street	12
Palo Verde High School	Blythe	9 - 12	667 N. Lovekin Blvd.	933
Twin Palms Continuation	Blythe	9 - 12	811 West Chanslor Way	101

Source: National Center for Education Statistics 2016.

3.18.1.2.2 Law Enforcement

BLM, the City of Blythe, and the Riverside County Sheriff's Department provide law enforcement and public safety in the Project area. The City of Blythe Police Department (BPD) is located at 240 North Spring Street in Blythe and its service area covers all land in the City limits, which is approximately 27 square miles. The Riverside County Sheriff's Department services include traffic control and neighborhood policing, emergency calls, and crime prevention. The Riverside County Sherriff's Department's Colorado River Station at 260 North Spring Street in Blythe provides service from the community of Red Cloud to the west to the Arizona state line in the east, Imperial County line to the south, and San Bernardino County line to the north. Communities included in this service are Desert Center, Eagle Mountain, Blythe, Hayfield, Midland, Nicholls Warm Springs, Ripley, and the Colorado River area. The California Highway Patrol (CHP) is the primary law enforcement agency for state highways and roads. The nearest CHP station to the Project area (Blythe Station 660) is located at 430 S. Broadway in the City of Blythe. Services include law enforcement, traffic control, accident investigation, and the management of hazardous materials spill incidents.

3.18.1.2.3 Fire Protection

The Riverside County Fire Department (RCFD)/California Department of Forestry (CAL FIRE) would provide fire protection to the Project site. The Bureau of Land Management California Desert District has responsibility for wildland fire protection in the Project area. The Project area is located within the RCFD's East Desert Division, which encompasses the lower Coachella Valley, east to the Arizona state line. RCFD services include municipal and wildland fire protection and prevention services, pre-hospital emergency medical services including paramedics, hazardous materials response, and technical rescue services. There are two battalions, nine permanently staffed fire stations, and two all-volunteer fire stations. The nearest fire stations are within the jurisdiction of RCFD Battalion 8. These include the Blythe, Ripley, Blythe Air Base, River Bend, and Lake Tamarisk fire stations. The closest station to the Project site area is Ripley Fire Station 44, on 13987 Main Street, approximately five miles away. This station has two firefighters and one certified paramedic. Ripley Fire Station 44 has one Type 1 fire engine and operates 24 hours per day, seven days a week.

The Project area falls within acceptable Total Response Time policy standards for an 'outlying' land use area based on its proximity to the nearest station (Station 45, Blythe Air Base, 17280 W. Hobson Way, Blythe, CA 92225) and that station's ability to meet the seventeen minute and 30 second response time standard. Additionally, the Project site is in close proximity to the City of Blythe Volunteer Fire Department.

Other nearby fire stations are Blythe Air Base Fire Station 45, Blythe Fire Station 43, River Bend Fire Station 46 (volunteer only), and Lake Tamarisk Fire Station 49 in Desert Center. Each of these fire stations has one Type 1 fire engine and provides paramedic services. Each of these fire stations has three personnel (two firefighters and one certified paramedic), with the exception of Lake Tamarisk, which has four personnel (two firefighters and two certified paramedics). The River Bend volunteer station is a reserve volunteer station and does not operate 24 hours per day, seven days a week. This station provides reserve personnel in case of an emergency but does not respond directly to an emergency. All stations are dispatched by CAL FIRE Riverside Unit/RCFD Emergency Command Center under the integrated Fire Protection System. All BLM California Desert District stations are dispatched through the Federal Interagency Communications Center.

3.18.1.2.4 Hazardous Materials Emergency Response

The Riverside County Hazardous Materials Management Division under the Department of Environmental Health is the Certified Unified Program Agency/Administering Agency (CUPA), with three participating agencies: Banning Fire Department, Corona Fire Department, and the RCFD. The CUPA Program conducts inspections of businesses that handle hazardous materials, generate hazardous waste, treat hazardous waste, and/or maintain underground storage tanks. RCFD would handle the response to emergency releases of hazardous material or waste for the Project. The closest RCFD Hazardous Materials Response Team (Station 81) is located at 37995 Washington Street in Palm Desert, California. Station 81 will respond with one Hazardous

Materials Response Unit staffed with three personnel and one Hazardous Materials Support Unit staffed with two personnel. One member of the five-person team is a certified paramedic.

3.18.1.2.5 Hospital Facilities and Emergency Response

There are several hospitals/medical facilities that provide medical services to the vicinity of the Project area. Table 3.18-2 below provides a summary of the following hospitals that provide medical services in eastern Riverside County, including the Project area. Desert Regional Medical Center is the closest trauma care center to the Project area and the only trauma center in the Coachella Valley. It is a Level II trauma center and provides a full range of specialists and services available 24 hours a day. Palo Verde Hospital provides intensive care services.

The CHP's Border Division Air Operations Unit, located at the Thermal California Station, may respond to a traumatic injury occurring in the Project area that requires medical evacuation via helicopter. However, the CHP usually covers Medevac situations in the area surrounding Palm Springs and rarely in the Blythe area. There are a number of additional Medevac companies that service the Project area. If a serious emergency medical incident were to occur at the solar array field, the paramedic or first responder would call in the emergency. Based on rotation and proximity, a Medevac service would be dispatched to the solar array field for evacuation to Desert Regional Medical Center in Palm Springs. The companies that provide Medevac services to the Project area are Merci Air Service, Reach Helicopter, Care Flight, and the CHP.

Blythe Ambulance, located at 129 South 1st Street in Blythe, also provides emergency medical response services in the Project area. This facility is located approximately seven miles east of the Project area.

Table 3.18-2. Hospitals and Clinics Serving the Project Area

Facility	Approximate Distance from Project Area	Services Provided
Palo Verde Hospital 250 North First Street Blythe, California 92225	7 miles northeast	Hospital, blood bank, computerized tomography scan, intensive care unit, labor/delivery/recovery rooms, magnetic resonance imaging, nuclear medicine, outpatient services, ultrasound.
La Paz Medical Services 150 East Tyson Road Quartzsite, AZ 85359	30 miles east	General medical services and treatments.
John F. Kennedy Memorial Hospital 47111 Monroe Street Indio, CA 92201	85 miles west	Hospital, cardiac and vascular, orthopedics and JFK Bone and Joint Institute, obstetrics, outpatient rehabilitation, women and children, emergency department, emergency and express care.
Desert Regional Medical Center 1150 N. Indian Canyon Drive Palm Springs, CA 92262	105 miles west	Hospital, comprehensive cancer center, inpatient rehabilitation, institute of orthopedics and neurosciences, women and infants center, wound center, hospice, surgery, emergency/trauma services, cardiac/heart care, anesthesiologists, and physical therapists.

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3.19 Visual Resources

Visual resources are the natural and/or man-made elements of the landscape that contribute to the aesthetic and/or scenic character and quality of the environment. This section describes the environmental setting in regards to aesthetics, visual resources, glare, and reflection for the proposed Project and alternatives. BLM's visual resources inventory provides information regarding the scenic quality, visual sensitivity and visibility of the Project site.

3.19.1 Environmental Setting

3.19.1.1 Regional Setting

The Project would be located on the Palo Verde Mesa in the southern section of the Basin and Range Physiographic Province in Riverside County, California. The Palo Verde Mesa is relatively flat, with occasional desert washes and decreases in elevation toward the Palo Verde Valley to the southeast. The Palo Verde Mesa is bordered on the north by the McCoy Mountains, and on the southwest by the Mule Mountains. The mountain ranges in the area trend northwest to southeast, and create a natural barrier between the Colorado River and the greater Colorado Desert.

3.19.1.2 Visual Character

The visual character of the regional landscape depends on visual variables such as season, climate, atmospheric and lighting conditions, cultural modifications, and the visibility, presence, and extent of character-defining visual features. The visual quality of the landscape, visual variables, and the manner in which a viewer experiences the landscape setting (i.e., the cumulative impression felt by different types of users traveling through an area) are all factors that combine to produce visual experiences that are unique to the Project, and difficult to quantify. However, the visual character of the region can be broadly generalized within two primary contexts: the natural landscape and the built environment (i.e., areas where cultural modifications dominate, or nearly dominate the visual character of an area).

The natural landscape of the Project area is generally characterized by large expanses of desert and agricultural croplands. The Project area on the Palo Verde Mesa is relatively flat, but the nearby Mule and McCoy Mountains provide scale, variety, interest, and enclosure to the broader landscape. The Mule and McCoy Mountains are recognized by the Palo Verde Valley Area Plan as rugged visual landmarks that accent the area's environment (Riverside County 2015b). Vegetation in the Project area is primarily composed of creosote scrub and open desert. Agricultural land east of the Project area includes a variety of cultivated crops and provides a visual contrast compared to the arid desert west, south and north of the Project area. The Colorado River is located east of the Project area and is considered a substantial recreation and tourist attraction (Riverside County 2015b).

The built environment visible from within the vicinity of the Project includes residences, the Blythe Airport, the Blythe Energy Center, the Modified Blythe Solar Power Project (BSPP), the Colorado River Substation (CRSS), electrical transmission lines, and commercial businesses that are primarily located east, north and south of the Project area. Interstate Highway 10 (I-10), which has status as an Eligible County Scenic Highway, passes north of the Project site in an east-west alignment.

Based on the Project site, viewer groups, the location of public roadways, BLM facilities, and other public vantage points, eight key observation points (KOPs) were chosen in consultation with the BLM. The purpose of the KOPs was to capture representative views of the Project site to be used in visual simulations of the Project, and as an aid in preparing visual contrast ratings of the Project. The locations of the KOPs are shown in Figure 3.19-1; however, the visual characteristics of each viewpoint and the Project-related visual contrast are fully detailed in Section 4.19.

3.19.1.3 Existing Light and Glare

Based on the relatively undeveloped nature of the surrounding landscape, there are very few sources of light associated with the Project area. The primary source of light and glare in the area is motor vehicles traveling on surrounding roadways and from residences in Nicholls Warm Springs/Mesa Verde. During daytime hours, roadways generate glare from the sun’s reflection off cars and paved surfaces. Likewise, at night, vehicle headlights on surrounding roadways generate light and glare. Lighting is also located on the Blythe Energy Center site; at the Blythe Airport to alert aircraft of potential hazards in their flight path; and at Palo Verde College.

3.19.1.4 Approach to Baseline Analysis

BLM’s Visual Resource Management (VRM) Policy is the agency’s implementation of requirements from FLPMA and NEPA for managing scenic resources. Pursuant to FLPMA, BLM has developed and applied a standard visual assessment methodology to inventory and manage scenic values on lands under its jurisdiction. BLM Manual 8400-Visual Resource Management (BLM 1984), Handbook 8410-Visual Resource Inventory (BLM 1986a), and Manual 8431-Visual Resource Contrast Rating (BLM 1986b) set forth the policies and procedures for determining visual resource values, establishing management objectives, and evaluating Proposed Actions for conformance to the established objectives for BLM-administered public lands. The following describes the three primary elements of the BLM’s VRM Policy.

Determining Visual Resource Values

The primary means to establish visual resource values are to conduct a Visual Resource Inventory (VRI), as described in BLM Handbook H-8410. There are four VRI Classes (I to IV) assigned as a representation of the relative visual value. VRI Class I has the highest value and VRI Class IV has the lowest. VRI Class I is assigned to areas where a management decision was previously made to maintain a natural landscape, such as wilderness areas, wild sections of wild and scenic rivers, and other congressionally and administratively designated areas such as visually sensitive ACECs. Visual resource values are determined through a systematic process that documents the landscape’s scenic quality, public sensitivity, and visibility. Rating units for each of these factors are mapped individually, evaluated, and then combined through an over-layering analysis using GIS. The three factors are briefly described below.

Scenic Quality: Scenic Quality Rating Units (SQRUs) are delineated based on common physiographic characteristics of the landscape. There are seven criteria used for inventorying the landscape's scenic quality within each SQRU: landform, vegetation, water, color, influence of adjacent scenery, scarcity, and degree of cultural modification. Each factor is scored for its respective contribution to the scenic quality, the scores are summed, and the unit is given a rating of A (highest), B, or C (lowest) based on the final score.

Sensitivity Level: Sensitivity Level Rating Units (SLRU) are delineated and evaluated for public sensitivity to landscape change. Criteria used for determining level of sensitivity within each unit includes types of use, amount of use, public interest, adjacent land uses, special areas, and other factors. Each criterion is ranked high, medium, or low and an overall sensitivity level rating is then assigned to the unit.

Distance Zones (visibility): The third factor is visibility of the landscape evaluated from where people commonly view the landscape. The distance zones are divided into foreground/middleground (0 to 5 miles); background (5 to 15 miles); and seldom seen (beyond 15 miles or topographically concealed areas within the closer range distance zones).

The relationships between the rated values of scenic quality, sensitivity level, and visibility are cross-referenced with the VRI Matrix to determine the VRI Class, as shown in Table 3.19-1. VRI classes are informational in nature and provide the basis for considering visual values in the RMP process. They are considered the baseline data for existing conditions.

Table 3.19-1. Determining Visual Resource Inventory Classes

		Sensitivity Level								
		High			**Medium**			**Low**		
Special Areas		I	I	I	I	I	I	I	I	I
Scenic Quality	A	II	II	II	II	II	II	II	II	II
	B	II	III	III/IVa	III	IV	IV	IV	IV	IV
	C	III	IV	IV	IV	IV	IV	IV	IV	IV
		Fg/mg	Bg	Ss	Fg/mg	Bg	Ss	Fg/mg	Bg	Ss
		Distance Zones								

Notes:
a. If adjacent area is Class III or lower, assign Class III, if higher assign Class IV.
Fg/mg=Foreground/Middleground
Bg=Background
Ss=Seldom seen
Source: BLM 1986a

Establishing Management Objectives

VRM Classes, defined in Table 3.19-2, are determined by considering the assigned VRI Class (visual values) along with resource allocations or special management decisions made in the applicable RMP. Management objectives for each VRM Class set the level of allowable visual change to the landscape that may be permitted for any surface-disturbing activity. The objective of VRM Class I is to preserve the character of the landscape, whereas VRM Class IV provides for activities that require major modification to the landscape.

Table 3.19-2. Visual Resource Management Classes

VRM Class	Objective
Class I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
Class II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
Class III	The objective of this class is to partially retain the existing character of the landscape. The level of change to characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
Class IV	The objective of this class is to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Source: BLM 1986a

The VRM classes are a land use plan decision and mandate how the visual environment is to be treated in future land management actions and subsequent site-specific implementation decisions. The VRM classes are to be designated for all BLM-administered lands. The VRM class designations may be different than the VRI classes assigned in the inventory. For example, an area with a VRI Class II designation may be assigned a VRM Class IV designation, based on its overriding value for mineral resource extraction, or its designation as a utility corridor.

The applicable RMP for the Project is the CDCA Plan. The CDCA Plan does not contain a visual resource element and has not established VRM Classes. Interim VRM Classifications are typically established when a project is proposed and there are no RMP or Management Framework Plan-approved VRM Classifications. If the area is also without a VRI, then one must be conducted in order to provide a baseline of data by which to analyze impacts and to consider when establishing Interim VRM Classes. The Interim VRM Class for the Project area is discussed in Section 3.19.1.6.

Evaluating Proposed Actions

Proposed plans of development are evaluated for conformance to the VRM Class objectives through the use of the Visual Resource Contrast Rating process set forth within BLM Manual 8431. Because this concerns the environmental consequences of the Proposed Action, this process is further described and applied in Section 4.19.

3.19.1.5 Visual Resource Inventory of the Project Area

The visual resource characteristics of the Project area are summarized in the Applicant's Visual Resources Technical Report (URS 2016c), provided as Appendix U.

Sources of Visual Resource Inventory Data

The BLM Palm Springs Field Office recently conducted a large-scale visual resource inventory of BLM-administered lands extending east from Palm Springs to the Arizona border. This inventory is used as the source of baseline data (BLM 2010).

Scenic Quality Rating

Scenic quality is a measure of the visual appeal of an area created by the features of the landscape, including both natural landscape features (landform, vegetation, water, color, adjacent scenery, and scarcity) and man-made features (roads, structures, and agriculture). The scenic quality of the landscape was assessed based on the criteria used in the BLM VRM system's Visual Resource Inventory (VRI) scenic quality rating system, described in BLM Handbook H-8410, Visual Resource Inventory (BLM 1986a). Criteria including distinctiveness, contrast, variety, harmony, and balance are assessed and scenic quality classes A, B, or C are assigned. Scenic quality classes are defined as follows:

> **Class A:** Areas have outstanding diversity or interest; characteristic features of landform, water, and vegetation are distinctive or unique in relation to the surrounding region. These areas contain considerable variety in form, line, color, and texture.
>
> **Class B:** Areas have above-average diversity or interest, providing some variety in form, line, color, and texture. The natural features are not considered rare in the surrounding region but provide adequate visual diversity to be considered valuable.
>
> **Class C:** Areas have minimal diversity or interest; representative natural features have limited variation in form, line, color, or texture in the context of the surrounding region. Discordant cultural modifications (e.g., substations, transmission lines, other cultural modifications) can be highly noticeable, which can reduce the inherent value of the natural setting.

The Project area overlaps six Scenic Quality Rating Units (021 (Chuckwalla Valley), 026 (McCoy Mountains), 036 (Blythe Valley), 037 (Palo Verde), 038 (Mule Mountains), and 039 (Little Chuckwalla Mountains)). Four of these units are rated Class B and two (026 (McCoy Mountains) and 037 (Palo Verde)) are rated Class C due to lack of naturalness (BLM 2010).

Visual Sensitivity

Visual sensitivity is defined as a measure of public concern for scenic quality (BLM 1986a). Sensitivity Level Rating Units (SLRUs) represent a geographic area where public sensitivity to change of the visual resources is shared amongst constituents. Visual sensitivity ratings within each SLRU are estimated as high, moderate, or low.

The Project site is located in SLRU 49, Bradshaw Trail Backcountry Byway. Visual sensitivity in this SLRU was classified as high, primarily due to presence of the Byway, high OHV use, and importance of maintaining scenic quality to sustain land use objectives of neighboring

Wilderness areas, ACECs, and military ranges. There are three SLRU's adjacent to the Project site, two of which (McCoy and Little Chuckwalla Mountains) have visual sensitivity classified as medium and one (Mule Mountains) classified as high visual sensitivity (BLM 2010).

Visibility and Distance Zones

Distance zones, or visibility thresholds, for this Project were based on a review of distance zones used by the BLM for VRI assessment (BLM 1986a). Distance zones represent the distance from which the landscape is most commonly viewed and are established by buffering common travel routes and viewer locations at distances of 5 miles and 15 miles.

The Project site is located in the foreground-middleground distance zone, indicating visibility of this area from locations within 0 to 5 miles from viewing platforms. Primary viewing platforms include I-10 and SR-78 (BLM 2010).

3.19.1.6 Interim Visual Resource Management Class Recommendation

As discussed above, currently no VRM Classes are established for lands under BLM jurisdiction within the CDCA Plan area, and VRM classes differ from VRI Classes in that they represent decisions about how the land will be managed in conjunction with resource allocations and management priorities outlined in the applicable RMP. The designation and adoption of Interim VRM classes conducted in support of a specific project is a BLM Field Office Manager decision. The Project site is located in an area designated as VRI Class II, indicating high scenic value. However, the BLM Field Office Manager has assigned a Class III Interim VRM Objective to the Desert Quartzite Solar Project footprint (Dalton 2015).

3.20 Water Resources

This section describes the existing groundwater and surface water resources in the vicinity of the Project site. In addition to describing the existing conditions, this analysis examines the affected environment within the Project footprint and vicinity, where appropriate.

3.20.1 Environmental Setting

The Project would be located on the Palo Verde Mesa in the Mojave Desert Physiographic Province in Riverside County, California. The physiography of the area consists of mountains, alluvial fans, alluvial fan remnants, and alluvial valleys, including active drainages and fluvial terraces, and internally drained basins. Elevations in the Project vicinity range from 260 feet amsl near the Colorado River to 2,054 feet amsl on McCoy Peak. The portion of the Project area located on BLM land is currently undeveloped. The 160-acre private parcel was previously the location of a jojoba farm.

The Project area is located in the largely alluvial-filled basin of the Palo Verde Mesa in eastern Riverside County bounded by the Big Maria and Little Maria mountains to the north, the McCoy and Mule Mountains to the west, and the Palo Verde Mountains to the south. Beneath the Palo Verde Mesa lies the Palo Verde Mesa Groundwater Basin (PVMGB), which is bounded by non-water-bearing rocks of the mountains to the north, west, and south, and by the Palo Verde Valley and Colorado River to the east. The PVMGB encompasses an area of about 353 square miles or 226,000 acres, is tributary to the lower Colorado River, and is part of the Colorado River aquifer (DWR 2004).

Surface water drains onto the Project site from the surrounding mountains to the north, south, and west, then towards the Colorado River to the east. Although the drainage flows in the direction of the Colorado River, the drainages were determined by the USACE to be ephemeral, intrastate, isolated waters, and not under the jurisdiction of the USACE. There are no perennial streams on the Palo Verde Mesa. A topographic map of the Project site is shown in Figure 2-7. The Project area consists of two distinct types of topography which affect site drainage. The northwestern portion of the Project area, comprising approximately half of the overall Project site, is part of an alluvial fan which slopes in a southeastward direction from the McCoy Mountains, which are located to the northwest. The I-10 highway crosses this alluvial fan in between the mountains and the Project site, so the natural flow of the alluvial fan is interrupted, passes through concentrated channels underneath a highway bridge, and then becomes dispersed again as it continues its route across the alluvial fan between I-10 and the Project site.

The southeastern portion of the site is a flat plateau, part of the Palo Verde Mesa. This area receives drainage from the alluvial fan to the northwest, but also from an alluvial fan system coming from the Mule Mountains to the southwest of the Project area. The ground surface in this area is characterized by a series of depressions in which surface water can pool temporarily. A drainage divide crosses from north to south through the eastern portion of the Project area. The depressions west of this divide drain surface water to the west and southwest, meeting the flow from the Mule Mountains and eventually draining off of the mesa to the southeast, towards the Colorado River. The depressions to the east of this divide drain directly to the east, towards the Colorado River.

The southeastern edge of the Project site is parallel to, and within a few hundred feet of, the sharp break in the slope that forms the boundary between the Palo Verde Mesa and the Palo Verde Valley, which is 80 to 130 feet below the mesa. In this region, the Palo Verde Valley is roughly equivalent to the recent historic floodplain of the Colorado River.

3.20.1.1 Groundwater

The Project site is located within the Palo Verde Mesa Groundwater Basin (PVMGB, Groundwater Basin Number 7-39), which has a drainage area of approximately 353 square miles. The basin is bounded by the Big Maria and Little Maria Mountains to the north, McCoy Mountains and Mule Mountains to the west, the Palo Verde Mountains to the south, and the Palo Verde Valley Groundwater Basin (PVVGB, Groundwater Basin Number 7-38) to the east. Average annual precipitation in the basin is six inches. Groundwater in the PVMGB is present in alluvial deposits consisting of lenticular beds of sand, gravel, silt, and clay. There are no known barriers to groundwater flow. Recharge is from the percolation of runoff which flows into the basin from the surrounding mountains, irrigation return flow, infiltration from canal seepage, direct precipitation in the basin, and underflow from the adjacent Chuckwalla Valley. Natural recharge is estimated to be 800 AF per year, and underflow from the Chuckwalla Valley is estimated to be 400 AFY. The total groundwater storage capacity is estimated at 6,840,000 AF.

According to groundwater level data acquired to support the analysis of the MSEP, depth-to-groundwater near the Project area ranges from approximately 148 feet below the surface just north of the Blythe Airport, to approximately 83 feet below the surface near the intersection of Hobson Way and Keim Boulevard. Groundwater levels are influenced by seasonal variations, variations in ground surface topography, precipitation, irrigation practices, soil/rock types, groundwater pumping, and other factors and are subject to fluctuations.

Water Bearing Units

The youngest major units in the Palo Verde region, the Older Alluvium and Younger Alluvium, were deposited by the Colorado River, and are the primary water-bearing units of the local aquifer system. The Older Alluvium comprises all of the known groundwater system deposits of the Palo Verde Mesa and extends beneath the Palo Verde Valley, underlying the Younger Alluvium. The Older Alluvium is much thicker than the Younger Alluvium, reaching thickness of 600 feet beneath the central portion of the valley and the mesa and pinching out along the bordering bedrock mountains.

The Pliocene Bouse Formation underlies the Quaternary sediments. The Bouse Formation includes a marine to brackish-water estuarine sequence deposited in an arm of the proto-Gulf of California (Wilson and Owen-Joyce 1994; Metzger 1968). This formation has alternatively been interpreted as, or may include, lacustrine sediments deposited in a closed, brackish basin (Stone 2006). These unconsolidated to semi-consolidated sediments are reported to yield several hundred gpm in wells perforated within coarse-grained units (Wilson and Owen-Joyce 1994).

The following information is from Metzger et al. (1973). The Bouse Formation is unconformably underlain by a fanglomerate composed chiefly of angular to subrounded and poorly sorted, partially to fully cemented pebbles with a sandy matrix. The fanglomerate is likely of Miocene age; however, it may in part be of Pliocene age. Bedding surfaces generally dip from the mountains towards the basin. The fanglomerate reportedly dips between 2 and 17 degrees near the mountains due to structural warping. The amount of tilting indicates a general decrease in structural movements since its deposition.

Bedrock beneath the site consists of metamorphic and igneous intrusive rocks of pre-Tertiary age that form the basement complex (Metzger et al. 1973). The bedrock topography in the study area has not been determined but appears to lie at depths exceeding 1,000 feet below ground surface (bgs) in Parker Valley which is located over 3 miles northeast of the Project site, and thus bedrock is not likely to be a significant source of water (Metzger et al. 1973).

Aquifer Characteristics

In their development of a two-dimensional superposition model for the Parker-Palo Verde-Cibola area, which includes the PVMGB, Leake et al. (2008) evaluated published aquifer testing data and through statistical analysis derived a range of transmissivity values from a low value of 6,300 ft^2/day to an average value of 26,200 ft^2/day. They selected a storage coefficient of 0.20 to approximate aquifer conditions throughout their model domain, which includes the Chuckwalla Valley Groundwater Basin (CVGB) and the PVMGB.

Metzger et al. (1973) provided historical data from pumping tests that were conducted in the 1960s on wells in the PVMGB. They reported transmissivity values ranging from 64,000 to 1,900,000 gallons per day per foot (gpd/ft) of aquifer thickness (or 8,756 to 254,600 ft^2/day), specific yields from 100 to 2,180 gallons per minute per foot of drawdown, and hydraulic conductivities ranging from 210 to 12,300 gallons per day per square foot (gpd/ft^2). The data are summarized in Table 3.20-3. Groundwater production, from wells completed in the PVMGB, averages 1,650 gpm (DWR 1979). The DWR (1979) indicated that large well yields are common for properly designed and developed wells near the edge of the Palo Verde Valley floodplain, which is east of and adjacent to the PVMGB.

Well yields in the rest of the PVMGB, where sand is the dominant lithology, are lower. Yields greater than 1,000 gpm are reported in wells in the McCoy Wash area. The depth of these wells range from 250 to 600 feet and the wells are 12 to 16 inches in diameter (DWR 1979).

Groundwater Occurrence and Movement

The groundwater below the Project site in the central part of the mesa occurs under apparently semiconfined conditions in the older alluvium at a depth of about 200 feet bgs. In their estimate of groundwater storage, the DWR (1979) used an assumed average saturated thickness of 300 feet and a specific yield of 10 percent for the PVMGB to derive a usable storage of about 5 million AF, with about half of the usable storage estimated to be in the McCoy Wash part of the basin. In subsequent reports, the DWR (2003) listed the groundwater in storage for the basin as “unknown” although the total storage capacity in the basin was estimated to be approximately 6,840,000 AF.

As described in Section 3.7, *Geology and Soils Resources*, the Project site is not crossed by any known active faults or designated Earthquake Fault Zones. No known barriers or faults inhibit the flow of groundwater in the PVMGB (DWR 1978; DWR 2003).

Based on water level elevation contours for the PVMGB and PVVGB drawn from year 2000, the groundwater flows to the southeast towards the Colorado River. Based on the 2000 water level data in the USGS and DWR databases (USGS 2009; as cited in BLM 2010), the hydraulic gradient is about 0.007 ft/ft.

A key feature of the groundwater occurrence and flow within the PVGB is the Palo Verde Irrigation District (PVID) drains situated in the Palo Verde Valley, between the Palo Verde Mesa on the west and the Colorado River on the east. The PVID provides water from the Colorado River to agricultural users in the area, and operates a series of canals which extend through the agricultural areas to the north and west of Blythe. The drains serve to recharge groundwater through leakage, and also serve as a discharge location for groundwater, which is then discharged back to the river through the drains. The water volumes involved comprise a large proportion of the overall groundwater budget for the PVGB.

Historic Groundwater Levels and Flow

AECOM (2009) reported that the water level data from 1971 show local variations in water level contours in the area, which reflects localized pumping in support of agriculture. Water level data from 2000 show that the water levels had recovered in the area due east of the site, and show a southerly flow of groundwater coincident with the flow in the Colorado River. Recovery of groundwater levels may have also been influenced by the application of canal water to mesa crops by PVID, in order to manage salinity. Groundwater flow in the PVMGB is from the north, southeast through McCoy Wash at a gradient of 0.001 ft/ft, then south-southwest at gradients of between about 0.0003 and 0.0008 ft/ft in a direction coincident with the flow of the Colorado River (AECOM 2009).

AECOM (2009) reported that hydrographs indicate that the water level in the PVMGB has generally remained stable over the past few decades, except in areas immediately adjacent to some pumping wells. In well Township 4 Range 21 Section 9B1 at the north end of the PVMGB, groundwater elevation remained unchanged from 1971 to 2000. In wells north of the DQSP site, groundwater elevations have decreased about 5 feet in well Township 5 Range 22 Section 31E1 from 1966 to 2000 and in well Township 6 Range 22 Section 32R1 from 1947 to 2006. The relatively stable groundwater levels that have been measured over this period suggest that groundwater withdrawal from the underlying aquifer has not significantly changed the water balance within the PVMGB. This is probably in large part due to recharge of water from the Colorado River (AECOM 2009).

Groundwater levels are also evaluated using the Colorado River Accounting Surface methodology proposed by the USGS (USGS 2009). A review of the Figure 6 in the USGS analysis shows that the Accounting Surface elevation in the vicinity of the Project is approximately 237 feet above sea level. From Figure 5 in the Groundwater Modeling Report (URS 2016d), the groundwater elevation in the Project area is approximately 245 to 250 feet above sea level. A value of 245 feet above sea level for the PVMGB is also used in the analysis of the impact of solar project development in the East Riverside SEZ by Greer et. al. (2013).

Groundwater Balance

Table 3.20-1 presents the estimated annual groundwater budget for the PVGB, and the following subsections describe the inflow and outflows associated with the basin. The groundwater balance was developed in support of the groundwater impact analysis for the MSEP (BLM 2012b). In support of the DQSP analysis, the Applicant's technical contractor and BLM staff have reviewed the groundwater balance, and concur that it still accurately reflects the groundwater conditions in the PVGB. The balance presented in Table 3.20-1, and the following discussion of the various inflows and outflows, are derived from the MSEP analysis.

Recharge into PVGB

Recharge of groundwater in the PVGB consists of a combination of discharge of Colorado River surface water into the groundwater, leakage from the PVID canal system, infiltration of water applied to irrigate crops, percolation of precipitation, subsurface underflow from adjacent groundwater basins, and percolation from the Blythe Wastewater Reclamation Facility.

Of these sources of recharge, the largest is discharge of surface water from the Colorado River, accounting for more than half (225,850 AFY) of the total 426,600 AFY of recharge into the PVGB. An estimated 120,000 AFY is returned to the PVGB from leakage from irrigation canals. Both of these sources are located in the eastern part of the PVGB, which is the PVVGB.

Infiltration of water used to irrigate crops is the next largest component of the recharge to the PVGB. Again, most of this infiltration (67,000 AFY) occurs in the PVVGB area, and a much smaller amount (3,500 AFY) occurs on the PVMGB. Of the infiltration on the PVMGB, approximately 3,600 AFY of groundwater is directly pumped from wells on the mesa for irrigation use on 724 acres of agricultural land. In addition, the PVID pumps surface water uphill from the irrigation canal system in the Palo Verde Valley to irrigate 1,862 acres on the Palo Verde Mesa. The groundwater assessment prepared for the MSEP used estimates of 4.5 to 5.85 AF/ac/year and a crop efficiency of 70 to 75 percent on these combined 2,683 acres on the mesa. Assuming that 25 to 30 percent of the water applied to crops infiltrates and recharges the groundwater basin, an estimated 3,600 AFY recharges the PVMGB from irrigation return flow.

In this area of the Colorado Desert, almost all moisture from rain is lost through evaporation or evapotranspiration and runoff occurs principally during intense thunderstorms. Most recharge from precipitation occurs when runoff from the surrounding mountains exits bedrock canyons and flows across the coarse sediments deposited along the western edge of the PVMGB. In the MSEP analysis, methods to estimate runoff proposed by Hely and Peck (1964) were used to estimate mean annual runoff and infiltration in the PVMGB. From the estimated total runoff for the PVMGB, an estimate of five percent of the estimated total volume of rainwater from mean annual precipitation was used to generate an estimate of total annual infiltration volume (AF) for the basins. This analysis estimated 5,000 AFY of groundwater recharge from precipitation.

Underflow from adjacent groundwater basins contributes approximately one percent of the overall recharge of groundwater in the PVGB. Subsurface inflow from the CVGB eastward into the PVMGB is estimated to be 1,000 AFY, and subsurface inflow into the PVGB from the Parker Valley Groundwater Basin on the east is estimated to be 3,500 AFY.

The smallest contributor to groundwater recharge in the PVGB is percolation of an estimated 750 AFY from the percolation-evaporation ponds at the Blythe Regional Water Reclamation Facility.

Table 3.20-1. Estimated Annual Groundwater Budget in the Palo Verde Valley Groundwater Basin

Budget Components	Budget (AFY)
Recharge (Inflow)	
Underflow from Chuckwalla Valley Groundwater Basin	1,000
Underflow from Parker Valley Groundwater Basin	3,500
Agricultural Return – Mesa	3,500
Agricultural Return – Valley	67,000
Percolation from Blythe Wastewater Reclamation Facility	750
Percolation from Mountain Front Precipitation	5,000
PVVGB Irrigation Canal Leakage (less evaporation)	120,000
River Discharge to PVVGB Groundwater (Losing Condition)	225,850
Bedrock	0
Total Inflow	**426,600**
Discharge (Outflow)	
Underflow out of the Palo Verde and Cibola Valley Aquifer	0
Groundwater Pumping for Agriculture – Mesa	3,600
Groundwater Pumping for Municipal and Domestic Use	7,500
PVVGB Groundwater Discharge to Colorado River (Gaining)	50,000
Consumptive Use – Native Vegetation	8,500
PVVGB Groundwater Discharge through PVID Drains	357,000
Total Outflow	**426,600**
Budget Balance (Inflow-Outflow)	**0**

Source: URS 2016d

Outflow from PVGB

The largest component of outflow of groundwater from the PVGB is discharge to the PVID drains, which return the water to the Colorado River. The drains comprise approximately 83.7 percent (357,000 AFY) of the total 426,600 AFY outflow from the PVGB. An additional 50,000 AFY (another 11.7 percent) is returned from the groundwater to the river through groundwater discharge in gaining sections of the river. The remaining 19,600 AFY (or approximately 4.6 percent) is pumped for use in agriculture (3,600 AFY), for municipal or domestic use (7,500 AFY), or lost through evapotranspiration by native riparian vegetation (8,500 AFY).

Groundwater Quality

In general, water quality in the PVMGB is generally higher near the edge of the Palo Verde Mesa adjacent to the Colorado River floodplain. The amount of dissolved solids becomes progressively higher away from the Colorado River floodplain and with depth (AECOM 2011), although the application of surface water in select portions of the PVMGB could result in localized net reductions in dissolved solids concentrations. The groundwater chemistry in the vicinity is generally sodium sulfate-chloride in character (DWR 2003). According to AECOM (2011), the Total Dissolved Solids (TDS) content of shallow groundwater in the basin ranges from 730 to 3,100 milligrams per liter (mg/L), while the TDS of deeper groundwater is higher at 4,500 mg/L.

Table 3.20-2 presents the analytical results for a select number of wells that were sampled between October 1962 and April 1966 located in the area. Given the long screen interval for these wells, and the uncertain methodology of sampling the wells, these data likely represent an average water quality of the more permeable sediments over the screen interval. A review of the water quality data for the PVMGB and PVVGB in Table 3.20-2 indicate the following:

1. TDS concentrations (466 to 5,640 mg/L) generally exceeded the recommended standard of 500 mg/L for a drinking water resource in California. TDS concentrations above 1,000 mg/L were reported.
2. Fluoride concentrations (0.2 to 6.3 mg/L) in some cases exceed the State of California Maximum Contaminant Levels (MCLs) for drinking water (2.0 mg/L). Fluoride concentrations above the MCL are present in water samples from wells on the Mesa. Concentrations are significantly lower and below the MCL in water samples from wells located in the floodplain.
3. Chloride concentrations range from 77.7 to 3,220 mg/L, and in some cases exceed the State of California Secondary MCL for drinking water (250 mg/L). Higher concentrations are found in wells on the Mesa in the area of McCoy Wash.
4. Boron concentrations range from 40 micrograms per liter [µg/L] to 2,000 µg/L. Based on data collected in 2009, most of the water samples collected underlying that site exceeded the State of California Action Level for drinking water (1,000 µg/L).
5. Sulfate concentrations range from 90 to 1,850 mg/L, and in some cases exceed the State of California Secondary MCLs for drinking water (250 mg/L). The highest concentrations mirror those found for chloride and are located in the area east of the site and in the area of McCoy Wash.

Table 3.20-2. Summary of Groundwater Quality Data (all values reported in mg/L[c] unless otherwise indicated)

Analyte[a,b]	Test Well (October 2009)a	Well 5/22-28C1 (Oct-1962)	Well 5/22-33J1 (Oct-1962)	Well 6/21-36R1 (May 1964)	Well 6/22-17L1 (April 1966)	All Palo Verde Mesa Groundwater Basin Wells[a]
Arsenic	ND<0.01	--d	--	--	--	0.0011
Bicarbonates as HCO3	--	--	--	--	--	20 – 736
Boron	1.41	--	--	1.07	1.4	0.04 – 2.0
Calcium	287	--	--	--	--	9.21 – 844
Carbonates as CO3	--	--	--	--	--	0 – 12
Fluoride	1.3	--	1.7	3	--	0.02 – 6.30
Chloride	370	440	400	420	380	77.7 – 3,220
Iron	0.123	--	--	--	--	0 – 0.4
Magnesium	29.6	--	--	--	--	0.1 – 351
Manganese	ND<0.005	--	--	--	--	0 – 3.9
Nitrate	(N)	ND<0.01	--	--	--	--
Selenium	ND<0.015	--	--	--	--	--
Sodium	457	--	--	--	--	0 – 2,000

Table 3.20-2. Summary of Groundwater Quality Data (all values reported in mg/L[c] unless otherwise indicated)

Analyte[a,b]	Test Well (October 2009)a	Well 5/22-28C1 (Oct-1962)	Well 5/22-33J1 (Oct-1962)	Well 6/21-36R1 (May 1964)	Well 6/22-17L1 (April 1966)	All Palo Verde Mesa Groundwater Basin Wells[a]
Sulfate	970	970	380	440	400	90 – 1,850
Total Alkalinity as CaCO3	34	--	--	--	--	28 – 3,600
TDS	2,170	2,160	--	1,470	1,250	466 – 5,640
pH (units)	--	--	--	--	--	7 – 8.6

Notes:

a - Metals data reported from the unfiltered ("total") sample (turbidity at the time of sampling <10NTU).

b - Water quality data for all wells in the Project vicinity are from available information in online databases and historic reports, a summary of which is provided in Appendix J of the AFC. Source: USGS 2009; as cited in BLM 2010.

c - mg/L – milligrams per liter

d - no data reported in available online databases or historic documents

Source: AECOM 2011.

In general, based on available water quality data from the area, groundwater would not meet drinking water quality primary or secondary standards for domestic supply without treatment given the elevated levels of TDS and high concentrations of fluoride, chloride, boron, and sulfate. The data show that generally, TDS and sulfate concentrations were higher with increasing distance from the Colorado River, with the highest concentrations occurring in the area of McCoy Wash and the gap between the PVMGB and CVGB. Fluoride, chloride, and boron concentrations were generally lower in the eastern portions of the PVMGB (closer to the Colorado River) and increased westward. The much higher TDS concentrations below the Palo Verde Mesa reflect recharge of high TDS water to the PVMGB from percolation along the mountain front and underflow from Rice and Chuckwalla valleys.

The U.S. Geological Survey (USGS) sampled groundwater wells throughout the Colorado River Study Unit in 2007 as part of the Priority Basin Project of the California State Water Resources Control Board. The purpose of the study was to assess the quality of raw groundwater used for water supplies in the region. Samples were collected from 28 wells on a regular grid spacing in three study areas, including 15 wells in the Palo Verde Valley and Palo Verde Mesa area. The closest well, COLOR-09, was in the Palo Verde Valley approximately two miles from the Project area. There was no construction information available on this well, so the source of the water is not known. Most wells sampled, including COLOR-09, had specific conductance that exceeded the upper threshold value of the California Department of Public Health secondary maximum contaminant level. No volatile organic compounds, pesticides, contaminants of special interest (such as perchlorate) were detected in well COLOR-09. Concentrations of chloride and fluoride in COLOR-09 exceeded the recommended secondary maximum contaminant level. No other nutrients, metals, or ions exceeded secondary maximum contaminant levels in COLOR-09 (Goldrath et. al. 2009).

There is no site-specific information on groundwater quality. As discussed in Section 3.9.1.1, the Phase I Environmental Site Assessment (ESA) identified two suspected groundwater supply wells, which were observed to be open and unsecured. Unsecured wells can act as conduits for surface-based contamination or wastes to enter groundwater aquifers. There have been no subsequent response actions, including securing of the groundwater wells or sampling of environmental media, to verify whether site contamination currently exists.

Groundwater Wells

Over 580 water supply wells were identified in online databases in the PVMGB (AECOM 2011). A field survey of wells in the Project vicinity conducted by AECOM (2009) encountered no active water supply wells. Nine out of 13 wells within one mile of the site were found to be accessible. All of these wells had been used for irrigation supply, but because no sources of electrical power for pumps (i.e., power lines and generators) were observed at any of these wells, it was presumed that these nine wells were inactive. The remaining four wells were reported to be not accessible, and therefore their status could not be determined (AECOM 2009). Available information for water supply wells located in the area is summarized in Table 3.20-3. Water level data were updated by AECOM (2011) to include 2010 data. Only two wells indicated new data available during this period.

Table 3.20-3. Characteristics of Nearby Wells

State Well Number	Surface Elevation (ft amsl)	Total Depth (ft bgs)	Distance from Proposed Production Well (feet)	Specific Capacity (gpm/ft)
6/21E-25L01	400.2	--	25,000	--
6/22E-08J01	408	302	135,000	35.56-64.80
6/22E-17B01	399.64	302	135,000	25.00-30.60
6/22E-17L01	400	445	15,000	37.88-54.90
6/22E-17L02	397	323	15,500	42.73-56.90
6/22E-18A01	406.88	298	13,000	30.19-35.14
6/22E-18J01	408	302	14,000	32.43-34.62
6/22E-19N02	397	300	20,000	--
6/22E-19N03	397.2	394	20,000	--
6/22E-19R01	395.6	300	21,000	--

Source: Derived from AECOM 2009; AECOM 2011, as cited in BLM 2012b.

3.20.1.2 Surface Water Hydrology and Water Quality

Surface Water Flow

The surface water flow conditions of the Project area are described in the Applicant's Drainage Report (TLA Engineering and Planning 2011), provided as Appendix V. The dominant surface water feature in the region is the Colorado River, which is located approximately 11 miles to the east of the Project site. No perennial water bodies are located on the Project site itself.

A topographic map of the Project area is shown in Figure 2-7, and a more detailed view of the Project site is shown in Figure 2-8. The Project area consists of two distinct types of topography which affect site drainage. The northwestern portion of the Project area, comprising approximately half of the overall Project site, is part of an alluvial fan which slopes in a southeastward direction from the McCoy Mountains, which are located to the northwest. This drainage area is 3,343 acres in size, and ranges in elevation from 1670 feet at the northwest corner to 470 feet at its southwest corner, at the I-10 bridge crossing. The I-10 highway crosses this alluvial fan in between the mountains and the Project site, so the natural flow of the alluvial fan is interrupted, passes through concentrated channels underneath a highway bridge, and then becomes dispersed again as it continues its route across the alluvial fan between I-10 and the Project site. The southeastern portion of the site is a flat plateau, part of the Palo Verde Mesa. This source of drainage for this area is the Mule Mountains, which drain into the alluvial fan area west of the Project site.

In general, surface water on the Palo Verde Mesa is limited to ephemeral and intermittent drainages leading to the Colorado River. The Mesa is topographically higher than the Palo Verde Valley to the east, which forms the 100-year floodplain of the Colorado River. Lands in this area that are not utilized for agriculture are crossed by a number of small ephemeral drainages, generally flowing from northwest to southeast toward the Colorado River, either dissipating prior to reaching the edge of the Mesa or flowing into the Palo Verde Valley. In areas used for agriculture, flow may be diverted by earthen berms or irrigation ditches. The Palo Verde Mesa receives drainage from the alluvial fan to the northwest, but also from an alluvial fan system coming from the Mule Mountains to the southwest of the Project area. The ground surface in this area is characterized by a series of depressions in which surface water can pool. A drainage divide crosses from north to south through the eastern portion of the Project area. The depressions west of this divide drain surface water to the west and southwest, meeting the flow from the Mule Mountains and eventually draining off of the mesa to the southeast, towards the Colorado River. The depressions to the east of this divide drain directly to the east, towards the Colorado River.

The total drainage area of the alluvial fan consists of 14,847 offsite acres and 5,310 Project onsite acres for a total of 20,157 acres. The study area ranges in elevation from the 525 feet at its highest to a lowest elevation of 320-feet near the southeast side of the Project area. The straight line length between these elevations is approximately 6.92-miles and yields a slope of 0.0056 feet/foot.

The Applicant evaluated existing stormwater flows on the Project site, using the primary drainage criteria and methods following the Riverside County Hydrology Manual. The Applicant used U.S. Army Corps of Engineers HEC-1 modeling software to determine the mountain shed runoff hydrographs, and FLO-2D modeling software to determine the alluvial fan rainfall, flow depths, velocities, and sediment transport. Current stormwater flows have relatively shallow depths and low velocities due to the flat terrain. The majority of the Project site experiences flow depths less than six inches, and flow velocities less than half a foot per second.

Jurisdictional Waters

During large storm events, the ephemeral streams and washes in the Project area flow southeast across the Mesa and into the canal and drain system of the Palo Verde Valley. From this system, stormwater eventually flows into the Colorado River, which is a Traditional Navigable Water of the United States. Tributaries that drain into the Colorado River are likewise considered Waters of the United States, as defined in Section 404 CWA.

The Applicant conducted a delineation of wetlands and other waters at the Project site in 2014. The delineation consisted of field reconnaissance, as well as review of maps, aerial photographs, and soil resources reports. No areas were found which met the technical criteria for wetlands. Physical characteristics of water flow, including water marks, sediment deposits, drift deposits, and a distinctive border between vegetated and unvegetated areas were identified, and were considered potentially jurisdictional waters. Mapping indicated the presence of approximately 40,000 linear feet of ephemeral riverine intermittent streambed, and 1,500 linear feet of excavated ephemeral riverine intermittent streambed. These streambeds were not identified as navigable waters, and are not used to transport interstate or foreign commerce. In addition, the streambeds were also found to lack a surface hydrologic connection to a Traditional Navigable Water, and do not meet the requirements for jurisdictional isolated waters (Huffman-Broadway 2017). The results of the delineation were submitted to the U.S. Army Corps of Engineers, which determined that the Project area does not contain waters of the United States in a letter on February 18, 2016. The letter is attached to the Federal Jurisdictional Delineation provided in Appendix I.

Landscape features that potentially meet the definition of stream in 14 CCR Section 1.72 were identified, and may be jurisdictional streams under the jurisdiction of the California Department of Fish and Wildlife (CDFW). The areas which may be subject to CDFW jurisdiction are presented in Table 3.3-4. The results of the delineation, when finalized for the chosen alternative, will be submitted to CDFW for review.

Surface Water Quality

Surface water quality is the physical, chemical, and biological characteristics of water, when assessed according to standards related to ecosystem health, the safety of drinking water, and the safety of human contact. The State of California Water Resources Control Board (SWRCB) and the nine RWQCBs are responsible for setting policies and developing regulations for the implementation of water quality control programs mandated by Federal and state water quality statutes and regulations. Water Quality Control Plans, developed and implemented by the RWQCBs, consider regional beneficial uses, water quality characteristics, and water quality problems.

The Project site lies within the East Colorado River Basin Planning Area of the Water Quality Control Plan for the Colorado River Regional Water Quality Control Board (RWQCB). The Water Quality Control Plan (RWCQB 2017) describes surface and groundwater quality objectives for the Planning Area; the objectives were established to protect the existing and potential beneficial uses of surface and groundwater in the region. Beneficial are reasonable uses of a water body as specified in the Water Quality Control Plan, and may include existing, proposed, or intermittent uses. Beneficial uses for water bodies in the Project area are listed in Table 3.20-4, and include the following: Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Aquaculture (AQUA), Industrial Service Supply (IND), Ground Water Recharge (GWR), Water Contact Recreation (REC-1), Non-Contact Water Recreation (REC-2), Warm Freshwater Habitat (WARM), Wildlife Habitat (WILD), Hydropower Generation (POW), and Preservation of Rare, Threatened, or Endangered Species (RARE).

Table 3.20-4. Beneficial Uses of Surface Waters in the Project Area

	MUN	AGR	AQUA	IND	GWR	REC-1	REC-2	WARM	WILD	POW	RARE
Colorado River and associated lakes and reservoirs	E	E	E	E	E	E	E	E	E	E	E
Palo Verde Valley Canals	P	E	E		E	E	E	E	E		
Palo Verde Drains						E	E	E	E		
Palo Verde Lagoon and Outfall drain						E	E	E	E		E
Washes (Ephemeral Streams)					I		I	C	I		

Source: Adapted from the Water Quality Control Plan for the Colorado River Basin – Region 7 (RWQCB 2017).
E – Existing use
P – Potential Use
I – Intermittent Use
C – Conditional use, to be determined on a case-by-case basis

Under Section 303(d) of the Clean Water Act (CWA), states, territories, and authorized Tribes are required to develop a list of surface waters with impaired water quality. These waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. The law requires that these jurisdictions establish priority rankings for surface waters on the lists and develop action plans that establish targets known as Total Maximum Daily Loads (TMDLs) to improve water quality.

The current Section 303(d) List of Impaired Waters is the 2014-2016 list, which was approved by the United States Environmental Protection Agency (USEPA) on June 6, 2017. Within the Project region, the only water body listed as impaired is the Palo Verde Outfall Drain and Lagoon. This feature, which is 18 miles long and located approximately 5 miles southeast and downstream of the Project site, is listed as impaired by chloride, dichlorodiphenyltrichloroethane (DDT), Indicator Bacteria, and toxaphene, all from unknown sources (SWRCB 2018).

3.21 Wildland Fire Ecology

The study area for Wildland Fire Ecology constitutes an area approximately one mile larger than the periphery of the Project site boundary, capturing the greatest extent of any likely wildfires near the Project. Fire risk in the study area is low, with most fires in the NECO Plan area caused by lightning or vehicles (BLM 2002).

3.21.1 Environmental Setting

The behavior and characteristics of wildfires are dependent on a number of biophysical and anthropogenic (human-caused) factors. The biophysical variables are fuels (including composition, cover, and moisture content), weather conditions (particularly wind velocity and humidity), topography (slope and aspect), and ignition sources (e.g., lightning). The anthropogenic variables are ignitions (e.g., arson, smoking, and power lines) and management (wildfire prevention and suppression efforts).

Vegetation with low moisture content is more susceptible to ignitions and burns more readily than vegetation with higher moisture content. Grasses tend to ignite more easily and burn faster, but tend to burn for a shorter duration than woody vegetation such as shrubs and trees. Continuity of fuels helps sustain wildland fires. Dense vegetation tends to carry a fire farther than patchy vegetation. The presence of invasive annual grasses, however, can provide fuel connectivity in patchy desert shrublands that would otherwise provide inconsistent fuel for a wildland fire. High winds provide oxygen to wildfires and can also blow glowing embers off burning vegetation to areas far ahead of the front of a fire, allowing fires to jump fuelbreaks in some cases. Conditions of low relative humidity will dry out fuels, increasing the likelihood of ignition. Finally, steep slopes and slopes with exposure to wind will carry fires rapidly uphill, and fires that are extinguished in mountainous areas are often contained along ridgelines.

Larrea tridentata and *Larrea tridentata-Ambrosia dumosa* shrublands are the dominant plant alliances covering almost the entire Project area, except for two small areas of *Parkinsonia florida - Olneya tesota* on the northern perimeter of the area. Major threats to these community types include fire, grazing, OHV use, and invasive species. These vegetation types are not fire-adapted. Fire, particularly repeated wildfire, is deleterious to these plant communities and tends to deplete the native woody shrubs that characterize and dominate these communities in favor of exotic weedy annuals.

Compared to other parts of the state, there are relatively few fires in the NECO Plan area and most are small. Between 1980 and 1995, a handful of fires burned a total of about 6,000 acres, all outside the study area (BLM 2002). The potential for wildfire on the Project site is limited, due to the sparse vegetation. The locations of fire ignitions near the Project area between 1990 and 2016 are shown in Figure 3.21-1. This map shows that 21 out of the 31 ignitions since 1990 occurred along Interstate 10, and 6 others occurred along publicly accessible rural roads or near private/BLM land boundaries. This suggests that most ignitions are associated with motorized vehicle use. There are no reports of fires having previously occurred on the Project site.

BLM and the National Park Service (NPS) have collaborated in the development of the *Fire Management Activity Plan (FMAP) for the California Desert* (1996) which brings together fire management goals for biological resources, wilderness, and other sources. The FMAP establishes fire management standards and prevention and protection programs as well as limitations on fire suppression methods in critical habitat and other Mojave desert tortoise habitat designed to limit habitat disturbance while keeping fires small (BLM 2002).

Exotic and invasive weedy annual plants such as Mediterranean grass (*Schismus barbatus*) and red brome (*Bromus madritensis*) completely occupy ground cover in some areas of the NECO Plan area, where disturbances such as livestock grazing, off highway vehicle (OHV) use, development and fire have contributed to the spread of exotic annuals by displacing native annual and perennial grasses and forbs (Brooks 1998; Malo and Suarez 1995 as cited in BLM 2002). The Project site has not been the location of grazing, substantial OHV use, or development, so is not expected to present a substantial risk of fire. Plant inventories have not detected red brome at the Project site.

Fire Hazard Severity Zones (FHSZs) are areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors that have been mapped by CAL FIRE. FHSZs are ranked from moderate to very high and are categorized for fire protection as within a Federal responsibility area (FRA) under the jurisdiction of a Federal agency, within a state responsibility area (SRA) under the jurisdiction of CAL FIRE, or within a local responsibility area (LRA) under the jurisdiction of a local agency. The Project area is located in a FRA under the jurisdiction of BLM, with the exception of the 160 acre private land parcel, which is in an LRA under the jurisdiction of the RCFD. The BLM would be first responder for wildland fires and the County for structures. Both the FRA and LRA portions of the Project area are designated as within a moderate FHSZ (CAL FIRE 2016).

CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

4.1 Introduction

This chapter assesses environmental consequences or impacts that would result from the implementation of the Proposed Action or the alternatives described in Chapter 2, *Proposed Action and Alternatives*. The scope of the impact analyses presented in this chapter is commensurate with the level of detail for the alternatives provided in Chapter 2, and the availability and/or quality of data necessary to assess impacts. Baseline conditions for assessing the potential environmental impacts are described in Chapter 3, *Affected Environment*.

The impact assessment that follows focuses on the general impacts that could occur as a result of implementing each of the alternatives. The methodology for this assessment conforms to the guidance found in the following sections of the CEQ regulations for implementing NEPA: 40 CFR §1502.24, *Methodology and Scientific Accuracy*; 40 CFR §1508.7, *Cumulative Impact*; and 40 CFR §1508.8, *Effects*. The CEQ regulations require agencies to "rigorously explore and objectively evaluate" the impacts of the alternatives. This chapter discusses short- and long-term direct, indirect, and cumulative impacts of the Proposed Action and alternatives relative to baseline conditions using established significance criteria for each environmental resource area; identifies mitigation measures to avoid or reduce the intensity of significant and potentially significant impacts (below established thresholds where possible); and summarizes on an issue-by-issue basis the residual impacts that would remain after mitigation measures are incorporated.

For purposes of performing a CEQA-compliant analysis, the potential impacts are classified as:

- *Significant and unavoidable*: cannot be mitigated to a level that is less than significant
- *Less than significant with mitigation incorporated*: can be mitigated to a level that is less than significant
- *Less than significant*: no mitigation required
- *No impact*: no effect identified

Although NEPA allows the lead agency to approve an action regardless of whether it will have significant and unavoidable impacts, CEQA requires that a lead agency make specific findings in a statement of overriding considerations before approving a project with impacts that cannot be mitigated to a level that is less than significant. The significant and unavoidable impacts of the Project are discussed in Section 5.2 of this Draft PA/EIS/EIR.

4.1.1 Baseline

The baseline for purposes of this Draft PA/EIS/EIR is the affected environment described in Sections 3.2 through 3.21, which generally reflect conditions as they existed on or about March 6, 2015, when the BLM published a NOI announcing its intention to prepare a Draft PA/EIS, and March 15, 2015, when the County published a NOP announcing its intention to prepare a Draft EIR. The baseline is intended to reflect the pre-Project environmental conditions to which the potential impacts of the Proposed Action (Project) and alternatives are compared in Sections 4.2 through 4.21.

4.1.2 Analytical Assumptions

The impacts analyses contained within this chapter were conducted using the following assumptions:

1. The laws, regulations, and policies applicable to BLM authorizing ROW grants for renewable energy development facilities would be applied consistently for all action alternatives.
2. The proposed facility would be constructed, operated, maintained, and decommissioned as described in each action alternative including the implementation of APMs (see Section 2.3.7).
3. Short-term impacts are those expected to occur during the construction phase and the first years of the operation and maintenance. Long-term impacts are those that would occur after the first five years of operation.

4.1.3 Types of Effects

The potential impacts from those actions that would have direct, indirect, and cumulative effects were considered for each resource. The terms "effects" and "impacts" as used in this document are synonymous and could be beneficial or detrimental.

4.1.4 Resources and Uses Not Affected or Present in the Action Area

The resources, BLM program areas, or other aspects of the human environment that were determined by the BLM as not affected or not present in the Project area include: wild and scenic rivers; national scenic or historic trails, monuments, recreation areas, or conservation areas; cooperative management and protection areas; outstanding natural areas; forest reserves; wetlands; livestock grazing; and wild horses and burros.

4.1.5 Cumulative Scenario Approach

Under NEPA, cumulative effects are defined as the impact on the environmental that results from the incremental impact of the Proposed Action or an alternative when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions (40 CFR § 1508.7). Similarly under CEQA, CEQA defines a cumulative effect as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (14 CCR § 15355). This Draft PA/EIS/EIR analyzes the cumulative effects of the construction, operation and maintenance, closure, and decommissioning of the Project within the ROW grant application area and all other elements of the Proposed Action, taking into account the effects of other past, present, and reasonably foreseeable future actions. The cumulative effects analysis considers past actions that are related either in time or space (i.e., temporally or in geographic proximity) to the proposed action; present actions that are ongoing at the same time the Draft PA/EIS/EIR was being prepared; and reasonably foreseeable future actions, limited to those for which there are existing decisions, funding, formal proposals, or which are highly probable, based on known opportunities or trends.

Varying degrees of information exist about projects within the cumulative scenario. Therefore, for resource areas for which quantitative information is available, a quantitative analysis is provided; however, if said level of detail is not available, a qualitative analysis is provided. Because cumulative effects are defined as the incremental impact of a Proposed Action or an alternative, the Draft PA/EIS/EIR does not analyze potential cumulative effects on a resource if the Proposed Action or alternatives would have no direct or indirect effects on that resource. See, for example, Section 4.1.4, *Resources and Uses Not Affected or Present in the Action Area*.

The cumulative scenario includes projects identified in Table 4.1-1. Table 4.1-1 identifies each resource or BLM program, the cumulative analysis impacts area (which is the geographic scope for each cumulative effects issue), issues to consider (as limited by the timeframes within which the Project could cause an effect), and which renewable projects and other known actions or activities are located or would occur within the cumulative analysis impacts area. Tables 4.1-1 and 4.1-2 identify existing and reasonably foreseeable future projects within the geographic scope of the cumulative analysis. These projects are shown in Figure 4.1-1.

4.1.5.1 NEPA Requirements for Cumulative Impact Analysis

The approach to the cumulative effects analysis follows the principles outlined in the CEQ's Considering Cumulative Impacts (1997), which are listed below.

1. Cumulative effects are caused by the aggregate of past, present, and reasonably foreseeable future actions.
2. Cumulative effects are the total effect, including both direct and indirect effects, on a given resource, ecosystem, and human community of all actions taken, no matter who (Federal, non-Federal, or private) has taken the action.
3. Cumulative effects need to be analyzed in terms of the specific resource, ecosystem, and human community being affected.
4. It is not practical to analyze the cumulative effects of an action on the universe; the list of environmental effects must focus on those that are truly meaningful.
5. Cumulative effects on a given resource, ecosystem, and human community are rarely aligned with political or administrative boundaries.
6. Cumulative effects may result from the accumulation of similar effects or the synergistic interaction of different effects.
7. Cumulative effects may last for many years beyond the life of the action that caused the effects.
8. Each affected resource, ecosystem, and human community must be analyzed in terms of its capacity to accommodate additional effects, based on its own time and space parameters.

Where a lead agency is examining a project with an incremental effect that is not cumulatively considerable, a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.

The BLM NEPA Handbook outlines the following elements to be considered for each cumulative effect issue:

- Describe the existing condition. The existing condition is the combination of the natural condition and the effects of past actions. The natural condition is the naturally occurring resource condition without the effects of human actions. Detailed description of the natural condition may not be possible for some resources because of incomplete or unavailable information or may not be applicable for some resources. Described the effects of past actions, either individually or collectively, to understand how the existing condition has been created.
- Describe the effects of other present actions.
- Describe the effects of reasonably foreseeable actions.
- Describe the effects of the proposed action and each action alternative.
- Describe the interaction among the above effects.
- Describe the relationship of the cumulative effects to any thresholds.

4.1.5.2 CEQA Requirements for Cumulative Impact Analysis

CEQA requires that an EIR contain an assessment of the cumulative impacts that could be associated with the proposed Project. According to state CEQA Guidelines Section 15130(a), “an EIR shall discuss cumulative impacts of a project when the project’s incremental effect is cumulatively considerable.” “Cumulatively considerable” means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (as defined by Section 15130). As defined in state CEQA Guidelines Section 15355, a cumulative impact consists of an impact that is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts. A cumulative impact occurs from:

> *. . . the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.*

In addition, state CEQA Guidelines Section 15130(b) identifies that the following three elements are necessary for an adequate cumulative analysis:

1) Either:

- a list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency; or
- a summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact. Any such planning document shall be referenced and made available to the public at a location specified by the lead agency.

2) A summary of the expected environmental effects to be produced by those projects with specific reference to additional information stating where that information is available;

3) A reasonable analysis of the cumulative impacts of the relevant projects. An EIR shall examine reasonable, feasible options for mitigating or avoiding the project's contribution to any significant cumulative effects.

Cumulative Impact Approach

This Draft PA/EIS/EIR evaluates cumulative impacts of the proposed Project and alternatives for each resource area, using the following steps:

1. Define the geographic and temporal scope of cumulative impact analysis for each discipline, based on the potential area within which impacts of the proposed Project could combine with those of other projects to result in significant cumulative impacts.
2. Evaluate the effects of the proposed Project in combination with past and present (existing) projects in the study area.
3. Evaluate the effects of the proposed Project with foreseeable future projects that occur within the area of geographic effect defined for each discipline.

The specific area for cumulative effect differs according to the resource under consideration. For each resource, the geographic scope of analysis in the Draft PA/EIS/EIR is based on the natural boundaries and physical conditions relevant to the resource affected, rather than jurisdictional boundaries. The geographic scope of cumulative effects often extends beyond the scope of the direct effects, but not beyond the scope of the direct and indirect effects of the Proposed Action and alternatives. Table 4.1-1 identifies the relevant geographic scope for each resource's analysis of cumulative impacts.

In addition, each project in a region would have its own implementation schedule, which may or may not coincide or overlap with the Proposed Action's schedule. This can impact the conclusions related to short-term impacts from activities such as construction of the Project. To be conservative, the cumulative analysis assumes that all projects in the cumulative scenario are built and operating during the operating lifetime of the Project.

4.1.5.3 Known Actions and Activities in the Cumulative Scenario

Existing actions and activities within the cumulative impact analysis area (including existing BLM-authorized actions) are identified in Table 4.1-2. Reasonably foreseeable future projects within the cumulative impact analysis area are identified in Table 4.1-3.

4.1.5.4 Renewable Energy Projects Included in the Cumulative Scenario

A large number of renewable projects have been proposed on BLM-managed land, state land, and private land in California. As of April, 2016, there were 47 renewable projects approved, or in various stages of the environmental review process or under construction, in California. Solar, wind, and geothermal development applications have requested use of BLM land, including approximately one million acres of the California desert. State and private lands have also been targeted for renewable energy projects.

Table 4.1-1. Cumulative Scenario

Resource Or BLM Program	Cumulative Analysis Impact Area	Issues To Consider	BLM Renewable Energy Projects	Other Known Actions And Activities
Air Resources	MDAB	$PM_{2.5}$, PM_{10}, ozone	All projects	All projects
Biological Resources - Wildlife	Recovery Plan Area defined by NECO; Critical Habitat Unit defined by USFWS/CDFW; existing range or eastern Riverside County	Species include Mojave desert tortoise, Mojave fringe-toed lizard, migratory birds, golden eagle, western burrowing owl, American badger, kit fox, Desert big horn sheep. Impacts include mortality and injury; special status wildlife; wildlife movement; and indirect impacts, including from lighting, collisions, climate change, and stressors and potential changes to sand dune systems.	All projects	All California projects
Biological Resources – Vegetation	NECO Plan area	Ephemerally flowing drainages and natural communities; special status plants including plants protected under the California Desert Native Plants Act; microphyll woodlands; sand dunes; spread of invasive plants; mortality of plants, loss of forage and cover; changes to the vegetation alliances	All projects	All California projects
Cultural Resources	Cultural sites, traditional use areas, and cultural landscapes on the plant site, along the linear facilities corridor and in the APE.	Ground-disturbing activities and the adverse effects on historic properties, as discussed in 36CFR800.5[a][2]). Cultural resources, including archaeological (prehistoric and historic), and ethnographic resources.	All projects	All projects
Geology and Soils	Project site and linear facilities corridor for geologic hazards. Watershed for soil erosion impacts.	Accelerated and/or environmentally harmful soil erosion from water and wind; and land subsidence.	RE Crimson Solar Project, MSEP, Modified BSPP	NRG Blythe PV Project, BMSP, Interstate 10, DPV1, West-wide Section 368 Energy Corridor, DPV2, CRSS, Desert Southwest Transmission Line, and Ten West Link Transmission Line.

Table 4.1-1. Cumulative Scenario

Resource Or BLM Program	Cumulative Analysis Impact Area	Issues To Consider	BLM Renewable Energy Projects	Other Known Actions And Activities
Greenhouse Gases and Climate Change	International, national, and regional	Emission of CO_2e, global climate change impacts on Project.	All projects	All projects
Hazards and Hazardous Materials	One mile radius of Project site for hazardous materials impacts and the Blythe Airport Influence Area for aircraft safety hazards.	Releases, spills, emissions, bacteria; airborne fungi (valley fever); ground disturbance that exposes existing subsurface conditions; engineering and administrative controls; health risks from dust; Site access; fire response; hazardous materials response; advanced life support/paramedic services; disaster preparedness	RE Crimson Solar Project, MSEP, Modified BSPP	NRG Blythe PV Project, BMSP, DPV1, West-wide Section 368 Energy Corridor, DPV2, CRSS, Desert Southwest Transmission Line, and Ten West Link Transmission Line.
Lands and Realty	Project site and linear facilities corridor; CDCA Plan areas bearing the multiple use class designation "Moderate"	Designated utility corridors (e.g., transmission lines, cellular telephone towers, poles), existing ROWs, I-10; restriction or preclusion of otherwise allowable use opportunities	Palen Solar Project, Genesis Solar Energy Project, Desert Sunlight, Desert Harvest Project, RE Crimson Solar Project	Desert Southwest Transmission Line Project; Eagle Mountain Landfill Project, and Ten West Link Transmission Line.
Mineral Resources	All areas potentially underlain by construction-grade aggregate resources	Designated aggregate resource areas, extent and availability of aggregate.	All projects	All projects
Noise	Areas within 0.5 mile of the Project	Equipment, motor vehicles	RE Crimson Solar Project	NRG Blythe PV Project, BMSP, CRSS, and CUP03602, Ten West Link Transmission Line, vehicles on nearby roads..
Paleontological Resources	Quaternary-age Geologic units within eastern Riverside County	Ground-disturbing activities; rock units with potentially high sensitivity or known paleontological resources	All projects	All projects with ground disturbance

Table 4.1-1. Cumulative Scenario

Resource Or BLM Program	Cumulative Analysis Impact Area	Issues To Consider	BLM Renewable Energy Projects	Other Known Actions And Activities
Recreation and Public Access	NECO Plan area, LTVAs, Lands with Wilderness Characteristics, OHV Routes, recreational areas within viewing or hearing distance	Dispersed recreational opportunities and experiences, LTVAs, lands with wilderness characteristics, OHV recreation opportunities, unauthorized routes	Modified BSPP, Rio Mesa Solar Electric Generating Facility, RE Crimson Solar Project, MSEP	NRG Blythe PV Project, BMSP, Desert Southwest Transmission Line Project, Eagle Mountain Landfill Project, Blythe Airport Solar Project, CRSS, CUP03602, and Ten West Link Transmission Line.
Social and Economic Setting	Social: eastern Riverside County and adjacent parts of La Paz County. Economic: Riverside County	Flow of goods and services; impacts to local infrastructure and services; ability to meet housing demand; employment/labor demand; possible positive impacts to regional economic sectors and/or adverse community impacts; severance or other tax benefits; ability of communities to absorb impacts.	Palen Solar Project, Genesis Solar Energy Project, Desert Sunlight, Desert Harvest Project, Palo Verde, Rio Mesa Solar Electric Generating Facility, RE Crimson Solar Project, MSEP, Modified BSPP	NRG Blythe PV Project, BMSP, DPV2 Transmission Line Project, CRSS, Desert Southwest Transmission Line, CUP03602, Palo Verde Mesa Solar Project, and Ten West Link Transmission Line.
Special Designations	California Desert, with emphasis on Riverside County	Land with wilderness characteristics	MSEP	None
Transportation and Traffic	Roadways which may be impacted by the Project, including local roadways and the I-10 corridor in eastern Riverside County and adjacent parts of La Paz County.	Construction traffic – materials and workers	All projects	All projects
Utilities and Service Systems	California Desert, with emphasis on Riverside County	Solid and liquid wastes	All projects	All projects

Table 4.1-1. Cumulative Scenario

Resource Or BLM Program	Cumulative Analysis Impact Area	Issues To Consider	BLM Renewable Energy Projects	Other Known Actions And Activities
Visual Resources	Locations from which the Project may be visible, including the I-10 corridor.	Project appearance/visual contrast; construction- related dust, light, glint and glare; views from key observation points	RE Crimson Solar Project, MSEP, Modified BSPP	NRG Blythe PV Project, BMSP, Blythe Airport Solar Project, CRSS, CUP03602, and Ten West Link Transmission Line.
Surface Water	Watershed	Hydrology and water quality	Rio Mesa, RE Crimson Solar Project, MSEP, Modified BSPP	NRG Blythe PV Project, BMSP, Blythe Energy Project Transmission Line, City of Blythe projects, Blythe Airport Solar I Project, DPV2, CRSS, Desert Southwest Transmission Line, Eagle Mountain Landfill Project, RCL00161R1, BGR100258, CUP03602, Palo Verde Mesa Solar Project, and Ten West Link Transmission Line.
Groundwater	PVMGB	Basin balance, groundwater availability, and water quality	RE Crimson Solar Project, MSEP, Modified BSPP	NRG Blythe PV Project
Wildland Fire Ecology	eastern Riverside County	Mortality of plants and wildlife, loss of forage and cover; changes to the vegetation alliances; spread of invasive plants; consequences of extreme weather events	All projects	NRG Blythe PV Project, BMSP, West-wide Section 368 Energy Corridors, Eagle Mountain Pumping Plant, Recreational Opportunities, Kaiser Mine, Blythe Energy Project Transmission Line, Blythe Airport Solar 1, Chuckwalla Valley Raceway, Interstate 10, Chuckwalla Valley State Prison, Ironwood State Prison, DPV1 Transmission Line, Blythe Energy Project II, DPV2 Transmission Line Project, CRSS, Desert Southwest Transmission Line, Eagle Mountain Landfill Project, and Ten West Link Transmission Line.

Table 4.1-1. Cumulative Scenario

Resource Or BLM Program	Cumulative Analysis Impact Area	Issues To Consider	BLM Renewable Energy Projects	Other Known Actions And Activities
Transmission Line Safety and Nuisance	Immediate vicinity of the proposed gen-tie line	Interference with radio-frequency communication; noise; fire hazards; hazardous shocks; nuisance shocks; and EMF exposure	All projects	DPV1Transmission Line, Blythe Energy Project Transmission Line, DPV2 Transmission Line, and Desert Southwest Transmission Line, and Ten West Link Transmission Line.
Aviation Safety	Air space governed by the Blythe ALUCP	Navigable airspace; reflectivity and temporary flash occurrences; radio frequency emissions and potential interference; thermal plumes; height and location of structures; clear space within Compatibility Zone D; bird strike and avian-aviation incompatibilities	Modified BSPP, RE Crimson Solar Project, MSEP	Blythe Airport Solar 1, NRG Blythe PV Project, BMSP, Blythe Energy Project Transmission Line, DPV1 Transmission Line, Desert Southwest Transmission Line, Palo Verde Mesa Solar Project, and Ten West Link Transmission Line.

Table 4.1-2. Existing Projects Within the Cumulative Impact Analysis Area

ID#	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
1	Interstate 10	Linear project running from Santa Monica, through Blythe, and into Arizona	Caltrans	Existing	N/A	I-10 is a major east-west route for trucks delivering goods to and from California. It is a four lane divided highway in the Blythe region.
2	Chuckawalla Valley State Prison	19025 Wiley's Well Rd. Blythe, CA	CA Dept. of Corrections and Rehabilitation	Existing	1,080	State prison providing long-term housing and services for male felons classified as medium and low-medium custody inmates jointly located on 1,720 acres of state-owned property. Assessor's Parcel Numbers (APNs) 879040006, 008, 012, 027, 028, 029, 030
3	Ironwood State Prison	19005 Wiley's Well Rd. Blythe, CA	CA Dept. of Corrections and Rehabilitation	Existing	640	ISP jointly occupies with Chuckawalla Valley State Prison 1,720 acres of state-owned property, of which ISP encompasses 640 acres. The prison complex occupies approximately 350 acres with the remaining acreage used for erosion control, drainage ditches, and catch basins. APNs 879040001, 004, 009, 010, 011, 015, 016, 017, 018, 019, 020
4	Devers-Palo Verde 1 Transmission Line	From Palo Verde in Arizona to Devers Substation, San Bernardino County	Southern California Edison	Existing	N/A	Existing 500 kV transmission line parallel to I-10 from Arizona to the SCE Devers Substation, near Palm Springs.
5	West-wide Section 368 Energy Corridors	Coincident with Corridor K, along northern boundary of Project	BLM, DOE, U.S. Forest Service	Approved by BLM and U.S. Forest Service	N/A	Designation of corridors on Federal land in the 11 western states, including California, for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities (energy corridors). Corridor 30-52 passes east-west across the northern boundary of the Project site.
6	Eagle Mountain Pumping Plant	Eagle Mountain Road, west of Desert Center	Metropolitan Water District of Southern California	Existing		144 ft. pumping plant that is part of the Metropolitan Water District of Southern California's facilities. APNs 807150007, 807150009, 807150010

Table 4.1-2. Existing Projects Within the Cumulative Impact Analysis Area

ID#	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
7	Recreational Opportunities	eastern Riverside County and adjacent parts of La Paz County	BLM	Existing	N/A	BLM has numerous recreational opportunities on lands in eastern Riverside County along the I-10 corridor including the Wiley's Well Campground, Coon Hollow Campground, and multiple LTVAs.
8	Kaiser Mine	Eagle Mountain, north of Desert Center	Kaiser Ventures, Inc.	Existing		Kaiser Steel mined iron ore at Kaiser Mine in Eagle Mountain and provided much of the Pacific Coast steel in the 1950s. Mining project also included the Eagle Mountain Railroad, 51 miles long. Imported steel captured market share in the 1960s and 1970s and primary steelmaking closed in the 1980s. APN 701380031
9	Blythe Energy Project Transmission Line; 99-AFC-8C	From the Blythe Energy Project (Blythe, CA) to Julian Hinds Substation	Blythe Energy, LLC	Existing	N/A	Transmission line modifications including upgrades to Buck Substation, approximately 67.4 miles of new 230 kV transmission line between Buck Substation and Julian Hinds Substation, upgrades to the Julian Hinds Substation, installation of 6.7 miles of new 230 kV transmission line between Buck Substation and SCE's DPV 500 kV transmission line.
10	NRG Blythe PV Project	Blythe	First Solar	CPUC approved project terms of a 20 year power purchase agreement for sale of 7.5 MW, Began operations in December 2009	200	21 MW solar photovoltaic project located on 200 acres. Project was constructed by First Solar and sold to NRG Energy.
11	Chuckwalla Valley Raceway	Desert Center Airport (no longer a community airport)	Developer Matt Johnson	Existing	400	Proposed 500-mile race track located on 400 acres of land that used to belong to Riverside County and was used as the Desert Center Airport. APNs 811-142-016, 811-142-006. Small private airstrip kept as part of project. Construction completed in March 2010.

Table 4.1-2. Existing Projects Within the Cumulative Impact Analysis Area

ID#	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
12	Devers-Palo Verde 2 Transmission Line Project; CPUC Application No. A.05-04-015; CACA-048771	From the Midpoint Substation to Devers Substation (CA-only portion*)*	Southern California Edison	Existing	N/A	500 kV transmission line 115 miles long from the CRSS to Devers, and 41.6 miles long between the Devers Substation and SCE's Valley Substation.
13	Colorado River Substation Expansion; CPUC Application No. A.05-05-015	10 miles southwest of Blythe	Southern California Edison	Existing	90	500/230 kV substation constructed in an area approximately 1,000 feet by 1,900 feet.
14	Genesis Solar Energy Project; CACA-48880	North of I-10, 25 miles west of Blythe and 27 miles east of Desert Center	NextEra (FPL)	Existing	1.950	250 MW (two adjacent, independent solar plants with a 125 MW capacity each) solar thermal electric generating facility, using solar parabolic trough technology; includes 6-mile natural gas pipeline and 5.5-mile transmission line interconnecting Blythe Energy Center to Julian Hinds Transmission Line; on 1,950 acres. Construction completed in April, 2014.
15	Desert Sunlight; CACA-48649	North of Desert Center	Desert Sunlight Holdings, LLC	Existing	4,245	550 MW solar photovoltaic project located on 4,245 acres.
16	Red Bluff Substation CPUC 10-11-012	Adjacent to the south side on I-10, east of Aztec Road, and west of Corn Springs Road, in unincorporated Riverside County	Southern California Edison	Existing	75	500/250 kV substation, two new parallel 500 kV transmission lines of about 2,500 to 3,500 feet each looping the substation into the existing DPV 500 kV transmission line (DPV1), and two parallel 500 kV transmission lines of about 2,500 to 3,500 feet each looping the new substation into the DPV2 line.

Table 4.1-2. Existing Projects Within the Cumulative Impact Analysis Area

ID#	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
17	Blythe Solar Power Generation Station 1	6 miles north of Blythe	Blythe Solar Power Generation Station 1, LLC	Existing	29.4	4.76 MW solar PV facility; on 29.4 acres
18	McCoy Solar Energy Project (MSEP); CACA-48728	10 miles northwest of Blythe	McCoy Solar LLC	ROW Grants approved by BLM in December, 2013and August, 2014. Under construction, expected to be completed in August, 2016.	4,014	Up to a 750 MW PV solar power plant using photovoltaic technology; 16-mile-long 230 kV generation tie and switchyard that would connect to SCE’s CRSS.

Table 4.1-3. Reasonably Foreseeable Projects Within the Cumulative Impact Analysis Area

ID#	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
A	Three Commercial Projects	Blythe, CA	Various	Approved	N/A	Three commercial projects have been approved by the Blythe Planning Department including the Agate Road Boat & RV Storage, Riverway Ranch Specific Plan, and Agate Senior Housing Development.
B	Intake Shell	Blythe, CA	Shell	Under Construction	N/A	Reconstruction of a Shell facility located at Intake and Hobson Way. Demolition occurred in 2008, reconstruction planned for 2009-2010.
C	Eleven Residential Developments	Blythe, CA	Various	Approved/ Under Construction	N/A	Eleven residential development projects have been approved by the Blythe Planning Department including: Van Weelden (184 SFR), Sonora South (43 SFR), Irvine Assets (107 SFR), Chanslor Village (79 SFR), St. Joseph's Investments (69 SFR), Edgewater Lane (45 SFR), Chanslor Phase II & III (78 SFR), Chanslor Place Phase IV (57 SFR), Palo Verde Oasis Phase IV (29 SFR), Mesa Bluffs Villas Phase IV (26 attached SFR), and Agate Senior Housing (81 MFR). Two of these, Chanslor Place and Mesa Bluffs Villas, ad under construction as of March, 2016.
D	Desert Southwest Transmission Line; CACA-044491	118 miles primarily parallel to DPV	Imperial Irrigation District	Approved June 2007, Plan of Development submitted 2009	N/A	118-mile 500 kV transmission line from Blythe Energy Project Substation to the existing Devers Substation. Located adjacent to SCE's existing 500 kV DPV1 transmission line.
E	Eagle Mountain Pumped Storage Project; FERC 13123-002	Eagle Mountain iron ore mine, north of Desert Center	Eagle Crest Energy Company	Final EIS published Jan. 2012.	1,524	1,300 MW pumped storage project on a 1,524 acres, designed to store off-peak energy to use during peak hours.

Table 4.1-3. Reasonably Foreseeable Projects Within the Cumulative Impact Analysis Area

ID#	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
F	Palen Solar Project (formerly Palen Solar Energy Project); CACA-048810	North of I-10, 10 miles east of Desert Center	Palen Solar III, LLC, a subsidiary of EDF Renewable Energy	Solar thermal plant approved by CEC in 2010 and BLM in 2011, but not built. Modified project proposed in 2013, but withdrawn in 2014. Revised POD for 500 MW solar PV plant submitted to BLM in December, 2015. Draft EIS issued in October 2017.	5,200	500 MW solar PV facility.
G	Blythe Airport Solar I Project	Blythe Airport	U.S. Solar	City of Blythe approved the project in November, 2009 Building Permit applied for December, 2010	640	100 MW photovoltaic (PV) power plant; 640 acres; constructed in five 20 MW phases; includes a 3,200-foot-long 33 kV generation tie.
H	Modified Blythe Solar Power Project (Modified BSPP); CACA-48811	North of I-10, immediately north of the Blythe Airport	NextEra	ROW Grant approved by BLM in August, 2014. Notice to Proceed for construction was issued March 19, 2015. Project is expected to be completed in August, 2016.	4,138	485 MW PV solar plant; 4,138 acres of BLM-administered public land.
I	Desert Harvest Project; CACA-049491	6 miles north of Desert Center	EDF Renewable Energy	BLM Record of Decision (ROD) signed on March, 13, 2013. BLM is awaiting Applicant’s submittal of documentation in order to issue a Notice to Proceed with construction.	1,280	100 MW PV solar plant, 1,280 acres.

Table 4.1-3. Reasonably Foreseeable Projects Within the Cumulative Impact Analysis Area

ID#	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
J	Eagle Mountain Landfill Project; CACA-30070 CACA-25594 CACA-31926	Eagle Mountain, North of Desert Center	Mine Reclamation Corporation and Kaiser Eagle Mountain, Inc.	Land exchange for the project was not properly approved. Kaiser's Mine and Reclamation is considering all available options.	3,500	The project is proposed to be developed on a portion of the Kaiser Eagle Mountain Mine in Riverside County, California. The proposed project comprises a Class III nonhazardous municipal solid waste landfill and the renovation and repopulation of Eagle Mountain Townsite. The proposal by the proponent includes a land exchange and application for rights-of-way with the Bureau of Land Management and a Specific Plan, General Plan Amendment, Change of Zone, Development Agreement, Revised Permit to Reclamation Plan, and Tentative Tract Map with the County.
K	RCL00161R1	North of 95, east of Intake Blvd	N/A	Reclamation Plan applied for September, 2009	38	Expansion of gravel pit from 12.95 acres to 38 acres.
L	BGR100258	Ehlers Blvd and W Chanslor Way	N/A	Grading Permit applied for November, 2010	<1	Grading permit for 9000 square foot church
M	BNR100126	8 miles south of the intersection of HWY 177 and HWY 10.	U.S. Solar	Building Permit applied for December, 2010	400	49.5 MW solar PV plant (PP24754)
N	Palo Verde Mesa Solar Project	5 miles northwest of Blythe	Renewable Resources Group, Inc.	Proposed: Conditional Use Permit applied for September 2011; Public Use Permit applied for July 2012.	3,250	Up to 486 MW solar PV generating facility. The project would include a solar panel array, two on-site electrical substations, a maintenance building, and ancillary facilities. A 14.7-mile 230 kV transmission line would cross lands under County, City of Blythe, and BLM jurisdiction to connect to the CRSS.
O	Eagle Mountain; CACA-51664	Eagle Mountain, north of Desert Center	L.H. Renewables	Testing	3,500	3,500-acre wind facility with met towers.

Table 4.1-3. Reasonably Foreseeable Projects Within the Cumulative Impact Analysis Area

ID#	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
P	Rio Mesa Solar Electric Generating Facility; CACA-53138	Approximately 11 miles south west of the City of Blythe	BrightSource Energy	Notice of Intent issued September, 2012.	3,805	500 MW solar power project composed of two power plants and a common area with shared facilities. Each 250 MW solar concentration power plant would utilize a solar power boiler and solar field based on heliostat mirror technology. A new generation tie line would be constructed to connect to the new SCE CRSS.
Q	RE Crimson Solar Project (formerly Sonoran West; CACA-51967	12 miles west of Blythe	Sonoran West Holdings, a subsidiary of Recurrent Energy, LLC.	Application received	4,000	450 MW solar PV facility and 450 MW of integrated energy storage capacity.
R	Mule Mountain III; CACA-50390	15 miles southwest of Blythe	Solar Reserve	Application received August 13, 2008	8,160	150 MW power tower
S	Blythe Mesa Solar Project (BMSP)	Adjacent to east boundary of DQSP	Renewable Resources Group	BLM issued Record of Decision in August, 2015. Construction not begun as of March, 2016.	3,665	485 MW solar PV facility on private land, with gen-tie on BLM land.
T	Blythe Energy Project II	City of Blythe, north of I-10, 7 miles west of the CA/AZ border	Caithness Blythe II, LLC	Approved, but construction not begun.	76	520 MW combined-cycle natural gas-fired electric-generating facility. Project is connected to the Buck Substation owned by WAPA.
U	Ten West Link Transmission Project	Adjacent to southwestern boundary of DQSP.	DCR Transmission, LLC	Environmental review initiated in August, 2016.	N/A	114 mile proposed 500 kV transmission line from Tonopah, Arizona to CRSS.

Solar, wind, and geothermal projects are also being considered on BLM land in Nevada and Arizona. However, none of these are located in the vicinity of the Desert Quartzite Project area. The closest is the Quartzsite Solar Energy Project, located more than 30 miles northeast of the Project site, and separated from the Palo Verde Valley by the Dome Rock Mountains. Large renewable projects now described in applications to the BLM and on private land are competing for utility Power Purchase Agreements, which will allow utilities to meet state-required Renewables Portfolio Standards. Not all of the projects listed will enter the environmental review process or be approved, and not all projects will be funded and ultimately constructed.

4.1.6 Mitigation Measures Included in the Analysis

The impact analyses are based on the Applicant's description of their proposed Project, and that description includes, for some resources, Applicant-Proposed Measures (APMs). The impact analyses assume that APMs are to be implemented, and these measures are therefore requirements for approval of the Project.

For impacts identified in the following resource sections, measures have been developed to avoid or reduce potential environmental effects that would be implemented during all appropriate phases of the Project from initial ground breaking and construction, to operation and maintenance, and through closure and decommissioning. The measures include a combination of the following:

1. APMs, as specified in the Applicant's POD, management plans, and technical reports;
2. Regulatory requirements of other Federal, state, and local agencies;
3. USFWS terms and conditions identified in the BO; and
4. Additional BLM-proposed mitigation measures, ROW grant terms and conditions, and best management practices (BMPs).

These requirements generically are referred to as "mitigation measures" throughout this Draft PA/EIS/EIR. Descriptions of the proposed mitigation measures for impacts identified for each of the resources are included in Appendix G.

4.1.7 Terms and Conditions found in FLPMA and BLM ROW Regulations

Title V of FLMPA addresses the issuance of ROW authorizations on public land. The general terms and conditions applicable to all public land ROWs are described in FLPMA §505, and include measures to minimize damage and otherwise protect the environment, and requirements for compliance with air and water quality standards, as well as compliance with more stringent state standards for public health and safety, environmental protection, siting, construction, operation, and maintenance of ROWs.

The Secretary may prescribe additional terms and conditions as s/he deems necessary to protect Federal property, provide for efficient management, and among other things, generally protect the public interest in the public lands subject to or lands adjacent thereto. For this Project, additional terms and conditions will be incorporated into the ROW grant that are necessary to protect public safety, including security fencing and on-site personnel. The environmental consequences analysis in this Draft PA/EIS/EIR identifies impacts and mitigation measures to reduce or avoid impacts. The mitigation measures identified by the BLM and incorporated as terms and conditions of the ROW grant provide those actions necessary to prevent unnecessary or undue degradation of the public lands as required by FLPMA §302. The additional mitigation measures that are identified and described in the Draft PA/EIS/EIR and that would be enforced by the other agencies, as noted above, provide additional protection to public land resources.

Finally, all BLM ROW grants are approved subject to regulations contained at 43 CFR §2800. Those regulations specify that the BLM may, at any time, change the terms and conditions of a ROW grant "as a result of changes in legislation, regulations, or as otherwise necessary to protect public health or safety or the environment" (43 CFR §2805.15(e)).

If the ROW grant is authorized, the BLM will monitor conditions and review any ROW grant stipulations and terms and conditions issued for the Project to evaluate if future changes to the grant are necessary or justified under this provision of the regulations to further minimize or reduce impacts resulting from the Project. Changes may be subject to additional NEPA analysis.

If approved, the solar energy ROW authorization would include diligent development terms and conditions, consistent with the requirements of 43 CFR §2805.12(i)(5). Failure of the holder to comply with the diligent development terms and conditions provides the BLM authorized officer (AO) the authority to suspend or terminate the authorization (43 CFR §2807.17).

If approved, the solar energy ROW authorization would include a required "Performance and Reclamation" bond to ensure compliance with the terms and conditions of the ROW authorization, consistent with the requirements of 43 CFR §2805.12(g). The "Performance and Reclamation" bond would consist of three components. The first component would be hazardous materials, the second component would be the decommissioning and removal of improvements and facilities, and the third component would address reclamation, revegetation, restoration, and soil stabilization.

4.2 Air Resources

4.2.1 Methodology for Analysis

This analysis of potential air resources-related impacts of the Proposed Action and Alternatives is based on criteria pollutant emission estimates, public health risk, and cumulative impacts that would be associated with construction, operation and maintenance, and decommissioning of the Project. The methodology and results from air emissions estimates are included in the Air Quality and Greenhouse Gas Technical Study (URS 2015, provided in Appendix W). Analyses of emissions of greenhouse gases (GHGs) are presented separately in Sections 3.8 and 4.8.

Independent of NEPA, Section 176 of the CAA requires that Federal agency activities, including licensing and permitting, within EPA-designated nonattainment or maintenance areas must comply with applicable General and Transportation Conformity Rules/Regulations. However, the study area has no nonattainment or maintenance designations for any NAAQS. Consequently, formal CAA conformity requirements do not apply to Federal agency actions related to the Proposed Action or Alternatives.

However, for the purposes of this analysis, the CAA conformity to *de minimis* levels are used as mass emissions indicators for adverse annual emissions. The CAA conformity thresholds for maintenance areas (i.e., areas that currently meet Federal air quality standards, but have violated the standards in prior years), which in the Project area are 100 tons per year per pollutant, are used in this analysis to gauge the potential for the Project and alternatives to result in an exceedance of NAAQS.

The MDAQMD has been the delegated local authority by the EPA to implement and enforce most Federal requirements that are applicable to the Project. Compliance with the MDAQMD regulations assures compliance and consistency with the corresponding Federal requirements because the MDAQMD requirements are more stringent. Project-related construction and operation and maintenance emissions are also compared to MDAQMD thresholds to determine whether the Project and alternatives could result in an exceedance of the CAAQS.

Construction Emissions

Alternative 1: Proposed Action

The primary sources of air emissions during the construction of the Project would include exhaust from heavy equipment and vehicles, as well as fugitive dust generated in areas disturbed by grading, excavating, earth moving, and the movement of various construction vehicles around the site.

Emissions from vehicles and equipment during construction would include:

- Exhaust from the off-road construction equipment, including diesel construction equipment used for site grading, excavation, and construction of on-site structures, generators, and water trucks used to control construction dust emissions.
- Exhaust from on-road construction vehicles, including diesel fuel trucks and water trucks used to transport fuel and water between the local Blythe area and the construction site, and from diesel trucks used to deliver concrete, material, equipment, and construction supplies to the construction site.

- Exhaust from vehicles used by workers to commute to the construction site.

Fugitive dust emissions from the construction of the Project would include:

- Site grading/excavation activities at the construction site.
- Installation of the 230 kV gen-tie line foundations.
- Installation of conductors along the gen-tie route.
- Installation of solar array foundation and related equipment installation.
- On-site vehicle and equipment travel on unpaved surfaces.
- Off-site travel of worker vehicles and trucks on unpaved and paved roads.

Exhaust emissions from construction equipment and vehicles were estimated using equipment lists and construction scheduling information. Mass emissions of all criteria pollutants were estimated using equipment-specific OFFROAD2011/2007 software published by the ARB. ARB's EMFAC2014 model was used to generate emission factors specific to each vehicle for criteria pollutants. For volatile organic compounds (VOCs), the model calculates an emission value for Reactive Organic Gases (ROG), which is equivalent to EPA's VOC definition.

The assumptions used in calculating emissions from Project construction included a 25-month construction period with 5 construction days per week (21 work-days per month). The weight and speed for equipment and vehicle were assumed from EMFAC/OFFROAD guidance, EPA AP-42, and other similar solar project and construction project experience. The Project-related vehicular traffic distances on offsite paved roads were measured and included in the emission estimates. All off-site road travel was assumed to be within the MDAQMD jurisdiction area.

Fugitive dust emissions resulting from on-site soil disturbances were estimated using EPA AP-42 emission factors for activities including bulldozing and dirt-pushing, travel on paved and unpaved roads, and material handling of aggregate materials. $PM_{2.5}$ emissions were scaled from factors determined using guidance from SCAQMD Final Methodology to Calculate $PM_{2.5}$ and $PM_{2.5}$ Significance Thresholds (10/1/2006, Appendix A Updated CEIDARS Table with $PM_{2.5}$ Fractions) (SCAQMD 2006).

Other modeling assumptions included the number of vehicle and truck trips. The estimated construction workforce is expected to require up to 450 vehicle trips per day, with a maximum of 810 vehicle trips per day during peak construction. Approximately 14,400 truck deliveries of equipment, materials and fuel were estimated to be required over the course of the construction period. If onsite groundwater or local wells are not used, then water will be trucked into the Project site from an off-site source(s), and would potentially require up to approximately 57,000 water deliveries.

The primary hazardous air pollutant emission associated with the Project and alternatives would be Diesel Particulate Matter (DPM) emissions from heavy construction equipment. Small quantities of other hazardous air pollutants would be associated with gasoline-fueled vehicles also operating onsite during construction. The location of hazardous pollutant emissions from construction equipment operation would vary across the Project site over the construction period, and thus would not be in a fixed location for long periods of time.

The MDAQMD CEQA Guidelines state that an industrial project within 1,000 feet of a sensitive receptor must be evaluated quantitatively to determine if it would expose sensitive receptors to substantial pollutant concentrations based on the criteria presented in the guidelines (MDAQMD 2011). Because there are no sensitive receptors within 1,000 feet of the Project site, health risks are assessed qualitatively and a full health risk assessment was not warranted for the Project.

Alternative 2: Resource Avoidance Alternative

The annual criteria pollutant emissions that would be generated within the MDAB under Alternative 2 were estimated based on the analysis developed for the Proposed Action, but scaled, where applicable, to account for differences in Project activities between Alternative 2 and the Proposed Action. The Project features which affect the calculation of emissions, include:

- Alternative 2 would involve the same peak number of construction workers as the Proposed Action, and therefore the same peak onsite and offsite emissions associated with the vehicles of commuting workers.
- Alternative 2 would involve the same peak number of onsite construction vehicles and equipment as the Proposed Action, and therefore the same peak onsite emissions associated with construction equipment.
- Alternative 2 would involve the same peak number of truck deliveries of Project components and equipment as the Proposed Action, and therefore the same peak onsite and offsite emissions associated with delivery trucks.
- Alternative 2 would involve ground disturbance of a smaller area than the Proposed Action, and therefore would result in a reduced amount of fugitive dust associated with ground disturbance. The fugitive dust emissions for the Proposed Action were based on an assumption that grading requirements would total 838,000 cubic yards. The Applicant estimates that the grading requirements for Alternative 2 would total 750,000 cubic yards, or approximately 89 percent of the Proposed Action. Therefore, the fugitive dust emissions for Alternative 2 were estimated by scaling down the fugitive dust emissions of the Proposed Action by 11 percent.

Alternative 3: Reduced Project Alternative

The annual criteria pollutant emissions that would be generated within the MDAB under Alternative 3 were estimated based on the analysis developed for the Proposed Action, but scaled, where applicable, to account for differences in Project activities between Alternative 3 and the Proposed Action. The Project features that affect the calculation of emissions, include:

- Alternative 3 would involve the same peak number of construction workers as the Proposed Action, and therefore the same peak onsite and offsite emissions associated with the vehicles of commuting workers.
- Alternative 3 would involve the same peak number of onsite construction vehicles and equipment as the Proposed Action, and therefore the same peak onsite emissions associated with construction equipment.
- Alternative 3 would involve a reduced number of truck deliveries of Project components and equipment from that of the Proposed Action. The Applicant estimates that the Proposed Action and Alternative 2 would require up to 14,400 truck deliveries, while Alternative 3 would require 10,800 deliveries, a reduction of 25 percent. Therefore, the onsite and offsite emissions associated with truck deliveries for Alternative 3 were

estimated by scaling down the vehicle dust and fugitive dust emissions of the Proposed Action by 25 percent.

- Alternative 3 would involve ground disturbance of a smaller area than the Proposed Action, and therefore would result in a reduced amount of fugitive dust associated with ground disturbance. The fugitive dust emissions for the Proposed Action were based on an assumption that grading requirements would total 838,000 cubic yards. The Applicant estimates that the grading requirements for Alternative 3 would total 670,000 cubic yards, or approximately 80 percent of the Proposed Action. Therefore, the fugitive dust emissions for Alternative 3 were estimated by scaling down the fugitive dust emissions of the Proposed Action by 20 percent.

Alternative 4: No Action Alternative

The No Action Alternative would not result in any increase in air emissions.

Operation and Maintenance Emissions

Operation-related criteria pollutant emissions, including fugitive dust, would be generated from onsite equipment and onsite and offsite vehicle use.

The workforce for operations and security purposes is estimated to be 5 full-time workers. The expected annual demand for water is approximately 38 acre feet per year (AFY). Only limited deliveries would be necessary for replacement PV modules and equipment during operations and maintenance; up to 15 daily round trips were estimated for workers and deliveries. Off-road equipment is not expected to be used during Project operations. The methodology to estimate operational emissions and construction emissions from the on-road vehicles are identical.

There would be few sources of hazardous air pollutant emissions other than limited onsite vehicle traffic at the Project site during facility operation and maintenance.

Alternatives 2 and 3 would involve the same number of operations workers and deliveries as the Proposed Action. Therefore, operations and maintenance emissions for Alternatives 2 and 3 were assumed to be the same as those of the Proposed Action.

Decommissioning Emissions

The sources of emissions from decommissioning of the Proposed Action were assumed to be similar to those associated with construction. Because the land area and number of Project components under Alternatives 2 and 3 would both be reduced from those associated with construction, the emissions associated with decommissioning of these alternatives would be reduced by approximately the scale factor as would the construction emissions.

4.2.1.1 CEQA Significance Criteria

The criteria listed below were used to determine if the Proposed Project would result in significant impacts to air quality. These criteria were obtained from the CEQA Environmental Checklist, Appendix G of the state CEQA Guidelines and from the MDAQMD CEQA Guidelines (MDAQMD 2011). The thresholds from both sources have been combined into a single set of criteria to define that a project could have potentially significant impact if it would:

AIR-1) Conflict with or obstruct implementation of the applicable air quality attainment or maintenance plan.

AIR-2) Violate any air quality standard or contribute substantially to an existing or projected air quality violation when added to the local background. The MDAQMD significance thresholds for criteria pollutants are shown in Table 4.2-1.

AIR-3) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).

AIR-4) Expose sensitive receptors to substantial pollutant concentrations including those resulting in a cancer risk greater than or equal to 10 in a million and/or a Hazard Index (HI) (non-cancerous) greater than or equal to 1. As defined in the MDAQMD's CEQA Guidelines, sensitive receptors include land uses associated with residences, schools, daycare centers, playgrounds, and medical facilities. The following project types proposed for sites within the specified distance to an existing or planned (zoned) sensitive receptor land use must be evaluated using CEQA Significance Criterion AIR-4:

- Any industrial project within 1,000 feet;
- A distribution center (40 or more trucks per day) within 1,000 feet;
- A major transportation project (50,000 or more vehicles per day) within 1,000 feet;
- A dry cleaner using perchloroethylene within 500 feet; or
- A gasoline dispensing facility within 300 feet.

AIR-5) Create objectionable odors affecting a substantial number of people.

The following additional significance criteria from the County of Riverside CEQA Environmental Assessment Form are used in the analysis. A project could have potentially significant impacts if it would:

AIR-6) Expose sensitive receptors that are located within one mile of the Project site to substantial point source emissions.

AIR-7) Involve the construction of a sensitive receptor located within one mile of an existing substantial point source emitter.

Table 4.2-1. MDAQMD's CEQA Significant Emissions Thresholds

Pollutant	Annual Threshold (Tons)	Daily Threshold (Pounds)
Carbon monoxide (CO)	100	548
Oxides of nitrogen (NO_x)	25	137
Volatile organic compounds (VOC)	25	137
Oxides of sulfur (SO_x)	25	137
Particulate matter (PM_{10})	15	82
Particulate matter ($PM_{2.5}$)	15	82
Hydrogen Sulfide (H_2S)	10	54

Source: MDAQMD 2011

4.2.2 Applicant-Proposed Measures (APMs)

In their Air Quality and Greenhouse Gas Technical Study (URS 2015), the Applicant described APMs which would be implemented to reduce emissions from the Project. During construction, operations and maintenance, and decommissioning, watering of unpaved travel surfaces would occur and travel speed on unpaved surfaces would be limited to 15 miles per hour. The measure for watering at least three times per day or equivalent control, and for a speed limit of 15 miles per hour, intend to achieve a combined dust control efficiency of 83 percent (SCAQMD 2012) during temporary construction activities on unpaved surfaces at the Project site and the off-site unpaved access road (16th Avenue/Seeley Avenue) to SR-78. The assumption of an 83 percent of combined dust mitigation efficiency from watering and limiting speeds to 15 miles per hour was also used for estimating emissions from bulldozing, grading, dirt piling, and material handling activities. All dust emissions from travelling on paved roads off-site was assumed to be non-mitigated, for the purposes of estimating the emissions. The Applicant may achieve required control efficiency through application of dust suppressants, consistent with applicable regulations.

In addition, as described in Section 2.3.7.6, the Applicant has developed a preliminary summary of a Dust Control Plan to control fugitive dust emissions during Project construction. Prior to the Notice to Proceed, the Dust Control Plan would be developed in conformance with requirements of the MDAQMD Rule 403.2, Fugitive Dust Control for the Mojave Desert Planning Area. The Plan would include requirements such as use of water or dust suppressants on dirt roads and graded areas, speed limits for vehicles, covers for vehicles transporting soil, and cleaning and maintaining vehicles and equipment. Dust control measures and BMPs would include limiting ground disturbance and vegetation removal to the extent practicable; using water on unpaved areas and stockpiles; stabilizing inactive surfaces and stockpiles with soil binders or dust palliatives; covering stockpiles during windy conditions; using gravel at key locations on roads to prevent track-out; covering bulk material on trucks; maintain 15 mile per hour speed limits for loaded vehicles on public and private earthen or gravel roads; and suspending grading activities during periods of high wind.

The emission estimates for Project construction and emissions assumed that the APMs and the Dust Control Plan described above would be implemented as part of the Project.

As discussed in Section 4.1.6, the impact analysis assumes that the APMs have been implemented, and these measures are therefore requirements for approval of the Project. The APMs are to be incorporated into the EICMPP/MMRCP, along with the agency-required mitigation measures.

4.2.3 Direct and Indirect Impacts

4.2.3.1 Alternative 1: Proposed Action

Construction

Criteria Pollutant Emissions

Project construction would generate emissions of criteria pollutants through direct emissions from construction-related vehicles, as well as fugitive dust emissions. In general, ground disturbance associated with construction acts to increase fugitive dust emissions by removing stabilizing vegetation and crusts. Dusts are emitted immediately as construction vehicles traverse soils. Dusts are also emitted after construction vehicles have left an area, because once surficial vegetation and crusts are removed, exposed soils are unprotected and become vulnerable to both wind and water erosion. Two methods to reduce fugitive dusts associated with construction are 1) to minimize the amount of soil disturbance that occurs by reducing grading and vegetation removal to the maximum extent practicable, and 2) to stabilize areas that have been disturbed.

Tables 4.2-2 and 4.2-3 summarize the worst-case daily and annual construction air emissions. Table 4.2-2 compares the maximum daily construction emissions with the applicable MDAQMD thresholds of significance, while Table 4.2-3 compares the maximum annual construction emissions with the MDAQMD thresholds of significance. The emissions estimates in Tables 4.2-2 and 4.2-3 show that the emissions associated with Project construction activities would exceed applicable MDAQMD daily and annual thresholds for NO_x, PM_{10}, and $PM_{2.5}$ emissions, resulting in an adverse effect. The onsite PM_{10} and $PM_{2.5}$ emissions estimates account for reductions from the APMs (application of watering and speed limit of 15 miles per hour on unpaved travel surfaces). The analysis assumes that the control efficiency associated with the Applicant proposed dust control measures would be 83 percent.

The vast majority of Project-related PM_{10} and $PM_{2.5}$ emissions (approximately 88 percent) are not generated onsite, but are generated by worker vehicles and delivery trucks traversing the unpaved, 5.6-mile long segment of 16th Avenue/Seeley Avenue between the site entrance and the beginning of pavement near SR-78. Mitigation Measure TRN-4 would require that the Applicant pave this segment, a length of approximately 5.6 miles, prior to beginning any other construction activities at the Project area. This measure would reduce emissions of PM_{10} and $PM_{2.5}$ during construction substantially.

As shown in Table 4.2-3, the annual emissions for all pollutants would be below the respective annual *de minimis* levels (below 100 tons/year), except for PM_{10}, which would exceed the *de minimis* level. The projected exceedance of the PM_{10} MDAQMD annual emissions threshold would also contribute to the non-attainment for PM_{10} in the area under CAAQS. The magnitude of the exceedance of the *de minimis* level and the MDAQMD annual threshold would be substantially reduced by paving of the access road under Mitigation Measure TRN-4. However, exceedance of the *de minimis* level and the MDAQMD annual threshold would still occur.

Implementation of mitigation measures AQ-1 (dust control plan), AQ-2 (protect the stability of desert pavement areas), and TRN-4 (paving of the access road) would minimize air quality impacts to the extent feasible, particularly related to emissions of $PM_{2.5}$ and PM_{10}. MDAQMD Rule 403.2 requires that soil stabilizers be used on exposed surfaces to reduce fugitive dust emissions. Even with these mitigation measures, the PM_{10} emissions during construction would exceed the MDAQMD regional significance threshold of 82 pounds/day. The exceedance of the MDAQMD thresholds and the annual *de minimis* level would be temporary, occurring only during the 25 month construction period. Upon completion of construction, these emissions would cease.

Table 4.2-2. Proposed Action Construction Daily Emission Estimations (Pounds/Day)

Daily Emissions (Pounds Per Day)	Pollutant									
	Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NO_x	SO_x	CO	ROG
On-site emissions	279.93	14.37	294.30	32.95	13.22	46.17	271.61	0.50	158.55	24.86
Off-site emissions	2,539.00	2.90	2,541.91	261.26	2.76	264.02	151.38	0.85	342.55	19.75
Total	2,818.94	17.27	2,836.21	294.21	15.98	310.19	422.99	1.35	501.10	44.61
MDAQMD CEQA daily threshold	NA	NA	82	NA	NA	82	137	137	548	137
Exceed the threshold (Yes/No)	NA	NA	Yes	NA	NA	Yes	Yes	No	No	No

Note: NA = Not Applicable.

Table 4.2-3. Proposed Action Construction Annual Emission Estimations (Tons/Year)

Annual Emissions (Tons per Year)	Pollutant									
	Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NO_x	SO_x	CO	ROG
On-site emissions	31.05	1.62	32.67	3.68	1.49	5.17	30.19	0.06	17.96	2.80
Off-site emissions	266.97	0.29	267.26	27.47	0.27	27.75	15.00	0.09	37.13	2.05
Total	298.02	1.91	299.92	31.15	1.76	32.91	45.19	0.15	55.09	4.86
de minimis level	NA	NA	100	NA	NA	100	100	100	100	100
MDAQMD CEQA annual threshold	NA	NA	15	NA	NA	15	25	25	100	25
Exceed the threshold (Yes/No)	NA	NA	Yes	NA	NA	Yes	Yes	No	No	No

Note: NA = Not Applicable.

Toxic Air Contaminants

Emissions of hazardous air pollutants (air toxics) are limited for construction of solar PV generating facilities, and from a health risk perspective are primarily associated with the emissions of DPM. DPM would be emitted from construction equipment and diesel fueled construction vehicles. MDAQMD requirements for health risk assessments categorize project sites by land use type and define the distance from the project site within which sensitive receptors must be considered for increased health risk. The worst case potential impact radius is associated with "Any industrial project" which requires that sensitive receptors within 1,000 feet of the project be considered. Though solar projects are not specifically identified in the categories, this worst case radius was assumed as the criterion for determining potential risks from exposure to DPM during construction. Using the associated definition of sensitive receptors, which include residences, schools, daycare centers, playgrounds, and medical facilities, it was determined that there would be little risk from exposure to DPM during construction because the closest sensitive receptor is located approximately 3,700 feet from the Project area.

Odors

Construction equipment may create mildly objectionable odors. The specific potential minor odor sources during construction would include equipment and construction vehicle exhausts. The impact is not expected to be substantial, because construction activities would be intermittent and spatially dispersed, and because the closest sensitive receptor is located approximately 3,700 feet from the Project area.

Operation and Maintenance

Operation of the Project would result in substantially lower emissions than Project construction, since the Project would not have any major stationary emission sources. Annual emission estimates for operation of all of the action alternatives are shown in Table 4.2-4. The emission estimates in Table 4.2-4 show that emissions from operation of the Project would all be below MDAQMD thresholds and *de minimis* levels. Impacts associated with operation and maintenance of the Project would not be expected to result in or contribute to an exceedance of a NAAQS or CAAQS.

Table 4.2-4. Operational Annual Emission Estimations for All Action Alternatives (Tons/Year)

Annual Emissions (Tons per Year)	**Pollutant**									
	Fugitive Dust PM_{10}	**Exhaust PM_{10}**	**Total PM_{10}**	**Fugitive Dust $PM_{2.5}$**	**Exhaust $PM_{2.5}$**	**Total $PM_{2.5}$**	**NO_x**	**SO_x**	**CO**	**ROG**
On-site emissions	0.16	0.00	0.16	0.02	0.0001	0.02	0.01	0.00001	0.0019	0.0004
Off-site emissions	9.02	0.03	9.04	0.93	0.02	0.96	1.26	0.003	0.61	0.09
Total	9.17	0.03	9.20	0.95	0.02	0.97	1.26	0.003	0.61	0.09
de minimis level	NA	NA	100	NA	NA	100	100	100	100	100
MDAQMD CEQA annual threshold	NA	NA	15	NA	NA	15	25	25	100	25
Exceed the threshold (Yes/No)	NA	NA	No	NA	NA	No	No	No	No	No

Note: NA = Not Applicable.

Sources of DPM emissions during operation include trucks and maintenance equipment, such as diesel fueled vehicles. DPM emissions during operation would be very limited. Due to the negligible amount of emissions that would be generated during operation and maintenance of the Project, and because the closest sensitive receptor is located approximately 3,700 feet from the Project area, the risk from exposure to DPM during Project operation and maintenance would be negligible. Similarly, exhaust from off-road equipment and on-road vehicle use during Project operation would not be expected to create objectionable odors. Photovoltaic solar projects are not typically large generators of odors.

Decommissioning

At the end of the 30-year term of the ROW grant, Project operation and maintenance would cease and associated facilities would be decommissioned and dismantled, and the site would be restored. Decommissioning activities could generate temporary air pollutant emissions similar to those that would occur during construction of the Project. It is likely that technological advances and continuing stringent regulation of air pollutants would result in lower rates of emissions than during the construction phase of the Project.

4.2.3.2 Alternative 2: Resource Avoidance Alternative

Construction

As discussed in Section 4.2.1, the annual criteria pollutant emissions that would be generated within the MDAB under Alternative 2 were estimated based on the analysis developed for the Proposed Action, but scaled, where applicable, to account for differences in Project activities between Alternative 2 and the Proposed Action. The primary difference between the alternatives is that Alternative 2 would involve ground disturbance of a smaller area than the Proposed Action, and therefore would result in a reduced amount of fugitive dust associated with ground disturbance. The fugitive dust emissions for the Proposed Action were based on an assumption that grading requirements would total 838,000 cubic yards. The Applicant estimates that the grading requirements for Alternative 2 would total 750,000 cubic yards, or approximately 89 percent of the Proposed Action. Therefore, the fugitive dust emissions for Alternative 2 were estimated by scaling down the fugitive dust emissions of the Proposed Action by 11 percent.

Table 4.2-5 provides the estimated maximum daily criteria pollutant emissions that would be generated within the MDAB during construction of Alternative 2. As shown in Table 4.2-5, the maximum daily emissions for VOC, NO_x, CO, SO_x, and $PM_{2.5}$ would be below the respective MDAQMD thresholds. Therefore, construction of Alternative 2 would not result in or contribute to an exceedance of an applicable daily or hourly AAQS. With regard to PM_{10}, the estimated maximum daily emissions would exceed the MDAQMD threshold, indicating that PM_{10} emissions could result in an exceedance of the state PM_{10} 24-hour AAQS.

The emissions estimates in Tables 4.2-5 and 4.2-6 show that the emissions associated with Alternative 2 construction activities would exceed applicable MDAQMD daily and annual thresholds for NO_x, PM_{10}, and $PM_{2.5}$ emissions, resulting in an adverse effect. As shown in Table 4.2-6, the annual emissions for all pollutants would be below the respective annual *de minimis* levels (below 100 tons/year), except for PM_{10}, which would exceed the *de minimis* level. The projected exceedance of the PM_{10} MDAQMD annual emissions threshold would also contribute to the non-attainment for PM_{10} in the area under CAAQS.

The vast majority of Project-related PM_{10} and $PM_{2.5}$ emissions (approximately 88 percent) are not generated onsite, but are generated by worker vehicles and delivery trucks traversing the unpaved, 5.6-mile long segment of 16th Avenue/Seeley Avenue between the site entrance and the beginning of pavement near SR-78. Mitigation Measure TRN-4 would require that the Applicant pave this segment, a length of approximately 5.6 miles, prior to beginning any other construction activities at the Project area. This measure would reduce emissions of PM_{10} and $PM_{2.5}$ during construction substantially.

Implementation of mitigation measures AQ-1 (dust control plan), AQ-2 (protect the stability of desert pavement areas), and TRN-4 (paving the access road) would minimize air quality impacts to the extent feasible, particularly related to emissions of $PM_{2.5}$ and PM_{10}. MDAQMD Rule 403.2 requires that soil stabilizers be used on exposed surfaces to reduce fugitive dust emissions. Even with these measures, the PM_{10} emissions during construction would exceed the MDAQMD regional significance threshold of 82 pounds/day. The exceedance of the MDAQMD thresholds and the annual *de minimis* level would be temporary, occurring only during the 25 month construction period. Upon completion of construction, these emissions would cease.

Table 4.2-5. Alternative 2 Construction Daily Emission Estimations (Pounds/Day)

Daily Emissions (Pounds per Day)	**Pollutant**									
	Fugitive Dust PM_{10}	**Exhaust PM_{10}**	**Total PM_{10}**	**Fugitive Dust $PM_{2.5}$**	**Exhaust $PM_{2.5}$**	**Total $PM_{2.5}$**	**NO_x**	**SO_x**	**CO**	**ROG**
On-site emissions	249.14	14.37	263.51	29.33	13.22	42.55	271.61	0.50	158.55	24.86
Off-site emissions	2,539.00	2.90	2,541.91	261.26	2.76	264.02	151.38	0.85	342.55	19.75
Total	2,788.14	17.27	2,805.42	290.59	15.98	306.57	422.99	1.35	501.10	44.61
MDAQMD CEQA daily threshold	NA	NA	82	NA	NA	82	137	137	548	137
Exceed the threshold (Yes/No)	NA	NA	Yes	NA	NA	Yes	Yes	No	No	No

Note: NA = Not Applicable.

Table 4.2-6. Alternative 2 Construction Annual Emission Estimations (Tons/Year)

Annual Emissions (Tons per Year)	**Pollutant**									
	Fugitive Dust PM_{10}	**Exhaust PM_{10}**	**Total PM_{10}**	**Fugitive Dust $PM_{2.5}$**	**Exhaust $PM_{2.5}$**	**Total $PM_{2.5}$**	**NO_x**	**SO_x**	**CO**	**ROG**
On-site emissions	27.63	1.62	29.25	3.28	1.49	4.77	30.19	0.06	17.96	2.80
Off-site emissions	266.97	0.29	267.26	27.47	0.27	27.75	15.00	0.09	37.13	2.05
Total	294.60	1.91	296.51	30.75	1.76	32.52	45.19	0.15	55.09	4.86
de minimis level	NA	NA	100	NA	NA	100	100	100	100	100
MDAQMD CEQA annual threshold	NA	NA	15	NA	NA	15	25	25	100	25
Exceed the threshold (Yes/No)	NA	NA	Yes	NA	NA	Yes	Yes	No	No	No

Note: NA = Not Applicable.

The distances to the closest sensitive receptors (i.e., residences) under Alternative 2 would be the same as under the Proposed Action. Therefore, emissions of DPM from construction would not be expected to cause adverse health risks at any sensitive receptor in the vicinity of Alternative 2.

The impact of odors is not expected to be substantial, because construction activities would be intermittent and spatially dispersed, and because the closest sensitive receptor is located approximately 3,700 feet from the Project area.

Operation and Maintenance

Operation of Alternative 2 would result in substantially lower emissions than Project construction, since the Project would not have any major stationary emission sources. Annual emissions for operations of Alternative 2 would be the same as estimated for operation of the Proposed Action, as shown in Table 4.2-4. The emission estimates in Table 4.2-4 show that emissions from operation of Alternative 2 would all be below MDAQMD thresholds and *de minimis* levels. Impacts associated with operation and maintenance of Alternative 2 would not be expected to result in or contribute to an exceedance of a NAAQS or CAAQS.

Sources of DPM emissions during operation include trucks and maintenance equipment, such as diesel fueled vehicles. DPM emissions during operation would be very limited. Due to the negligible amount of emissions that would be generated during operation and maintenance of the Project, and because the closest sensitive receptor is located approximately 3,700 feet from the Project area, the risk from exposure to DPM during Project operation and maintenance would be negligible. Similarly, exhaust from off-road equipment and on-road vehicle use during Project operation would not be expected to create objectionable odors. Photovoltaic solar projects are not typically large generators of odors.

Decommissioning

At the end of the 30-year term of the ROW grant, operation and maintenance of Alternative 2 may cease in the absence of ROW renewal. In that case, associated facilities would be decommissioned and dismantled, and the site would be restored. It is likely that technological advances and continuing stringent regulation of air pollutants would result in lower rates of emissions than during the construction phase of Alternative 2.

4.2.3.3 Alternative 3: Reduced Project Alternative

Construction

As discussed in Section 4.2.1, the annual criteria pollutant emissions that would be generated within the MDAB under Alternative 3 were estimated based on the analysis developed for the Proposed Action, but scaled, where applicable, to account for differences in Project activities between Alternative 3 and the Proposed Action. The differences between the alternatives are that Alternative 3 would involve ground disturbance of a smaller area than the Proposed Action, resulting in a reduced amount of fugitive dust associated with ground disturbance, and that Alternative 3 would require fewer deliveries of Project components, resulting in a reduced amount of onsite and offsite vehicle emissions.

The fugitive dust emissions for the Proposed Action were based on an assumption that grading requirements would total 838,000 cubic yards. The Applicant estimates that the grading requirements for Alternative 3 would total 670,000 cubic yards, or approximately 80 percent of the Proposed Action. Therefore, the fugitive dust emissions for Alternative 3 were estimated by scaling down the fugitive dust emissions of the Proposed Action by 20 percent.

Alternative 3 would involve a reduced number of truck deliveries of Project components and equipment from that of the Proposed Action. The Applicant estimates that the Proposed Action and Alternative 2 would require up to 14,400 truck deliveries, while Alternative 3 would require 10,800 deliveries, a reduction of 25 percent. Therefore, the onsite and offsite emissions associated with truck deliveries for Alternative 3 were estimated by scaling down the vehicle dust and fugitive dust emissions of the Proposed Action by 25 percent.

Table 4.2-7 provides the estimated maximum daily criteria pollutant emissions that would be generated within the MDAB during construction of Alternative 3. As shown in Table 4.2-7, the maximum daily emissions for VOC, NO_x, CO, SO_x, and $PM_{2.5}$ would be below the respective MDAQMD thresholds. Therefore, construction of Alternative 3 would not result in or contribute to an exceedance of an applicable daily or hourly AAQS. With regard to PM_{10}, the estimated maximum daily emissions would exceed the MDAQMD threshold, indicating that PM_{10} emissions could result in an exceedance of the PM_{10} 24-hour CAAQS.

The emissions estimates in Tables 4.2-7 and 4.2-8 show that the emissions associated with Alternative 3 construction activities would exceed applicable MDAQMD daily and annual thresholds for NO_x, PM_{10}, and $PM_{2.5}$ emissions, resulting in an adverse effect. As shown in Table 4.2-8, the annual emissions for all pollutants would be below the respective annual *de minimis* levels (below 100 tons/year), except for PM_{10}, which would exceed the *de minimis* level. The projected exceedance of the PM_{10} MDAQMD annual emissions threshold would also contribute to the non-attainment for PM_{10} in the area under CAAQS.

Implementation of mitigation measures AQ-1 (dust control plan) and AQ-2 (protect the stability of desert pavement areas) would minimize air quality impacts to the extent feasible, particularly related to emissions of $PM_{2.5}$ and PM_{10}. MDAQMD Rule 403.2 requires that soil stabilizers be used on exposed surfaces to reduce fugitive dust emissions. Even with this mitigation measure (AQ-1), the PM_{10} emissions during construction would exceed the MDAQMD regional significance threshold of 82 pounds/day. The exceedance of the MDAQMD thresholds and the annual *de minimis* level would be temporary, occurring only during the 25 month construction period. Upon completion of construction, these emissions would cease.

Table 4.2-7. Alternative 3 Construction Daily Emission Estimations (Pounds/Day)

Daily Emissions (Pounds per Day)	Pollutant									
	Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NO_x	SO_x	CO	ROG
On-site emissions	222.89	14.37	237.26	26.26	13.22	39.47	271.55	0.50	158.54	24.86
Off-site emissions	2477.56	2.59	2480.16	254.79	2.47	257.25	134.41	0.82	339.42	18.56
Total	2700.45	16.96	2717.42	281.04	15.69	296.72	405.96	1.32	497.96	43.42
MDAQMD CEQA daily threshold	NA	NA	82	NA	NA	82	137	137	548	137
Exceed the threshold (Yes/No)	NA	NA	Yes	NA	NA	Yes	Yes	No	No	No

Note: NA = Not Applicable.

Table 4.2-8. Alternative 3 Construction Annual Emission Estimations (Tons/Year)

Annual Emissions (Tons per Year)	Pollutant									
	Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NO_x	SO_x	CO	ROG
On-site emissions	24.74	1.62	26.36	2.93	1.49	4.42	30.19	0.06	17.96	2.80
Off-site emissions	261.43	0.26	261.69	26.89	0.24	27.14	13.42	0.09	36.84	1.94
Total	286.17	1.88	288.05	29.82	1.73	31.56	43.60	0.15	54.80	4.74
de minimis level	NA	NA	100	NA	NA	100	100	100	100	100
MDAQMD CEQA annual threshold	NA	NA	15	NA	NA	15	25	25	100	25
Exceed the threshold (Yes/No)	NA	NA	Yes	NA	NA	Yes	Yes	No	No	No

Note: NA = Not Applicable.

A comparison of the emissions associated with each action alternative is shown in Tables 4.2-9 and 4.2-10. The comparison shows that the overall emissions associated with the alternatives are approximately the same. Alternative 2 PM_{10} and $PM_{2.5}$ emissions are approximately 98.8 percent of those of the Proposed Action, and Alternative 3 emissions are approximately 96 percent of those of the Proposed Action. This result is because the vast majority of PM_{10} and $PM_{2.5}$ emissions (approximately 88 percent) are not generated onsite, but are generated by worker vehicles and delivery trucks traversing the unpaved, 5.6-mile long segment of 16th Avenue/Seeley Avenue between the site entrance and the beginning of pavement near SR-78. Because Alternatives 2 and 3 would have the same number of workers and water trucks as the Proposed Action, and would use the same access road, these emissions would be largely unaffected. There would be reductions in emissions associated with the reduced amount of grading under Alternatives 2 and 3, and with the reduction in the number of delivery trucks under Alternative 3. But these reductions would be minor compared to the emissions associated with the use of 16th Avenue/Seeley Avenue under all three action alternatives. Mitigation Measure TRN-4 would require that the Applicant pave this segment, a length of approximately 5.6 miles, prior to beginning any other construction activities at the Project area. This measure would reduce emissions of PM_{10} and $PM_{2.5}$ during construction substantially.

Table 4.2-9. Comparison of Daily Construction Emissions Among Action Alternatives (Pounds/Day)

Daily Emissions (Pounds per Day)	Pollutant									
	Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NO_x	SO_x	CO	ROG
Alternative 1 Total	2,818.94	17.27	2,836.21	294.21	15.98	310.19	422.99	1.35	501.10	44.61
Alternative 2 Total	2,788.14	17.27	2,805.42	290.59	15.98	306.57	422.99	1.35	501.10	44.61
Alternative 3 Total	2700.45	16.96	2717.42	281.04	15.69	296.72	405.96	1.32	497.96	43.42

Table 4.2-9. Comparison of Daily Construction Emissions Among Action Alternatives (Pounds/Day)

Daily Emissions (Pounds per Day)	**Pollutant**									
	Fugitive Dust PM_{10}	**Exhaust PM_{10}**	**Total PM_{10}**	**Fugitive Dust $PM_{2.5}$**	**Exhaust $PM_{2.5}$**	**Total $PM_{2.5}$**	**NO_x**	**SO_x**	**CO**	**ROG**
MDAQMD CEQA daily threshold	NA	NA	82	NA	NA	82	137	137	548	137

Note: NA = Not Applicable.

Table 4.2-10. Comparison of Annual Construction Emissions Among Action Alternatives (Tons/Year)

Annual Emissions (Tons per Year)	**Pollutant**									
	Fugitive Dust PM_{10}	**Exhaust PM_{10}**	**Total PM_{10}**	**Fugitive Dust $PM_{2.5}$**	**Exhaust $PM_{2.5}$**	**Total $PM_{2.5}$**	**NO_x**	**SO_x**	**CO**	**ROG**
Alternative 1 Total	298.02	1.91	299.92	31.15	1.76	32.91	45.19	0.15	55.09	4.86
Alternative 2 Total	294.60	1.91	296.51	30.75	1.76	32.52	45.19	0.15	55.09	4.86
Alternative 3 Total	286.17	1.88	288.05	29.82	1.73	31.56	43.60	0.15	54.80	4.74
de minimis level	NA	NA	100	NA	NA	100	100	100	100	100
MDAQMD CEQA annual threshold	NA	NA	15	NA	NA	15	25	25	100	25

Note: NA = Not Applicable.

The distances to the closest sensitive receptors (i.e., residences) under Alternative 3 would be the same as under the Proposed Action. Therefore, emissions of DPM from construction would not be expected to cause adverse health risks at any sensitive receptor in the vicinity of Alternative 3. The impact of odors is not expected to be substantial, because construction activities would be intermittent and spatially dispersed, and because the closest sensitive receptor is located approximately 3,700 feet from the Project area.

Operation and Maintenance

Operation of Alternative 3 would result in substantially lower emissions than Project construction, since the Project would not have any major stationary emission sources. Annual emissions for operations of Alternative 3 would be the same as estimated for operation of the Proposed Action, as shown in Table 4.2-4. The emission estimates in Table 4.2-4 show that emissions from operation of Alternative 3 would all be below MDAQMD thresholds and *de minimis* levels. Impacts associated with operation and maintenance of Alternative 3 would not be expected to result in or contribute to an exceedance of a NAAQS or CAAQS.

Sources of DPM emissions during operation include trucks and maintenance equipment, such as diesel fueled vehicles. DPM emissions during operation would be very limited. Due to the negligible amount of emissions that would be generated during operation and maintenance of the

Project, and because the closest sensitive receptor is located approximately 3,700 feet from the Project area, the risk from exposure to DPM during Project operation and maintenance would be negligible. Similarly, exhaust from off-road equipment and on-road vehicle use during Project operation would not be expected to create objectionable odors. Photovoltaic solar projects are not typically large generators of odors.

Decommissioning

At the end of the 30-year term of the ROW grant, operation and maintenance of Alternative 3 would cease and associated facilities would be decommissioned and dismantled, and the site would be restored. It is likely that technological advances and continuing stringent regulation of air pollutants would result in lower rates of emissions than during the construction phase of Alternative 3.

4.2.4 Application of CEQA Significance Thresholds

Emissions estimates for construction and decommissioning of Alternatives 1, 2, or 3 would exceed applicable MDAQMD daily and annual thresholds for NO_x, PM_{10}, and $PM_{2.5}$. The emissions estimates assume that the APMs and Mitigation Measures AQ-1 and AQ-2 would be applied to each alternative, so these measures would not reduce these emissions to be below MDAQMD thresholds, resulting in a significant and unavoidable impact for construction and decommissioning. Emissions associated with operation of Alternatives 1, 2, or 3 would not exceed applicable MDAQMD thresholds. Therefore, Alternatives 1, 2, and 3 would each have less than significant impacts to air resources during operations and maintenance.

AIR-1) Would the Project conflict with or obstruct implementation of the applicable air quality attainment or maintenance plan?

Because the Project is located in the Federal attainment/unclassified area, there is no applicable air quality plan and SIP from MDAQMD and ARB. Therefore, Alternatives 1, 2, or 3 would not conflict or obstruct implementation of the applicable air quality plan. There would be no impact from Alternatives 1, 2, or 3.

AIR-2) Would the Project violate any air quality standard or contribute substantially to an existing or projected air quality violation when added to the local background?

As shown in Tables 4.2-2 and 4.2-3 for Alternative 1, Tables 4.2-5 and 4.2-6 for Alternative 2, and Tables 4.2-7 and 4.2-8 for Alternative 3, emissions associated with Project construction activities are expected to exceed applicable MDAQMD daily and annual thresholds for NO_x, PM_{10}, and $PM_{2.5}$ emissions. These emissions estimates already account for the APMs related to watering and speed limits to reduce dust. Even with mitigation measures AQ-1, AQ-2, and TRN-4, emissions for NO_x, PM_{10}, and $PM_{2.5}$ during construction would exceed the MDAQMD daily and annual thresholds, and these emission levels could cause localized exceedances, or contribute significantly to existing exceedances, of the state or Federal air quality standards, including PM_{10} for which the Project area is already within the non-attainment area for CAAQS for PM_{10}. Therefore, Alternatives 1, 2, and 3 would each have temporary significant and unavoidable NO_x, PM_{10}, and $PM_{2.5}$ impacts during construction. Due to technological advances and continuing stringent regulation of air pollutants, it is expected that decommissioning emissions would be lower than construction emissions for each of the alternatives.

As shown in Table 4.2-4, emissions associated with Alternatives 1, 2, or 3 operations would not exceed applicable MDAQMD thresholds. Therefore, Alternatives 1, 2, and 3 would each have less than significant impacts during operations and maintenance to air resources.

AIR-3) Would the Project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or state ambient air quality standard (including release emissions which exceed quantitative thresholds for ozone precursors)?

Construction and decommissioning of Alternatives 1, 2, or 3 would exceed the MDAQMD CEQA significance thresholds for NO_x, PM_{10}, and $PM_{2.5}$, and the addition of emissions from cumulative projects would only increase those exceedances. The Project area is within the non-attainment area for CAAQS for PM_{10}. Even with mitigation measures AQ-1, AQ-2, and TRN-4, Alternatives 1, 2, and 3 would result in a cumulatively considerable net increase of nonattainment pollutants (PM_{10}) and would have a significant and unavoidable impact to regional air quality during construction and decommissioning activities; however, the significant impact would be temporary, and would cease upon completion of construction and decommissioning activities.

Emissions associated with Alternatives 1, 2, or 3 operations would not exceed applicable MDAQMD thresholds and therefore the contribution of Alternatives 1, 2, or 3 would not be cumulatively considerable resulting in a less than significant impact. In addition, Alternatives 1, 2, or 3 would provide renewable energy, which would reduce statewide emissions associated with power generation compared to fossil fuel power generation.

AIR-4) Would the Project expose sensitive receptors to substantial pollutant concentrations including those resulting in a cancer risk greater than or equal to 10 in a million and/or a Hazard Index (H1) (non-cancerous) greater than or equal to 1? As defined in the MDAQMD's CEQA Guidelines, sensitive receptors include land uses associated with residences, schools, daycare centers, playgrounds, and medical facilities. The following project types proposed for sites within the specified distance to an existing or planned (zoned) sensitive receptor land use must be evaluated using CEQA Significance Criterion AIR-4:

- **Any industrial project within 1,000 feet;**
- **A distribution center (40 or more trucks per day) within 1,000 feet;**
- **A major transportation project (50,000 or more vehicles per day) within 1,000 feet;**
- **A dry cleaner using perchloroethylene within 500 feet; or**
- **A gasoline dispensing facility within 300 feet?**

Alternatives 1, 2, or 3 would not expose sensitive receptors within 1,000 feet of the Project to substantial pollutant concentrations, including TACs. Though construction-related emissions from Alternatives 1, 2, or 3 would result in emissions in excess of MDAQMD thresholds for NO_x, PM_{10}, and $PM_{2.5}$, there are no sensitive receptors within 1,000 feet of the Project area. The closest residence (apparent occupied mobile home trailer) is located approximately 3,700 feet north of the northeast corner of the Alternative 1, 2, or 3 boundary. The next two closest sensitive air quality receptors are located in the residential community of Nicholls Warm Springs/Mesa Verde approximately 4,800 north of the northeast corner of the Alternative 1, 2, or 3 boundary. Impacts associated with construction would be less than significant.

During operations of Alternatives 1, 2, or 3, the emissions of both criteria and toxic pollutants would be relatively small. The decommissioning of Alternatives 1, 2, or 3 would not expose sensitive receptors to substantial pollutant concentrations given the distance of sensitive receptors from the site and the intermittent nature of construction activities. Thus, impacts during construction, operation, maintenance, and decommissioning of Alternatives 1, 2, or 3 would not expose sensitive receptors to substantial pollutant concentrations and therefore would be less than significant.

AIR-5) Would the Project create objectionable odors affecting a substantial number of people?

Alternatives 1, 2, or 3 would not create objectionable odors affecting a substantial number of people. The specific potential minor odor sources during construction of Alternatives 1, 2, or 3 would include equipment and construction vehicle exhausts. Due to the sparse population adjacent to the site, these mild odors would not affect a substantial number of people. During operation of Alternatives 1, 2, or 3, equipment and other activities would not include significant odor-producing sources. Few odor sources would be activated during decommissioning. Thus, impacts would not create objectionable odors affecting a substantial number of people during construction, operation, maintenance, and decommissioning of Alternatives 1, 2, or 3, and therefore would be less than significant.

AIR-6) Would the Project expose sensitive receptors that are located within one mile of the Project site to substantial point source emissions?

There are two sensitive receptors within one mile of Alternatives 1, 2, or 3. One is an apparent occupied mobile home trailer located approximately 3,700 feet north of the northeast corner of the Alternative 1 boundary, approximately 3,200 feet north of the northeast corner of the Alternative 2 boundary, and approximately 6,250 feet north of the northeast corner of the Alternative 3 boundary. The other is a residence located approximately 4,800 feet north of the northeast corner of the Alternative 1 boundary, approximately 4,300 feet north of the northeast corner of the Alternative 2 boundary, and approximately 6,250 feet north of the northeast corner of the Alternative 3 boundary. Although these receptors are located within one mile of the Project boundary, emissions sources would be dispersed throughout the Project area and the access road, and there would be no substantial point source emissions. Therefore, Alternatives 1, 2, or 3 would not expose sensitive receptors that are within one mile of the Project area to substantial point source emissions, and the impact would be less than significant.

AIR-7) Would the Project involve the construction of a sensitive receptor located within one mile of an existing substantial point source emitter?

Alternatives 1, 2, and 3 do not involve the establishment of a use that would be classified as a sensitive receptor. There would be no impact.

4.2.5 Alternative 4: No Action Alternative

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, the BLM would continue to manage the land under its land use jurisdiction consistent with the site's multiple use classification as described in the CDCA Plan, as it was amended by the Western Solar Plan.

If the site remained undeveloped, the existing environmental setting described in Chapter 3.2 would be maintained. There would be no air emissions associated with vehicles or equipment, and no fugitive dust emissions from ground disturbance. Therefore Alternative 4 would not result in any air quality impacts.

4.2.6 Cumulative Impacts

The geographic scope considered for potential cumulative impacts to regional air quality is the MDAB. With respect to existing projects, the summary of available air quality data presented in Table 3.2-3 reflects the cumulative contributions of all emissions from those projects, and Table 3.2-4 reflects the attainment status resulting from those emissions. Reasonably foreseeable future projects within the MDAB, both those that release emissions and those that reduce emissions, would be expected to affect the air quality, and potentially the attainment status, in the future.

Because there are no sensitive receptors within 1,000 feet of the Project site, there is no potential for the Project to contribute to cumulative air quality impacts that could exceed the MDAQMD CEQA Guidelines. There are two sensitive receptors within one mile of the Project; one is an apparent occupied mobile home trailer located approximately 3,700 feet north of the northeast corner of the Project boundary, and the other is a residence located approximately 4,800 feet north of the northeast corner of the Project site boundary. The Project could potentially contribute to cumulative impacts to these two receptors, should another project also be located within one mile of these receptors. The only other projects within one mile of those receptors are the NRG Blythe PV Project, and the BMSP.

The temporal scope for the potential for the Project to contribute to cumulative regional air quality impacts is from construction through decommissioning of the Project. However, the time period in which Project emissions would exceed MDAQMD thresholds is within months 6 to 22 of the 25 month construction period. Outside of this time period, Project emissions would be minimal, and would not be a significant contributor to cumulative air quality impacts. Once Project construction ceases, the contribution of the Project to cumulative fugitive dust emissions during operations would be greatly reduced. In addition, once the Project is decommissioned, Project-related air emissions would cease, and the Project would no longer contribute to cumulative air quality impacts.

The ambient air quality and attainment status of the area, discussed in Section 3.2, incorporate emissions from all current sources in the region. Tables 4.2-11 and 4.2-12 present the emissions from other current and potential future sources in the Project area. In 2015, the Blythe Energy Center and SoCal Gas, both in Blythe, were the largest stationary emitting sources of CO in Riverside County. For NOx in 2015, SoCal Gas was the largest source and the Blythe Energy Center was the fourth-largest source in Riverside County. These non-renewable energy facilities are point sources to which the present Project will add emissions. In addition to these sources, the construction of the Palen and Modified Blythe solar projects may be contemporaneous with that of the Project.

Table 4.2-11. Daily Construction Emission Estimations for Project and Nearby Projects (Pounds/Day)

Daily Emissions (Pounds Per Day)	Pollutant									
	Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NO_x	SO_x	CO	ROG/VOC
Project On-site emissions	279.93	14.37	294.30	32.95	13.22	46.17	271.61	0.50	158.55	24.86
Project Off-site emissions	2,539.00	2.90	2,541.91	261.26	2.76	264.02	151.38	0.85	342.55	19.75
Project Total	**2,818.94**	**17.27**	**2,836.21**	**294.21**	**15.98**	**310.19**	**422.99**	**1.35**	**501.10**	**44.61**
Palen Total[1]	NR	NR	277.7	NR	NR	73.2	660.9	2.3	1,102.9	43.4
Modified Blythe On-Site Emissions[2]	674.4	4.7	679.1	83.0	4.3	87.3	122.5	0.2	54.9	18.4
Modified Blythe Off-Site Emissions[2]	17.3	7.9	25.2	5.3	7.3	12.6	333.3	0.7	304.2	40.4
Modified Blythe Total[2]	691.7	12.6	704.3	88.3	11.6	99.9	455.8	0.9	359.1	58.8
MDAQMD CEQA daily threshold	NA	NA	82	NA	NA	82	137	137	548	137

Note: NA = Not Applicable.
NR = Not Reported
1 – Source is BLM 2017, Palen Draft EIS/EIR. Values were not reported per offsite and onsite, or fugitive versus exhaust. Values provided here are the highest of the 4 years reported. ROG was not reported, but VOCs were reported.
2 – Source is BLM 2015, Modified Blythe Final EIS.

Table 4.2-12. Construction Annual Emission Estimations for Project and Nearby Projects (Tons/Year)

Annual Emissions (Tons per Year)	Pollutant									
	Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NO_x	SO_x	CO	ROG/VOC
Project On-site emissions	31.05	1.62	32.67	3.68	1.49	5.17	30.19	0.06	17.96	2.80
Project Off-site emissions	266.97	0.29	267.26	27.47	0.27	27.75	15.00	0.09	37.13	2.05
Project Total	**298.02**	**1.91**	**299.92**	**31.15**	**1.76**	**32.91**	**45.19**	**0.15**	**55.09**	**4.86**
Palen[1]	NR	NR	36.65	NR	NR	9.66	87.24	0.30	145.58	5.73

Table 4.2-12. Construction Annual Emission Estimations for Project and Nearby Projects (Tons/Year)

Annual Emissions (Tons per Year)	**Pollutant**									
	Fugitive Dust PM_{10}	**Exhaust PM_{10}**	**Total PM_{10}**	**Fugitive Dust $PM_{2.5}$**	**Exhaust $PM_{2.5}$**	**Total $PM_{2.5}$**	**NO_x**	**SO_x**	**CO**	**ROG/VOC**
Modified Blythe On-Site Emissions[2]	69.1	0.4	69.5	8.7	0.5	9.2	13.4	0	5.7	2.1
Modified Blythe Off-Site Emissions[2]	1.9	0.9	2.8	0.6	0.9	1.5	39.7	0.1	31.7	4.3
Modified Blythe Total[2]	71.0	1.5	72.3	9.3	1.4	10.7	53.1	0.1	37.4	6.4
Blythe Energy[3]	NR	NR	4.8	NR	NR	NR	35.6	1.9	69.4	4.4
SCG Blythe[3]	NR	NR	8.2	NR	NR	NR	330.6	0.2	60.5	32.4
de minimis level	NA	NA	100	NA	NA	100	100	100	100	100
MDAQMD CEQA annual threshold	NA	NA	15	NA	NA	15	25	25	100	25

Note: NA = Not Applicable.
NR = Not Reported
1 – Source is BLM 2017, Palen Draft EIS/EIR. Values were not reported per offsite and onsite, or fugitive versus exhaust. Values provided here are the highest of the 4 years reported. ROG was not reported, but VOCs were reported.
2 – Source is BLM 2015, Modified Blythe Final EIS.
3 – Source is CARB 2018. Emissions are those reported for 2016.

Alternative 1 – Proposed Action

Construction

As discussed in Section 4.2.3, Project construction activities would exceed applicable MDAQMD daily and annual thresholds for NO_x, PM_{10}, and $PM_{2.5}$ emissions, resulting in an adverse effect. In addition, emissions of PM_{10} would exceed the *de minimis* level, and would also contribute to the non-attainment for PM_{10} in the area under CAAQS. Even with implementation of APM and mitigation measures (AQ-1), the PM_{10} emissions during construction would exceed the MDAQMD regional significance threshold of 82 pounds/day. The exceedance of the MDAQMD thresholds and the annual *de minimis* level would be temporary, occurring only during the 25 month construction period. Upon completion of construction, these emissions would cease.

The cumulative analysis focuses on whether a specific project would result in a cumulatively considerable increase in emissions. By its very nature, air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development within the air basin, and this regional impact is cumulative rather than attributable to any one source. A project's emissions may be individually limited, but cumulatively considerable when taken in combination with past, present, and future development projects.

The MDAQMD thresholds of significance are relevant to whether a project's individual emissions would result in a cumulatively considerable incremental contribution to the existing cumulative air quality conditions. These thresholds are designed to identify those projects that would result in significant levels of air pollution and to assist the region in attaining the applicable state and Federal ambient air quality standards. Projects that would not exceed the thresholds of significance would not contribute a considerable amount of criteria air pollutant emissions to the region's emissions profile, and would not impede attainment and maintenance of ambient air quality standards.

Because the Project would exceed the air quality significance thresholds for NO_x, PM_{10}, and $PM_{2.5}$ emissions, the Project's construction emissions would have a cumulatively considerable contribution to the region's air quality. The Project area is already within the non-attainment area for CAAQS for PM_{10}. Therefore, the Project would contribute substantially to an existing or projected air quality violation when added to the local background (AIR-2), and would result in a cumulatively considerable net increase of a criteria pollutant for which the Project region is non-attainment under an applicable Federal or state ambient air quality standard (AIR-3).

BLM's Western Solar Plan identifies the energy development projects occurring largely on Federal lands in the East Riverside SEZ. The air quality impact of a solar energy development scenario for the Riverside East SEZ identified theoretical continuous development of 9,000 acres of renewable energy development in the central portion of the SEZ. Based on modeling in the BLM Solar DEIS, 24-hr PM_{10} concentrations of about 10 micrograms per cubic meter would occur at residences around the eastern portion of the SEZ near Blythe. This concentration added to current ambient concentrations would not be enough to exceed the Federal PM_{10} standard, but would exceed the state 24-hour standard. While the analysis is very conservative and may overestimate the concentrations, the Western Solar Plan acknowledges that the emissions from cumulative projects (solar and others), combined with natural sources such as dust storms, would temporarily degrade particulate air quality in the SEZ. Aggressive dust control is recommended with implementation of solar projects.

Construction of the Project would not cause a substantial impact due to the generation of odors from diesel equipment emissions because construction activities would be intermittent and spatially dispersed, equipment would conform to California Clean Air Act Section 2449 standards for off-road vehicles, and associated odors would dissipate quickly from the source (impact AIR-5). Additional cumulative projects are not expected to cause diesel-related odors that would intermingle with those of the Project.

With respect to impacts on sensitive receptors, only two sensitive receptors are located within one mile of the Project; one is an apparent occupied mobile home trailer located approximately 3,700 feet north of the northeast corner of the Project boundary, and the other is a residence located approximately 4,800 feet north of the northeast corner of the Project site boundary. The only other projects within one mile of those receptors are the NRG Blythe PV Project, and the BMSP. Of these, the NRG Blythe PV Project has already been constructed, and its operations-related emissions are expected to be minimal. The analysis of the BMSP concluded that construction would not result in a significant impact to sensitive receptors. Although these two receptors are located within one mile of the DQSP boundary, emissions sources would be dispersed throughout the Project area and along the Project the access road, and there would be no substantial point source emissions. Therefore, cumulative impacts to those receptors would be less than significant, and the Project would not contribute to exposure of sensitive receptors to substantial pollutant concentrations (impact AIR-4).

The Project would not contribute to a conflict with or obstruction of implementation of an applicable air quality attainment or maintenance plan (AIR-1), would not be a source of substantial point source emissions (impact AIR-6), and would not result in placing sensitive receptors within one mile of an existing substantial point source emitter (impact AIR-7). Therefore, the impact of the Project with respect to these criteria would not be cumulatively considerable.

Operations

As discussed in Section 4.2.3, operation of the Project would result in substantially lower emissions than Project construction, since the Project would not have any major stationary emission sources during operations. Annual emissions for Project operation would all be below MDAQMD CEQA annual thresholds and *de minimis* levels, and the contribution of the Project to air quality impacts would not be cumulatively significant.

Decommissioning

It is likely that technological advances and continuing stringent regulation of air pollutants would result in lower rates of emissions during decommissioning than during the construction phase of the Project. In addition, the duration of decommissioning would be approximately one year, and therefore the duration of emissions that exceed MDAQMD thresholds would be shorter than that of construction.

Alternative 2 – Resource Avoidance Alternative

As shown in Tables 4.2-9 and 4.2-10, the emissions associated with Alternative 2 construction and decommissioning activities would be almost the same, although slightly (approximately one percent) lower than those of the Proposed Action. Therefore, the contribution of Alternative 2 to cumulative air quality impacts would be effectively the same as those described for the Proposed Action. The selection of the Resource Avoidance Alternative over the proposed Project would not result in air emissions being reduced to a level that is not cumulatively significant.

Alternative 3 – Reduced Project Alternative

As shown in Tables 4.2-9 and 4.2-10, the emissions associated with Alternative 3 construction and decommissioning activities would be almost the same, although slightly (approximately four percent) lower than those of the Proposed Action. Therefore, the contribution of Alternative 3 to cumulative air quality impacts would be effectively the same as those described for the Proposed Action. The selection of the Reduced Project Alternative over the proposed Project would not result in air emissions being reduced to a level that is not cumulatively significant.

Alternative 4 – No Action

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project, and the DQSP would not be implemented. The public lands in the Project area would continue to be managed by BLM in accordance with existing land use designations in the CDCA Plan, which could include a different solar project, or other development. Alternative 4 would not contribute to cumulative air quality impacts.

4.2.7 Residual Impacts

A substantial residual Project-specific and cumulative impact would result from short-term construction emissions of NO_x, $PM_{2.5}$, and PM_{10} after APMs and mitigation measures have been incorporated, because these emissions would not be reduced to below MDAQMD thresholds. The emissions would be temporary, and would cease once construction is completed. However, any impacts that occurred to human receptors and vegetation due to deposition of nitrogen on soils would continue following the completion of construction.

4.3 Biological Resources – Vegetation

4.3.1 Methodology for Analysis

This section analyzes potential impacts to vegetation resources from construction, operation and maintenance, and decommissioning of the Proposed Action and Alternatives. This analysis of potential impacts relies on results of literature reviews and biological surveys (as summarized in Section 3.3, *Biological Resources – Vegetation*) and coordination with appropriate permitting agencies including the USFWS and CDFW. Acreages calculated for impacts were based on the best information available at the time of publication of the Draft PA/EIS/EIR.

Impact analyses typically characterize effects to native vegetation as temporary or permanent, with a permanent impact referring to areas that are paved or otherwise precluded from restoration to a pre-Project state. In desert ecosystems, the definition of permanent impacts must reflect the slow recovery rates of its plant communities on bajadas (alluvial fans with established vegetation communities and cryptogrammic crusts on the surface soils (Lovich and Bainbridge 1999). Abella (2010) reviewed additional studies on desert habitat recovery following disturbance, and determined that disturbance of relatively recent geomorphic desert surfaces not containing vegetation (e.g., new deposition of alluvial flows, eolian sand deposits, etc.), primary succession occurs whereby biological communities are initially established. In reviewing studies focused on primary succession, Abella noted that establishment of desert vegetation occurred between 9 to 33 years following disturbance (defined as deposition of alluvium as a result of debris flows), as compared to several studies addressing secondary succession (i.e., recovery from disturbance to established vegetation communities), documenting various rates of recovery after several hundreds of years (Abella 2010). For the purposes of this analysis, all ground disturbance activity is considered a permanent impact due to the long time period for natural revegetation to occur in the desert. Natural recovery rates from disturbance in desert ecosystems depend on the nature and severity of the impact and the autecology of the plant species under consideration for revegetation. For example, creosote bushes can resprout a full canopy within 5 years after damage from heavy vehicle traffic (Gibson et al. 2004 as cited in CEC 2010). Most other species are less robust. For larger-scale projects, severe damage involving vegetation removal and soil disturbance may take from 50 to 300 years for partial recovery with complete ecosystem recovery requiring over 3,000 years (Lovich and Bainbridge 1999).

4.3.1.1 CEQA Significance Criteria

The following thresholds of significance are used to determine whether implementing the Project would result in a significant impact to biological resources pursuant to CEQA. These thresholds of significance are based on Appendix G of the state CEQA Guidelines and the County of Riverside CEQA Environmental Assessment Form. A vegetation resources impact is considered significant if implementation of the proposed Project would do any of the following:

> BIO-1) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species including species identified in the California Desert Native Plants Act, in local or regional plans, policies, or regulations, or by CDFW or USFWS.

BIO-2) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by CDFW or USFWS.

BIO-3) Have a substantial adverse effect on Federal protected wetlands as defined by Section 404 of the Clean Water Act (CWA) (including, but not limited to, marshes, vernal pools, and coastal areas) or any state-protected jurisdictional areas not subject to regulation under Section 404 of the CWA through direct removal, filling, hydrological interruption, or other means.

BIO-5) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

BIO-6) Conflict with the provisions of an adopted habitat conservation plan; natural community conservation plan; or other approved local, regional, or state habitat conservation plan.

BIO-7) Substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or substantially reduce the number or restrict the range of an endangered, rare, or threatened species.

4.3.2 Applicant-Proposed Measures

The Applicant proposed the following APMs to address potential effects to vegetation, wetland, and riparian resources. These measures primarily were intended to avoid or reduce potential direct and indirect Project impacts to wildlife resources, specifically to Mojave desert tortoise and its habitat; however, they also would reduce Project impacts to vegetation resources identified in this chapter. APMs for Project impacts to vegetation, wetland, and riparian resources are listed below. The impact analysis assumes that the applicable APMs would be implemented as part of the Project. Therefore, these APMs are to be incorporated into the EICMPP/MMRCP, along with the agency-required mitigation measures.

APM BIO-1. Environmental Inspection and Compliance Monitoring Program and Plan. Prior to the Notice to Proceed, a comprehensive Environmental Inspection and Compliance Monitoring Program and Plan (EICMPP)/Mitigation Monitoring, Reporting, and Compliance Program (MMRCP), covering both construction and operation and maintenance (O&M), will be developed. The EICMPP/MMRCP will incorporate all APMs, agency-required mitigation measures, and agency regulatory requirements for all resources, including biological resources. The EICMPP/MMRCP will ensure that all measures intended to avoid or reduce impacts are appropriately implemented, documented, and reported to the applicable agencies.

A qualified individual will be designated to serve as the Project Environmental Manager. The Environmental Manager will be responsible for the following tasks.

- Development and implementation of the overall Project compliance program;
- Communication and coordination with the applicable regulatory agencies;
- Ensuring compliance with the APMs, agency-required mitigation measures, and various conditions and requirements of permits and approvals;

- Record keeping and reporting required by permits and approvals;
- Ensuring that all applicable environmental plans are up to date;
- Advising management of actual and potential compliance issues; and
- Ensuring that Project planning takes appropriate account of compliance issues in advance.

The EICMPP/MMRCP shall be submitted to the BLM and County for approval prior to the start of ground disturbance and issuance of a County grading permit.

APM BIO-2. Construction-Related Plans. Prior to the Notice to Proceed, the following construction-related plans will be developed, as necessary. These plans have specific objectives that would indirectly help reduce potential adverse effects to biological resources.

- Storm Water Pollution Prevention Plan (discussed in more detail in Sections 2.3.7.1, 2.3.7.9, and Mitigation Measure WATER-1);
- Dust Control Plan (discussed in more detail in Sections 2.3.7.6, 4.2.2, and Mitigation Measure AQ-1);
- Hazardous Materials Management and Emergency Response Plan, including components of a Waste Management Plan (discussed in more detail in Sections 2.3.7.1 and 4.9.3);
- Spill Prevention Control and Countermeasure Plan (discussed in more detail in Sections 2.3.7.1 and 4.9.3);
- Vegetation Resources Management Plan, which would include components for habitat restoration and site revegetation (discussed in more detail in Section 2.3.7.2, and APM BIO-4);
- Worker Environmental Awareness Program (discussed in more detail in Section 2.3.7.5 and Mitigation Measure VEG-6); and
- Fire Prevention Plan (included within the Hazardous Materials Management and Emergency Response, and discussed in more detail in Section 2.3.7.3).

The referenced plans shall be submitted to the BLM and County for approval prior to the start of ground disturbance and issuance of a County grading permit.

APM BIO-3. Construction-Related BMPs. The following general measures shall be implemented during construction, which would assist with reducing potential adverse effects to biological resources,

- Construction activities shall be limited to daylight hours to the extent possible;
- Water required for construction purposes shall only be stored in retention ponds (equipped with wildlife exclusion fencing), or closed containers/structures and shall be transported throughout the site in enclosed water trucks;
- Water sources (such as wells) shall be checked periodically by monitors to ensure they are not creating open water sources through leaking or consistently overfilling trucks;
- All vehicles leaking fuel or other liquids shall be immediately removed to the staging area and repaired – all spills shall be cleaned up promptly and disposed of correctly;

- All construction activities conducted outside the fenced areas shall be monitored by a qualified biological monitor;
- Vegetation removal shall be limited to the smallest area necessary and avoid entirely the desert wash woodland (microphyll woodlands);
- Construction traffic shall remain on existing roads when possible – new roads, passing areas, and turning areas shall be limited to permitted area of direct effect;
- Speed limits on all unimproved areas of the Project site shall be a maximum of 15 miles per hour;
- Trash shall always be contained within raven-proof receptacles and removed from the site frequently, including trash collected in vehicles in the field;
- No dogs or firearms shall be allowed on the Project site during construction; and
- Plant and wildlife collection by Project staff during construction or operation shall be prohibited except as allowed by the Project's permits, including permits obtained from Riverside County as per the California Desert Native Plants Act.

APM BIO-4: Prior to the Notice to Proceed, a Vegetation Resources Management Plan (VRMP) will be prepared to address impacts to and mitigation measures for special status plants and succulents. The VRMP will be submitted to BLM and the County for review and approval prior to beginning construction. The VRMP will include the following:

- Distribution of target plants within the Project site;
- Criteria for determining whether an individual plant is appropriate for salvage, including, but not limited to, special-status plants and cacti
- Equipment and methods for salvage, propagation, transport, and planting;
- Procedures for marking and flagging target plants during preconstruction clearances surveys;
- Storage and/or pre-planting requirements;
- Proposed transplantation sites;
- A requirement for maintenance of the transplanted individuals, including removal of invasive species and irrigation (if necessary); and
- A requirement for monitoring, including specification of monitoring periods, to determine the percentage of surviving plants each year and to adjust maintenance activities using an adaptive management approach.

APM BIO-5: Prior to the Notice to Proceed, the Applicant will finalize and implement their Draft Integrated Weed Management Plan (IWMP; provided in Appendix J), a component of the VRMP, to control invasive and exotic weeds. The objectives of the IWMP are:

- Identify weed species currently present within the Project components;
- Identify weeds not seen on the Project components that may have the potential to be present in the Project site and have the potential to invade the Project site due to construction activities;

- Identify construction and maintenance activities that may increase the presence of weeds or introduce new weed species on and adjacent to the Project components; and
- Identify and implement proven, new, or improved practices on an ongoing basis to ensure that the presence of weed populations on and adjacent to the Project components shall not increase because of construction and maintenance activities. These steps shall be intended to prevent weeds not currently found on the Project site from becoming established there, and prevent weeds already present on the site from spreading to other areas.
- The Draft IWMP will be modified based on BLM comments on the Draft IWMP. The particular chemicals selected will be adjusted appropriately, including timing of treatment and specific techniques employed.

4.3.3 Direct and Indirect Impacts

4.3.3.1 Alternative 1: Proposed Action

Construction

Native Vegetation Alliances

As shown in Figure 3.3-2, five native vegetation alliances and three other cover types were mapped within the Project area by BLM. *Larrea tridentata* and *Larrea tridentata – Ambrosia dumosa* are the dominant native vegetation alliances on the proposed solar facility, while the gen-tie ROW includes areas of the *Pleuraphis rigida* alliance. A small area of the *Parkinsonia florida – Olneya tesota* alliance is present along the northern Project boundary, adjacent to the NRG Blythe PV facility. An area of the *Chorizanthe rigida – Geraea canescens* Desert Pavement Alliance would not be impacted by any of the Project alternatives.

Construction of the Project would require vegetation removal and ground disturbance within most of the solar facility and much of the gen-tie ROW. Of the 3,770 acre Project area, approximately 3,304 acres, or 88 percent of the site, would have site preparation performed by either mowing or the disk and roll method. Grading, in the form of cut and fill, would be performed on approximately 466 acres, or 12 percent of the site. While only a portion of the vegetation within the gen-tie ROW would be disturbed by installation of towers, this analysis assumes all vegetation within the ROW would be permanently impacted. Construction would also require temporary vegetation removal for construction work areas such as staging and laydown areas. Although temporary work areas would be revegetated following construction, per Mitigation Measure VEG-8.17, impacts on construction work areas are considered permanent given the long time period for revegetation to occur in desert ecosystems.

Vegetation removal during construction would result in a reduction in the total acres of native vegetation in the Study Area. The acreage of direct impacts is shown in Table 4.3-1. The majority of the impacted vegetation would be the *Larrea tridentata* and *Larrea tridentata – Ambrosia dumosa* alliances, which are very common, and are not considered Special Vegetation Features subject to CMAs under the DRECP.

As shown in Table 4.3-1, none of the Project alternatives would directly impact the *Parkinsonia florida – Olneya tesota* alliance, present along the northern Project boundary. The direct impacts to the *Pleuraphis rigida* alliance, present within the gen-tie corridor, would vary among the alternatives. Alternative 1 would directly impact 40.4 acres of the 171.4 acres of the alliance identified within the Project area.

Table 4.3-1. Comparison of Direct Impacts to Vegetation Alliances

Vegetation Alliance	Alternative 1	Alternative 2	Alternative 3
Chorizanthe rigida - Geraea canescens Desert Pavement Sparsely Vegetated	0 acres	0 acres	0 acres
Larrea tridentata and *Larrea tridentata – Ambrosia dumosa*	3,575 acres	2,607 acres	1,872 acres
Parkinsonia florida - Olneya tesota	0 acres	0 acres	0 acres
Pleuraphis rigida	40.4 acres	14 acres	14 acres

Implementation of APM BIO-3 (Construction-Related BMPs) would minimize the direct loss of native and sensitive vegetation by limiting impacts to only areas that need to be disturbed. Related measures include Mitigation Measures VEG-8 (Avoidance of Biological Resources During Construction), VEG-9 (Special-Status Plant measures), and VEG-10 (Measures for Riparian Habitat and State Waters), which require biological construction monitoring, and avoiding and minimizing construction-related impacts to vegetation, jurisdictional waters, and special-status species. Additionally, implementation of Mitigation Measures WIL-4, WIL-9, WIL-10, and WIL-12 would offset the habitat loss through habitat compensation associated with impacts to listed and otherwise special-status wildlife species.

Potential indirect impacts to vegetation resulting from construction activities include the introduction of invasive nonnative plant species such as Sahara mustard. Seeds of nonnative species from outside sources may be inadvertently introduced to native vegetation areas surrounding the Project via vehicles, people, and equipment. Ground disturbance associated with construction activities could promote the establishment and spread of opportunistic nonnative plants. Additionally, wildfires caused by construction in desert habitats are rare but may occur, and nonnative plant species often become established in burned areas. Once introduced, these species often out-compete native species for resources resulting in a reduction in growth, future dispersal, and recruitment of native species. The spread of invasive nonnative species reduces native plant diversity and abundance, eventually degrading the structure and function of vegetation alliances, and potentially reducing the food supply for animal species of management concern such as the Mojave desert tortoise. The potential introduction of invasive nonnative plant species is considered a permanent indirect impact as total eradication of invasive plants is rarely achieved. Implementation of APM BIO-3 (Construction-Related BMPs) would minimize the indirect loss of native and sensitive vegetation by limiting impacts to only areas that must be disturbed to complete construction. Related measures include Mitigation Measures VEG-8 (Avoidance of Biological Resources During Construction), VEG-9 (Special-Status Plant measures), and VEG-10 (Measures for Riparian Habitat and State Waters), which require biological construction monitoring, and avoiding and minimizing construction-related impacts to vegetation, jurisdictional waters, and special-status species.

Dust generated from vehicle travel on dirt access roads and other ground-disturbing activities could also indirectly impact native vegetation. Accumulation of dust on plants can reduce the rates of metabolic processes such as photosynthesis and respiration. Dust deposition during the 25- to 48-month construction period could degrade native vegetation by reducing plant growth rates, increasing plant susceptibility to disease, reducing reproductive capacity, or reducing ability to compete with nonnative species. Construction-generated dust is considered a temporary indirect impact. Implementation of APM BIO-2 (Construction-Related Plans) would require the preparation and implementation of a Dust Control Plan, minimizing indirect dust impacts on native vegetation and plant species.

Construction activities could also result in changes to existing hydrology regimes and geomorphic processes. Vegetation clearing, grading, and compaction associated with Project construction could increase the rate, volume, and sediment load of storm water runoff traveling offsite. Changes in hydrology could indirectly impact surface-water-dependent plant species, and could result in increased erosion and rates of scouring the desert habitats surrounding the Project site, including *Parkinsonia florida-Olneya tesota* alliance. Changes to existing hydrology regimes and geomorphic processes are considered permanent indirect impacts. Implementation of APM BIO-2 (Construction-Related Plans) would require the preparation and implementation of a Storm Water Pollution Prevention Plan (as also required under Mitigation Measure WATER-1, which would minimize any construction-related erosion.

Finally, removal of vegetation within the Study Area would lead to fragmentation of existing habitats. Habitat fragmentation results in isolated patches of formerly connected habitats which usually contain fewer species, have proportionally larger perimeters (making them more vulnerable to edge effects), and tend to be more vulnerable to adverse stochastic (random) events such as fires and floods. Habitat fragmentation is considered a permanent indirect impact. Implementation of APM BIO-3 (Construction-Related BMPs) would minimize the direct and indirect loss of native and sensitive vegetation by limiting impacts to only areas that need to be disturbed, thereby minimizing habitat fragmentation. Related measures include Mitigation Measures VEG-8 (Avoidance of Biological Resources During Construction), VEG-9 (Special-Status Plant measures), and VEG-10 (Measures for Riparian Habitat and State Waters), which require biological construction monitoring, and avoiding and minimizing construction-related impacts to vegetation, jurisdictional waters, and special-status species.

Jurisdictional Waters and Wetlands

The state jurisdictional watercourse areas, along with the footprints of the action alternatives, are shown in Figure 4.3-1. The Alternative 1 footprint encompasses approximately 26.2 acres of watercourses, including 6.3 acres of FP1 and 19.4 acres of FP2, potentially jurisdictional dormant channels within FP2, and potentially jurisdictional abandoned channels. Actual impacts to these areas, including the precise locations, areas, and volumes of soil disturbance, are unknown, pending development of a detailed grading plan for this area. Mitigation measure VEG-10 (Measures for Riparian Habitat and State Waters) requires compensation for impacts, at a ratio to be determined by CDFW. Both areas are situated on the edge of the Project, and could potentially be avoided by detailed Project design. If the areas are avoided as a result of final design, no impacts would occur, and no mitigation would be required. If final design shows that the areas would be impacted, overlays of permanent and temporary construction areas, volumes of soil disturbance, and restoration and mitigation plans would be provided to CDFW as part of the Streambed Alteration Agreement application.

Table 4.3-2. Comparison of Direct Impacts to CDFW Jurisdictional Watercourse

CDFW Jurisdictional Watercourse	Alternative 1 (acres)	Alternative 2 (acres)	Alternative 3 (acres)
Watercourse FP1 (and Associated Dormant Channels)[1]	6.3	0	0
Watercourse FP2 (and Associated Dormant Channels)	19.4	0	0
Watercourse FP3	0.04	0	0
Abandoned Channels	**0.46**	**0.39**	**0.36**
Total	**26.2**	**0.39**	**0.36**

1 – The FP1 watercourse is coincident with the *Parkinsonia florida – Olneya tesota* alliance, and is also mapped as a critically important for eolian sand systems as a sand source and stabilizing moisture for sand dune systems by Kenney (2017).

The Federal jurisdictional delineation identified 41,932 linear feet of potentially Federally jurisdictional areas, consisting of either ephemeral riverine intermittent streambed (40,349 linear feet) or excavated ephemeral riverine intermittent streambed (1,583 linear feet). However, the Corps determined all of these areas to be intrastate isolated waters with no apparent interstate or foreign commerce connection, and are therefore excluded from Clean Water Act jurisdiction.

Special-Status Plants

Six special-status plant species were documented during rare plant surveys conducted on BLM land in Fall 2012 (September 11 to 19, 2012), Spring 2013 (March 18 to 30, 2013), and Spring 2017 (May 9 to 14, 2017), and on the private inholding in Spring 2015 (March 10 to 12, 2015). None of the species documented are Federally- or state-listed under FESA or CESA; therefore, impacts to listed special-status species are not anticipated.

Potential direct impacts to non-listed special-status plant species during construction activities include removal or accidental crushing of plants, bulbs, or seeds. The numbers of existing individuals of each non-listed special-status plant species that would be removed during construction of Alternative 1 are presented in Table 4.3-3. Table 4.3-3 also includes the numbers of individuals that would be removed under the other Project alternatives to facilitate comparison.

One of the species that would be directly impacted, Harwood's eriastrum, is a BLM Sensitive species. Alternative 1 would directly impact 510 documented occurrences of the Harwood's eriastrum, including 433 within the solar facility and 77 along the gen-tie line. In addition to the occurrences, Table 4.3-3 also shows the acreage of direct impact to occupied and potential Harwoods eriastrum habitat. Within 250 feet of these documented occurrences, Alternative 1 would directly impact 110 acres of occupied habitat. As shown in Figure 3.3-8, the remainder of the Project area was identified as suitable habitat in the DRECP model, and is therefore considered to be potential habitat. Alternative 1 would directly impact 3,660 acres of this potential habitat.

There is a chance that additional special-status species could emerge within the Alternative 1 footprint prior to construction (especially annual species). If present, these species would be directly impacted as well. Implementation of APM BIO-4 (Vegetation Resources Management

Plan), and Mitigation Measures VEG-8.1, VEG-9(A), and VEG-9(B), would require identification and avoidance of occurrences of special-status plants, where practicable.

Potential indirect effects to special-status plants are similar to those described above for native vegetation. Most special-status plant species are threatened by the introduction and spread of invasive nonnative plant species. Invasive nonnative plant species outcompete and displace special-status species, thereby resulting in population declines. Construction-generated dust can adversely affect special-status plants by reducing the rates of metabolic processes, such as photosynthesis and respiration. Alteration of hydrology regimes and geomorphic processes could limit resources for special-status plant species in certain habitats such as areas of the *Parkinsonia florida-Olneya tesota* alliance and sand dunes. Lastly, fragmentation of remaining populations of special-status plant species could disrupt gene flow, and remaining populations would be more vulnerable to adverse stochastic events and edge effects such as invasion of nonnative species. Implementation of APM BIO-5 (Integrated Weed Management Plan) would mitigate the indirect impacts from invasive weeds by requiring the finalization and implementation of an Integrated Weed Management Plan, thereby minimizing disruption of the natural native species population dynamics.

Potential indirect effects to special-status plant species could also occur if the Project were to interfere with the flow of sediment or moisture to their habitat. Habitat for some of the special-status plant species, including the Harwoods eriastrum, is associated with sand deposits, which are present in both alluvial and eolian deposits in the Project area. The floodplain area designated as FP1, shown in Figure 4.3-1, roughly corresponds to the *Parkinsonia florida-Olneya tesota* vegetation alliance mapped by BLM, and is also mapped as a ponding area that is critically important for eolian sand systems as a sand source and stabilizing moisture for sand dune systems by Kenney (2017). As shown in Tables 4.3-1 and 4.3-2, Alternative 1 would not directly impact the *Parkinsonia florida-Olneya tesota* vegetation alliance, but would directly impact the 6.3 acres of the FP1 watercourse. This direct impact could affect the function of the area as a sand source and stabilizing moisture for sand dune systems, resulting in an indirect impact to occupied or potential habitat for the Harwoods eriastrum.

Table 4.3-3. Summary of Direct Impacts to Special-Status Plant Species

Special Status Plants by Project Component		Alternative 1 Proposed Action	Alternative 2 Resource Avoidance Alternative	Alternative 3 Reduced Project Alternative	Alternative 4 No Action
Solar Plant Site					
Abrams' Spurge	Individual Occurrences	21	1	0	0
Desert Unicorn-Plant	Individual Occurrences	584	300	315	0
Harwoods Eriastrum	Individual Occurrences	433	0	0	0
	Occupied Habitat Acreage[1]	80 acres	1 acres	0 acres	0 acres
	Potential Habitat Acreage[2]	3,634 acres	2,697 acres	1,963 acres	0 acres
Harwoods Milkvetch	Individual Occurrences	10,420	9,507	9,507	0
Ribbed Cryptantha	Individual Occurrences	34,064	0	0	0

Table 4.3-3. Summary of Direct Impacts to Special-Status Plant Species

Special Status Plants by Project Component		**Alternative 1 Proposed Action**	**Alternative 2 Resource Avoidance Alternative**	**Alternative 3 Reduced Project Alternative**	**Alternative 4 No Action**
Utah Vine Milkweed	Individual Occurrences	0	0	0	0
Gen-Tie Line, Communications Line, and Temporary Work Areas Outside of Fence					
Abrams' Spurge	Individual Occurrences	0	0	0	0
Desert Unicorn-Plant	Individual Occurrences	0	0	0	0
Harwoods Eriastrum	Individual Occurrences	77	77	77	0
	Occupied Habitat Acreage[1]	30 acres	34 acres	34 acres	0 acres
	Potential Habitat Acreage[2]	26 acres	50 acres	50 acres	0 acres
Harwoods Milkvetch	Individual Occurrences	0	0	0	0
Ribbed Cryptantha	Individual Occurrences	30,170	30,178	30,178	0
Utah Vine Milkweed	Individual Occurrences	0	0	0	0

1 – Occupied Harwoods eriastrum habitat based on 250 foot buffer surrounding individual occurrences.

2 – Potential Harwoods eriastrum habitat based on modeled suitable habitat that is not occupied.

Cacti

Three species of cactus were documented within the Study Area during rare plant surveys: silver cholla (106 individuals documented), common fish hook cactus (11 individuals documented), and barrel cactus (1 individual documented). None of these species are considered special-status species. Species of yucca were not documented during rare plant surveys, and no cacti were documented on the 160-acre private inholding portion of the Study Area. Direct and indirect impacts to the cacti are identical to those described above for special-status plant species (i.e., direct removal/crushing, competition from invasive nonnative species, dust, alteration of hydrology regimes and geomorphic processes, and fragmentation of populations). The exact locations of cacti found on-site were not recorded. However, implementation of APM BIO-4 (Vegetation Resources Management Plan) would require the salvage and relocation of all cacti that would otherwise be impacted by Alternative 1.

Operation and Maintenance

Native Vegetation Alliances

Operation and maintenance of Alternative 1 would not result in direct impacts to native and sensitive vegetation alliances beyond those described above for construction. However, operation and maintenance would result in indirect impacts to native and sensitive vegetation alliances. As discussed above for construction, indirect impacts to vegetation alliances could occur if the Project were to interrupt the movement of sand across the Project area.

Invasive nonnative plant species are opportunistic and often establish on disturbed soils, such as those along access roads, within transmission line corridors, and within solar facilities where areas of exposed bare ground are maintained. Vehicles and crews present during operation and maintenance could inadvertently introduce seeds and/or parts of invasive species, thus facilitating their spread into intact vegetation alliances. Implementation of APM BIO-5 (Integrated Weed Management Plan) would mitigate the impacts associated with the spread of invasive weeds by requiring the finalization and implementation of an Integrated Weed Management Plan, thereby minimizing the effects of invasive weeds on native and/or sensitive vegetation alliances.

Dust generated from vehicle travel on dirt access roads during operation and maintenance could also indirectly impact native vegetation. As discussed above for construction, accumulation of dust on plants can reduce the rates of metabolic processes such as photosynthesis and respiration thereby resulting in degradation of vegetation alliances. Implementation of APM BIO-2 (Construction-Related Plans) would require the preparation and implementation of a Dust Control Plan, minimizing indirect dust impacts on native vegetation and plant species.

Once constructed, existing hydrology regimes and geomorphic processes would likely be altered for the duration of ROW operation. The compacted and developed site could increase the rate, volume, and sediment load of storm water runoff traveling offsite. Additionally, the developed site could result in disruption of geomorphic processes (e.g., sand transportation) essential to the function and integrity of certain desert habitats and species (e.g., Mojave fringe-toed lizard). Implementation of APM BIO-2 (Construction-Related Plans) and Mitigation Measure WATER-1 would require the preparation and implementation of a Storm Water Pollution Prevention Plan (SWPPP), which would minimize any construction-related erosion and changes in site hydrology.

Indirect impacts could occur if the Project were to directly impact sand and moisture sources, or were to affect wind patterns. Adverse impacts to Coachella Valley fringe-toed lizard habitat due to interference with sand sources were documented by Griffiths et al. (2002). Human alterations to the episodic flow from Whitewater River and Morongo Creek in Riverside County near Palm Springs have included channelization, groundwater recharge facilities, gravel mining, roads, railroads, and residential development. These changes have degraded eolian sand dune habitat by redirecting sand to other locations and thereby reducing the volume of wind-blown sand into habitat for the Coachella Valley fringe-toed lizard (Griffiths et al. 2002).

Although Griffiths et al. (2002) documented the relationship between modifications to fluvial depositional areas and degradation of downwind eolian sand habitat, this relationship between sand sources, the Project, and eolian sand habitat does not appear to be the same in the Project area. The onsite sand deposits and habitat are primarily located on the western, upstream portion of the Project area, and the Project facilities are located downstream of both the source areas and the occupied habitat. The Project is not likely to affect fluvial deposition within these upstream areas to the west.

Although the Project is not likely to affect fluvial transport of sand to adjacent vegetation alliances or known occupied habitat west of the site, it could potentially affect eolian transport of sand to these areas. As discussed above for construction, the floodplain area designated as FP1 has been mapped as a ponding area that is critically important for eolian sand systems as a sand source and stabilizing moisture for sand dune systems by Kenney (2017). Alternative 1 would directly impact 6.3 acres of this area. The significance of this area or other areas on the Project site, in supporting vegetation alliances through acting as a sand and moisture source is unknown, but it is possible that long-term occupation of the land area by a solar facility could affect this function of the area, and thus result in an indirect impact to vegetation alliances.

An indirect impact to vegetation alliances could also occur if the occupation of the land area by the project could potentially impede future expansion or migration of onsite sand deposits. Potter and Weigand (2016) documented that inactive areas within dune fields can become active within a very short timeframe, such as within the timeframe of the life of the Project. Although Kenney (2017) concludes that dunes within the Project area are inactive, the fact that inactive areas within Palen Dunes underwent substantial changes within a short timeframe indicates that such changes in the Project area are possible. If the onsite dune systems were to expand within the timeframe of the Project, it is possible that vegetation alliances associated with the systems could also expand. Modification of wind patterns associated with Project development could either hinder or facilitate this expansion.

Special-Status Plants

Operation and maintenance of Alternative 1 would not result in direct impacts to special-status plant species beyond those described above for construction. However, operation and maintenance could result in indirect impacts to special-status plant species occurring offsite. Potential indirect effects to special-status plants resulting from operation and maintenance are similar to those described above for native vegetation alliances.

Operation and maintenance could result in the introduction and spread of invasive nonnative plant species, which could threaten the survival of special-status plant populations surrounding the developed site. Implementation of APM BIO-5 (Integrated Weed Management Plan) would mitigate the indirect impacts from invasive weeds by requiring the finalization and implementation of an Integrated Weed Management Plan, thereby minimizing the effects of invasive species on special-status plants.

The potential for operation of the Project to indirectly impact habitat for the Harwood’s eriastrum is similar to the analysis of indirect impacts to vegetation alliances, discussed above. As demonstrated by Potter and Weigand (2016) at Palen dunes, there is the potential for inactive areas within dune fields to become active within a very short timeframe. If this were to occur, then the occupation of the land area by a solar project could either hinder or facilitate expansion of occupied Harwoods eriastrum habitat. As the Alternative situated closest to the known occupied habitat for the Harwoods eriastrum, the potential for these indirect impacts to occur is higher under Alternative 1 than Alternatives 2 or 3.

Cacti

Operation and maintenance of Alternative 1 would not result in direct impacts to special-status plant species beyond those described above for construction. Indirect impacts to the cacti resulting from operation and maintenance are identical to those described above for special-status plant species. Implementation of APM BIO-5 (Integrated Weed Management Plan) would mitigate the indirect impacts from invasive weeds by requiring the finalization and implementation of an Integrated Weed Management Plan, thereby minimizing the effects of invasive species on cacti.

Decommissioning

Decommissioning of Alternative 1 would generally be considered beneficial to vegetation resources given that development would be removed and restoration of the site would be possible. Decommissioning activities are anticipated to only directly affect areas that were previously disturbed during installation of the facilities. Thus, the direct removal of native vegetation alliances, jurisdictional waters and wetlands, special-status plants, and cacti is not anticipated during decommissioning activities. It is expected that indirect impacts during decommissioning would be similar to those described for construction of Alternative 1. Potential indirect impacts to vegetation alliances, jurisdictional waters and wetlands, special-status plant populations, and cacti include generation of dust and colonization of the site by invasive nonnative plant species during and following site decommissioning. Implementation of APMs BIO-2 (Construction-Related Plans) and BIO-5 (Integrated Weed Management Plan) would require the preparation and implementation of a Dust Control Plan and an Integrated Weed Management Plan, respectively. Effective implementation of these plans would minimize the effects on botanical and wetland resources from dust and invasive species during decommissioning.

4.3.3.2 Alternative 2: Resource Avoidance Alternative

As shown in Table 4.3-1, the types of impacts that would occur under the Resource Avoidance Alternative would result in the direct and permanent loss of all special-status plants and vegetation alliances within the disturbance footprint, and indirect impacts to vegetation resources would be similar to those discussed for the Proposed Action. Alternative 2 would not directly impact the *Parkinsonia florida – Olneya tesota* alliance identified within the Project area. Alternative 2 would directly impact 14 acres of the 171.4 acres of the *Pleuraphis rigida* alliance identified within the Project area. This is a reduction from the 40 acres of the *Pleuraphis rigida* alliance associated with Alternative 1. Similar to Alternative 1, implementation of APMs BIO-2 (Construction-Related Plans), BIO-3 (Construction-Related BMPs), and BIO-5 (Integrated Weed Management Plan), and Mitigation Measures VEG-8 (Avoidance of Biological Resources During Construction), VEG-10 (Measures for Riparian Habitat and State Waters), WIL-4, WIL-9, WIL-10, and WIL-12 would minimize the direct and indirect impacts to vegetation alliances.

The state jurisdictional watercourse areas, along with the footprints of the action alternatives, are shown in Figure 4.3-1. Table 4.3-2 provides the acreages of FP1, FP2, and FP3 encompassed by the Proposed Action and Alternatives 2 and 3. The Alternative 2 footprint completely avoids the FP1 and FP2 watercourses and their associated dormant channels. However, the Alternative 2 footprint directly impacts 0.39 acres of potentially jurisdictional abandoned channels. Actual impacts to these channels, including the precise locations, areas, and volumes of soil disturbance, are unknown, pending development of a detailed grading plan for this area. Mitigation measure VEG-10 (Measures for Riparian Habitat and State Waters) requires compensation for impacts, at a ratio to be determined by CDFW.

Anticipated direct impacts to special-status plants of Alternative 2 are presented in Table 4.3-3. Under this alternative, impacts would occur to the same special-status plant species as identified for Alternative 1, but with an overall reduction in the number of individuals and acreage of habitat impacted for each species type. The Resource Avoidance Alternative would result in reduced impacts to Abrams' spurge (a decreased impact of approximately 57 percent, relative to the Proposed Action), desert unicorn-plant (a decreased in impact by 37 percent), Harwood's eriastrum (an 85 percent decrease), Harwood's milkvetch (an 8.7 percent decrease), and ribbed cryptantha (a 56 percent decrease).

Alternative 2 would directly impact 78 documented occurrences of the Harwood's eriastrum, including 1 within the solar facility and 77 along the gen-tie line. In addition to the occurrences, Table 4.3-3 also shows the acreage of direct impact to occupied and potential Harwoods eriastrum habitat. Within 250 feet of these documented occurrences, Alternative 2 would directly impact 35 acres of occupied habitat. As shown in Figure 3.3-8, the remainder of the Project area was identified as suitable habitat in the DRECP model, and is therefore considered to be potential habitat. Alternative 2 would directly impact 2,747 acres of this potential habitat.

Potential indirect effects to special-status plant species could also occur if the Project were to interfere with the flow of sediment or moisture to their habitat. Habitat for some of the special-status plant species, including the Harwoods eriastrum, is associated with sand deposits, which are present in both alluvial and eolian deposits in the Project area. The floodplain area designated as FP1, shown in Figure 4.3-1, roughly corresponds to the *Parkinsonia florida-Olneya tesota* vegetation alliance mapped by BLM, and is also identified as a ponding area that is critically important for eolian sand systems as a sand source and stabilizing moisture for sand dune systems by Kenney (2017). As shown in Tables 4.3-1 and 4.3-2, Alternative 2 would not directly impact the *Parkinsonia florida-Olneya tesota* vegetation alliance or the FP1 watercourse. For comparison, Alternative 1 would directly impact 6.3 acres of the FP1 watercourse.

Similar to Alternative 1, implementation of APMs BIO-4 (Vegetation Resources Management Plan) and BIO-5 (Integrated Weed Management Plan), and Mitigation Measure VEG-9 (Special Status Plant measures) would avoid and minimize impacts to special-status plant species.

4.3.3.3 Alternative 3: Reduced Project Alternative

As shown on Table 4.3-1, the types of impacts that would occur under the Reduced Project Alternative would result in the direct and permanent loss of all special-status plants and vegetation alliances within the disturbance footprint, and indirect impacts to vegetation resources would be similar to those discussed for the Proposed Action. Alternative 3 would not directly impact the *Parkinsonia florida – Olneya tesota* alliance identified within the Project area. Alternative 3 would directly impact 14 acres of the 171.4 acres of the *Pleuraphis rigida* alliance identified within the Project area. This is a reduction from the 40 acres of the *Pleuraphis rigida* alliance associated with Alternative 1. Similar to Alternative 1 and Alternative 2, implementation of APMs BIO-2 (Construction-Related Plans), BIO-3 (Construction-Related BMPs), and BIO-5 (Integrated Weed Management Plan), and Mitigation Measures VEG-8 (Avoidance of Biological Resources During Construction), VEG-10 (Measures for Riparian Habitat and State Waters), WIL-4, WIL-9, WIL-10, and WIL-12 would minimize the direct and indirect impacts to vegetation alliances.

The state jurisdictional watercourse areas, along with the footprints of the action alternatives, are shown in Figure 4.3-1. Table 4.3-2 provides the acreages of FP1, FP2, and FP3 encompassed by the Proposed Action and Alternatives 2 and 3. The Alternative 3 footprint completely avoids the FP1 and FP2 watercourses and their associated dormant channels. However, the Alternative 3 footprint directly impacts 0.36 acres of potentially jurisdictional abandoned channels. Actual impacts to these channels, including the precise locations, areas, and volumes of soil disturbance, are unknown, pending development of a detailed grading plan for this area. Mitigation measure VEG-10 (Measures for Riparian Habitat and State Waters) requires compensation for impacts, at a ratio to be determined by CDFW.

Anticipated direct impacts to special-status plants of Alternative 3 are presented in Table 4.3-3. Under this alternative, impacts would occur to the same special-status plant species as identified for Alternative 1, but with an overall reduction in the number of individuals impacted for each species type. The Reduced Project Alternative would result in reduced impacts to Abrams' spurge (a decreased impact of approximately 57 percent, relative to the Proposed Action), desert unicorn-plant (a decrease in impact by 40 percent), Harwood's eriastrum (an 85 percent decrease), Harwood's milkvetch (an 8 percent decrease), and ribbed cryptantha (a 56 percent decrease).

Alternative 3 would directly impact 77 documented occurrences of the Harwood's eriastrum, including 0 within the solar facility and 77 along the gen-tie line. In addition to the occurrences, Table 4.3-3 also shows the acreage of direct impact to occupied and potential Harwoods eriastrum habitat. Within 250 feet of these documented occurrences, Alternative 3 would directly impact 34 acres of occupied habitat. As shown in Figure 3.3-8, the remainder of the Project area was identified as suitable habitat in the DRECP model, and is therefore considered to be potential habitat. Alternative 3 would directly impact 2,013 acres of this potential habitat.

Potential indirect effects to special-status plant species could also occur if the Project were to interfere with the flow of sediment or moisture to their habitat. Habitat for some of the special-status plant species, including the Harwoods eriastrum, is associated with sand deposits, which are present in both alluvial and eolian deposits in the Project area. The floodplain area designated as FP1, shown in Figure 4.3-1, roughly corresponds to the *Parkinsonia florida-Olneya tesota* vegetation alliance mapped by BLM, and is also identified as a ponding area that is critically important for eolian sand systems as a sand source and stabilizing moisture for sand dune systems by Kenney (2017). As shown in Tables 4.3-1 and 4.3-2, Alternative 3 would not directly impact the *Parkinsonia florida-Olneya tesota* vegetation alliance or the FP1 watercourse. For comparison, Alternative 1 would directly impact 6.3 acres of the FP1 watercourse.

Similar to Alternative 1 and Alternative 2, implementation of APMs BIO-4 (Vegetation Resources Management Plan) and BIO-5 (Integrated Weed Management Plan), and Mitigation Measure VEG-9 (Special Status Plant measures) would avoid and minimize impacts to special-status plant species.

4.3.4 Application of CEQA Significance Thresholds

For the purposes of CEQA compliance, the significance of each identified impact of Alternative 1 has been determined. The CEQA Lead Agency is responsible for determining whether an impact is significant and is required to adopt mitigation measures to minimize or avoid each significant impact. BIO-4 is not applicable to vegetation resources; therefore, this threshold is not addressed in this section. BIO-4, along with other CEQA thresholds applicable to wildlife resources are addressed in Section 4.4, *Biological Resources – Wildlife*.

BIO-1) Would the Project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or the USFWS?

Construction, operation and maintenance, and decommissioning of Alternative 1, 2, and 3 would result in direct and indirect impacts to the following non-listed special-status species: Abrams' spurge, desert unicorn-plant, Harwood's eriastrum, Harwood's milkvetch, and ribbed cryptantha. Direct impacts to these species resulting from Alternatives 1, 2, and 3 are quantified in Table 4.3-3. Potential direct and indirect impacts to special-status plant species would be less than significant with implementation of APMs BIO-1 (Environmental Inspection and Compliance Monitoring Program and Plan), BIO-3 (Construction-Related BMPs), BIO-4 (Vegetation Resources Management Plan), and BIO-5 (Integrated Weed Management Plan), as well as Mitigation Measures VEG-1 through VEG-5 (requirements for biological monitoring), and VEG-6 through VEG-10 (various resource protection plans and impact avoidance measures).

BIO-2) Would the Project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by CDFW or USFWS?

As shown in Table 4.3-1, the Project alternatives would not directly impact the *Parkinsonia florida – Olneya tesota* alliance, which is identified in DRECP as microphyll woodland. There would be no impacts.

BIO-3) Would the Project have a substantial adverse effect on Federal protected wetlands as defined by Section 404 of the Clean Water Act (CWA) (including, but not limited to, marshes, vernal pools, and coastal areas) or any state-protected jurisdictional areas not subject to regulation under Section 404 of the CWA through direct removal, filling, hydrological interruption, or other means?

The Federal jurisdictional delineation indicated that potential waters were isolated, therefore not under CWA jurisdiction. The Alternative 1 footprint encompasses approximately 26.2 acres of watercourses, including 6.3 acres of FP1 and 19.4 acres of FP2, potentially jurisdictional dormant channels within FP2, and potentially jurisdictional abandoned channels. The footprints for Alternatives and 3 completely avoid the FP1 and FP2 watercourses and their associated dormant channels, but directly impact 0.39 and 0.36 acres of potentially jurisdictional abandoned channels, respectively. Actual impacts to these areas, including the precise locations, areas, and volumes of soil disturbance, are unknown, pending development of a detailed grading plan for this area. Mitigation measure VEG-10 (Measures for Riparian Habitat and State Waters) requires compensation for impacts, at a ratio to be determined by CDFW. Both areas are situated on the edge of the Project, and could potentially be avoided by detailed Project design. If the areas are avoided as a result of final design, no impacts would occur, and no mitigation would be required. If final design shows that the areas would be impacted, overlays of permanent and temporary construction areas, volumes of soil disturbance, and restoration and mitigation plans would be provided to CDFW as part of the Streambed Alteration Agreement application. Impacts would be less than significant with mitigation through VEG-10.

BIO-5) Would the Project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Alternatives 1, 2, or 3 would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. Regional resource planning documents prepared by Federal, state, and local agencies were reviewed, including the CDCA Plan, the NECO amendment to the CDCA Plan, the Riverside County General Plan, and USFWS Recovery Plans. These documents were reviewed to confirm that the proposed Project would not conflict with and would have no impact on any local policies or ordinances protecting biological resources.

BIO-6) Would the Project conflict with the provisions of an adopted habitat conservation plan; natural community conservation plan; or other approved local, regional, or state habitat conservation plan?

Alternatives 1, 2, or 3 would not conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan. This is because no conservation plans (local, regional, or state) encompass the Study Area. Alternatives 1, 2, or 3 would have no impact on adopted habitat conservation plans, natural community conservation plans, or other approved local, regional, or state habitat conservation plans.

BIO-7) Would the Project substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or substantially reduce the number or restrict the range of an endangered, rare, or threatened species?

Alternatives 1, 2, and 3 would not substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or substantially reduce the number or restrict the range of an endangered, rare, or threatened species. Based on the available data specific to the Project area and the surrounding region (project-specific surveys, state and Federal database records analysis, and coordination with the resource agencies), no rare or threatened plant species would be impacted or threatened by Alternatives 1, 2, or 3. While the associated impacts to 3,575 acres of the *Larrea tridentata* and *Larrea tridentata-Ambrosia dumosa* alliances and 40 acres of the *Pleuraphis rigida* alliance would also impact portions of the various plant species populations that occur within the development footprint of the solar facility and gen-tie line under Alternative 1, those affected vegetation alliances and plant species have relatively wide distributions throughout the Sonoran desert, and would not be eliminated or reduced in numbers below self-sustaining levels. Implementation of the APMs and Mitigation Measures discussed previously for impacts to vegetation alliances would also provide impact avoidance, minimization, and compensation measures to offset any population-level impacts to plant species. Impacts would be less than significant. Additional analysis of CEQA Significance Threshold BIO-7 is provided for wildlife resources in Section 4.4.

Impacts to 2,607 acres of the *Larrea tridentata* and *Larrea tridentata-Ambrosia dumosa* alliances and 14 acres of the *Pleuraphis rigida* alliance associated with Alternative 2 are less than what would occur under Alternative 1; impacts to 1,872 acres of the *Larrea tridentata* and

Larrea tridentata-Ambrosia dumosa alliances and 14 acres of the *Pleuraphis rigida* alliance associated with Alternative 3 are less than what would occur under Alternative 1. Therefore, the anticipated impacts to plant species populations that occur within the Alternative 2 footprint or the Alternative 3 footprint for the solar facility and gen-tie line would be commensurately lower as well. As such, those affected vegetation alliances and plant species would not be eliminated or reduced in numbers below self-sustaining levels. Implementation of the APMs and the Mitigation Measures discussed previously for impacts to vegetation alliances would also provide impact avoidance, minimization, and compensation measures to offset any population-level impacts to plant species. Impacts would be less than significant. Additional analysis of CEQA Significance Threshold BIO-7 is provided for wildlife resources in Section 4.4.

4.3.5 Alternative 4: No Action Alternative

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, the BLM would continue to manage the land under its land use jurisdiction consistent with the site's multiple use classification as described in the CDCA Plan, as it was amended by the Western Solar Plan.

If the site remained undeveloped, the existing environmental setting described in Section 3.3 would be maintained. No vegetation alliances, plant species dependent upon those habitats, or jurisdictional waters would be lost through development of the Project area, no disturbance of site soils would occur, and no gen-tie line would be constructed. Therefore, Alternative 4 would not result in any impacts associated with natural vegetation alliances.

4.3.6 Cumulative Impacts

This cumulative impact analysis evaluates the effects of existing and reasonably foreseeable future projects that threaten plant alliances on the Palo Verde Mesa and adjacent Palo Verde Valley. This scale was selected for the analysis of cumulative effects to better understand the contribution of local projects to effects on sensitive resources near the Project site. In addition to construction-related impacts, the Project would have ongoing operational impacts to biological resources. Therefore the temporal scope of the cumulative effects analysis for sensitive vegetation alliances includes the construction, operation and maintenance, and decommissioning phases of the Project.

Existing conditions within the area of cumulative effects analysis, described in Section 3.3, reflect a combination of natural conditions, as well as the effects of past and present actions. Urban, residential, and agricultural development in the Blythe area has resulted in removal of natural desert vegetation in the Palo Verde Valley and on Palo Verde Mesa. In recent years, commercial-scale solar power projects, identified in Section 4.1, have contributed to this cumulative impact. Some projects, such as the BMSP and the private land portion of the DQSP, are proposed on abandoned agricultural lands, so do not contribute additional displacement of native vegetation alliances. Other renewable energy projects, including the Modified BSPP, MSEP, Palen, and RE Crimson projects, as well as the majority of land areas associated with the DQSP, are proposed/being developed on previously undisturbed land, and therefore do contribute to cumulative impacts. Development of these projects could contribute to habitat loss and fragmentation and barriers to gene flow. The introduction of nonnative plant species has also contributed to habitat degradation, population declines, and range contractions for many special-status plant species (Boarman 2002). Combined with the effects of historical grazing and military training, and fragmentation of habitat from highway and aqueduct construction, the renewable energy projects have the potential to further reduce and degrade native plant populations. Although these projects have undergone, or would undergo, environmental permitting and analysis under NEPA, CEQA, and/or other Federal and state laws to evaluate project-level environmental impacts, even after mitigation of project-level impacts, these projects would collectively contribute to impacts on sensitive resources. In the context of this large-scale habitat loss, the Project would contribute to the cumulative loss and degradation of habitat for desert plants in the cumulative analysis area.

Alternative 1 – Proposed Action

Construction, Operations, and Decommissioning

Native Vegetation Alliances

The development of numerous large-scale projects, such as the other solar generation facilities identified in Tables 4.1-1 and 4.1-2, would result in the long-term conversion of desert habitat to industrial and commercial uses. Table 4.3-4 presents the total acreage of vegetation communities within the geographic scope and the cumulative impacts on each community type from existing and foreseeable future projects. These acreages were calculated using the list of cumulative projects that are located in the Palo Verde Valley and lower Chuckwalla Valley. Note that most previous projects have presented their analyses in terms of vegetation communities, while the current Project is evaluated as vegetation alliances. Therefore, the approximate correlations of the communities and the alliances are presented.

A total loss of 8.4 percent of the *Larrea tridentata* and *Larrea tridentata-Ambrosia dumosa* alliances, 1.6 percent of the *Parkinsonia florida-Olneya tesota* alliance, and 5.2 percent of the *Pleuraphis rigida* alliance in the cumulative analysis area is projected to occur as a result of existing and foreseeable future projects. As shown in Table 4.3-4, implementation of Alternative 1 would contribute 10.8 percent of the cumulative impact to the *Larrea tridentata* and *Larrea tridentata-Ambrosia dumosa* alliances, Alternative 2 would contribute 7.8 percent of the impact to the *Larrea tridentata* and *Larrea tridentata-Ambrosia dumosa* alliances, and Alternative 3 would contribute 6.1 percent of the impact to the *Larrea tridentata* and *Larrea tridentata-Ambrosia dumosa* alliances. Associated contributions to the *Pleuraphis rigida* alliance would be 1.7 percent for Alternative 1, and 0.6 percent for Alternatives 2 and 3. The *Larrea tridentata* and *Larrea tridentata-Ambrosia dumosa* alliances and the *Pleuraphis rigida* alliance are not identified as a BLM or CDFW sensitive vegetation community.

Preparation and implementation of the VRMP (to restore temporarily disturbed areas), Decommissioning and Reclamation Plan, and other plans as required in APM BIO-2 (Construction-Related Plans) and BIO-4 (Vegetation Resources Management Plan), and the implementation of Mitigation Measures VEG-7 (Biological Resources Mitigation Implementation and Monitoring Plan), VEG-8 (Avoidance of Biological Resources During Construction), VEG-10 (Measures for Riparian Habitat and State Waters), WIL-4, WIL-9, WIL-10, and WIL-12, would ensure that the loss of the *Parkinsonia florida-Olneya tesota* alliance habitat from the DQSP is adequately compensated for and equivalent habitat would be protected off-site. Implementation of these measures would reduce the Project's contribution to a cumulative impact on sensitive natural alliances, and the Project's contribution would not be cumulatively considerable (impact BIO-2).

Table 4.3-4. Cumulative Impacts to Vegetation Alliances

Vegetation Community[1]	Vegetation Alliance	Acreage within Study Area[1]	Impacts of Present and Future Projects[1]	Impacts of Alternative 1	Impacts of Alternative 2	Impacts of Alternative 3
Sonoran creosote bush scrub	*Larrea tridentata* and *Larrea tridentata-Ambrosia dumosa* alliances	403,579 acres	33,748 acres (8.4% of total)	3,575 acres (10.6% of total cumulative impact)	2,607 acres (7.7% of total cumulative impact)	1,872 acres (5.5% of total cumulative impact)
Desert dry wash woodland	*Parkinsonia florida-Olneya tesota* alliance	108,335 acres	1,743 acres (1.6% of total)	0 acres (0% of total cumulative impact)	0 acres (0% of total cumulative impact)	0 acres (0% of total cumulative impact)
Stabilized Sand Dune	*Pleuraphis rigida* alliance	37,823 acres	2,257 acres (5.2% of total)	40 acres (1.7% of total cumulative impact)	14 acres (0.6% of total cumulative impact)	14 acres (0.6% of total cumulative impact)

Source:
1 – Sources of acreage of impacts from past and potential future projects was obtained from Table 4.3-5 in McCoy EIS (BLM 2012b), specific acreage reported in completed environmental documents (MSEP, Modified BSPP, and BMSP), and the Proposed Action acreages for DQSP. Values from other environmental documents were reported as vegetation communities, not alliances.
2 – Acreage includes an assumption that all impacts of the additional projects for which specific acreages are not reported will occur in the *Larrea tridentata* and *Larrea tridentata-Ambrosia dumosa* alliances.

Special-Status Plant Species

As discussed above, the development of numerous large-scale projects, such as other wind and solar generation facilities would result in a substantial long-term conversion of desert habitat to industrial and commercial uses, which would remove habitat for many special-status plant species and cacti. Therefore, the loss of this habitat is anticipated to result in cumulative impacts on populations of many special-status plant species and cacti. As shown in Table 4.3-4, the past, present, and reasonably foreseeable future projects are expected to impact less than 10 percent of the available vegetation habitat in the Study Area, and the contribution of the Proposed Action ranges from 0 to 12.6 percent of the cumulative impact. In addition, preparation and implementation of the Vegetation Resources Management Plan (to restore temporarily disturbed areas), Decommissioning and Reclamation Plan, and other plans as required in APM BIO-2 (Construction-Related Plans) and BIO-4 (Vegetation Resources Management Plan), and the implementation of Mitigation Measures VEG-7 (Biological Resources Mitigation Implementation and Monitoring Plan), VEG-8 (Avoidance of Biological Resources During Construction), VEG-10 (Measures for Riparian Habitat and State Waters), WIL-4, WIL-9, and WIL-10 provide for the salvage of rare plants and cacti, avoidance of special-status plants whenever possible, and compensatory mitigation. Provided the ROW grant is not extended beyond the 30 year operational period, site restoration following decommissioning would minimize the loss of special-status plant species and protect similar habitat off-site. Through implementation of these measures, the Project's contribution to a cumulative impact on special-status plant species would not be cumulatively considerable (impact BIO-1).

Local Policies or Ordinances Protecting Vegetation Resources

The Project is not proposed within the boundaries of any adopted habitat conservation plan or natural community conservation plan. The Project site is within the CDCA and is within the planning boundaries of the NECO Plan amendment to the CDCA Plan. The Project was planned and designed in coordination with BLM with the intent of providing consistency with the NECO Plan and CDCA Plan. The Project would not contribute to a conflict with any local policies or ordinances protecting biological resources (impact BIO-5) or with the provisions of an adopted habitat conservation plan; natural community conservation plan; or other approved local, regional, or state habitat conservation plan (impact BIO-6).

Alternative 2 – Resource Avoidance Alternative

Construction, Operations, and Decommissioning

The overall cumulative impacts associated with implementation of Alternative 2 would be similar in type as described for Alternative 1. However, since Alternative 2 disturbance footprint is relatively smaller in size, the contribution to cumulative impacts would also be commensurately decreased. The decrease in the contribution to cumulative impacts to the *Pleuraphis rigida* alliance from implementation of Alternative 2 is substantial compared to Alternative 1, since there would be a decrease of approximately 26 acres (or a 65 percent decrease) of the *Pleuraphis rigida* alliance impacted with this alternative. Similarly, the contribution to cumulative impacts on common and other special-status species would also occur with the implementation of Alternative 2. However, the decreased impact footprint relative to Alternative 1 would also result in a similar decrease associated with Alternative 2's contribution to those impacts. The APMs and Mitigation Measures outlined for Alternative 1 would also be pertinent for Alternative 2. Implementation of these measures would reduce impacts to sensitive wildlife species and their habitat and provide that impacted habitat is adequately mitigated with equivalent habitat that would be protected off-site.

Alternative 3 – Reduced Project Alternative

Construction, Operations, and Decommissioning

The overall cumulative impacts associated with implementation of Alternative 3 would be similar in type as described for Alternatives 1 and 2. However, since Alternative 3 disturbance footprint is relatively smaller in size, compared to Alternatives 1 and 2, the contribution to cumulative impacts would also be commensurately decreased. The decrease in cumulative impacts to the *Pleuraphis rigida* alliance from implementation of Alternative 3 is substantial compared to Alternative 1, since there would be a decrease of approximately 26 acres (or a 65 percent decrease) of the *Pleuraphis rigida* alliance impacted with this alternative. The contribution to cumulative impacts to the *Pleuraphis rigida* alliance is the same between Alternatives 2 and 3. The APMs and Mitigation Measures outlined for Alternative 1 would also be pertinent for Alternative 3. Implementation of these measures would reduce impacts to sensitive wildlife species and their habitat and provide that impacted habitat is adequately mitigated with equivalent habitat that would be protected off-site.

Alternative 4 – No Action

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project, and the DQSP would not be implemented. The public lands in the Project area would continue to be managed by BLM in accordance with existing land use designations in the CDCA Plan, which could include a different solar project, or other development. Alternative 4 would not contribute to cumulative impacts to vegetation resources.

4.3.7 Residual Impacts

The Proposed Action and other action alternatives would cause adverse impacts to vegetation resources, eliminating most of the *Larrea tridentata* and *Larrea tridentata-Ambrosia dumosa* alliances and the *Pleuraphis rigida* alliance within the disturbance area of Alternative 1. Alternatives 2 and 3 have relatively fewer impacts to vegetation resources, but would still result in the loss of special-status species and important desert habitats. As discussed in the sections above, the recommended avoidance and minimization measures as well as compensatory mitigation would effectively offset direct, indirect, and cumulative impacts in varying, but unquantified degrees and assure compliance with state and Federal laws. It is expected that some residual adverse effects would remain after mitigation measures have been applied, including net losses in waters of the state and vegetation resources.

4.4 Biological Resources - Wildlife

4.4.1 Methodology for Analysis

This section analyzes potential impacts to wildlife resources from construction, operation and maintenance, and decommissioning of the Proposed Action and Alternatives. This analysis of potential impacts relies on results of literature reviews and biological surveys (as summarized in Section 3.4, *Biological Resources – Wildlife*) and coordination with appropriate permitting agencies including the USFWS and CDFW. Acreages calculated for impacts were based on the best information available at the time of publication of the Draft PA/EIS/EIR. A summary of the overall acreages of disturbance associated with each Alternative is provided in Table 4.4-1. As noted in Section 4.3, all ground disturbance activity is considered a permanent impact for the purposes of this analysis due to the long time period for natural revegetation to occur in the desert.

4.4.1.1 CEQA Significance Criteria

For the purpose of this analysis, the following applicable thresholds of significance have been used to determine whether implementing the Project would result in a significant impact pursuant to CEQA. These thresholds of significance are based on Appendix G of the state CEQA Guidelines and the County of Riverside CEQA Environmental Assessment Form. A biological resources impact is considered significant if implementation of the proposed Project would do any of the following:

BIO-1) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or the USFWS.

BIO-2) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by CDFW or USFWS.

BIO-3) Have a substantial adverse effect on Federal protected wetlands as defined by Section 404 of the Clean Water Act (CWA) (including, but not limited to, marshes, vernal pools, and coastal areas) or any state-protected jurisdictional areas not subject to regulation under Section 404 of the CWA through direct removal, filling, hydrological interruption, or other means.

BIO-4) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

BIO-5) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

BIO-6) Conflict with the provisions of an adopted habitat conservation plan; natural community conservation plan; or other approved local, regional, or state habitat conservation plan.

BIO-7) Substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or substantially reduce the number or restrict the range of an endangered, rare, or threatened species.

BIO-2 and BIO-3 are not applicable to wildlife resources; therefore, this threshold is not addressed in this section. BIO-2 and BIO-3, along with other CEQA thresholds applicable to vegetation resources are addressed in Section 4.3, *Biological Resources – Vegetation*.

4.4.2 Applicant-Proposed Measures

No APMs specific to wildlife are proposed. APM BIO-1 through APM BIO-5, discussed in Section 4.3, *Biological Resources – Vegetation*, are also applicable measures to avoid and minimize impacts to wildlife resources.

4.4.3 Direct and Indirect Impacts

A summary of the overall acreages of disturbance associated with each alternative is provided in Table 4.4-1. Impacts associated with Alternative 1 include the disturbance of 3,714 acres of habitat on the solar plant site, 54 acres in the gen-tie corridor, and 2 acres associated with the buried telecommunications line and possible above-ground electrical service line (Table 4.4-1). An additional 61 acres would be temporarily impacted by construction of the access road, and temporary construction areas, for a total of 3,831 acres of habitat disturbance. Acreages calculated for impacts were based on the best information available at the time of publication of the Draft PA/EIS/EIR for the ROW and temporary disturbance areas. For the gen-tie line, temporary disturbances would be associated with string pulling sites and construction around poles. Some vegetation in temporarily disturbed areas (e.g., the string pulling sites) would be crushed by equipment, but these areas would not be otherwise disturbed. Long-term impacts outside of the solar plant site would be caused by transmission pole and tower footprints and access roads. All ground-disturbing activities within the solar plant site are assumed to be permanent in this analysis.

Table 4.4-1. Summary of Long-Term and Temporary Habitat Disturbance

Project Component	Project Alternative Disturbance Area (Acres)		
	Alternative 1 Proposed Action	**Alternative 2 Resource Avoidance Alternative**	**Alternative 3 Reduced Project Alternative**
Solar Arrays	3,714	2,698	1,912
Gen-tie Line	54	81	81
Telecommunications Line	2	2.8	2.8
Total Permanent Project Area	3,770	2,782	2,047
Temporary Area for Construction	61	63.6	65
Total Disturbance Acreage	3,831	2,845	2,112

Table 4.4-2 summarizes the special-status wildlife species that either have been observed to occur in the Study Area for the Project or alternatives, or are expected to occur based upon the presence of suitable habitat and known species ranges. Potential roosting habitat for pallid bat and California leaf-nosed bat are known from mines and caves near the solar plant site, but no

suitable roosting locations were identified within the limits of the site. The habitat requirements for each species are described in detail in Section 3.4.

Table 4.4-2. Potential for Special-Status Wildlife Species to Occur within Each Alternative Area

Special Status Wildlife Species	Project Alternative		
	Alternative 1 Proposed Action	**Alternative 2 Resource Avoidance Alternative**	**Alternative 3 Reduced Project Alternative**
Amphibians			
Couch’s spadefoot toad	Low	Low	Low
Reptiles			
Mojave desert tortoise	Present	Present	Present
Mojave fringe-toed lizard	Present	Present	Present
Coachella Valley fringe-toed lizard	Absent	Absent	Absent
Birds			
Cooper’s hawk	Present (foraging only)	Present (foraging only)	Present (foraging only)
Western burrowing owl	Present	Present	Present
Elf owl	Low	Low	Low
Golden eagle	Moderate (foraging only)	Moderate (foraging only)	Moderate (foraging only)
Ferruginous hawk	Present (non-breeding)	Present (non-breeding)	Present (non-breeding)
Swainson’s hawk	Present (non-breeding)	Present (non-breeding)	Present (non-breeding)
Vaux’s swift	Present (non-breeding)	Present (non-breeding)	Present (non-breeding)
Western snowy plover	Moderate (foraging only)	Moderate (foraging only)	Moderate (foraging only)
Northern harrier	Present	Present	Present
Peregrine falcon	Present (foraging only)	Present (foraging only)	Present (foraging only)
Loggerhead shrike	Present	Present	Present
Vermillion flycatcher	Moderate	Moderate	Moderate
Bendire’s thrasher	Moderate	Moderate	Moderate
Crissal thrasher	Moderate	Moderate	Moderate
Le Conte’s thrasher	Present	Present	Present
Mammals			
Pallid bat	Present (foraging only)	Present (foraging only)	Present (foraging only)
Townsend’s big-eared bat	Moderate	Moderate	Moderate
Western mastiff bat	Present (foraging only)	Present (foraging only)	Present (foraging only)
Pocketed free-tailed bat	Present (foraging only)	Present (foraging only)	Present (foraging only)
Western red bat	Moderate (foraging only)	Moderate (foraging only)	Moderate (foraging only)
California leaf-nosed bat	Moderate (roosting/foraging)	Moderate (roosting/foraging)	Moderate (roosting/foraging)
Cave myotis	Present (foraging only)	Present (foraging only)	Present (foraging only)
American badger	Present	Present	Present
Desert kit fox	Present	Present	Present

Source: Ironwood Consulting Inc., 2016

Table 4.4-3 summarizes the estimated number of special-status wildlife species present within the footprints of the Proposed Action and alternatives. The potential direct and indirect impacts of each action alternative on wildlife are discussed in Sections 4.4.3.1 to 4.4.3.3. Direct impacts on wildlife are considered to include injury or death to an individual, habitat loss or degradation, adverse effects on movement, increased predation, and disturbance from noise, light, or dust. Examples of potential indirect impacts include habitat degradation through the introduction of invasive species, or increased predation due to site conditions during the construction and operation and maintenance phases of the Project.

Table 4.4-3. Summary of Direct Impacts to Special-Status Wildlife Species

Special Status Wildlife by Project Component		Alternative 1 Proposed Action	Alternative 2 Resource Avoidance Alternative	Alternative 3 Reduced Project Alternative	Alternative 4 No Action
Solar Plant Site					
Mojave Desert Tortoise	Tracks	0	0	0	0
Mojave Fringe-toed Lizard	Individual Occurrences	107	0	0	0
	Occupied Habitat Acreage[1]	64 acres	0 acres	0 acres	0 acres
	Potential Habitat Acreage[2]	3,650 acres	2,698 acres	1,963 acres	0 acres
Kit Fox	Dens	6	5	5	0
Gen-Tie Line, Communications Line, and Temporary Work Areas Outside of Fence					
Mojave desert tortoise	Tracks	1	1	1	0
Mojave Fringe-toed Lizard	Individual Occurrences	28	30	30	0
	Occupied Habitat Acreage[1]	15 acres	16 acres	16 acres	0 acres
	Potential Habitat Acreage[2]	41 acres	68 acres	68 acres	0 acres
Kit Fox	Dens	0	0	0	0

1 – Occupied Mojave fringe-toed lizard habitat based on 150 foot buffer surrounding individual occurrences.

2 – Potential Mojave fringe-toed lizard habitat based on modeled suitable habitat that is not occupied.

4.4.3.1 Alternative 1: Proposed Action

Construction

Wildlife Habitat

The removal of habitat under Alternative 1 would have a direct effect on wildlife species through habitat loss (see below for separate discussions of impacts on special-status wildlife species and wildlife movement and breeding). Impacts include the disturbance of 3,770 acres of habitat on the solar plant site (3,714 acres), gen-tie line (54 acres), and buried telecommunications line and possible above-ground electrical service line (2 acres) (Table 4.4-1). An additional 61 acres would be temporarily impacted by construction of the access road, and temporary construction areas.

Construction of the Project would increase noise, night lighting, and fugitive dust that could disturb common and special-status wildlife species near the construction area. Many species are sensitive to visual and noise disturbances that could cause wildlife to alter foraging and/or breeding behavior and avoid suitable habitat in adjacent areas. Night lighting also could attract wildlife to the site, disrupting their normal pattern of behavior. During construction, nighttime task lighting would be used only as necessary. In addition, implementation of dust control mitigation measures discussed in Section 4.2, *Air Resources*, would reduce impacts associated with dust.

As discussed in Section 4.3, *Biological Resources - Vegetation*, Project construction also has the potential to introduce invasive plant species outside of the Project site, which could result in the degradation of wildlife habitat outside of the solar plant site and linear corridors.

Mojave Desert Tortoise

As shown in Figure 3.4-1, signs of Mojave desert tortoise were found primarily on the north-central portion of the Project solar plant site, north and northwest of the private inholding (tortoise carcass or parts thererof), and within the linear corridors (one incidental observation of tortoise tracks). Of the vegetation alliances onsite, only the *Larrea tridentata* and *Larrea tridentata-Ambrosia dumosa* alliances are considered to be potential Mojave desert tortoise habitat, because the sand dunes south of I-10, along the northern portion of Alternative 1, are sandier and provide less favorable habitat for tortoises. Therefore, Table 4.3-1 shows that the Project would have a direct impact to 3,575 acres of suitable Mojave desert tortoise habitat. All six of the documented locations of tortoise sign (carcasses) shown in Figure 3.4-1 would be within the Project area.

Since no live Mojave desert tortoises were documented during protocol level surveys for the species, the USFWS population estimate methodology cannot be used to calculate the population density for the Alternative 1 site. The nearby MSEP was documented as having a low tortoise population density (0.2 adult tortoises per square mile of habitat). However, the MSEP is located closer to the McCoy Mountains and the associated alluvial fans at the base of the mountains, which the DRECP has identified as having relatively higher value to the Mojave desert tortoise within the McCoy valley. Since the Project area is relatively more distant from the base of the McCoy Mountains, it is assumed that the Alternative 1 Mojave desert tortoise habitat value and associated tortoise population density, is even lower than assumed for the MSEP. However, based on the incidental observation of Mojave desert tortoise tracks at one location along the utility corridor, the Mojave desert tortoise population density was estimated to be approximately 1 adult Mojave desert tortoise for the Alternative 1 Project area. Direct effects could include individual tortoises being crushed or entombed in their burrows, collection or vandalism, disruption of tortoise behavior during construction or operation of facilities, disturbance by noise or vibrations from the heavy equipment, and injury or mortality from encounters with workers' or visitors' pets. Mojave desert tortoises also could be attracted to the construction area by application of water to control dust, placing them at higher risk of injury or mortality. Increased human activity and vehicle travel would occur from the construction and improvement of access roads, which could disturb, injure, or kill individual tortoises. Tortoises are most likely to be killed, injured, or harassed if they have taken shelter under a parked car in order to seek shade or thermal cover, particularly along utility corridors (Boarman 2002).

Foraging opportunities for common raven, kit fox, coyote and other predators would temporarily increase on the Project site during construction. Construction activities are expected to provide food for scavengers and opportunistic feeders. Potential sources of increased predator base include inappropriately discarded food trash, increases in equipment-related wildlife mortality, and the availability of water sources, which tend to draw species that prey on Mojave desert tortoise.

Common raven populations in some areas of the Mojave Desert have increased over 1,000 percent from 1968 to 1988 in response to expanding human use of the desert, largely as a result of human-caused land alterations that have increased and stabilized food, water, and nesting site availability to ravens (Boarman 2002; Boarman and Berry 1995). Project construction, operation, and maintenance could temporarily increase raven and coyote presence in the Project area.

Ravens capitalize on human encroachment and expand into areas where they previously were absent or in low abundance. Ravens habituate to human activities and are subsidized by the food and water, as well as roosting and nesting resources, that are introduced or augmented by human encroachment. The City of Blythe and the nearby airport provide food, water features, and roosting/nesting substrates (buildings, signs, lamps, and utility poles) that otherwise would be unavailable. This development near the Project provides year-round water and trash subsidies for the raven as well as nesting opportunities.

It is anticipated that the existing baseline level of wildlife road kills would increase with Project construction and operation traffic, providing an additional food source that could exacerbate the raven/predator attraction and potentially increase predation pressure on Mojave desert tortoise. Increased vehicle traffic on access roads during the construction period could also increase the risk of tortoise mortality. The potential for increased traffic-related tortoise mortality is greatest along paved roads where vehicle frequency and speed is greatest, though tortoises on dirt roads also could be affected depending on vehicle frequency, speed, and driver attentiveness. Additional unauthorized impacts could occur from casual use of access roads due to unauthorized off-road activities.

The capture, handling, and relocation of Mojave desert tortoises from the Project site following the installation of perimeter wildlife exclusion fencing could result in the harassment and mortality of juvenile and adult Mojave desert tortoises during relocation. As previously discussed, local tortoise densities were assumed to be similar to the estimate for the nearby MSEP, which was determined to be 0.2 adults per square mile. Extrapolated for Alternative 1, it is estimated that 1 adult tortoise occupies the Project site. Therefore, it is assumed that any juvenile and/or adult tortoises could be relocated from the site prior to construction and would be subject to harassment and possibly death or injury. A Mojave desert tortoise translocation area will be selected and approved through the ESA Section 7 consultation process, and via the development of the Project's Desert Tortoise Translocation Plan (Mitigation Measure WIL-2).

Tortoises could die or become injured by capture and relocation if these methods are performed improperly, particularly during extreme temperatures, or if they void their bladders. If multiple Mojave desert tortoises are handled by biologists without the use of appropriate protective measures, pathogens could be spread among the tortoises, both resident and relocated or translocated animals. Relocated tortoises also could be subject to increased risk of predation, increased intraspecific competition, reduced availability of food or water resources, reduced health, exposure to environmental elements, and death. However, the site is not expected to be inhabited by a population of Mojave desert tortoise, but would instead provide an area which tortoises traverse across between the populations in the foothills of the McCoy Mountains (north of the site) and the Mule Mountains (south of the site). The addition of external site fencing could alter tortoise movement by directing tortoises around the fenced perimeter, but would not be anticipated to change their home range, nor would it be expected to separate individuals from the regional tortoise population.

As discussed in Section 4.3, *Biological Resources - Vegetation*, during and following construction, several invasive plant species could colonize disturbed areas within the solar plant site fencing and spread into adjacent vegetation alliances, thereby reducing habitat values for native plant and wildlife species. The spread of invasive weeds both within and outside of the Project boundary could result in the degradation of additional habitat for the Mojave desert tortoise.

Construction activities are expected to expose fine silt and other erosion-prone soils. This would temporarily increase suspended dust in off-site Mojave desert tortoise habitat, particularly during periods of high wind. Increased dust may have adverse effects on the health and survival of individual tortoises. The exposure of Mojave desert tortoises to dust suppression chemicals, if used, would have unknown effects on tortoise populations.

Mojave Fringe-toed Lizard

Direct impacts to Mojave fringe-toed lizards during construction of the solar facility, gen-tie line, distribution line, and associated access roads would occur due to removal of habitat and accidental mortality of lizards from vehicle strikes. The Mojave fringe-toed lizard has wide distribution in portions of the gen-tie line alignment located south of I-10, with 135 individuals identified in the Alternative 1 Study Area during surveys (107 within the solar facility footprint, 28 along the gen-tie corridor). Within 150 feet of these documented occurrences, Alternative 1 would directly impact 78 acres of occupied habitat. As shown in Figure 3.4-3, the remainder of the Project area was identified as suitable habitat in the DRECP model, and is therefore considered to be potential habitat. Alternative 1 would directly impact 3,692 acres of this potential habitat.

The NECO Plan Amendment to the CDCA Plan (BLM 2002) and Mitigation Measure WIL-10 requires that permanent habitat loss and direct impacts to Mojave fringe-toed lizards shall be subject to compensatory mitigation at a 3:1 ratio, which may include compensation lands purchased in fee or in easement in whole or in part, for impacts to Mojave fringe-toed lizard habitat. Without this mitigation, the project would not be consistent with the land use plan, with which BLM is required to comply. It is uncertain whether sufficient private lands meeting the habitat criteria may be available for purchase. Therefore, compensation required under Mitigation Measure WIL-10 may be accomplished through acquisition and management of off-site habitat or, if suitable compensation habitat is not available, through off-site habitat enhancement and restoration (e.g., by controlling weeds). However, it is also uncertain whether off-site enhancement and restoration can feasibly and effectively restore natural sand transport function and aeolian sand habitat values. Therefore, with implementation of Mitigation Measure WIL-10 to the extent it is feasible, the Proposed Action's direct effects on sand transport may remain only partially mitigated.

Indirect construction impacts include increased predation on lizards by raptors, ravens, and other birds such as loggerhead shrike; the introduction and spread of exotic vegetation species; fragmentation and degradation of occupied dune habitat; and hazards associated with the spraying of herbicides and dust suppression chemicals within occupied habitat. Potential indirect effects to Mojave fringe-toed lizard habitat could also occur if the Project were to interfere with the flow of sediment or moisture to the habitat. Habitat for the Mojave fringe-toed lizard is associated with sand deposits, which are present in both alluvial and eolian deposits in the Project area. The floodplain area designated as FP1, shown in Figure 4.3-1, roughly corresponds to the *Parkinsonia florida-Olneya tesota* vegetation alliance mapped by BLM, and is also identified as a ponding area that is critically important for eolian sand systems as a sand source and stabilizing moisture for sand dune systems by Kenney (2017). As shown in Tables 4.3-1 and 4.3-2, the Project would not directly impact the *Parkinsonia florida-Olneya tesota* vegetation alliance, but would directly impact 6.3 acres of the FP1 watercourse. This direct impact could affect the function of the area as a sand source and stabilizing moisture for sand dune systems, resulting in an indirect impact to occupied or potential habitat for the Mojave fringe-toed lizard.

The potential for operation of the Project to indirectly impact habitat for the Mojave fringe-toed lizard is similar to the analysis of indirect impacts to vegetation alliances. As demonstrated by Potter and Weigand (2016) at Palen dunes, there is the potential for inactive areas within dune fields to become active within a very short timeframe. If this were to occur, then the occupation of the land area by a solar project could either hinder or facilitate expansion of occupied Mojave fringe-toed lizard habitat. As the Alternative situated closest to the known occupied habitat for the Mojave fringe-toed lizard, the potential for these indirect impacts to occur is higher under Alternative 1 than Alternatives 2 or 3.

Couch's Spadefoot Toad

The BRTR (Ironwood 2016) identified 27 locations within the Study Area that had standing water at some point between 2008 and 2012. Two of these locations were identified as likely to support the species, due to their extent and association with dry desert wash woodland plant species. One of these was the *Parkinsonia florida-Olneya tesota* alliance area located near the NRG Blythe Solar facility (also identified in Huffman-Broadway [2017] as floodplain FP-1), and the other was located in the buffer outside of the Project area. Both locations were visited after heavy rains between 2008 and 2012 to determine if they held ponded water for more than 8 days, and they were also subjected to monitoring during the monsoon season in the summer of 2013. Neither area was determined to hold ponded water for more than 8 days. Therefore, the potential for occurrence of the species is low. However, there are reports from other projects of the species being present at the CRSS, and there is predicted occupied habitat present onsite in the DRECP suitable habitat model.

If this species is present in the project site, impacts from construction could include loss of habitat and direct mortality during grading and construction. Construction activities that create pits or depressions during the summer rains could attract toads which then would be vulnerable to additional construction impacts. During project construction and operation, Couch's spadefoot toads could be crushed on access roads. To address these potential impacts, Mitigation Measure WIL-12 (Couch's Spadefoot Toad Protection and Mitigation) would require avoidance and minimization measures should occupied habitat be identified during pre-construction surveys.

Nesting Birds

The Proposed Action would result in direct and indirect impacts to nesting bird species protected under Fish and Game Code §§3503.5 and 3511, and the Migratory Bird Treaty Act. Site clearing, vegetation removal, ground disturbance, and construction noise could cause nest abandonment and death of young or loss of reproductive potential at active nests located in or near the Study

Area. Additionally, night lighting during construction has the potential to affect nesting bird species.

Migratory Birds

During construction of the Project, the Applicant proposes to use either ponds covered with wildlife exclusion fencing, or tanks to store water for dust control. If ponds are used, they could provide an attractant to migratory birds. To minimize the potential for such impacts, Mitigation Measure WIL-13 (Development of Ponding Area) requires that the Applicant provide the BLM with an analysis of the feasibility of using tanks, as part of an application for authorization for ponds.

Golden Eagle

The Proposed Action occurs in the breeding range of the golden eagle. Golden Eagle Territory and Occupancy Surveys were conducted within a 10-mile buffer area surrounding the Project site. No nesting territories were documented during the surveys, although a golden eagle was documented soaring over the Study Area. A total of 26 raptor and raven nests were documented within the 10-mile buffer, none of which were verified as active golden eagle nests (Ironwood 2016). A previously active golden eagle nest within the Territory and Occupancy Survey area includes a nest documented during 2010/2011 surveys approximately 21 miles north of the Project in the Big Maria Mountains (Tetra Tech EC, Inc., 2011). A nest location is also identified in DRECP in the McCoy Mountains, approximately 8 miles northwest of the Project. This nest was found to not be active, and there is no information regarding when it was last active.

The Project would likely not result in direct or indirect impacts to golden eagle nests because of the large distance between active nest sites and the Project site. Due to lack of active nests near the Project and low observed prey densities on the site (i.e., 0.0035 black-tailed jackrabbits per acre), golden eagles are expected to forage infrequently within the Alternative 1 site.

Western Burrowing Owl

The most recently available survey data documented 12 unused owl burrows, and an additional four occupied burrows were observed within the Study Area (Ironwood 2016). The two northern occupied burrows are located outside of the Proposed Action footprint, and therefore would not be impacted by Alternative 1. The remaining two occupied burrows are located on the northeast portion of the Study Area, and only one of these burrows is located within the footprint of the solar arrays. It is anticipated that all identified active burrows on the solar plant site would be removed during Project construction and those on the linear corridor would be avoided where feasible. The majority of the Alternative 1 site, excluding the *Pleuraphis rigida* alliance, *Parkinsonia florida-Olneya tesota* alliance, and portions of the *Larrea tridentata* and *Larrea tridentata-Ambrosia dumosa* alliances adjacent to the sand dunes, is considered to provide suitable burrowing owl foraging habitat (Ironwood 2016).

In addition to direct impacts on individual owls and burrows, burrowing owl survival can be indirectly affected by human disturbance and foraging habitat loss even when impacts to individual owls and burrows are avoided. A significant impact to the burrowing owl may occur if there is:

1. Disturbance or harassment within approximately 160 feet of occupied burrows;

2. Destruction of burrows and burrow entrances; and/or
3. Degradation of foraging habitat adjacent to occupied burrows (i.e., an approximately 6.5 acres based on a 300-foot radius around each occupied breeding or resident burrow; CDFW 1995).

American Badger and Desert Kit Fox

Project construction has the potential to injure or kill American badgers and desert kit foxes by crushing them with construction equipment or by crushing den entrances, which would prevent them from escaping. Following the erection of perimeter fencing around the solar plant site and subsequent wildlife clearance surveys, the perimeter fence would limit badger and kit fox access to the main Project site, and consequently would reduce the likelihood of injury on the site during construction. There is also a low risk that individual animals could be inadvertently injured or killed by vehicles on access roads.

Six active kit fox burrows/den complexes were documented with wildlife camera stations within the Alternative 1 site, all within the southern portion of the Study Area (Ironwood 2016), within the proposed solar array fields associated with Alternative 1. Photographic evidence indicated occupation of four burrows/den complexes by one adult individual (unknown whether it was the same adult moving between areas, or multiple individuals), one pair of adults at another burrow/den complex, and a family unit consisting of a breeding pair and three juveniles at the last burrow/den complex. No American badger individuals were documented through direct observation or via wildlife camera stations. However, several instances of badger sign (scat and digs) were recorded on the southern edge of the Study Area (Ironwood 2016).

In late 2011, the first known cases of canine distemper virus (CDV) were observed in desert kit foxes about 20 miles west of Blythe on public lands managed by the BLM and leased to Genesis Solar LLC to construct the Genesis Solar Energy Project site. CDFW believes that the outbreak originated from an infected host animal entering the site, possibly a wild or domestic dog, American badger, or other carnivore. The rapid spread of CDV within the kit fox population was facilitated by the project-related displacement of infected animals from the Genesis site into new kit fox territories. Subsequently, desert kit foxes were captured for disease testing at the First Solar Desert Sunlight, Solar Millennium Palen, Genesis Ford Dry Lake, and at Southern California Edison's CRSS and CDV was identified at the two later sites, which span a distance of about 40 miles on the I-10 corridor within the Chuckwalla Valley (CEC 2012).

The typical practice for solar projects has been to exclude desert kit foxes from project areas during pre-construction clearing of project sites by “passive relocation” methods (i.e., by closing burrows, forcing foxes to locate to new off-site burrows). In the absence of protective measures the Project has the potential to worsen the CDV outbreak by raising kit fox stress levels and causing increased susceptibility to infection, causing increased movement of diseased animals thereby increasing the spread of disease into new areas, or placing healthy kit foxes into contact with off-site infected animals (CEC 2012).

Desert Bighorn Sheep and Burro Deer

The Project site is unlikely to serve as a potential movement corridor for Desert bighorn sheep based on their low numbers in the region. Presently, the Mule Mountains are considered an unoccupied portion of the bighorn’s range, and the deme (subpopulation) in these mountains has been considered lost (BLM 2002). Repopulation in the Mule Mountains could happen naturally (via recruitment from the Chuckwalla Mountains/Little Mule Mountains deme to the west and southwest of the Project and the Mule Mountains) or could happen deliberately via translocation of breeding individuals. The CDFW has successfully re-established bighorn in some ranges in the past. Due to the low likelihood of bighorn sheep from the Project area, the construction phase of the Project would not adversely affect habitat for this species or cause effects to individual sheep or sheep populations.

The Project would not present a complete barrier to movement between mountain ranges as sheep still could disperse around the site to the west, north, and south. Corridors described in the NECO Plan Amendment to the CDCA Plan (BLM 2002) identify potential for bighorn sheep movement from the Mule Mountains south to the Chocolate Mountains and west to the Chuckwalla Mountains. Further, the Project site, due to the width of the valley in which the solar facility would be located, has limited value as a movement corridor.

Direct and indirect construction impacts to burro deer include the loss of foraging habitat in the *Parkinsonia florida-Olneya tesota* alliance, vegetated swales, and the *Larrea tridentata* and *Larrea tridentata-Ambrosia dumosa* alliances, and potential barriers to local and regional deer movement. The Project area has a Very Low or Low habitat intactness in the DRECP habitat intactness model. The Project would not present a barrier to regional movement because deer still could disperse around the site to the west, north, and south.

Special-Status Bats

No bat roosts or colonies were identified within the Project site. The closest known bat colony is located approximately 3.4 miles south of Alternative 1, at the Hodge Mine in the Mule Mountains (Ironwood 2016). All habitats within the solar plant site are suitable for bat foraging. Direct and indirect impacts to bat species are expected if construction activities were to disrupt nighttime foraging activities, as well as loss of foraging habitat.

Operation and Maintenance

Special-Status Amphibians, Reptiles, and Terrestrial Mammals

Special-status amphibians, reptiles, and terrestrial mammals, including Mojave desert tortoises, Mojave fringe-toed lizards, American badgers, and desert kit foxes, may access the Project site during the O&M phase, either by excavating under the perimeter fence or walking through the Project entrances. To minimize the chances for individuals of these species to access the Project site, the Applicant will install Mojave desert tortoise exclusionary fencing at the base of the perimeter security fence and cattle guards at Project entrances. These structures will be inspected quarterly and their integrity maintained, as necessary. Finally, if any terrestrial special-status species gain access to the Project site despite implementation of these minimization measures, the Applicant will ensure that an Authorized Biologist captures and relocates the individual(s) outside of the Project site, coordinating with USFWS and CDFW, as needed.

The presence of employees on the Project site during O&M activities could introduce trash into the area and attract common ravens, coyotes, or other Mojave desert tortoise predators. Increased predation upon Mojave desert tortoises would be an indirect Project impact. Similar impacts would be anticipated to Mojave fringe-toed lizard.

Lighting for the Project could disturb special-status wildlife species in adjacent areas. Night lighting would be provided at the O&M building, the On-Site Substation, the temporary construction staging areas, and on or near each PCS station. All lighting would be kept to the minimum required for safety and security; sensors, motion detectors, and switches would be used to keep lighting turned off when not required; and all lights would be hooded and directed downward to minimize backscatter and off-site light.

Migratory Birds

Operation and maintenance activities are unlikely to result in direct or indirect impacts to nesting bird species protected under the Migratory Bird Treaty Act and the Fish and Game Code. O&M activities could result in active nests being removed from existing facilities if conflicts are identified (e.g., nest locations create a hazardous situation). There is a low chance that nesting bird disturbance could occur in association with the removal or management of vegetation within the solar plant site or other facilities site, or due to foot or vehicle traffic associated with O&M activities. Additionally, night lighting during O&M activities has the potential to affect nesting bird species.

Migrating birds may be adversely impacted due to collision or electrocution associated with the gen-tie line. To reduce this risk, the Applicant proposes to follow the applicable APLIC guidelines in Suggested Practices for Avian Protection on Power Lines (APLIC 2006), and Reducing Avian Collisions with Power Lines (APLIC 2012).

A potential risk to migrating birds is associated with Polarized Light Pollution (PLP), which creates the “lake effect” in which PV panels may mimic the reflective and light polarizing characteristics of water. Migrating water birds may mistake fields of PV panels as water bodies, and consequently be attracted to them. The lake effect has recently been postulated as a causal factor in injuries and mortalities of water birds at some solar facilities in the California Desert. Migrating birds may attempt to land on what they perceive as water, and instead collide with solar panels or other structures, resulting in injury or death. Additionally, some water birds require a running start across a water surface to take off. If these birds successfully land at the solar facility, they will be unable to take off again.

To date, little is known regarding the avian response to reflection or glare from PV solar technology; however, it is likely that glare will affect birds to some degree because the panels would reflect light and images, and might be mistaken for open sky or water. Light reflecting from photovoltaic panels could cause an increase in glare and PLP. PLP caused by anthropogenic structures can alter the ability of wildlife to seek out suitable habitat, detect or elude predators, or effectively navigate using natural polarized light patterns, ultimately affecting dispersal and reproduction. However, available information is not sufficient to allow quantification of the potential hazard of glare. Forecasting the importance of PLP to the survival of avian populations and the integrity and function of ecosystems remains largely speculative (Horvath et al. 2009).

Avian injury and mortality monitoring data for two solar facilities in the region along the I-10 corridor east of Palm Springs were reviewed for potential impacts associated with the Project. These two solar facilities include Desert Sunlight (PV solar, relatively similar to the Project) and Genesis Solar (solar trough). The Desert Sunlight observations were collected over a 5 year period (September 2011 through September 2016), while the Genesis Solar data provided for the review encompassed a much shorter period of 1 year and 7 months (March 2015 through October 2016). The comparison of raw mortality numbers between the two studies are relatively similar (432 total mortality events at Desert Sunlight, versus 536 at Genesis Solar), but the rate of mortality (7.2 deaths per month for Desert Sunlight versus 28 deaths per month for Genesis) suggests that the solar trough technology associated with the Genesis Solar facility presents a higher risk to birds than the photovoltaic technology of Desert Sunlight, especially considering that the acreage of the Desert Sunlight facility (more than 4,000 acres) is twice the size of Genesis (1,952 acres).

Table 4.4-4. Results of Bird Monitoring at Nearby Solar Facilities[1]

Parameter	**Desert Sunlight**			**Genesis**		
Total Mortalities	432			536		
Duration of Monitoring Period (months)	60			19		
Type of Technology	PV			Solar Trough		
Overall Rate of Mortality	7.2/month			28.2/month		
Cause of Mortality	**Total Number**	**Percent of Total**	**Rate per Month**	**Total Number**	**Percent of Total**	**Rate per Month**
Collision with solar panels/ troughs or wires	69	16%	1.15 incidents per month	54	10%	2.8 incidents per month
Predation	22	5%	0.36 incidents per month	5	1%	0.26 incidents per month
Entanglement in netting	1	0.2%	0.02 incidents per month	10	1.8%	0.52 incidents per month
Drowning	12	2.8%	0.2 incidents per month	6	1.2%	0.32 incidents per month
Unknown	328	76%	5.5 incidents per month	461	86%	24.2 incidents per month
Location of Mortality	**Total Number**		**Percent of Total**	**Total Number**	**Percent of Total**	
Fence	54		12.5%	70	13%	
Building	16		3.7%	21	3.9%	
Near Vehicle	3		0.7%	1	0.2%	
Water Pond	25		5.8%	117	21.8%	
Gen-tie Corridor	96		22.2%	47	9%	
PV Panels	192		44.4%	NA	NA	
Solar array framework (no panels)	20		4.6%	NA	NA	
Powerblock	NA		NA	84	15.7%	
Solar trough	NA		NA	162	30.2%	
Other/Unknown	26		6%	34	6.3%	

1 - The Desert Sunlight observations were collected from September 2011 through September 2016, and the Genesis Solar observations were collected from March 2015 through October 2016.

A summary of the causes of mortality is presented in Table 4.4-4. At each site, the cause for the majority of mortalities was unknown (76 percent at Desert Sunlight and 86 percent at Genesis). Known causes of mortality included collision with solar panels/troughs or wires (16 percent at Desert Sunlight versus 10 percent at Genesis Solar), predation (5 percent versus 1 percent), entanglement in netting (0.2 percent versus 1.8 percent), and drowning (2.8 percent versus 1.2 percent).

The high rate of unknown causes, which is due to high scavenging rates after death and a lack of necropsies performed on intact carcasses, makes it difficult to directly link solar project components to bird mortalities. Another method of evaluation is to consider mortalities by location. Although this does not prove that a project feature was a cause of mortality, it does suggest areas that may be investigated for their impact on migratory birds in the future.

The review of the locations of mortalities presented in Table 4.4-4 shows that most mortalities at both sites were found within the solar array fields. At Desert Sunlight, 44.4 percent of mortalities were found near PV panels, while 30.2 percent of mortalities were found near the solar troughs at Genesis. The higher percentage of mortalities in the solar field at Desert Sunlight may be a reflection of the fact that this project has an overall lower rate of mortalities than Genesis. In addition to solar trough arrays, the Genesis technology involves a power block that was the location of 15.2 percent of mortalities, and evaporation ponds that were the location of 21.8 percent of mortalities. These features are not associated with the PV technology used at Desert Sunlight, or that proposed for the DQSP Project. Therefore, the percentage of mortalities that occurred near the solar panels was higher than at Genesis, but the overall number and rate of mortalities associated with the solar array fields was much lower.

There were also a substantial percentage of mortalities found at fencelines (12.5% for Desert Sunlight, and 13% for Genesis), gen-tie lines (22.2% for Desert Sunlight, and 9% for Genesis), and water ponds (5.8% for Desert Sunlight, and 21.8% for Genesis). The reason for the relatively higher rate of mortalities at the gen-tie line for Desert Sunlight is unknown. This seems unusual, because the length of the gen-tie line is about the same for each project. The larger percentage of mortalities at water ponds for Genesis reflects the fact that Genesis has permanent evaporation ponds totaling more than 100 acres, while Desert Sunlight had approximately 10 acres of temporary ponds only during construction.

Operation and maintenance of the Project is likely to result in similar direct and indirect impacts to migratory birds moving through the region via collision, drowning, entanglement, or other "unknown" causes (which may or may not be attributable to the solar facility). However, the majority of the migratory birds encountering the Project would not be expected to nest on the facility. In the unlikely event that migratory birds nest at the operating facility, direct or indirect impacts could occur to species protected under the Migratory Bird Treaty Act and the Fish and Game Code. In the mortality monitoring data for the Desert Sunlight operations and maintenance phase, one individual of Ridgway's rail (*Rallus obsoletus*), a Federally-listed endangered species, was documented along an access road. It was recorded in the database in association with a PV panel. However, detailed notes in the monitoring data indicated that the rail carcass was found along a closed road, and that no evidence of impact with a PV panel was found.

While migratory Federally-listed species have the potential for flying through the region, there is only circumstantial evidence that they collide with PV panels in the region. Additionally, a review of the Genesis Solar mortality monitoring data indicates that no species of rail was documented during the 19 months of monitoring data reviewed. Therefore, it is not anticipated that any adverse impacts would occur to Federally-listed migratory birds through collision with any components of the Project. O&M activities could result in active nests being removed from existing facilities if conflicts are identified (e.g., nest locations create a hazardous situation).

There is a low chance that nesting bird disturbance could occur in association with the removal or management of vegetation within the solar plant site, or due to foot or vehicle traffic associated with O&M activities. Night lighting during O&M activities has the potential to affect nesting bird species. Additionally, O&M activities associated with the Proposed Action, such as washing the solar panel arrays, has the potential to directly impact nesting birds through loss of an active nest (including loss of eggs and/or nestlings) or disruption of breeding and nesting behaviors during the migratory bird nesting season.

Golden Eagle

The Project would likely not result in direct or indirect impacts to golden eagle nest sites during O&M activities because the nearest inactive nest site is approximately 8 miles from the Project site, and no active golden eagle nests were documented within 10 miles of the site during the Territory and Occupancy Survey conducted for the Project. Based on avian point counts and focused golden eagle surveys, and the low abundance of prey item density, foraging use of the Study Area is considered low (Ironwood 2016).

The Project gen-tie line would be approximately 3 miles long, and would be sited almost entirely within BLM's Utility Corridor K and Section 368 Federal Energy Corridor 30-52. The gen-tie line would be included within a 160-foot wide corridor along its 3 mile length. The high voltage line could pose a collision hazard to birds and possibly bats.

A review of the mortality monitoring data from Desert Sunlight and Genesis indicates that no eagle mortality collisions were noted for either of the existing solar facilities. The monitoring data suggest that there is a potential for mortality due to collision with the gen-tie or distribution lines, resulting from regional and local movement of avian species through the area, despite the distance from known golden eagle nests and nesting habitat and the lack of known prey concentrations on the Project site (Ironwood 2016).

The BLM has considered whether development of the DQSP could cause impacts to golden eagles related to the loss of potential foraging habitat. Although it is unknown whether golden eagles that might nest in the McCoy, Little Maria, and Big Maria Mountains in the future would utilize the Project area for foraging, avian point counts, the Territory and Occupancy Survey, and the prey abundance estimate that have been conducted for the Project suggest that golden eagles don't maintain breeding/nesting territories on any portion of the Project, and only infrequently use the area for foraging (Ironwood 2016). Project studies, and data collected from other projects in the region, have determined no active nesting within 10 miles of the Project, and an inactive golden eagle nest approximately 8 miles from the edge of the proposed development. Additionally, the population density of the black-tailed jackrabbit, a prey item of the golden eagle, was estimated to only be 0.0035 rabbits per acre. Furthermore, the habitat that would be disturbed or removed by development of the Project is neither unique nor limiting on the landscape, and does not represent a known prey concentration. Comparable or better foraging opportunities are expected to be available within the surrounding areas. For these reasons, development and operation of the Project is not expected to appreciably disturb the foraging of any eagle pairs within 10 miles of the Project site, and indirect impacts are expected to be negligible.

Western Burrowing Owl

Operation and maintenance actions have a low likelihood to affect burrowing owls because activities would largely occur within the developed solar plant site. Burrowing owls have the potential to return to the Project area, following the completion of construction. However, if the burrowing owl does return to the Project area as a resident species, it would likely inhabit the periphery of the development footprint in either natural burrows or manmade structures (e.g., drainage culverts, debris piles, etc.). O&M activities are not expected to remove burrowing owl breeding habitat, and would occur only on Project access roads and within work areas.

American Badger and Desert Kit Fox

Because new ground disturbance would be minimal during O&M activities, it is unlikely that such activities would injure or kill American badgers or desert kit foxes. A low risk remains that badgers or foxes could be inadvertently injured or killed by vehicles on access roads during O&M activities.

Desert Bighorn Sheep and Burro Deer

Once the Project is constructed, noise and human activity are expected to be similar to pre-Project conditions. The Project site is located in an area that receives minimal public use, Therefore, O&M activities are not expected to have any more effect from vehicular use and human activity than what already occurs in the area.

Development and the associated increases in human activities adjacent to and within occupied Desert bighorn sheep and burro deer habitat have the potential to adversely affect these species by fragmenting habitat areas if located in close proximity to the base of the Mule Mountains; however, Desert bighorn sheep does not currently occupy the Mule Mountains. If reintroduced to the area, the Project would only have a minor impact on the potential regional connectivity corridor for bighorn sheep because the movement corridor is maintained to the west, north, and south of the solar plant site.

Impacts to burro deer during maintenance and operation include minor barriers to local and regional deer movement; however, the Project would not present a barrier to regional movement because deer still could disperse around the site to the west, north, and east. The Project area has a Very Low or Low habitat intactness in the DRECP habitat intactness model.

Special-Status Bats

Night lighting and insect populations close to the ground at the Project site could attract bats to the site. A review of the Desert Sunlight and Genesis mortality monitoring data indicates that very few bats have collided with project buildings, and only one bat mortality was documented along either project's gen-tie/transmission corridor. Bat mortalities documented during the 5 year monitoring period at the Desert Sunlight project site included three total mortalities, one at a transmission tower, one along a fence, and one at a project building. Monitoring at the Genesis project documented a total of 19 bat mortalities, with none along the gen-tie/transmission corridor. Mortalities were concentrated at project buildings and the power blocks, with smaller numbers along fences and at the evaporation pond. Considering the Project more closely resembles Desert Sunlight, it is anticipated that the Project would result in similarly low impacts to bat species.

Decommissioning

Decommissioning is anticipated to only directly affect areas that were previously disturbed during installation of Project facilities. Thus, the direct removal of wildlife habitat is not anticipated for decommissioning activities. Potential direct and indirect effects to wildlife populations during decommissioning are similar to those described for the construction phase of the Project and include wildlife disturbance from noise, light, or dust, and the introduction of invasive plant species by various vectors. Revegetation of the site and removal of exclusion fencing would benefit wildlife in the area; however, the restored wildlife access to large expanses of denuded habitat that lack food, water, and cover could subject special-status species such as Mojave desert tortoises to mortality hazards long after site decommissioning.

4.4.3.2 Alternative 2: Resource Avoidance Alternative

The types of impacts related to construction, operation and maintenance, and decommissioning on wildlife resources under Alternative 2 would be similar to those described for Alternative 1. The main difference in impacts between Alternative 1 and Alternative 2 is that the solar plant site would be smaller, resulting in overall reduced impacts to wildlife habitat. Impacts associated with Alternative 2 include the disturbance of 2,782 acres of habitat for the permanent facilities. An additional 63.6 acres would be temporarily impacted by construction of the access road and temporary construction areas, for a total of 2,845 acres of habitat disturbance. Alternative 2 has a longer gen-tie corridor at 3.89 miles in length, as compared to 2.79 miles for Alternative 1.

Table 4.3-1 shows that Alternative 2 would have a direct impact to 2,607 acres of suitable Mojave desert tortoise habitat. Of the six documented locations of tortoise sign (carcasses) shown in Figure 3.4-1, three would be avoided, and three would be within the disturbance area. Due to the lack of live tortoises documented during protocol-level surveys, it is expected that the tortoise is not a resident species, but rather occasionally traverses portions of the Project site.

Similarly, there are substantially fewer Mojave fringe-toed lizard observations documented within the Alternative 2 footprint, with complete avoidance of the species within the solar plant footprint (Table 4.4-3). Within the gen-tie corridor, the number of direct impacts to Mojave fringe-toed lizard occurrences would be 30, higher than the 28 observed for the Alternative 1 gen-tie corridor. This is because the gen-tie corridor coincides with the Mojave fringe-toed lizard, and is longer under Alternative 2. Within 150 feet of these documented occurrences, Alternative 2 would directly impact 16 acres of occupied habitat. As shown in Figure 3.4-3, the remainder of the Project area was identified as suitable habitat in the DRECP model, and is therefore considered to be potential habitat. Alternative 2 would directly impact 2,766 acres of this potential habitat.

Potential indirect effects to Mojave fringe-toed lizard habitat could also occur if Alternative 2 were to interfere with the flow of sediment or moisture to the habitat. Habitat for the Mojave fringe-toed lizard is associated with sand deposits, which are present in both alluvial and eolian deposits in the Project area. The floodplain area designated as FP1, shown in Figure 4.3-1, roughly corresponds to the *Parkinsonia florida-Olneya tesota* vegetation alliance mapped by BLM, and is also identified as a ponding area that is critically important for eolian sand systems as a sand source and stabilizing moisture for sand dune systems by Kenney (2017). As shown in Tables 4.3-1 and 4.3-2, Alternative 2 would not directly impact the *Parkinsonia florida-Olneya* *tesota* vegetation alliance or the FP1 watercourse. For comparison, Alternative 1 would directly impact 6.3 acres of the FP1 watercourse.

As discussed in Section 4.4.3.1, there are many uncertainties associated with assigning impacts to migratory birds to individual components of solar facilities. Impacts are likely to be associated with bird collisions with Project fencing, gen-tie lines, and PV panels, including potential impacts associated with attraction of migratory birds to the lake effect created by the panels. Although the magnitude of these impacts, and the overall impact on avian populations, is uncertain, avian impacts associated with Alternative 2 would likely be lower than those of Alternative 1, due to the reduced acreage of solar arrays. However, the longer gen-tie corridor of 3.89 miles associated with Alternative 2 has the potential to result in greater operations and maintenance impacts to migratory birds and bats, through collision with tower structures and overhead lines.

The solar array for Alternative 2 would impact five known locations of kit fox dens, reduced from six in Alternative 1. Impacts to wildlife movement would be lower in Alternative 2 than in Alternative 1 due to the smaller amount of habitat that would be impacted. Thus, a greater amount of habitat would be preserved for intermountain and localized, valley floor wildlife movements.

The APMs and mitigation measures for Alternative 2 would be the same as those described under Alternative 1, with adjustments to reduce the amount of off-site compensatory habitat needed to mitigate impacts for Alternative 2.

4.4.3.3 Alternative 3: Reduced Project Alternative

The types of impacts related to construction, operation and maintenance, and decommissioning on wildlife resources under Alternative 3 would be similar to those described for Alternative 1. The main difference in impacts between Alternative 3 and Alternatives 1 and 2 is that the solar plant site would be smaller, resulting in overall reduced impacts to wildlife habitat. Impacts associated with Alternative 3 include the disturbance of 2,047 acres of habitat for the permanent facilities. An additional 65 acres would be temporarily impacted by construction of the access road and temporary construction areas, for a total of 2,112 acres of habitat disturbance. Alternative 3 has a longer gen-tie corridor at 4.18 miles in length, as compared to 2.79 miles for Alternative 1.

Table 4.3-1 shows that Alternative 3 would have a direct impact to 1,872 acres of suitable Mojave desert tortoise habitat. Of the six documented locations of tortoise sign (carcasses) shown in Figure 3.4-1, five would be avoided, and one would be within the disturbance area. Due to the lack of live tortoises documented during protocol-level surveys, it is expected that the tortoise is not a resident species, but rather occasionally traverses portions of the Project site.

Similarly, there are substantially fewer Mojave fringe-toed lizard observations documented within the Alternative 3 footprint, with complete avoidance of the species within the solar plant footprint (Table 4.4-3). Within the gen-tie corridor, the number of Mojave fringe-toed lizard observations would be 30, higher than the 28 observed for the Alternative 1 gen-tie corridor. This is because the gen-tie corridor coincides with the sand dune habitat, and is longer under Alternative 3. Within 150 feet of these documented occurrences, Alternative 3 would directly impact 16 acres of occupied habitat. As shown in Figure 3.4-3, the remainder of the Project area was identified as suitable habitat in the DRECP model, and is therefore considered to be potential habitat. Alternative 1 would directly impact 2,031 acres of this potential habitat.

Potential indirect effects to Mojave fringe-toed lizard habitat could also occur if Alternative 3 were to interfere with the flow of sediment or moisture to the habitat. Habitat for the Mojave fringe-toed lizard is associated with sand deposits, which are present in both alluvial and eolian deposits in the Project area. The floodplain area designated as FP1, shown in Figure 4.3-1, roughly corresponds to the *Parkinsonia florida-Olneya tesota* vegetation alliance mapped by BLM, and is also identified as a ponding area that is critically important for eolian sand systems as a sand source and stabilizing moisture for sand dune systems by Kenney (2017). As shown in Tables 4.3-1 and 4.3-2, Alternative 3 would not directly impact the *Parkinsonia florida-Olneya tesota* vegetation alliance or the FP1 watercourse. For comparison, Alternative 1 would directly impact 6.3 acres of the FP1 watercourse.

As discussed in Section 4.4.3.1, there are many uncertainties associated with assigning impacts to migratory birds to individual components of solar facilities. Impacts are likely to be associated with bird collisions with Project fencing, gen-tie lines, and PV panels, including potential impacts associated with attraction of migratory birds to the lake effect created by the panels. Although the magnitude of these impacts, and the overall impact on avian populations, is uncertain, avian impacts associated with Alternative 3 would likely be lower than those of Alternatives 1 and 2, due to the reduced acreage of solar arrays. However, the longer gen-tie corridor of 4.18 miles associated with Alternative 3 has the potential to result in greater operations and maintenance impacts to migratory birds and bats, through collision with tower structures and overhead lines.

The solar array for Alternative 3 would impact five known locations of kit fox dens, reduced from six in Alternative 1. Impacts to wildlife movement would lower in Alternative 3 than in Alternatives 1 and 2 due to the smaller amount of habitat that would be impacted. Thus, a greater amount of habitat would be preserved for intermountain and localized, valley floor wildlife movements.

The APMs and mitigation measures for Alternative 3 would be the same as those described under Alternative 1, with adjustments to reduce the amount of off-site compensatory habitat needed to mitigate impacts for Alternative 3.

4.4.4 Application of CEQA Significance Thresholds

For the purposes of CEQA compliance, the significance of each identified impact of Alternative 1, Alternative 2, or Alternative 3 has been determined. The CEQA Lead Agency is responsible for determining whether an impact is significant and is required to adopt mitigation measures to minimize or avoid each significant impact.

BIO-1) Would the Project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife (CDFW) or the U.S. Fish and Wildlife Service (USFWS)?

Construction, operation and maintenance, and decommissioning of Alternatives 1, 2, and 3 could result in direct and indirect impacts to special-status species. Potential construction- and operation-related direct and indirect impacts to non-listed special-status species occurring within the Study Area could occur as a result of construction activities. Construction of the solar facility, gen-tie lines, new On-Site Substation, access roads, and O&M buildings would require ground-disturbing activities, including clearing and grading for structure installation work areas, and access construction.

Special-status wildlife: Direct impacts to non-listed wildlife species could occur from mortality of individuals by crushing or vehicle collisions during operation and maintenance activities of Alternative 1, Alternative 2, or Alternative 3, nighttime lighting, wildfires, and human presence and activity. Potential construction- and operation-related direct and indirect impacts to special-status wildlife would be potentially significant. APMs BIO-1 (Environmental Inspection and Compliance Monitoring Program and Plan) and BIO-3 (Construction-Related BMPs), in addition to implementing Mitigation Measures VEG-1 through VEG-8, WIL-3 (Project Notification and Reporting), WIL-8 (American Badger and Desert Kit Fox Protection), WIL-9 (Burrowing Owl Protection and Mitigation), and WIL-12 (Couch's Spadefoot Toad Protection and Mitigation) would be implemented to further reduce impacts. Post-mitigation, impacts would be less than significant. All mitigation measures that are required during construction of Alternative 1, Alternative 2, or Alternative 3 to avoid or minimize impacts to biological resources would also be required during decommissioning activities.

Migratory Birds: The potential impacts of Alternatives 1, 2, or 3 on migratory birds, including an evaluation of data from nearby solar projects, are discussed in Section 4.4.3. There is a potential for direct and indirect impacts to occur to migratory birds through crushing of nests during clearing and grubbing, as well as during construction. Other impacts could include collisions with solar arrays and gen-tie line and structures, loss of nesting and foraging habitat, and disruption of normal breeding behaviors in areas adjacent to the Project from increased noise, ambient light at night, and an increase in the level of human encroachment into the vicinity. However, although these impacts are documented, there is a large amount of uncertainty regarding their effect on total population size. As discussed in Section 4.4.3, the cause of most mortalities at nearby solar facilities is unknown, making it difficult to accurately predict the significance of collision mortality. The significance of the lake effect on the survival of avian populations and the integrity and function of ecosystems remains largely speculative (Horvath et al. 2009). Based upon the bird surveys conducted on the site and the data from nearby sites, there is no evidence that the DQSP would have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or the USFWS.

Alternative 2 or Alternative 3 would also not be expected to contribute to any adverse impacts to avian species from PLP, since none of the design features have been connected to such impacts. Similar to Alternative 1, mortality monitoring at the Desert Sunlight and Genesis solar facilities were reviewed, and the data indicate that avian collisions with solar panels and troughs occur, but that the cause of the vast majority of deaths were categorized as “unknown”, or due to other factors such as predation, drowning, or entanglement in netting. Therefore, Alternative 2 or Alternative 3 will not have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or the USFWS.

APMs BIO-1 (Environmental Inspection and Compliance Monitoring Program and Plan), BIO-2 (Construction-Related Plans), and BIO-3 (Construction-Related BMPs), as well as Mitigation

Measures WIL-3 (Project Notification and Reporting), WIL-7 (Preconstruction Nest Surveys), WIL-9 (Burrowing Owl Protection and Mitigation), and WIL-12 (Couch's Spadefoot Toad Protection and Mitigation) would be implemented to help reduce any potential impacts during construction and operation and maintenance of the gen-tie line and solar array facility. These measures specify pre-construction surveys to identify the presence of potentially affected individuals, date limits to avoid Project activities when protected individuals are present and/or breeding, distance limits to minimize direct impacts and habitat modification, and documentation and reporting requirements. Through these measures, impacts to individuals and habitat of protected species would be reduced to a level less than significant.

BIO-4) Would the Project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Wildlife: Although impacts on wildlife movement are anticipated under Alternatives 1, 2, or 3, these impacts would be less than significant with mitigation. The DRECP identifies wildlife corridors and linkages for use in evaluating impacts to wildlife movement. Figure D-1 of DRECP identifies a desert linkage network for landscape wildlife linkages, Figure D-2 identifies multi-species linkages and ACEC boundaries within the East Riverside DFA, and Figure D-16 identifies Tortoise Conservation Areas and Linkages. The Project area is not situated within any documented important migration routes for any terrestrial wildlife species, and most of the animals expected to move across the Project are considered common in California, with the exception of Mojave desert tortoise. Common species were found on-site in relatively low numbers, as well as in adjacent areas. The Mojave desert tortoise is not a resident species onsite, due to the lack of observations of live tortoises during protocol-level surveys. The incidental observation of tortoise tracks within the gen-tie line corridor north of the sand dunes suggests that the species only occasionally traverses portions of the site.

Regional habitat connectivity would be reduced by implementation of Alternatives 1, 2, or 3. However, much of the land surrounding the site is expected to remain as natural desert plant communities for the foreseeable future, which would allow regional movement by common terrestrial wildlife species, as well as the Mojave desert tortoise, to continue outside the perimeter of Alternatives 1, 2, or 3 without significant impediment once construction is completed.

Operation of Alternatives 1, 2, or 3 would not result in any direct impacts to wildlife movement in addition to those already described for construction. Mitigation Measures WIL-1 (Mojave desert tortoise fencing), WIL-4 (Mojave desert tortoise habitat acquisition), and WIL-9 (burrowing owl habitat acquisition) would reduce remaining potential impacts to a less than significant level by directing wildlife movement around the Project (via the site perimeter fencing), and building upon a consolidated block of conserved open space suitable for maintaining movement corridors (via the Project's habitat acquisition contribution). Post-mitigation, impacts would be less than significant.

Migratory Birds: To the east of the Alternatives 1, 2, or 3 area is the Lower Colorado River Valley. The Lower Colorado River Valley is in the Pacific Flyway, one of the four major migration flyways in North America, and is a globally important bird area (IBA) running from Alaska to Patagonia and stretching inland from the Pacific Ocean to encompass parts of

Montana, Wyoming, Colorado and New Mexico (Audubon 2011). As previously mentioned, migratory bird surveys and the Territory and Occupancy Survey, indicated that both the diversity and density of migratory birds and raptors was relatively lower within the Project site, compared to adjacent areas. However, many bird species migrate at night, including passerines and waterbirds, which may not have been adequately accounted for in the daytime surveys conducted for the Project.

Due to approximately 90,000 acres of existing suitable forage land on irrigated agricultural land within the Palo Verde Valley east of Alternatives 1, 2, or 3, and the distance of the alternatives from the Colorado River, it is assumed that migratory birds would only incidentally use the Alternative 1, 2, or 3 Project areas for forage land, and that these lands are of lesser value and importance for migratory bird foraging compared to lands closer to the River.

Wetlands, lakes, and streams are all documented potential "hot spots" for avian risk due to collision with facilities because water is often used by birds to forage or congregate (APLIC 2006). There is no standing water in the Project area, except briefly following heavy rains. The Applicant has proposed use of ponds to store dust control water during construction. Such ponds would only be authorized following an analysis of the feasibility of using tanks, as specified in WIL-13 (Development of Ponding Area). Potential impacts will be mitigated through APMs BIO-1 (Environmental Inspection and Compliance Monitoring Program and Plan), as well as Mitigation Measure WIL-3 (Project Notification and Reporting). These measures would be implemented to help reduce potential impacts during construction and operation and maintenance of the gen-tie line and solar array facility to less than significant.

BIO-5) Would the Project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Alternatives 1, 2, or 3 would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. Regional resource planning documents prepared by Federal, state, and local agencies were reviewed, including the CDCA Plan, the RCGP, and USFWS Recovery Plans. These documents were reviewed to confirm that Alternatives 1, 2, or 3 would not conflict with and would have no impact on any local policies or ordinances protecting biological resources.

BIO-6) Would the Project conflict with the provisions of an adopted habitat conservation plan; natural community conservation plan; or other approved local, regional, or state habitat conservation plan?

Alternatives 1, 2, or 3 would not conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan. This is because no conservation plans (local, regional, or state) encompass the Study Area. Alternatives 1, 2, or 3 would have no impact on adopted habitat conservation plans, natural community conservation plans, or other approved local, regional, or state habitat conservation plans.

BIO-7) Would the Project substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate

a plant or animal community; or substantially reduce the number or restrict the range of an endangered, rare, or threatened species?

Based on survey work and database searches that were conducted for the Project, signs of one Federally listed threatened species, the Mojave desert tortoise, and the state-listed threatened Swainson's hawk, were documented onsite. Because of the lack of observations of live tortoises or burrows during the protocol-level Project surveys, the Mojave desert tortoise is not expected to be a resident species onsite. However, since it is known from the region along the foothills of the McCoy Mountains (north of the site) and the Mule Mountains (south of the site), the presence of tortoise tracks on the northern edge of the sand dunes along the gen-tie corridor indicates the tortoise occasionally traverses portions of the site. The Swainson's hawk occurs as a foraging species during migration. However, the Swainson's hawk would not be expected to nest onsite. Therefore, Alternatives 1, 2, or 3 would not substantially reduce the number or restrict the range of either of these threatened species.

Based on a review of available information, review of existing databases, reconnaissance surveys and protocol surveys conducted as part of impacts assessment for the DQSP, fifteen non-listed special-status reptile, avian, and mammal species or their sign are associated with Alternatives 1, 2, and 3. These species include the following: Mojave fringe-toed lizard, Cooper's hawk, western burrowing owl, ferruginous hawk, Vaux's swift, northern harrier, peregrine falcon, loggerhead shrike, pallid bat, western mastiff bat, pocketed free-tailed bat, cave myotis, American badger, and desert kit fox.

Habitat destruction is thought to cause greater reductions in bird and other wildlife populations than any other factor, and is still the most serious long-term threat (APLIC 2006). Based on Project migratory bird surveys and Golden Eagle Territory and Occupancy Surveys, overall avian diversity and density is lower within the Project footprint, compared to outside of the Project. While these surveys were not designed to specifically document nesting of non-raptor avian species, no incidental observations of non-raptor avian nesting, nor any direct observation of raptor nesting, have been documented within the Project site. While the Project has not conducted any population viability analyses, the relatively low densities of migratory bird species and other species such as the Mojave desert tortoise, as previously noted, suggests that implementation of the Project would not likely expose any animal species to significant risk with regard to self-sustaining populations. Therefore the construction of Alternative 1 would not substantially reduce the habitat for birds or migratory birds that would cause the population to drop below self-sustaining levels, threaten to eliminate the avian community or substantially reduce the number or restrict the range of endangered, rare, or threatened species.

The direct impact of Alternatives 2 and 3 on occupied and potential Mojave fringe-toed lizard habitat would be reduced compared to Alternative 1. The Alternative 2 and 3 solar plant would completely avoid direct impacts to known fringe-toed lizard locations. Direct impacts to the species along the Alternative 2 and 3 gen-tie routes would slightly increase, relative to Alternative 1.

Various special-status mammal species, including several bat species, as well as the American badger and desert kit fox, might be impacted by the Project. However, no bat roosts were documented within the Project footprint, and direct take of the badger and kit fox would be avoided to the extent feasible through passive relocation. While habitats for these species would be lost, the displaced individuals would be able to utilize adjacent habitats. These species are present throughout the region. Therefore, the Project would not cause these species populations to drop below self-sustaining levels.

Potential impacts will be mitigated through Mitigation Measures WIL-1 and WIL-2 (Desert Tortoise Surveys and Desert Tortoise Translocation Plan), WIL-7 (Preconstruction Nest Surveys), WIL-8 (American Badger and Desert Kit Fox Protection), WIL-9 (Burrowing Owl Protection and Mitigation), WIL-10 (Compensatory Mitigation for Mojave Fringe-toed Lizard Habitat Losses), and WIL-12 (Couch's Spadefoot Toad Protection and Mitigation). These measures would be implemented to help reduce potential impacts during construction and operation and maintenance of the gen-tie line and solar array facility to less than significant.

4.4.5 Alternative 4: No Action Alternative

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, the BLM would continue to manage the land under its land use jurisdiction consistent with the site's multiple use classification as described in the CDCA Plan, as it was amended by the Western Solar Plan.

If the site remained undeveloped, the existing environmental setting described in Section 3.4 would be maintained. No disturbance of site soils would occur, and no gen-tie line would be constructed, and therefore Alternative 4 would not result in any impacts associated with biological resources.

4.4.6 Cumulative Impacts

The geographic scope for this cumulative impact analysis considers the incremental effects of the analyzed alternatives relative to other past, present, and reasonably foreseeable projects that affect wildlife. For wildlife resources, the geographic scope of analysis is based on species distribution and landforms surrounding the Project site and the natural boundaries of the resource affected, rather than jurisdictional boundaries.

The analysis considers potential effects at different scales for different species, with the analysis generally concentrating on wildlife resources in the Palo Verde watershed and a portion of the Chuckwalla Valley watershed in eastern Riverside County. This scale was used to analyze cumulative effects on Mojave desert tortoise, Mojave fringe-toed lizard, migratory birds, western burrowing owl, American badger, kit fox, and bat species. The geographic scope for assessing cumulative effects to Mojave desert tortoise and golden eagle were somewhat larger, as described below. In addition to short-term construction impacts, the Project would have ongoing operational impacts on some biological resources. Therefore the temporal scope of the cumulative effects analysis for wildlife includes the construction, operation and maintenance, and decommissioning phases of the Project.

Table 4.4-5. Cumulative Impacts to Wildlife Habitat

Wildlife Species *Cumulative Study Area*	**Acreage within Study Area**	**Impacts of Present and Future Projects**	**Impacts of Alternative 1**	**Impacts of Alternative 2**	**Impacts of Alternative 3**
Mojave desert tortoise *Colorado Desert Recovery Unit*	2,600,000 acres	39,444 acres[1] (1.5%)	3,575 acres (9.1% of total cumulative impact)	2,607 acres (6.6% of total cumulative impact)	1,872 acres (4.7% of total cumulative impact)
Mojave fringe-toed lizard *Occupied sand dune/ sand sheet habitat in the Palo Verde Valley*	12,911 acres	228 acres[2] (1.8%)	78 acres (34% of total cumulative impact)	16 acres (7.0% of total cumulative impact)	16 acres (7.0% of total cumulative impact)
Golden eagle[3] *Foraging Habitat within 10 mile buffer*	287,590 acres	39,444 acres[1] (13.7%)	3,831 acres (9.8% of total cumulative impact)	2,845 acres (7.2% of total cumulative impact)	2,112 acres (5.4% of total cumulative impact)
Burrowing owl / American badger/ desert kit fox *BLM-identified habitat in the Palo Verde watershed*	286,084 acres	27,923 acres[1] (9.8%)	3,831 acres (13.8% of total cumulative impact)	2,845 acres (10.2% of total cumulative impact)	2,112 acres (7.6% of total cumulative impact)

Source:
1 – Acreage for Mojave desert tortoise, Golden eagle, and burrowing owl/American badger/Desert kit fox estimated using impacts from Present/Future projects from Table 3.4-2 in Modified Blythe EIS (BLM 2015), which already includes the Proposed Action acreages for DQSP.
2 – Acreage for MFTL estimated from Table 4.4-3 in McCoy EIS (BLM 2012b), plus highest potential acreage (Alternative 1) for DQSP.
3 – Impact is to foraging habitat only

Alternative 1 – Proposed Action

Construction, Operations, and Decommissioning

A discussion of regional impacts to vegetation alliances and associated wildlife habitat was provided in Section 4.3.6, and is not repeated in this section. This section provides a detailed discussion of the effects of past, present, and future projects to wildlife resources in the Project vicinity.

Those areas in eastern Riverside County where existing and cumulative projects occur or are anticipated provide habitat for numerous special-status wildlife species, including Mojave desert tortoise, Mojave fringe-toed lizard, golden eagle, burrowing owl, American badger, desert kit fox, and Desert bighorn sheep, among others. Tables 4.1-1 and 4.1-2 identify those existing and reasonably foreseeable projects, respectively, in the cumulative effects study area. These include other proposed or approved renewable energy projects, BLM authorized actions or activities, proposed or approved projects within the counties' jurisdictions, and other actions/activities that Lead Agencies consider reasonably foreseeable. Generally, existing and cumulative projects have been sited outside of many sensitive areas that support these species, which include the ACECs, wilderness areas, and other Special Designation areas discussed in Section 4.16. However, substantial wildlife populations occur outside of these managed and protected areas, and are vulnerable to habitat loss and degradation, or other threats. While the Project is located within the NECO planning area, it is not located within the boundaries of the Chuckwalla Desert Tortoise ACEC, Joshua Tree Desert Tortoise ACEC, or Chuckwalla Unit of Critical Habitat for Mojave desert tortoise.

Land uses in the cumulative analysis area historically have been altered by human activities, resulting in conversion of undeveloped land and habitat loss, fragmentation, and degradation. Reasonably foreseeable future projects that could impact biological resources in the cumulative impacts area characterize overall development trends in the Palo Verde Valley and nearby Chuckwalla Valley. Much of the future development in the area is dominated by renewable energy projects. Major renewable projects require extensive access roads and new transmission lines to tie into the existing electrical grid system.

Other projects in the cumulative study area include several transmission lines and nonrenewable energy development, as well as residential and commercial development. In addition to one-time construction impacts, many of the cumulative projects would have ongoing operational impacts on wildlife resources. Therefore, all projects that might contribute impacts over time in the cumulative area are considered for this analysis. This would include nonrenewable energy, transmission lines, wind power, and solar power projects.

General threats to common and special-status wildlife species in the cumulative effects study area include the fragmentation of habitat from roads and urban development, the effects of historic livestock grazing on wildlife forage structure and availability, the effects of military training activities, and agricultural development. In the context of other existing and reasonably foreseeable projects, the proposed Project has the potential to further reduce wildlife habitat and incrementally degrade adjacent habitat. Thus, the Project would contribute to the cumulative loss and degradation of habitat for Mojave desert tortoise, Mojave fringe-toed lizard, and other species in the Palo Verde watershed.

Wildlife Habitat

The development of numerous large-scale projects such as other solar generation facilities would result in the conversion of wildlife habitat to industrial and commercial uses. Table 4.4-5 presents the estimated area of available wildlife habitat in the cumulative effects study areas, and the cumulative impacts on each species from existing projects and foreseeable future projects. Existing and future impact areas were derived using the list of existing and reasonably foreseeable projects in the Palo Verde Valley and nearby Chuckwalla Valley, as identified in Section 4.1.

The total projected habitat loss in the cumulative study area for wildlife resources includes approximately 1.5 percent of habitat for Mojave desert tortoise, 3.3 percent of habitat for Mojave fringe-toed lizard in the Palo Verde Valley, 13.7 percent of foraging habitat for golden eagle, and 9.8 percent of habitat for burrowing owl, American badger, and desert kit fox (Table 4.4-5). Alternatives 1, 2, and 3 would contribute to cumulative impacts on these resources. However, implementation of APM BIO-1 (Environmental Inspection and Compliance Monitoring Program and Plan), BIO-2 (Construction-Related Plans), BIO-3 (Construction-Related BMPs), and BIO-5 (Integrated Weed Management Plan), along with Mitigation Measures VEG-1 through VEG-8, VEG-10 (Measures for Riparian Habitat and State Waters), WIL-1, WIL-2, and WIL-4 through WIL-10, would reduce impacts to sensitive wildlife species and their habitat and provide that impacted habitat is adequately mitigated with equivalent habitat that would be protected off-site. With implementation of these Project-specific mitigation and protection measures, implementation of similar measures as part of each project in the cumulative scenario, and compliance with state and Federal laws, the cumulative effects to wildlife habitat between the Project and past, present, and foreseeable projects would be less than significant (impact BIO-1 and BIO-7).

Mojave Desert Tortoise

The cumulative effects study area for Mojave desert tortoise considered existing and future projects in the Colorado Desert Recovery Unit planning area, as defined in the Desert Tortoise Revised Recovery Plan (USFWS 2011a). The Recovery Plan focuses on Mojave desert tortoise populations within each of five distinct recovery units, with the fundamental recovery goal of ensuring sufficient population size and stability within an ample amount of protected habitat in each area. The Colorado Desert Recovery Unit includes the Joshua Tree Desert Tortoise ACEC and Chuckwalla Desert Tortoise ACEC, and includes both the Chuckwalla Valley and Palo Verde Valley. USFWS-designated critical habitat for Mojave desert tortoise occurs within the Chuckwalla Unit, which significantly overlaps the Joshua Tree and Chuckwalla Desert Tortoise ACECs.

While Mojave desert tortoises occur in low densities in the Palo Verde Valley, the Project site is not located within or between lands that are specifically managed for Mojave desert tortoise conservation. The Joshua Tree Desert Tortoise ACEC, Chuckwalla Desert Tortoise ACEC, and designated critical habitat for Mojave desert tortoise are greater than 10 miles west of the Project site and would not be impacted by the Project. A 2.6 million-acre study area was identified for Mojave desert tortoise in the Colorado Desert Recovery Unit, of which approximately 39,444 acres (1.5 percent) would be impacted by future projects (Table 4.4-5). Alternative 1 would contribute approximately 9.8 percent of the total cumulative impact from future projects, affecting about 0.14 percent of available Mojave desert tortoise habitat in the recovery unit. Under Alternative 2 the Project would contribute 7.9 percent of the total impact from future projects, affecting about 0.1 percent of available Mojave desert tortoise habitat. Alternative 3 would contribute approximately 5.2 percent of the total cumulative impact from future projects, affecting about 0.1 percent of available Mojave desert tortoise habitat.

Direct and indirect effects to tortoises and their habitat would be offset through the application of APM BIO-1 (Environmental Inspection and Compliance Monitoring Program and Plan), BIO-2 (Construction-Related Plans), and BIO-3 (Construction-Related BMPs), and the implementation of Mitigation Measures VEG-1 through VEG-8, WIL-1 though WIL-5. The loss of tortoise habitat and direct and indirect effects to this species are anticipated to result in cumulative effects on populations; however, the implementation of the required protection measures that include salvage of Mojave desert tortoises, compensatory mitigation, and site restoration following decommissioning would ensure that the loss of tortoise habitat is adequately compensated for and comparable or higher quality habitat would be protected off-site. With implementation of these measures, it is expected that the contribution of the Project to cumulative effects on Mojave desert tortoises would not be cumulatively considerable (impact BIO-7).

Mojave Fringe-toed Lizard

The analysis of cumulative Project effects to Mojave fringe-toed lizard habitat focused on known and CNDDB-documented populations within the Palo Verde Valley. In these areas, populations are dependent upon areas with fine aeolian sand that occur in association with dunes, margins of dry lakes and washes, and isolated sand patches. The cumulative effects analysis identified approximately 12,911 acres of occupied Mojave fringe-toed lizard habitat in the cumulative study area, of which approximately 228 acres (1.8 percent) occurs in areas where future projects are proposed (Table 4.4-5). Under Alternative 1, approximately 63 acres of occupied habitat would be disturbed for the solar field, and another 15 acres would be disturbed in association with the gen-tie line. This represents approximately 0.6 percent of available Mojave fringe-toed lizard habitat that was identified in the cumulative study area and represents a contribution of 34 percent of the total cumulative effect on this resource. The implementation of APM BIO-1 (Environmental Inspection and Compliance Monitoring Program and Plan), BIO-2 (Construction-Related Plans), and BIO-3 (Construction-Related BMPs), along with Mitigation Measures VEG-1 through VEG-8, and WIL-10 would minimize impacts to sensitive dune and sand sheet habitat and provide suitable compensatory habitat for habitat losses. With implementation of the above-mentioned BMPs, in addition to protection through the implementation of Project mitigation measures, the contribution of the Project to cumulative effects on Mojave fringe-toed lizard would not be cumulatively considerable (impact BIO-7).

Migratory Birds

The construction and operation of large-scale solar generation projects in the region, including Desert Sunlight and Genesis, have contributed to cumulative impacts on migratory bird species through loss of habitat, as well as through increased mortality as a result of the operation and maintenance of the facilities. Based on a review of the mortality monitoring studies for these two solar facilities, it can be inferred that the Project would also contribute to cumulative impacts to migratory birds by increasing impacts associated with collision with the proposed development features. Desert Sunlight contributed to 432 avian and bat mortalities over a 5 year period, while Genesis accounted for 536 mortalities over a period of 1 year and 7 months. Based on the monitoring data for Desert Sunlight and Genesis, the DQSP is likely to contribute to increase avian mortality through collision with PV panels, entanglement in netting, drowning, and an incremental loss of habitat.

Direct impacts to actively breeding birds would be avoided through the implementation of measures that would provide consistency with Fish and Game Code §§3503.5 and 3511, and the Migratory Bird Treaty Act. Under these laws, the removal or disturbance of active nests is prohibited. With implementation of APM BIO-1 (Environmental Inspection and Compliance Monitoring Program and Plan), BIO-2 (Construction-Related Plans), and BIO-3 (Construction-Related BMPs), and Mitigation Measures VEG-1 through VEG-8, WIL-6, WIL-7, WIL-9, and WIL-13 which require a Bird and Bat Conservation Strategy and preconstruction nesting bird surveys, the Project would not impact nesting birds other than those that are individually discussed in this Draft PA/EIS/EIR (e.g., burrowing owl). Other future projects would be required to implement similar measures to ensure compliance with Federal and state bird protection regulations.

Golden Eagle

The cumulative analysis for golden eagle considered the potential for Project impacts to interact with impacts caused by past, present, and reasonably foreseeable future projects within 10 miles of the Project site to cause or contribute to cumulative effects. The 10-mile radius is consistent with USFWS guidance for inventorying golden eagles that occur near a specific project (Pagel et al. 2010).

Based on a review of known and historic golden eagle breeding sites in the 10-mile golden eagle study buffer, none of the cumulative projects would impact golden eagle breeding sites. However, many of the projects are located or proposed within natural habitat that provides foraging opportunities for golden eagles. A GIS-based analysis identified 287,590 acres of potentially suitable golden eagle foraging habitat within 10 miles of the Project site. Within that area, present and future projects, including the DQSP, would impact approximately 39,444 acres (13.7 percent) of this potential foraging habitat. The Proposed Action would contribute 9.8 percent of the total projected cumulative impact.

Following USFWS guidance, the loss of potential golden eagle foraging habitat would be considered significant if losses occurred within 1.0 mile of an active nest. However, no active nests are known within 1.0 mile of the Project and few if any nests are known near other projects considered in the cumulative scenario. Few (if any) impacts are anticipated to golden eagle nesting sites generally because this species tends to regionally nest in remote mountainous areas where no active projects are proposed. Cumulative effects to the golden eagle between the Project and past, present, and foreseeable projects would be less than significant (impact BIO-7).

Western Burrowing Owl, American Badger, and Desert Kit Fox

As characterized by the NECO Plan Amendment to the CDCA Plan (BLM 2002), the Palo Verde watershed provides extensive habitat for western burrowing owl, American badger, and desert kit fox. While each species has its own specific habitat requirements, there is considerable overlap in the types of habitat used by these species. The cumulative analysis of effects to these species focused on potential habitat in the Palo Verde watershed, as mapped in the NECO Plan Amendment to the CDCA Plan. A GIS-based analysis identified approximately 286,084 acres of potential habitat in the Palo Verde watershed. Future projects would impact approximately 27,923 acres (9.8 percent) of potentially suitable habitat within this area that supports the *Larrea tridentata* and *Larrea tridentata-Ambrosia dumosa* alliances and unvegetated desert pavement; with the Proposed Action contributing approximately 13.8 percent of that total cumulative impact (Table 4.4-5).

The cumulative projects implemented in undeveloped areas would presumably result in impacts to burrowing owl, American badger, and desert kit fox similar to the Project. Such effects include the direct loss of suitable habitat, loss of individual animals, or indirect effects from human presence that result in changes to habitat quality during construction, operation and maintenance, and decommissioning. The implementation of measures identified to protect American badger and desert kit fox (WIL-8) and protect burrowing owls and mitigate habitat losses (WIL-9) would reduce Project impacts. With implementation of Project-specific mitigation and protection measures, as well as adherence to BMPs as part of each project in the cumulative scenario, and compliance with state and Federal laws, the cumulative effects to burrowing owls, American badger, and desert kit fox between the Project and past, present, and foreseeable projects would be less than significant (impact BIO-7).

Desert Bighorn Sheep and Burro Deer

As depicted in Figure 3.4-10, the Project is not located with a Desert bighorn sheep WHMA and would not result in the loss of habitat for this species within a WHMA. Within the Palo Verde Valley, the Project occurs in close proximity to a bighorn sheep WHMA located in the Mule Mountains. Should the Mule Mountains become occupied by this species at a future time, the Project may contribute to cumulative actions that would impact potential bighorn sheep movement corridors.

Habitat Connectivity and Wildlife Movement

Fencing that is proposed around the Project, other local solar projects, and I-10 create barriers to wildlife movement that would alter, but not likely impede, the movement of large wildlife species such as Desert bighorn sheep, burro deer, mountain lion, or other highly mobile species. For these wide-ranging species, the cumulative projects are not expected to present a barrier to regional movement, because these animals have the ability to move outside of the fenceline of the projects. In addition, the largest impact to wildlife movement associated with the cumulative projects is expected to be that posed by I-10. The contribution of the Project to the larger cumulative impact posed by the highway is expected to be minimal (impact BIO-4).

It is anticipated that fencing of the cumulative projects would pose an impediment to movement of smaller species, such as the Mojave desert tortoise, near the project sites. However, the Project site does not overlap with any designated Wilderness Areas, ACECs, Desert Tortoise ACECs, or WHMAs. In addition, the DQSP site was included in the BLM's draft Solar PEIS recommendations for the Riverside East Solar Energy Study Areas due to the area's low potential for substantial resource conflicts relative to other considered locations. The DRECP identifies wildlife corridors and linkages for use in evaluating the application of CMAs for the protection of biological resources. Figure D-1 of DRECP identifies a desert linkage network for landscape wildlife linkages, Figure D-2 identifies multi-species linkages and ACEC boundaries within the East Riverside DFA, and Figure D-16 identifies Tortoise Conservation Areas and Linkages. The Project area is not situated within any of these linkages. The Mojave desert tortoise occurs in low population densities in the Palo Verde Valley, with sparse populations noted in the Project area. It is expected that tortoise habitat located within the cumulative analysis area will continue to support tortoise populations and that tortoises will be physically able to circumnavigate the Project and other foreseeable solar development. Tortoises would not be able to directly traverse the solar project sites, but the remaining adjacent open space is of sufficient size that remaining tortoise populations may be sustained and would not be isolated from the regional population. Additionally, habitat on the sites would be reconnected to adjacent lands during Project decommissioning. With substantial habitat connectivity remaining following the cumulative development scenario, the impediment to wildlife movement presents an adverse, though not substantial impact, to the Mojave desert tortoise.

Direct and indirect effects to tortoises would be reduced and mitigated through the application of APM BIO-1 (Environmental Inspection and Compliance Monitoring Program and Plan), BIO-2 (Construction-Related Plans), and BIO-3 (Construction-Related BMPs), and the implementation of Mitigation Measures WIL-1 though WIL-10. The contribution of the Project to cumulative impacts on tortoise movement would not be cumulatively considerable (impact BIO-4).

Local Policies or Ordinances Protecting Wildlife Resources

The Project is not proposed within the boundaries of any adopted habitat conservation plan or natural community conservation plan. The Project site is within the CDCA and is within the planning boundaries of the NECO Plan Amendment to the CDCA Plan. The Project was planned and designed in coordination with BLM with the intent of providing consistency with the NECO Plan and CDCA Plan. The Project would not contribute to a conflict with any local policies or ordinances protecting biological resources (impact BIO-5) or with the provisions of an adopted habitat conservation plan; natural community conservation plan; or other approved local, regional, or state habitat conservation plan (impact BIO-6).

Alternative 2 – Resource Avoidance Alternative

Construction, Operations, and Decommissioning

The overall cumulative impacts associated with implementation of Alternative 2 would be similar in type as described for Alternative 1. However, since Alternative 2 disturbance footprint is relatively smaller in size, the contribution to cumulative impacts would also be commensurately decreased. For the impacts to Mojave desert tortoise, burrowing owl, American badger, and desert kit fox, Alternative 2 would result in a decrease of approximately 980 acres of habitat impacts. This decrease in the scale of the impacts would also represent a similar decrease in the contribution by the Project to cumulative impacts to these species.

The decrease in direct impacts to the Mojave fringe-toed lizard from implementation of Alternative 2 is substantial compared to Alternative 1, since there would be a decrease of approximately 62 acres (or an 80 percent decrease) of occupied Mojave fringe-toed lizard habitat impacted with this alternative. Therefore, the contribution to cumulative impacts would also be decreased. Similarly, the contribution to cumulative impacts on common and other special-status species would also occur with the implementation of Alternative 2.

The APMs and Mitigation Measures outlined for Alternative 1 would also apply to Alternative 2. Implementation of these measures would reduce impacts to sensitive wildlife species and their habitat and provide that impacted habitat is adequately mitigated with equivalent habitat that would be protected off-site.

Alternative 3 – Reduced Project Alternative

Construction, Operations, and Decommissioning

The overall cumulative impacts associated with implementation of Alternative 3 would be similar in type as described for Alternatives 1 and 2. However, since Alternative 3 disturbance footprint is relatively smaller in size, compared to Alternatives 1 and 2, the contribution to cumulative impacts would also be commensurately decreased. For the impacts to Mojave desert tortoise, burrowing owl, American badger, and desert kit fox, Alternative 3 would result in a decrease of approximately 1,700 acres of habitat impacts compared to Alternative 1, and a decrease of approximately 740 acres relative to Alternative 2. The decrease in the scale of the impacts would also represent a similar decrease in the contribution by the Project to cumulative impacts to these species.

The decrease in direct impacts to the Mojave fringe-toed lizard from implementation of Alternative 3 is substantial compared to Alternative 1, since there would be a decrease of approximately 62 acres (or an 80 percent decrease) of occupied Mojave fringe-toed lizard habitat impacted with this alternative. Therefore, the contribution to cumulative impacts would also be decreased. The contribution to cumulative impacts on common and other special-status species would also occur with the implementation of Alternative 3.

The APMs and Mitigation Measures outlined for Alternative 1 would also apply to Alternative 3. Implementation of these measures would reduce impacts to sensitive wildlife species and their habitat and provide that impacted habitat is adequately mitigated with equivalent habitat that would be protected off-site.

Alternative 4 – No Action

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project, and the DQSP would not be implemented. The public lands in the Project area would continue to be managed by BLM in accordance with existing land use designations in the CDCA Plan, which could include a different solar project, or other development. Alternative 4 would not contribute to cumulative impacts to wildlife resources.

4.4.7 Residual Impacts

The Proposed Action and the other two action alternatives would impact Mojave desert tortoise habitat, and possibly to Mojave fringe-toed lizard, burrowing owl, and other nesting birds and desert kit fox, which may occur on site. Relatively lesser impacts to American badger and bat species would be anticipated. As discussed in the sections above, the recommended avoidance and minimization measures as well as compensatory mitigation would effectively offset direct, indirect, and cumulative impacts to wildlife resources and assure compliance with state and Federal laws. It is expected that very limited residual adverse effects would remain after mitigation measures have been applied and that these residual impacts, if any, would not be significant.

4.5 Cultural Resources

4.5.1 Methodology for Analysis

4.5.1.1 Introduction

Evaluation of potential impacts of the Proposed Action and alternatives on cultural resources is based in part on review of legal responsibilities established under NEPA (42 USC §§4321, 4331-4335), the NHPA, and other relevant authorities. To carry out NEPA, the Federal government has a "continuing responsibility…to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may…preserve important historic, cultural, and natural aspects of our national heritage…." (42 USC §4331(b)(4)). NEPA requires the Federal agency to take a "hard look" at the impacts on cultural resources associated with a proposed action and alternatives. The analysis takes into account direct, indirect, and cumulative effects.

For purposes of NEPA, this Draft PA/EIS/EIR includes information gathered as part of the NHPA §106 process about historic properties and the potential effects to such properties from the proposed undertakings, i.e., the BLM's decision whether or not to issue the requested ROW grant or approve a CDCA Plan Amendment. Section 106 of the NHPA requires that the agency take into account the effects of undertakings on historic properties, defined as any district, site, building, structure, or object that is included in or eligible for inclusion in the NRHP; and to afford the ACHP a reasonable opportunity to comment. The steps of the §106 process are: (1) identification of historic properties within the APE for the proposed undertaking; (2) assessment of the proposed undertaking's potential effects on identified properties; and (3) resolution of any adverse effects. Each step requires consultation with the SHPO, interested Native American tribes, local governments, and other identified consulting parties.

Area of Potential Effects

The regulations implementing NHPA §106 define the APE as the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist. The APE is influenced by the scale and nature of the undertaking and may be different for different kinds of effects caused by the undertaking (36 CFR §800.16(d)). In addition, the APE may be buffered for purposes of cultural resources inventory to facilitate the identification of resources that may be located in proximity to the APE and indirectly affected by a proposed project or to allow for redesign of project components to avoid direct effects to cultural resources. The current APE, including the one-mile buffer for indirect APE and an expanded area to incorporate the Mule Tanks Discontiguous Rock Art District, is illustrated on Figure 3.5-1. SHPO concurred with the APE in 2014. The APE for the Project has been defined as:

1. For direct effects, the APE is defined as all areas where physical Project activities would occur, including the full extent of all Project components and alternatives. This consists of the area included within the ROW grant for the solar energy generating plant and associated facilities, roads, and transmission lines.
2. For indirect effects, the APE is defined as a one-mile buffer beyond the ROW grant, to take into consideration resources whose settings could be adversely affected by the

proposed Project development. In addition, for this Project, the indirect APE has been expanded beyond the one-mile buffer, in response to tribal and archaeological concerns, to address indirect impacts to a NRHP-eligible district located in the vicinity of the Project. There are no adverse impacts to NRHP-eligible or listed sites within the indirect APE.

Alternative 2, the Resource Avoidance Alternative, and Alternative 3, the Reduced Project Alternative, present a reduced Project footprint within the APE described above. Some NRHP- and CRHR-eligible sites are still within the direct APE; however, the Project components have been moved in an attempt to avoid the sites. Although both alternatives would reduce the number of sites that would be directly impacted, there would be indirect impacts to these sites, including making them inaccessible for future research, and surrounding them with Project components such as roads, solar panels, fences, and other structures.

4.5.1.2 Cultural Resources Evaluation of Historical Significance and Effects

A key part of any cultural resources analysis under NEPA and NHPA §106 is to determine whether the cultural resources located within the Project APE are historically significant. Subsequent effects assessments are made for those cultural resources that are determined to be historically significant.

Evaluation of Historical Significance

NHPA §106

Effects on historic properties are considered during Federal undertakings chiefly under NHPA §106 through its implementing regulations, 36 CFR Part 800. This includes consideration of effects on properties of traditional religious and cultural significance to Native American tribes. The §106 process requires Federal agencies to consider the effects of their undertakings on any historic district, site, building, structure, or object that is included in or eligible for inclusion in the NRHP and to afford the ACHP a reasonable opportunity to comment on such undertakings, 36 CFR §800.1(a).

The BLM has made NRHP and CRHR determinations of eligibility and findings of effect for all cultural resources, and has requested SHPO concurrence with those determinations and findings.

Indirect APE

Two NRHP and CRHR listed sites are located within the indirect APE. P-33-000504/CA-RIV-504 and P-33-000773/CA-RIV-773 make up the Mule Tank Discontiguous Rock Art District.

Two additional NRHP- and CRHR-eligible sites are located within the indirect APE. These two sites are transmission lines located within the indirect APE along the southeastern boundary of the DQSP. These lines are the Pilot Knob–Blythe 161-kV transmission line (P-33-11110) and the Blythe–Niland 161-kV transmission line (P-33-012532/CA-RIV-7127H). The Pilot Knob–Blythe 161-kV transmission line (P-33-11110) is a 64.4-mile-long line made of H-frame wooden poles built in 1951 that parallels the 2-mile-long boundary of the DQSP. The Blythe–Niland 161-kV transmission line (P-33-012532/CA-RIV-7127H) is a line of similar wooden-pole H-frame construction built in the 1940s and 1950s and located in the same corridor.

Direct APE

Seventeen additional NRHP- and CRHR-eligible sites are located within the APE. These include three sites (CA-RIV-12028, CA-RIV-343, and CA-RIV-772) that are eligible prehistoric trails that lead into the district. Twelve prehistoric sites (thermal and other rock features) and 2 multi-component sites (1 trail with debris scatter, and 1 artifact and debris scatter) have been determined to be as eligible for the NRHP and CRHR.

According to SRI, CA-RIV-1821 may be related to additional sites as well (CA-RIV-24356, CA-RVI-24307, CA-RIV-24283, CA-RIV-24459, CA-RIV-24508, CA-RIV-24451, and CA-RIV-24385) and further mitigation at these sites may be required. The remaining 266 archaeological and historic resources have been determined not eligible for the NRHP or CRHR.

It is anticipated that a NHPA §106 Memorandum of Agreement (MOA) will be developed for this Project for the purpose of resolving adverse effects to nine historic properties. This number may vary depending on which alternative is chosen and the results of the BLM's consultation with Native American tribes. The MOA will be developed by the BLM in consultation with the ACHP, SHPO, the Applicant, Riverside County, interested Native American tribes, and any other consulting parties, as appropriate. The MOA will describe the adverse effects to the nine historic properties, will include measures to resolve the adverse effects, and must be executed prior to the BLM's issuance of the ROD. Specific measures to resolve adverse effects will be developed in a Historic Properties Treatment Plan (HPTP) and included as an attachment to the MOA. Execution of the MOA will conclude the §106 process.

NEPA

NEPA establishes national policy for the protection and enhancement of the environment. Part of the function of the Federal government in protecting the environment is to "preserve important historic, cultural, and natural aspects of our national heritage." Cultural resources need not be determined eligible for the NRHP as stated in the NHPA to receive consideration under NEPA. NEPA is implemented by CEQ, 40 CFR §§1500-1508. NEPA provides for public participation in the consideration of cultural resources issues, among others, during agency decision-making.

Assessing Effects to Historic Properties

BLM is using the definition of adverse effect in the §106 regulations to assess impacts of the proposed or alternative action for those cultural resources that BLM has identified as historic properties eligible for or listed in the NRHP. The §106 regulations describe an adverse effect as an effect "found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the [NRHP] in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association" (36 CFR §800.5(a)(1)). This consideration should apply to all the qualifying characteristics of an historic property. Adverse effects also may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative. Examples of adverse effects include, but are not limited to:

a. Physical destruction, damage, or alteration of all or part of the property;
b. Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the NRHP;

c. Introduction of visual, audible, or atmospheric elements that are out of character with the property or that alter its setting;

d. Neglect of the property, resulting in its deterioration or destruction;

e. Transfer, lease, or sale of the property.

4.5.1.3 CEQA Significance Criteria

Under CEQA, a project is considered to have a significant impact on the environment if it causes a substantial adverse change in the significance of a historical resource. *Substantial adverse change in the significance of a historical resource* means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the resource would be materially impaired or diminished. Furthermore, under CEQA, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. Whenever a historical resource (Public Resources Code [PRC] 21084.1 and state CEQA Guidelines 15064.5(a)) or unique archaeological resource (PRC 21083.2) cannot be avoided by project activities, impacts must be addressed and mitigated if feasible, as outlined in state CEQA Guidelines 15126.4 and 15331.

CEQA criteria indicate that a project could have potentially significant impacts to cultural resources if it would:

CUL-1) Cause a substantial adverse change in the significance of a historical resource as defined in Code of Regulations Section 15064.5.

CUL-2) Cause a substantial adverse change in the significance of an archaeological resource as defined in California Code of Regulations Section 15064.5.

CUL-3) Disturb any human remains, including those interred outside of formal cemeteries.

Under AB 52, CEQA criteria indicate that a project could have potentially significant impacts to Tribal Cultural Resources (TCRs) if it would:

TCR-1) Cause a substantial adverse change in the significance of a Tribal Cultural Resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is: Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1 (k)

TCR-2) Cause a substantial adverse change a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1 for the purpose of this paragraph, the lead agency shall consider the significance to a California Native tribe.

As of July 1, 2015, Assembly Bill 52 (AB 52) established new requirements under CEQA to protect tribal cultural resources. AB 52 requires that CEQA analyses consider tribal cultural values, as well as scientific and archaeological values, when determining impacts and mitigation. AB 52 specifies that it is applicable to projects that have a NOP or a notice of negative declaration filed or mitigated negative declaration on or after July 1, 2015. Because the date of the NOP for the DQSP was March 12, 2015, AB 52 consultation is not applicable to the Project.

4.5.2 Applicant-Proposed Measures

The Applicant has not proposed any APMs related to cultural resources.

4.5.3 Direct and Indirect Impacts

4.5.3.1 Alternative 1: Proposed Action

Construction

Based on the anticipated disturbance below ground and the anticipated above-ground intrusion into the flat landscape, Project activities that have the potential to affect cultural resources include:

1. In areas where cutting and filling is required, this activity would disturb surficial soils.
2. In the solar array fields, foundations for fixed tilt structures would cause ground disturbance down to a maximum depth of 7 feet below grade, and posts for single-axis tracking structures would cause ground disturbance down to a maximum depth of 12 feet below grade. The maximum height of the solar panels would occur under the fixed tilt system, in which the arrays would intrude into the flat landscape to a maximum height of 13 feet above grade.
3. Underground direct current (DC) cables leading to a Power Conversion Station (PCS) would be situated within each array. Trenches excavated for cables would reach a depth of 3 feet.

Ground-disturbing construction activities associated with the Project could directly affect cultural resources by damaging and displacing artifacts. Construction activities could diminish site integrity of historic properties and alter the characteristics that make the properties eligible for the NRHP and/or CRHR. These historic properties, and any additional archaeological sites that are inadvertently discovered during construction, would be located within the full extent of the Project's below-grade impacts (inclusive of foundations and trenches) and above-grade impacts (inclusive of above-ground facilities). In addition, indirect effects to archaeological resources, historic architectural resources, and places of traditional cultural importance could occur. For example, increased site access could result in vandalism or unintentional harm to cultural resources. In addition, flash floods, whose effects would likely be magnified due to soil erosion caused by the proposed Project, could cause disturbance of surface or subsurface cultural resources located on lower gradients than the APE.

As a result of the literature and records searches, archival research, Native American consultation, and field investigations described in Section 3.5, a total of 287 archaeological sites (92 prehistoric, 186 historic-period, 9 multi-component) and 621 isolates (158 prehistoric and 463 historic-period), have been identified within the APE for the Project. Based on Appendix B in the Addendum to the SRI report, two of the sites which make up the Mule Tank Discontiguous Rock Art District are listed on the NRHP. Nineteen additional sites are eligible for the NRHP and CRHR, and may be impacted by the Project through direct or indirect impacts. All of these listed and eligible sites are located on land managed by the BLM. The majority of the eligible sites are near the Colorado River Substation (CRSS). Fifteen of these sites are prehistoric, two are historic transmission lines, and two are multicomponent.

Of the 287 sites and 621 isolates, the proposed construction, operation, maintenance, and decommissioning of the Project would permanently affect 195 archaeological sites and all 621 of the isolates by damaging and displacing artifacts and features. Of these, 9 sites (listed in Table 4.5-1) have been determined eligible for the NRHP or CRHR.

Avoidance of the eligible sites was recommended by SRI. Three of the prehistoric resources include trails that are related to prehistoric trade networks. SRI recommended further investigation of these sites by use of high-resolution aerial photographs and a more detailed field recording using GPS. The remaining archaeological sites were determined to be not eligible.

The Mule Tank Discontiguous Rock Art District, P-33-000504 and P-33-000773, is located outside of the Project area one mile to the southwest. The Project area may fall within the viewshed of the Mule Tank District due to the district's elevation above the Project area. However, the Project will not have an adverse effect to the Mule Tank District.

Table 4.5-1. NRHP and CRHR Eligible Sites Adversely Affected Within the Direct APE

Site Name	Site Type	Eligible under NRHP/CRHR Criteria	Proposed Effects Determinations
P-33-001821/CA-RIV-1821	Prehistoric thermal rock features with associated artifacts	Eligible, Criterion D/4, A/1, and B/2	Adverse Effect
P-33-024283/CA-RIV-11937	Prehistoric thermal rock features with associated artifacts	Eligible, Criterion D/4	Adverse Effect
P-33-024361/CA-RIV-11995	Prehistoric thermal rock features with associated artifacts	Eligible, Criterion D/4	Adverse Effect
P-33-024385/CA-RIV-12019	Prehistoric thermal rock features	Eligible, Criterion D/4	Adverse Effect
P-33-024393/CA-RIV-12027	Prehistoric thermal rock features	Eligible, Criterion D/4	Adverse Effect
P-33-024459/CA-RIV-12091	Prehistoric thermal rock features	Eligible, Criterion D/4	Adverse Effect
P-33-024394/CA-RIV-12028	Prehistoric trail	Eligible, Criterion D/4, A/1, and B/2	Adverse Effect
P-33-024496/CA-RIV-12128	Prehistoric thermal rock features with lithic scatter	Eligible, Criterion D/4	Adverse Effect
P-33-024497/CA-RIV-12129	Prehistoric thermal rock features with associated artifacts	Eligible, Criterion D/4	Adverse Effect

The Project may affect buried archaeological resources. A geoarchaeological study conducted for the Project indicated that the Orita and Rositas soil series within the Project area have a high potential for surface and buried archaeological deposits. These soil types are found in the central and northern portion of the Project. Aco and Carrizo soil series have a moderate potential for shallow subsurface deposits, and a low potential for deep subsurface deposits. The Chuckawalla soil series has a low potential for any subsurface cultural resources. Further exploration, including test units or geoarchaeological trenching, of the sensitive Orita and Rositas soil series will be conducted. Discovery of subsurface cultural resources will be documented in accordance with the monitoring and discovery plan identified in mitigation measure CULTURAL-1.

As discussed in Section 4.17.3.1, fencing of the Project area would eliminate public access to six open routes, including three routes that provide access to the Mule Mountain ACEC. However, as discussed in Section 4.14 and shown in Figure 3.14-3, there are alternative routes to the east of the Project area. With the closure of the three routes that access the Mule Mountains, alternative access to the Mule Mountains would occur by traveling west on 22nd Avenue to Gravel Pit Road, southwest along Gravel Pit Road, and then west on an unpaved extension of 24th Avenue to BLM Routes 660863 and 661093. No additional routes would be developed.

NHPA §106 government-to-government consultation with interested Native American tribes is ongoing. Mitigation Measures CULTURAL-1 and CULTURAL-2 would serve to mitigate adverse effects to historic properties as a result of the Project. Provisions to resolve the adverse effects to historic properties will be described in a MOA and a HPTP prepared in accordance with §106.

Operation and Maintenance

The primary potential for direct impacts to cultural resources during operation and maintenance of the Project is from unanticipated damage of known or post-review discovery of archaeological sites. During operation and maintenance, the Applicant’s worker training program, use of environmental monitoring, and clear demarcation of designated access roads would reduce the risk of unanticipated impacts to cultural resources within the Project APE. Avoidance and protection of resources during the operation and maintenance phase of the Project required by Mitigation Measure CULTURAL-1 would protect cultural resources originally avoided by construction impacts. Because operation and maintenance activities would be limited to the approved construction footprint of the Project, no additional direct or indirect impacts to cultural resources would be expected during operation and maintenance.

NHPA §106 and government-to-government consultation with interested Native American tribes is ongoing.

Decommissioning

The primary potential for direct impacts to cultural resources during the decommissioning phase of the Project is from unanticipated damage of known or post-review discovery of archaeological sites. The Applicant’s worker training program, use of environmental monitoring, and clear demarcation of designated access roads would reduce the risk of unanticipated impacts to cultural resources within the ROW, but outside the smaller construction footprint of the Project site. Avoidance and protection of resources (Mitigation Measure CULTURAL-1) during the decommissioning phase of the Project would protect cultural resources originally avoided by construction impacts. Because decommissioning activities would be limited to the approved construction footprint of the Project, no additional direct impacts to cultural resources would be expected.

Project decommissioning would eliminate or substantially reduce indirect impacts to cultural resources by the removal of modern elements inconsistent with the historic setting of the area.

4.5.3.2 Alternative 2: Resource Avoidance Alternative

Of the 287 sites and 621 isolates, the proposed construction, operation, maintenance, and decommissioning of Alternative 2 would permanently affect 153 archaeological sites and all 621 of the isolates by damaging and displacing artifacts and features. Of these, three sites (listed in Table 4.5-2) have been determined eligible for the NRHP or CRHR, but would be avoided.

Alternative 2 would affect a total of 42 fewer archaeological sites/isolates when compared to the Proposed Action, including 6 fewer NRHP- and CRHR-eligible archaeological resources. Mitigation Measures CULTURAL-1 and CULTURAL-2 would serve to resolve adverse effects to historic properties as a result of Alternative 2.

Table 4.5-2. NRHP and CRHR Eligible Sites Adversely Affected Within the Direct APE, Alternative 2

Site Name	Site Type	Eligible under NRHP/CRHR Criteria	Proposed Effects Determinations
P-33-024361/CA-RIV-11995	Prehistoric thermal rock features with associated artifacts	Eligible, Criterion D/4	No Adverse Effect
P-33-024393/CA-RIV-12027	Prehistoric thermal rock features	Eligible, Criterion D/4	No Adverse Effect
P-33-024497/CA-RIV-12129	Prehistoric thermal rock features with associated artifacts	Eligible, Criterion D/4	No Adverse Effect

Sixteen NRHP- and CRHR-eligible sites are located outside of the Alternative 2 Project area and could be subject to indirect impacts. They may require further treatment as described in Mitigation Measure CULTURAL-2. The Mule Tank Discontiguous Rock Art District, P-33-000504 and P-33-000773, is located outside of the area of Alternative 2 one mile to the southwest. Alternative 2 may fall within the viewshed of the Mule Tank District due to the district's elevation, but will not have an adverse effect to the Mule Tank District.

4.5.3.3 Alternative 3: Reduced Project Alternative

Of the 287 sites and 621 isolates, the proposed construction, operation, maintenance, and decommissioning of Alternative 3 would permanently affect 128 archaeological sites and all 621 of the isolates by damaging and displacing artifacts and features. Of these, two sites (listed in Table 4.5-3) have been determined eligible for the NRHP or CRHR, but would be avoided.

Alternative 3 would affect a total of 67 fewer archaeological sites/isolates when compared to the Proposed Action, including 7 fewer NRHP- and CRHR-eligible archaeological resources. Mitigation Measures CULTURAL-1 and CULTURAL-2 would serve to resolve adverse effects to historic properties as a result of Alternative 3.

Table 4.5-3. NRHP and CRHR Eligible Sites Adversely Affected Within the Direct APE, Alternative 3

Site Name	Site Type	Eligible under NRHP/CRHR Criteria	Proposed Effects Determinations
P-33-024393/CA-RIV-12027	Prehistoric thermal rock features	Eligible, Criterion D/4	No Adverse Effect
P-33-024497/CA-RIV-12129	Prehistoric thermal rock features with associated artifacts	Eligible, Criterion D/4	No Adverse Effect

Seventeen NRHP- and CRHR- eligible sites are located outside of the Alternative 3 Project area and could be subject to indirect impacts. They may require further treatment as described in Mitigation Measure CULTURAL-2. The Mule Tank Discontiguous Rock Art District, P-33-000504 and P-33-000773, is located outside of the area of Alternative 3 one mile to the southwest. Alternative 3 may fall within the viewshed of the Mule Tank District due to the district's elevation, but will not have an adverse effect to the Mule Tank District.

4.5.4 Application of CEQA Significance Thresholds

CUL-1) Would the Project cause a substantial adverse change in the significance of a historical resource as defined in Code of Regulations Section 15064.5?

Under Alternatives 1, 2, or 3, no CRHR-eligible historic resources would be located within the direct APE. Therefore, impacts would be less than significant. Because of the existence of cultural resources in the APE, the potential for inadvertent discovery of historic resources is considerable and a potentially significant impact of the Project. The disturbance could not feasibly be avoided because the likelihood of undiscovered resources exists throughout the Project area; reconfiguring the Project area would not reduce the impact.

Mitigation Measures CULTURAL-1, CULTURAL-2, CULTURAL-6, and CULTURAL-7 would address these potential impacts to historic properties. CULTURAL-1 would require the development of an MOA, to include the County and Native American tribes. The MOA would include measures to avoid, minimize, and mitigate adverse effects to both NRHP and CRHR-eligible historic properties. CULTURAL-2 would require a HPTP for both NRHP- or CRHR-eligible or listed historic properties that cannot be protected from indirect effects by Project redesign. CULTURAL-6 would require that the Applicant make a good faith effort to enter into a contract with and retain monitors designated by Tribal representatives. CULTURAL-7 requires a Cultural Resources Monitoring Report that meets BLM Manual requirements and also complies with the current Riverside County Planning Department's requirements for Phase IV Cultural Resource Monitoring Reports. These measures would reduce the impacts to historical resources (including those eligible for the CRHR), if any are identified, by putting procedures in place for their management and treatment. Important resources that are not now known may be identified through ongoing tribal consultation or during construction. If the loss of these resources cannot be fully mitigated, the impacts would be significant and unmitigable under Alternatives 1, 2, or 3.

CUL-2) Would the Project cause a substantial adverse change in the significance of an archaeological resource as defined in California Code of Regulations Section 15064.5?

Under Alternative 1, nine prehistoric sites eligible for the CRHR fall within the APE and may be directly or indirectly affected by the Project, potentially creating significant impacts. However, significant impacts are not anticipated because no unique archaeological resources have been identified to date.

Within the Alternative 2 footprints for the solar facility site and gen-tie line, 3 prehistoric sites eligible for the CRHR fall within the APE and may be indirectly affected, potentially creating significant impacts. However, significant impacts are not anticipated because direct impacts to these resources would be avoided, and no unique archaeological resources have been identified.

Within the Alternative 3 footprints for the solar facility site and gen-tie line, 2 prehistoric sites eligible for the CRHR fall within the APE and may be indirectly affected, potentially creating significant impacts. However, significant impacts are not anticipated because significant impacts are not anticipated because direct impacts to these resources would be avoided, and no unique archaeological resources have been identified.

The possibility exists that archaeological resources could be unearthed during construction of Alternative 1, Alternative 2, or Alternative 3. The potential for inadvertent discovery of archaeological resources is considerable and a potentially significant impact of Alternative 1, Alternative 2, or Alternative 3. Alternative 1, Alternative 2, or Alternative 3 would incorporate a monitoring program to discover and evaluate previously undiscovered resources found during construction (Mitigation Measure CULTURAL-4), and implementation of Mitigation Measures CULTURAL-1 through 7 would reduce some of these impacts to less than significant levels. However, because the severity of the residual impact would depend on the value of each resource found and the extent of its destruction during construction, the impact may remain significant even with all mitigation implemented. Because Alternative 3 or Alternative 3 would disturb a smaller area that Alternative 1, the potential for significant impacts would be reduced.

Significant direct physical impacts to unique archaeological resources often result in the complete destruction of the resource. Mitigation of some of these impacts involves the collection of information or “data recovery.” This analysis and interpretation of the data collected through archaeology teaches us about the lives of historic people. The knowledge gained about American history enriches the lives of the general public. Therefore, although an important resource is lost forever, some of the information about that resource is retained. While mitigation measures can reduce many individual site impacts to less than significant levels, archaeological excavation and analysis cannot recover all the scientific values of a site. As a result, the impact overall may remain significant under Alternatives 1, 2, or 3.

CUL-3) Would the Project disturb any human remains, including those interred outside of formal cemeteries?

No human remains have been previously recorded or discovered during surveys of the Project site, as such, no impacts to this type of resource are anticipated; the possibility is substantial enough that the impact is considered potentially significant. Should human remains be discovered at any time during implementation of Alternatives 1, 2, or 3, construction in the vicinity would halt and the Coroner would be contacted immediately (Mitigation Measure CULTURAL-3). If the Coroner determines that the remains do not require an assessment of cause of death and are probably Native American, then the NAHC would be contacted to identify the most likely descendants in accordance with CULTURAL-3. Implementation of this measure would reduce impacts to a less than significant level under Alternatives 1, 2, or 3.

TCR-1) Would the Project cause a substantial adverse change in the significance of a Tribal Cultural Resource that is listed or eligible for listing in the California Register of Historical Resources?

In a letter dated November 18, 2016, the Tribal Historic Preservation Office (THPO) of the Twenty-Nine Palms Band of Mission Indians described the Project as being located within the boundary of its Traditional Use Area. As discussed in Table 4.5-1, Alternative 1 would adversely impact nine archaeological sites that are eligible for the NRHP and CRHR. Based on their eligibility for the NRHP and CRHR, these sites would be considered TCRs, and these impacts would be significant. An MOA requiring consultation with the ACHP, SHPO, the Applicant, Riverside County, Native American Tribes, and other identified consulting parties would be implemented under Mitigation Measure CULTURAL-1. Through this consultation, measures to avoid, minimize, or mitigate these adverse effects would be identified and implemented. In addition, Mitigation Measure CULTURAL-6 would require that Tribes be given an opportunity to designate Tribal Observer(s) to monitor the project. Since adverse effects would be avoided, minimized, or mitigated, impacts would be reduced to less than significant.

Table 4.5-2 shows that 3 of those sites would be within the footprint of Alternative 2, and Table 4.5-3 shows that 2 of those sites would be within the footprint of Alternative 3, but that direct impacts to the sites would be avoided under Alternatives 2 and 3.

TCR-2) Would the Project cause a substantial adverse change in a resource identified through consultation with any California Native American tribe that requests consultation and is traditionally and culturally affiliated with the geographic area of a proposed project?

In a letter dated November 18, 2016, the THPO of the Twenty-Nine Palms Band of Mission Indians Tribe requested ongoing consultation associated with the archaeological sites determined to be eligible and possibly eligible for the NRHP and CRHR, as well as a culturally sensitive site crossed by the Project, and a culturally sensitive area in the vicinity of the Project. In a letter dated May 16, 2018, the Tribe described the culturally sensitive site and the culturally sensitive area as TCRs that have a cultural value to the Tribe.

As described for TCR-1, Alternative 1 would adversely impact nine archaeological sites that are eligible for the NRHP and CRHR, and for which the Tribe has requested ongoing consultation. An MOA requiring consultation with the ACHP, SHPO, the Applicant, Riverside County, Native American Tribes, and other identified consulting parties would be implemented under Mitigation Measure CULTURAL-1. Through this consultation, measures to avoid, minimize, or mitigate these adverse effects would be identified and implemented. In addition, Mitigation Measure CULTURAL-6 would require that Tribes be given an opportunity to designate Tribal Observer(s) to monitor the project. Since adverse effects would be avoided, minimized, or mitigated, impacts would be reduced to less than significant. Impacts to these sites would be avoided under Alternatives 2 and 3.

In a letter dated May 16, 2018, the Tribe described the culturally sensitive site and the culturally sensitive area as TCRs that have a cultural value to the Tribe. As discussed in Section 4.5.3.1, the Mule Tank Discontiguous Rock Art District, P-33-000504 and P-33-000773, is located outside of the Project area one mile to the southwest. The Project area may fall within the viewshed of the Mule Tank District due to the district's elevation above the Project area. However, neither Alternatives 1, 2, or 3 would have an adverse effect to the Mule Tank District. There would be no impacts.

4.5.5 Alternative 4: No Action Alternative

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, the BLM would continue to manage the land under its land use jurisdiction consistent with the site's multiple use classification as described in the CDCA Plan, as it was amended by the Western Solar Plan.

If the site remained undeveloped, the existing environmental setting described in Section 3.5 would be maintained. No ground disturbance would occur, and no historic properties would be affected. Therefore Alternative 4 would not result in any impacts associated with cultural resources.

4.5.6 Cumulative Impacts

The regulations implementing §106 of the NHPA contemplate close coordination between the NEPA and NHPA processes (40 CFR §1502.25(a); 36 CFR §800.8(a)) and both require an examination of cumulative impacts. 36 CFR §800.5(a)(1) defines an undertaking's "adverse effect" to include "reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative".

For purposes of this cumulative analysis, impacts on cultural resources could occur at any time throughout the life of the Project. The past, present, and reasonably foreseeable projects considered to be the cumulative scenario for this Project are shown in Tables 4.1-1 and 4.1-2. These are primarily large-scale renewable energy projects that require extensive grading and ground disturbance. The cumulative projects also include several transmission lines and non-renewable energy projects, as well as residential and commercial developments along the I-10 corridor. Ground disturbance and construction associated with these types of projects would be on a smaller scale than the renewable energy projects, given the smaller acreage generally involved with these projects.

The area for analysis of cumulative impacts is often more extensive and far-reaching than just the APE. Impacts to cultural resources can include archaeological sites, traditional use areas, and cultural landscapes located along the I-10. Numerous significant archaeological and historical resources have been previously discovered within the Project's broader geographical area, although many are not thoroughly documented. Therefore, the Project and the alternatives have the potential to inadvertently discover, unearth, expose, disturb, or cause damage archaeological, historic, and Native American resources.

Information has been gathered by previous studies regarding various projects' impacts on previously known or unknown cultural resources within the region. The cumulative impacts of seven past projects (the Blythe Energy II Project, Genesis Solar Energy Project, Desert Sunlight

Solar, Eagle Mountain Pumped Storage Project, MSEP, Quartzsite Solar Energy Project in Arizona, and Desert Harvest Project) are summarized below (summarized from BLM 2014). The Blythe Energy II Project altered ten historic resources (CEC and WAPA 2005). Twelve prehistoric sites and 15 historic archeological sites were identified by Final EIS for the Genesis Solar Energy Project that would be impacted by the project (BLM 2010). The Desert Sunlight Solar Project estimated that 49 historic sites, six prehistoric sites, one multicomponent site, and one site of an unknown date would be damaged, as well as an indirect effect on one built environment resource, two archaeological districts, and one prehistoric site (BLM 2011). One built environment resource and seven historic sites were altered by the Eagle Mountain Pumped Storage Project (SWRCB 2010). The Final EIS for the MSEP listed 101 archaeological sites that would be impacted by the project (BLM 2012b). The Quartzsite Solar Energy Project, located in Arizona, concluded that it would alter three historic sites and one prehistoric site as well. Seven important tribal resources were also identified that the project would both directly and indirectly affect (WAPA 2011). Lastly, the Desert Harvest project stated that one prehistoric site would be impacted, while one historic landscape would have indirect effects from the project (BLM 2012f). The Modified BSPP EIS identified 99 archaeological sites, including 84 which remained unevaluated, and which could be impacted by that project (BLM 2014). It is worth noting that while these projects have all been approved for development, several have not been constructed years after their approval, including the Rice Solar Energy Project and Desert Harvest.

The majority of cultural resources currently identified in the course of past and present projects within the region are archaeological sites, most of which date from the historic period (BLM 2014). Prehistoric sites within the Project area consist of hearth features, trails, campsites, habitation sites, lithic scatters, and ceramic scatters. Historic archaeological sites within the Project vicinity include roads, wells, agricultural fields, refuse scatters, camps, and features associated with mining, transportation, agriculture, and military training. Many of these historic sites are related to the DTC-C/AMA. Answers to regional research questions can be learned from studying these prehistoric and historic sites. Damage to archaeological sites cannot be reversed and information may be lost. Cumulative effects may alter the setting, feeling, and association of archaeological resources within the wider geographic area.

Alternative 1 – Proposed Action

Construction, Operations, and Decommissioning

The proposed construction, operation, maintenance, and decommissioning of the Project would permanently affect 195 archaeological sites and 621 isolates by damaging and displacing artifacts and features. The Project would directly affect 9 archaeological resources that have been determined eligible for the NRHP and CRHR. None of these 9 resources are associated with the DTC-C/AMA, a NRHP-eligible historic district. An MOA would be developed pursuant to §106 of the NHPA for the Project and would include provisions to resolve the adverse effects to these archaeological sites.

Most of the cumulative projects are on BLM or other Federal land and, for this reason, are or would be subject to NEPA and the NHPA, which contain cultural resource protective requirements related to investigations, impact assessment, avoidance, and mitigation. The cumulative projects that would not be located on Federal land would require discretionary state or local agency approvals, and so would be subject to CEQA; therefore, any related impacts on cultural resources would be subject to cultural resource-protective requirements based on state law to avoid or minimize these impacts. Cumulative impacts would vary by alternative only to the degree to which direct and indirect impacts would vary by alternative.

The Project would not cause a substantial adverse change in the significance of a historical or archaeological resource (impact CUL-1 and CUL-2). With implementation of Mitigation Measures CULTURAL-1 through 7, the Project's contribution to impacts would not be cumulatively considerable.

Alternative 2 – Resource Avoidance Alternative

Construction, Operations, and Decommissioning

This alternative would result in a reduction of the number of sites impacted, as well as reduce the acreage and footprint of the overall Project. This will provide for fewer cumulative impacts over time. Alternative 2 would affect a total of 42 fewer archaeological sites/isolates when compared to the Proposed Action (Alternative 1). Due to the smaller Project area and planned avoidance of NRHP- and CRHR-eligible resources, the cumulative impacts for Alternative 2 are also reduced.

Alternative 3 – Reduced Project Alternative

Construction, Operations, and Decommissioning

This alternative would result in further reductions of the number of sites impacted, as well as reduce the acreage and footprint of the overall Project. This will provide for fewer cumulative impacts over time. Alternative 3 would affect a total of 67 fewer archaeological sites/isolates when compared to the Proposed Action (Alternative 1). It would also affect a total of 25 fewer archaeological sites/isolates when compared to Alternative 2. Due to the smaller Project area and planned avoidance of NRHP- and CRHR-eligible resources, the cumulative impacts for Alternative 3 are also reduced.

Alternative 4 – No Action

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project, and the DQSP would not be implemented. The public lands in the Project area would continue to be managed by BLM in accordance with existing land use designations in the CDCA Plan, which could include a different solar project, or other development. There would be no potential to impact cultural resources, and therefore no contribution to cumulative cultural resource impacts.

4.5.7 Residual Impacts

Implementation of Mitigation Measures CULTURAL-1 and CULTURAL-2 would reduce but may not fully avoid Project- related impacts on cultural resources. Cultural resources damaged or destroyed by construction activities, even if subjected to mitigation measures, would be permanently lost from the archaeological record. These cultural resources therefore would be unavailable for future study to address future research needs when more advanced investigative techniques and methods of analysis might be available. Unavoidable adverse effects on cultural resources would result from construction, operation, maintenance, and decommissioning of all of the Project components under Alternative 1. Consultations may raise issues that cannot be resolved through the implementation of mitigation measures. Prescribed treatments may resolve adverse effects under NHPA §106. However, given the scale and potential significance of the resources identified, impacts may remain significant under NEPA despite implementation of the MOA. Because all impacts under CEQA would be less than significant, residual impacts would also be less than significant.

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4.6 Environmental Justice

4.6.1 Methodology for Analysis

To carry out the policy set forth in NEPA, the Federal government has a "… continuing responsibility … to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources to the end that the Nation may … achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities" (42 USC §4331(b)(5)).

This analysis of potential effects of the Proposed Action and alternatives on environmental justice issues reflects this mandate as well as that contained in Executive Order No. 12898, which requires a Proposed Action's impacts on environmental justice to be considered as part of the NEPA process if the Proposed Action would "result in impacts that are appreciably more severe in magnitude or are predominately borne by any segment of the population, for example, household population with low income or a minority population in comparison with a population that is not low income or minority." The Presidential memorandum accompanying the executive order states that "each Federal agency shall analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by NEPA."

To consider environmental justice issues in the context of the Project, this analysis uses a demographic screening evaluation to determine whether a minority and/or low-income population exists within a six mile radius beyond the site boundary, which is considered the furthest extent of potential impacts to human health and safety. Broader social and economic impacts are considered for the populated areas of the City of Blythe, the Colorado River Indian Reservation, and the unincorporated community of Mesa Verde. These areas are included in U.S. Census tracts 459, 461.01, 461.02, 461.03, 462, 469, 9810, Blythe City, Blythe CCD, Chuckwalla CCD, and the Colorado River Indian Reservation. These areas contain many of the communities with the potential to be most affected by socioeconomic impacts.

The demographic screening to determine the presence of minority and low-income populations is based on information contained in two documents: *Environmental Justice: Guidance Under the National Environmental Policy Act* (CEQ 1997) and *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses* (USEPA 1998). The screening process relies on 2009-2013 American Community Survey data to determine the presence of minority and below- poverty-level populations. In addition to the demographic screening analysis, this document follows the steps recommended by the USEPA's guidance documents, which recommend outreach and involvement, and, if warranted, a detailed examination of the distribution of impacts on segments of the population.

The USEPA guidance (USEPA 1998) provides a numerical threshold, 50 percent of the total population, to identify an affected community of minority population for analysis of environmental justice. The guidance also states that the percentage of minority population in the affected area should be "meaningfully greater" than that in the general population to which the affected population is compared.

Although the guidance does not provide a numerical threshold for “meaningfully greater,” for this analysis, the percentage of minority population is considered to be meaningfully greater than that of the general population if the percentage of minority population in the affected area is simply greater than that of the general population, providing for a conservative analysis. For this analysis, because minority populations are nearly all over 50 percent, including for Riverside County, all geographies can be considered areas of environmental justice concern.

The USEPA guidance does not provide a numerical threshold for identifying a low-income population. It recommends use of Census data on poverty income as one indicator and other local data as may be available. This analysis uses the percentage of affected population who either as individuals or as members of families having incomes below the Census-defined poverty threshold.

The percentage is compared to that of the general population, and the affected area is included in the analysis if the percentage of low-income population is meaningfully greater than that of the general population, based on the same thresholds as in the case of a minority population.

In addition, the USEPA guidance states that the analysis of environmental justice should determine if the affected area of minority population and/or low-income population is subject to “disproportionately high and adverse human health or environmental effects” from the Project. The guidance suggests that a comparative analysis be performed on potential Project impacts to the affected population and a reference population to determine the type of high and adverse effects and the extent of disproportionality (USEPA 1998).

The primary affected area was considered to be six miles around the boundary of the Project site and the transmission corridor, including agricultural lands on northwestern Palo Verde Mesa, portions of the City of Blythe and its sphere of influence, Blythe Airport, and unincorporated community of Mesa Verde, located south of Blythe Airport and I-10. In addition, the analysis included a secondary area, which encompassed the populated areas of the City of Blythe and the Colorado River Indian Reservation. These areas are included in U.S. Census tracts 459, 461.01, 461.02, 461.03, 462, 469, 9810, Blythe City, Blythe CCD, Chuckwalla CCD, and the Colorado River Indian Reservation. As discussed in Section 3.6.1.1, the Chuckwalla Valley CCD, in which the Project is located, has a minority population of 76.7 percent of the population. This percentage is higher than Riverside County as a whole (61.7 percent) and the Blythe CCD (68.5 percent), but is similar to the percentage for the City of Blythe (71.9 percent). Only one of the areas, CT470, had a minority population lower than 50 percent of the total population. All of the areas, with the exception of CT470, are therefore of potential concern for environmental justice analysis.

With respect to income, the percentages of household population living with income below the poverty threshold for those areas within a six mile radius of the Project site, and within the secondary areas of La Paz County and Colorado River Indian Reservation, is shown in Table 3.6-1. The percentage of Riverside County population with income below the poverty level is 16.9 percent. Accordingly, the percentage of population below the poverty level in an affected area is considered to be meaningfully greater than the general population if it exceeds 16.9 percent, providing for a conservative analysis. The Chuckwalla Valley CCD, in which the Project is located, has 19.2 percent of the population with income below the poverty level. This percentage is higher than Riverside County as a whole (16.9 percent). All areas included in the analysis had a greater percentage of the population with income below the poverty level than

Riverside County as a whole, and are therefore of potential concern for environmental justice analysis..

The findings and analysis contained in the following sections of this Draft PA/EIS/EIR have been reviewed as part of this analysis of environmental justice issues: 4.2, *Air Resources*; 4.7, *Geology and Soils*; 4.9, *Hazards and Hazardous Materials*; 4.12, *Noise*; 4.14, *Recreation and Public Access*; 4.15, *Social and Economic Effects*; 4.17, *Transportation and Traffic*; 4.19, *Visual Resources*; and 4.20, *Water Resources*. Other sections (such as cultural resources, mineral resources, and lands and realty) were determined to have no potential health, environmental, or social effects on the local populations and, therefore, were not reviewed further for potential environmental justice impacts. In reviewing each of these sections, this environmental justice analysis considers potential impacts and mitigation measures and whether a "disproportionately high and adverse" (CEQ 1997) impact would result for the area within six miles of the proposed Project site, or to the secondary area which includes the Colorado River Indian Reservation.

4.6.1.1 CEQA Significance Criteria

CEQA does not require the analysis of environmental justice impacts and so does not provide specific significance criteria for environmental justice impacts. Consequently, no CEQA significance determinations have been made for the analysis of environment justice impacts below.

4.6.2 Applicant-Proposed Measures

There are no APMs to address potential effects of environmental justice.

4.6.3 Direct and Indirect Impacts

4.6.3.1 Alternative 1: Proposed Action

The closest residents are an apparent occupied mobile home trailer located approximately 3,700 feet north of the northeast corner of the Project boundary, and a residence located approximately 4,800 feet north of the northeast corner of the Project site boundary. The analysis of noise impacts, and impacts associated with geologic hazards and soils, hazards and hazardous materials, and transmission line safety and nuisance, concluded that impacts would be limited to a small area surrounding the Project site, and would not affect the communities of concern. As these impacts cannot affect any population, they are unable to accrue disproportionately to nearby environmental justice populations.

The potential for adverse impacts to human health and the environment through other resource areas to result in disproportionately high and adverse impacts on nearby residents is described below.

Construction, Operation and Maintenance, and Decommissioning

Project construction, operations, and decommissioning may result in potential impacts on the communities of concern for the following issues:

Air Quality

The analysis of air quality impacts in Section 4.2 indicates that, even with APMs and Mitigation Measures AQ-1 and AQ-2, emissions for NO_x, PM_{10}, and $PM_{2.5}$ during Project construction would exceed the MDAQMD daily and annual thresholds. Although there are two receptors located within one mile of the Project boundary, emissions sources would be dispersed throughout the Project area and the access road, and there would be no substantial point source emissions. These impacts are not expected to be disproportionately high and adverse for the community of concern because they would be temporary during construction, and would cease following completion of construction, and are unlikely to affect the closest sensitive receptor, which is located approximately 3,700 feet from the Project area.

Recreation

Six existing roadway routes on the Project site would be closed for the duration of the Project, reducing access for recreational activities. Three of these routes provide access to the private land parcel at the center of the Project area, which will be inaccessible to the public, so are not likely to be used for recreation. Three other routes provide access to the Mule Mountains. However, other nearby routes that provide similar access to these mountains would remain open. With the closure of the three routes that access the Mule Mountains, alternative access to the Mule Mountains would occur by traveling west on 22nd Avenue to Gravel Pit Road, southwest along Gravel Pit Road, and then west on an unpaved extension of 24th Avenue to BLM Routes 660863 and 661093. With access open to the Mule Mountains ACEC, the Project would be unlikely to adversely affect recreation access or reduce recreational opportunities. The area within the solar plant site boundary would be inaccessible for recreational use. However, these impacts would not be disproportionately high and adverse for the community of concern because alternative recreational sites are equally accessible and available to nearby residents.

Social and Economic Issues

Expenditures related to Project construction, operation, and maintenance are expected to result in beneficial economic impacts to the surrounding region. The need for temporary housing for construction workers may increase demand for vacant housing and for transient facilities (hotels, motels, and camping sites). The need for housing for permanent employees who may relocate to the Blythe area would increase the demand for housing to be purchased or rented. Such demand would result in positive impacts to owners of vacant and transient housing, but may result in negative impacts to those seeking to relocate into the surrounding areas by limiting the availability of remaining housing options. This is not considered to be a disproportionately high impact to the community of concern, because substantial temporary and long-term housing exists in the region to accommodate construction and operations personnel, and socioeconomic impacts are not considered to be adverse.

Transportation and Traffic

Construction-related traffic, both from commuting workers and transport of materials, would temporarily increase traffic levels on I-10, Mesa Drive, and the 16th Avenue/Seeley Avenue access road to the Project site. Operation and maintenance would result in a minor increase in traffic; however, no Project-related traffic increases would reduce the level of service (LOS) of I-10 in this area or cause traffic levels that would exceed the capacity of local roadways.

Therefore, these impacts would not be disproportionately high or adverse for nearby environmental justice populations.

Visual Resources

The Project would result in short-term impacts from construction lighting and visible dust plumes, and adverse effects from large-scale visual disturbance in the landscape resulting from construction activities and equipment. During operation and maintenance, the Project would likely be a source of adverse visual impact as a large-scale visual disturbance that would introduce industrial components and facilities to the landscape. Due to the Project site's distance from populated areas and its corresponding overall small part of the visual landscape from these locations, this impact is not considered to accrue disproportionately to nearby environmental justice populations, and is not considered an environmental justice impact.

Water Resources

As discussed in Section 4.20.3.1, groundwater modeling shows that the drawdown impacts from water use are negligible to offsite water wells. Therefore, the Project would not result in groundwater supply impacts from the use of groundwater for Project construction, operations, or decommissioning.

As shown in Figure 3.6-1, the Project is located in an area with minority and low income populations. Water supply for these local residents, the nearest being located approximately 3700 feet north of the proposed solar facility, is most likely from groundwater. Hazardous materials would be used as part of Project construction and operations and could, if released, contaminate groundwater. Mitigation Measure WATER-1 would require that vehicle fueling occur only in a designated area protected by secondary containment, limiting the potential for release of fuels. In addition, Mitigation Measure HAZ-1 requires the Applicant to cap onsite wells, establish baseline groundwater quality, and periodically sample groundwater and the septic system to verify that no releases have occurred. If a release were to occur, its extent would be limited because of the relatively low volumes of hazardous materials and fuels onsite at any time. A release to groundwater would also flow to the east, which is the dominant groundwater flow direction, and not towards the nearest residences to the north. Although releases to groundwater could occur, it is unlikely that these would accrue to any nearby environmental justice population.

4.6.3.2 Alternative 2: Resource Avoidance Alternative

With respect to the resource areas of air quality, recreation, social and economic issues, transportation and traffic, visual resources, and water resources, the analysis in their respective subsections in Chapter 4 concluded that impacts associated with Alternative 2 were similar to, or slightly lower than, the impacts associated with the Proposed Action. Because the Proposed Action was not expected to cause disproportionately high or adverse impacts on minority and/or low-income populations through impacts to these resource areas, there would be no high or adverse impacts on minority and/or low-income populations associated with Alternative 2.

4.6.3.3 Alternative 3: Reduced Project Alternative

With respect to the resource areas of air quality, recreation, social and economic issues, transportation and traffic, visual resources, and water resources, the analysis in their respective subsections in Chapter 4 concluded that impacts associated with Alternative 3 were similar to, or slightly lower than, the impacts associated with both the Proposed Action and Alternative 2. Because the Proposed Action and Alternative 2 were not expected to cause disproportionately high or adverse impacts on minority and/or low-income populations through impacts to these resource areas, there would similarly be no high or adverse impacts on minority and/or low-income populations associated with Alternative 3.

4.6.4 Alternative 4: No Action Alternative

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, the BLM would continue to manage the land under its land use jurisdiction consistent with the site's multiple use classification as described in the CDCA Plan, as it was amended by the Western Solar Plan.

If the site remained undeveloped, the existing environmental setting described in Section 3.6 would be maintained. With respect to the resource areas of air quality, recreation, social and economic issues, transportation and traffic, visual resources, and water resources, there would be no adverse impacts which would cause disproportionately high or adverse impacts on minority and/or low-income populations.

4.6.5 Cumulative Impacts

The Project would have no impact related to environmental justice; therefore, it would not cause or contribute to any cumulative impact in this regard.

4.6.6 Residual Impacts

In Sections 4.6.3.1, 4.6.3.2, and 4.6.3.3, no resource impacts which could potentially result in disproportionately high or adverse impacts on minority and/or low-income populations were identified for any of the action alternatives. Therefore, there would be no residual impacts.

4.7 Geology and Soils

4.7.1 Methodology for Analysis

The analysis of the Proposed Action and alternatives is based on a qualitative assessment of their effects on soil resources, their susceptibility to geologic and seismic hazards, and their potential to cause or exacerbate geologic and seismic hazards. The analysis is based upon existing publications and maps completed by state and Federal agencies, such as the U.S. Geological Survey (USGS), California Geological Survey (CGS), U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), and the California Division of Mines and Geology (CDMG). In addition, the severity and significance of geology and soils impacts are analyzed in the context of existing regulations and policies aimed at abating potential impacts to soil resources and from geologic and seismic hazards.

The information in the existing publications and maps was reviewed and summarized by the Applicant in their Preliminary Geotechnical Investigation Report for the First Solar Development, Inc., Desert Quartzite Solar Project, Riverside County, California, prepared by URS, 2011. That report concluded that a comprehensive design-level geotechnical investigation should be performed prior to construction. In their POD, the Applicant committed to conducting geotechnical field investigations, and incorporating the results into the Project design. The field investigations would include exploratory borings to evaluate subsurface conditions. While the scope, findings, and recommendations of that field investigation are forthcoming, this analysis assumes that the geotechnical report would be consistent with the current state of practice in the field of engineering geology, and would provide the information necessary to design the Project in accordance with the 2007 California Building Code (CBC). In addition, construction would be overseen by a licensed geotechnical engineer, who would observe and test engineered fill, subgrade preparation, foundation-bearing soils, and other geotechnical conditions exposed during construction.

The following issues were considered in the analysis of impacts related to geology and soils for the Proposed Action and each alternative:

1. Accelerated and/or environmentally harmful soil erosion;
2. Damage to Project elements or increased exposure of the public to risks from rupture of a known earthquake fault;
3. Injury, death, or property damage as a result of earthquake induced ground deformations (e.g. lateral spreading, subsidence, liquefaction, or collapse), or otherwise unstable soils; and
4. Injury, death, or property damage as a result of an on-site or off-site landslide.

4.7.1.1 CEQA Significance Criteria

The criteria used to determine the significance of potential geology and soils impacts are based on Appendix G of the state CEQA Guidelines. The Project would result in a significant impact under CEQA related to geology and soils if it would:

GEO-1) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, involving:

a) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault.

b) Strong Seismic ground shaking.

c) Seismic-related ground failure, including liquefaction.

d) Landslides.

GEO-2) Result in substantial soil erosion or the loss of topsoil.

GEO-3) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.

GEO-4) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life and property.

GEO-5) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.

The following additional significance criteria from the County of Riverside CEQA Environmental Assessment Form are used in the analysis. A project could have potentially significant impacts if it would:

GEO-6) Be subject to geologic hazards, such as seiche, mudflow, or volcanic hazard.

GEO-7) Change topography or ground surface relief features.

GEO-8) Create cut or fill slopes greater than 2:1 or higher than 10 feet.

GEO-9) Result in grading that affects or negates subsurface sewage disposal systems.

GEO-10) Change deposition, siltation, or erosion that may modify the channel of a river or stream or the bed of a lake.

GEO-11) Result in any increase in water erosion either on- or off-site.

GEO-12) Be impacted by or result in an increase in wind erosion and blowsand, either on- or off-site.

GEO-13) Be an incompatible land use located adjacent to a state classified or designated area or existing surface mine.

GEO-14) Expose people or property to hazards from proposed, existing or abandoned quarries or mines.

4.7.2 Applicant-Proposed Measures

There are no APMs proposed to address potential adverse impacts due to geologic hazards, or impacts to soil resources.

4.7.3 Direct and Indirect Impacts

4.7.3.1 Alternative 1: Proposed Action

Site conditions related to soil resources and potential geologic hazards are discussed in Section 3.7. Geologic and seismic hazards could affect the Project during construction, operations, and decommissioning phases, during which built structures could be exposed to adverse or unfavorable conditions related to soils and/or geology, or to the effects of a seismic event. Following the decommissioning phase, all Project facilities would be removed, precluding impacts related to geology, soils, and/or seismicity. During the construction and decommissioning phases, soil disturbance would occur that could result in the potential to contribute to erosion impacts.

Construction, Operation and Maintenance, and Decommissioning

Surface Fault Rupture

As discussed in Section 3.7, there are no active or potentially active faults mapped within the Project site (CGS 2010). The closest active faults are more than 58 miles away. Therefore, the potential for surface fault rupture within the Project site is low.

Ground Shaking

As discussed in Section 3.7, the Project site is located over 58 miles from the closest active faults in the region. Relative to the more seismically active areas to the west and northwest, the Project site will experience lower levels of shaking less frequently (CGS 2008). The estimated site intensity is a Modified Mercalli Intensity (MMI) value of V, which corresponds to a moderate shaking severity. Such an earthquake would be strong enough to be felt by nearly everyone, and would likely break windows and overturn unstable objects. There is a 10 percent chance that the Project area could experience a peak ground acceleration (PGA) value of 0.0373g or greater over the next 50 years. A PGA of 0.0373g could result in slight damage to older structures and would not likely result in damage to newer structures built according to current design standards. Relative to many areas in California, the Project site is distant from known, active faults and experiences less frequent and lower levels of shaking.

The highest severity of ground-shaking at the site that can be reasonably anticipated would be moderate, and building and foundation designs would be consistent with the CBC, which requires that engineers design structures to withstand earthquake loads as well as other loads (such as wind). As discussed in Chapter 2, *Proposed Action and Alternatives*, the Applicant's pre-construction geotechnical field investigations would be used to evaluate and, if necessary, modify the proposed Project design for buildings and PV mountings. In order to ensure that this proper geotechnical information is developed, Mitigation Measure GEO-1 would require the Applicant's site-specific geotechnical report to determine the physical and chemical characteristics of the site's soils, ground response to earthquakes, as well as the appropriate seismic design parameters necessary to develop adequate engineering designs and construction plans for the Project. Mitigation Measure GEO-1 would ensure compliance with the 2013 CBC, and would be sufficient to minimize risks associated with ground-shaking.

Based on the site's distance from active faults and the low likelihood of strong seismic ground shaking at the site, in addition to the design and construction standards imposed by the 2013

CBC, the impact of strong seismic ground shaking would be minor and no additional mitigation is required.

Liquefaction

As discussed in Section 3.7, the depth to groundwater of approximately 100 feet suggests that the Project site is unlikely to have saturated soils which could be susceptible to liquefaction.

Settlement

As discussed in Section 3.7, the site is underlain by alluvial fan deposits of relatively unconsolidated, medium-dense materials. These may be unstable to support structures in the vicinity of the operations and maintenance facility and the On-Site Substation, and could be susceptible to settlement. As discussed in Chapter 2, *Proposed Action and Alternatives*, the Applicant's pre-construction geotechnical field investigations would be used to evaluate the potential for settlement and, if necessary, modify the proposed Project design for buildings and PV mountings. In order to ensure that the proper geotechnical information is developed, Mitigation Measure GEO-1 would require the Applicant's site-specific geotechnical report to determine the potential for settlement, as well as the appropriate seismic design parameters necessary to develop adequate engineering designs and construction plans for the Project. Mitigation Measure GEO-1 would ensure compliance with the 2013 CBC, and would be sufficient to minimize risks associated with settlement.

Landslides

As discussed in Section 3.7, the potential for landslides, slope instability, or debris flows at the Project site is insignificant, due to the relatively flat terrain.

Subsidence

As discussed in Section 3.7, no subsidence has been reported in the Project area. There is no petroleum or natural gas withdrawal which could result in subsidence. The EIS prepared for the BSPP concluded that no regional subsidence due to the historic groundwater withdrawal has been reported in the vicinity (BLM 2010). This includes localized or regional subsidence during the 1980's and 1990's, when regional groundwater extraction was at its historic maximum of approximately 48,000 AFY in the general area (BLM 2010). Therefore, no subsidence associated with the groundwater production for the Project is expected.

Because the Project site is associated with alluvial fans, the potential for hydrocompaction of collapsible soils could exist. Hydrocompaction of site soils would not present a life or safety hazard to site workers or the public, but may cause damage to proposed facilities if hydrocompaction-related effects are not anticipated or considered in site preparation and foundation designs for the Project. Soils that experience hydrocompaction are more typically a problem for underground linear infrastructure such as pipelines and cables, or flat, rigid foundations where greater surface areas are in contact with collapsible soils, such as might be the case with building foundations and concrete equipment and tower pads. Steel posts for the solar trackers and gen-tie line monopoles that are directly driven into borings are less likely to be adversely affected by hydrocompaction. The potential adverse effects of hydrocompaction of site soils during the construction and operations phases of the Project would be adequately addressed through the compaction and grading requirements of the 2013 CBC, and by more stringent or specific recommendations provided by the Applicant's Project-specific geotechnical report described in Mitigation Measure GEO-1. Typical building practices might include moisture conditioning of the soil to achieve maximum stability, ensuring deleterious materials are removed from soil prior to being placed or moved on-site, and/or over-excavating existing soils and placing structural foundations on a mat of artificial fill compacted to appropriate design specifications. These types of measures, which are standard in the engineering practice and required through building and construction codes, ensure that small ground movements such as long-term soil consolidation or movements due to subsidence or collapsible soils do not damage or deteriorate building foundations and/or other structural components of the Project.

Expansive Soils

As discussed in Section 3.7, the soils on the Project site are not expected to have expansive characteristics (USDA 1969). The geotechnical study to be completed by the Applicant, as described in Mitigation Measure GEO-1, would include site-specific investigation to verify this conclusion. The study would provide site-specific Project design and construction recommendations, if needed, to address any expansive soils identified during the Applicant's field geotechnical investigations. Expansive soils, if present, would be adequately addressed through standard engineering and construction practices and implementation of geotechnical recommendations, if applicable.

Corrosive Soils

As discussed in Section 3.7, all soil types mapped on the site have a low potential for corrosion of concrete, but may have a high risk for corrosion of uncoated steel (USDA 1969). Long-term corrosion can cause damage to buried structures such as foundations and subgrade utilities, and if left unaddressed, can cause serious impairments to the structure's function and ability to withstand design loads. Adequate site preparation, which includes foundation placement of a mat of engineered fill, is likely to reduce the risk of corrosion for many of the proposed structures. The effects of corrosive soils would be further mitigated, if necessary, by incorporating any corrosion protection recommendations provided in the geotechnical report, as described in Mitigation Measure GEO-1.

Erosion

Figure 3.7-3 showed the distribution of Hydrologic Soil Groups in the Project area, and the acreage of each alternative with respect to Hydrologic Soil Groups is shown in Table 4.7-1. As shown in Figure 3.7-3, most of the Project area is dominated by Hydrologic Soil Group A soils, which have a high infiltration rate and are not expected to be prone to erosion by surface water runoff. There are Group C soils present in the western and northern portions of the site, but these areas mostly lie outside of the footprint of the evaluated alternatives, including Alternative 1. Also, these Group C soils coincide with flat stormwater ponding areas on the site. Although the soils may not facilitate infiltration, the fact that these areas are flat results in a low potential for stormwater erosion.

Table 4.7-1. Comparison of Project Footprint to Hydrologic Soil Groups

Hydrologic Soil Group by Project Component	Impact within Project Area (acres)			
	Alternative 1 Proposed Action	Alternative 2 Resource Avoidance Alternative	Alternative 3 Reduced Project Alternative	Alternative 4 No Action
Solar Plant Site				
Group A – High Infiltration Rate	2,522	2,138	1,567	0
Group B – Moderate Infiltration Rate	665	467	399	0
Group C – Low Infiltration Rate	351	104	123	0
Gen-Tie Line				
Group A – High Infiltration Rate	19	34	34	0
Group B – Moderate Infiltration Rate	0	0	0	0
Group C – Low Infiltration Rate	0	0	0	0

The geotechnical study to be completed by the Applicant, as described in Mitigation Measure GEO-1, would include site-specific investigation to verify this conclusion. Project activities which uncover and expose soils, including vegetation removal, site grading, excavation, and soil stockpiling, would leave loose soil exposed to the erosive forces of rainfall, stormwater run-on, and high winds. Further, the operation of heavy machinery and vehicles over access roads, staging areas, and construction work areas is likely to compact desert soils and decrease their capacity to infiltrate stormwater, resulting in greater levels of surface runoff in response to rainfall than might otherwise occur under natural conditions. The installation of proposed facilities, including roads, fencing, and solar arrays, could result in erosion and soil loss if not properly mitigated.

As discussed in Chapter 2, the Applicant has proposed several construction methods to minimize the potential for erosion during construction. Through Mitigation Measure WATER-1, the Applicant would be required to develop and implement a construction SWPPP, which would describe BMPs to be used for stormwater management and erosion control. The Applicant would use site preparation and stormwater control techniques to protect the facility from potential flood damage, avoid modifying upstream or downstream drainage flow rates, and avoid the potential for stormwater pollution through erosion. These techniques would be designed to encourage sheet flow across the Project site. The preferred method for site preparation would be to compact existing vegetation and disk it into the soil, leaving root systems in place. Cut and fill would be used in limited areas to fill depressions to stop water from pooling, and in limited areas where mounding occurs. Any necessary cut-and-fill site preparation would be timed to minimize the length of time that uncovered ground is left exposed, thereby minimizing wind and water erosion in those areas. In addition to site preparation, the Applicant would use silt fence, fiber rolls, and other erosion control methods at locations which may be subjected to erosion. Heavily used areas, such as the construction entrance, concrete wash-out area, and trackout pad areas would be stabilized with gravel, filter fabric, and straw bales.

As part of the analysis of impacts to soil resources for the BSPP, located north of the Project site, an analysis of soil loss under existing conditions, the construction phase, and the O&M phase of the Project for each of the three soil series mapped on the Project site was conducted (BLM 2010). One of these three soil series was the Rositas-Orita-Carrizo-Aco series, which are the predominant soils present at the DQSP site, and the analysis of the BSPP is relevant in informing the change in erosion rates that may be caused by the Project during both the construction and operation and maintenance phases.

The potential for soil loss by water erosion (sheet and rill erosion) on the BSPP site also estimated using the Universal Soil Loss Equation for pre-development, during construction, and operational conditions (BLM 2010). Modeling shows soil erosion rates on the Rositas-Orita-Carrizo-Aco series type soils would increase during construction, from 0.23 tons/acre/year to 0.51 tons/acre/year, but would be the same as the undisturbed state during operations. Without protective measures, soil disturbance and compaction, which could occur wherever soil moving activities and access roads are proposed, could cause a noticeable and possibly substantial increase in water erosion rates during low frequency, high intensity rainfall events.

The potential adverse effect of water issues is comprehensively addressed in Section 4.20. While the discussion in Section 4.20 is primarily concerned with changes in hydrology and adverse water quality impacts, the potential for surface water runoff to entrain soils and sediment is a primary concern from a water quality perspective. Consequently, the analysis provided in Section 4.20 is equally applicable to the issue of erosion and soil loss, and the mitigation proposed is likewise equally effective at reducing potential impacts. Mitigation Measure WATER-1 would reduce or avoid potential impacts with respect to construction and decommissioning activities, whereas Mitigation Measure WATER-2 would reduce the Project's effect on long-term erosion rates.

Figure 3.7-4 showed the distribution of Wind Erodibility Groups in the Project area, and the acreage of each alternative with respect to the Wind Erodibility Groups is shown in Table 4.7-1. As shown in Figure 3.7-4, the areas of highest potential wind erodibility (160 to 310 tons per acre per year) correspond to the sand dune areas in the northern and western parts of the Project area. The bulk of the Project area is classified as having moderate wind erodibility potential, in the range of 86 to 134 tons per acre per year. Alternative 1 overlies portions of the area with highest wind erosion potential in the southwestern part of the Project area, but mostly avoids the northern area.

Table 4.7-2. Comparison of Project Footprint to Soil Wind Erodibility Groups

Soil Wind Erodibility Group by Project Component	Impact within Project Area (acres)			
	Alternative 1 Proposed Action	Alternative 2 Resource Avoidance Alternative	Alternative 3 Reduced Project Alternative	Alternative 4 No Action
Solar Plant Site				
38 tons per acre per year	0	0	0	0
86 tons per acre per year	1,987	1,595	1,282	0
134tons per acre per year	1,121	958	683	0
160 to 310 tons per acre per year	430	157	123	0
Gen-Tie Line				
38 tons per acre per year	0	0	0	0
86 tons per acre per year	3	14	14	0
134tons per acre per year	5	6	6	0
160 to 310 tons per acre per year	11	14	14	0

The potential for soil loss by wind erosion on the BSPP site was also estimated using the Wind Erosion Prediction System (WEPS) for pre-development (undisturbed), during construction, and operational conditions. The wind erosion values calculated for the site indicate that, during construction, wind erosion of the Rositas-Orita-Carrizo-Aco series type soils would exceed undisturbed conditions, but only by two percent (553 tons/acre/year for exposed soils during construction, versus 539 tons/acre/year in the undisturbed state). During operations, wind erosion rates would be 296 tons/acre/year, substantially lower than undisturbed conditions (BLM 2010). While the above results were specific to the BSPP site, due to similarities in the type of construction activities and the underlying soil type, wind erosion rates within the Project site would likely show similar minor adverse changes.

Wind erosion caused by the Project is an issue addressed in the air quality analysis due to the potential for wind erosion to cause increases in fugitive dust emissions (PM_{10} and $PM_{2.5}$). As described in Section 4.2, potential increases in fugitive dust emissions would be addressed through development and implementation of the Dust Control Plan, as required by Mitigation Measure AQ-1. The Plan would include the use of BLM-approved dust palliatives along unpaved access roads, watering graded areas on the solar plant site and the off-site linear corridors, treatment of soil stockpiles with soil stabilizers or durable protective covers or tarps, vehicle speed limits, and use of windbreaks to minimize wind speeds. The analysis provided in Section 4.2, is equally applicable to the issue of soil loss via wind erosion, and the Dust Control Plan would be equally effective at reducing potential impacts.

4.7.3.2 Alternative 2: Resource Avoidance Alternative

The types of impacts of Alternative 2 on soil resources and geologic hazards would be the same as those identified for Alternative 1. The severity and potential for impacts to Project facilities resulting from adverse soil conditions and seismic-related ground failures would be similar to the Project because the same types of facilities would be built on the same soil types. However, due to the reduced acreage associated with this alternative, the amount of soil disturbance would be reduced, and there would be fewer structures that would be susceptible to geologic hazards. Therefore, the potential for adverse impacts would be reduced.

While Alternative 2 would reduce impacts compared to the Proposed Action, impacts related to adverse soil and seismic conditions could still be considered adverse. Therefore, the same Mitigation Measures would be required as for the Proposed Action.

4.7.3.3 Alternative 3: Reduced Project Alternative

The types of impacts of Alternative 3 on soil resources and geologic hazards would be the same as those identified for Alternatives 1 and 2. The severity and potential for impacts to Project facilities resulting from adverse soil conditions and seismic-related ground failures would be similar to the Project because the same types of facilities would be built on the same soil types. However, because the acreage associated with this alternative would be lower than that of Alternatives 1 and 2, the amount of soil disturbance would be reduced, and there would be fewer structures that would be susceptible to geologic hazards. Therefore, the potential for adverse impacts would be lower than that for Alternatives 1 and 2.

While Alternative 3 would reduce impacts compared to the Proposed Action, impacts related to adverse soil and seismic conditions could still be considered adverse. Therefore, the same Mitigation Measures would be required as for the Proposed Action.

4.7.4 Application of CEQA Significance Thresholds

The DQSP would be in a seismically active region, and people and structures could be exposed to seismic ground shaking. In addition, impacts resulting from secondary seismic effects, including ground-shaking, settlement, and hydrocompaction, may be potentially significant. However, geotechnical design considerations for structures shall be in accordance with applicable requirements of the 2010 CBC, the County of Riverside Municipal Code, and any applicable building and seismic codes in effect at the time the grading plans are approved. Additionally, with implementation of Mitigation Measure GEO-1, impacts would be considered less than significant during construction, operation, maintenance, and decommissioning.

GEO-1) Would the Project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death, involving:

1. **Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault.**
2. **Strong Seismic ground shaking.**
3. **Seismic-related ground failure, including liquefaction.**
4. **Landslides.**

The potential for surface fault rupture, seismic-related ground failure (including liquefaction), and landslides on Alternatives 1, 2, or 3 are very low. However, the Project site is in a seismically active region, and people and structures could be exposed to seismic ground shaking. Implementation of Mitigation Measure GEO-1 requires site-specific geotechnical investigations to determine site specific parameters for foundation design and engineering. With implementation of Mitigation Measure GEO-1, impacts would be reduced to less than significant levels for Alternatives 1, 2, or 3.

GEO-2) Would the Project result in substantial soil erosion or the loss of topsoil?

Implementation of Alternatives 1, 2, or 3 would result in an increase in the potential for wind erosion during construction due to earth-moving and removal of vegetative cover. Wind erosion would be managed through implementation of the Applicant's Dust Control Plan, as required by Mitigation Measure AQ-1. Wind erosion would be substantially reduced during operations of Alternatives 1, 2, or 3 due to soil compaction. Impacts associated with wind erosion would be less than significant for construction, operation, maintenance, and decommissioning.

The potential for water erosion to result in substantial soil erosion or loss of topsoil is discussed in Section 4.20. The potential for water erosion under Alternative 2 or Alternative 3 would be reduced from that of Alternative 1 because of the smaller Project area and avoidance of drainages under the Resource Avoidance Alternative. Implementation of a construction SWPPP (as required by Mitigation Measure WATER-1) and integration of stormwater management controls into the Project design (as required by Mitigation Measure WATER-2) would prevent erosion of onsite soils, as well as prevent the potential for increasing stormwater flow rates which could increase erosion in downstream areas. With these mitigation measures, impacts associated with water erosion would be less than significant for construction, operation, maintenance, and decommissioning of Alternatives 1, 2, or 3.

GEO-3) Would the Project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?

The Project area is flat, so the potential for landslides or lateral spreading under Alternatives 1, 2, or 3 is very low. However, the site is underlain by alluvial fan deposits of relatively unconsolidated, medium-dense materials, and they may be unstable to support structures in the vicinity of the operations and maintenance facility and the On-Site Substation, and could be susceptible to settlement or subsidence. In addition, because the Project site is associated with alluvial fans, the potential for hydrocompaction of collapsible soils could exist.

As discussed in Chapter 2, *Proposed Action and Alternatives*, the Applicant's pre-construction geotechnical field investigations would be used to evaluate the potential for settlement and hydrocompaction and would, if necessary, be used to modify the design for buildings and PV mountings. In order to ensure that this proper geotechnical information is developed, Mitigation Measure GEO-1 would require the Applicant's site-specific geotechnical report to determine the potential for settlement and hydrocompaction, as well as the appropriate seismic design parameters necessary to develop adequate engineering designs and construction plans for Alternatives 1, 2, or 3. Mitigation Measure GEO-1 would ensure compliance with the 2013 CBC, and would be sufficient to minimize risks associated with settlement. This potentially significant impact would be reduced to a level considered less than significant with implementation of Mitigation Measure GEO-1 under Alternatives 1, 2, or 3.

GEO-4) Would the Project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life and property?

The soils on the Alternatives 1, 2, or 3 site are not expected to have expansive characteristics (USDA 1969). The additional geotechnical investigation required in Mitigation Measure GEO-1 would provide site-specific Project design and construction recommendations if needed to address any expansive soils. Expansive soils, if present, would be adequately addressed through standard engineering and construction practices and implementation of geotechnical recommendations, if applicable. Mitigation Measure GEO-1 would reduce any significant impacts to a level considered less than significant under Alternatives 1, 2, or 3.

GEO-5) Would the Project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

During operations of Alternatives 1, 2, or 3, sanitary needs would be supplied by a septic system and leach field located near the O&M Building. The onsite sanitary system would require construction and annual operating Onsite Wastewater Treatment System (OWTS) permits from the County. As part of the geotechnical investigations required in Mitigation Measure GEO-1, soil percolation tests would be performed in order to demonstrate that an on-site septic system and leach field is feasible at the planned location, and additional testing may be performed in accordance with Riverside County test procedures prior to final leach field design. The specific location of the leach field and septic system may be adjusted based on the results of preliminary percolation tests. Mitigation Measure GEO-1 would reduce any significant impacts to a level considered less than significant under Alternatives 1, 2, or 3.

GEO-6) Would the Project be subject to geologic hazards, such as seiche, mudflow, or volcanic hazard?

There are no bodies of water in proximity to the Alternatives 1, 2, or 3 site, and the site is not near the shoreline or within 50 feet of sea level; therefore, hazards from a seiche or tsunami are considered to be negligible. There are no hillside areas within the Alternative 1, 2, or 3 vicinity that would generate mudflow. In addition, no known active volcanic features occur in the Alternative 1, 2, or 3 vicinity. No impacts would occur.

GEO-7) Would the Project change topography or ground surface relief features?

The topography of the Alternative 1, 2, and 3 areas is very flat, which is also the desirable topography for the solar facility. Construction would not substantially grade, excavate, or require modifying any existing topography. Therefore, implementation of Alternatives 1, 2, or 3 would not significantly change site topography or ground surface relief features.

GEO-8) Would the Project create cut or fill slopes greater than 2:1 or higher than 10 feet?

Construction of Alternatives 1, 2, or 3 would not substantially grade, excavate, or create cut and fill slopes greater than 2:1 or higher than 10 feet, or require modifying any existing topography. Therefore, no impacts would occur, and no mitigation is needed under Alternatives 1, 2, or 3.

GEO-9) Would the Project result in grading that affects or negates subsurface sewage disposal systems?

There are no known existing subsurface sewage disposal systems. Therefore, no impacts would occur, and no mitigation is needed under Alternatives 1, 2, or 3.

GEO-10) Would the Project change deposition, siltation, or erosion that may modify the channel of a river or stream or the bed of a lake?

Site preparation for the proposed solar arrays under Alternatives 1, 2, or 3 could result in modification of current site drainage and erosional processes, and these could result in modifying erosion and sedimentation characteristics downstream of the Project area. Mitigation Measure WATER-2 would require that the Applicant develop and implement a Comprehensive Drainage, Stormwater, and Sedimentation Control Plan prior to construction. The Applicant has modeled stormwater runoff, and concluded that development of the entire study area would cause minor impacts to the existing drainage shed area. The Project site is relatively flat, and has large natural depressions which store stormwater flow and attenuate outflow from the site. Effects of Alternative 1 on stormwater flow during a 100-year storm event would include an increase in flow velocity of 0.04 feet per second, and an increase in outflow off of the Project site of about 2.6 percent (TLA Engineering and Planning 2011). These flows would be mitigated through onsite drainage basins designed to accommodate the increased volume of flow. With implementation of Mitigation Measure WATER-1 and WATER-2 in Section 4.20, impacts would be reduced to less than significant levels.

The impacts of Alternatives 2 and 3 would be reduced even further, as these alternatives would occupy only a portion of the entire study area, and would avoid major active drainages. With implementation of Mitigation Measure WATER-1 and WATER-2 in Section 4.20, impacts would be reduced to less than significant levels.

GEO-11) Would the Project result in any increase in water erosion either on- or off-site?

See GEO-2 and GEO-10 above. The soils under Alternatives 1, 2, or 3 would be subject to wind and water erosion during construction activities. Mitigation Measure WATER-2 would require that the Applicant develop and implement a Comprehensive Drainage, Stormwater, and Sedimentation Control Plan prior to construction. The Plan would identify site surface water runoff patterns and develop mitigation measures that prevent excessive and unnatural soil deposition and erosion throughout and downslope of the Project area and Project-related construction areas. The Applicant has modeled stormwater runoff, and concluded that development of the Project site would cause minor impacts to the existing drainage shed area. The Project site is relatively flat, and has large natural depressions which store stormwater flow and attenuate outflow from the site. Effects of Alternative 1 on stormwater flow during a 100-year storm event would include an increase in flow velocity of 0.04 feet per second, and an increase in outflow off of the Project site of about 2.6 percent (TLA Engineering and Planning 2011). These flows would be mitigated through onsite drainage basins designed to accommodate the increased volume of flow. Mitigation Measure WATER-1 would require development and implementation of a SWPPP, which would prevent excessive and unnatural soil deposition and erosion throughout and downslope of the Project area and Project-related construction areas, and would also include measures for non-stormwater discharge and waste management. The SWPPP would also prevent offsite migration of contaminated stormwater, changes in pre-Project storm hydrographs, or increased soil erosion. Impacts would be less than significant; no additional mitigation is recommended for Alternative 1.

The impacts of Alternatives 2 and 3 would be reduced even further, as these alternatives would occupy only a portion of the entire study area, and would avoid major active drainages. Mitigation Measure WATER-1 would require development and implementation of a SWPPP, which would prevent excessive and unnatural soil deposition and erosion throughout and downslope of site under Alternatives 2 and 3. The SWPPP would also prevent offsite migration of contaminated stormwater, changes in pre-Project storm hydrographs, or increased soil erosion. Impacts would be less than significant; no additional mitigation is recommended for Alternatives 2 or 3.

GEO-12) Would the Project be impacted by or result in an increase in wind erosion and blowsand, either on- or off-site?

See analysis for GEO-2 above. With implementation of the Applicant's Dust Control Plan, as required by Mitigation Measure AQ-1, impacts would be less than significant for Alternatives 1, 2, or 3.

GEO-13) Be an incompatible land use located adjacent to a state classified or designated area or existing surface mine.

The Alternative 1, 2, and 3 sites are not located adjacent to a state classified or designated area or existing surface mine.

GEO-14) Expose people or property to hazards from proposed, existing or abandoned quarries or mines.

Alternatives 1, 2, or 3 would not expose people or property to hazards from proposed, existing, or abandoned quarries or mines.

4.7.5 Alternative 4: No Action Alternative

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, the BLM would continue to manage the land under its land use jurisdiction consistent with the site's multiple use classification as described in the CDCA Plan, as it was amended by the Western Solar Plan.

If the site remained undeveloped, the existing environmental setting described in Section 3.7 would be maintained. The potential for relatively large earthquakes to occur is regional, and is not related specifically to the DQSP. In the absence of the Project, the potential for seismic activity would be no different than with the Project. Soils underlying the site may still be subject to hydrocompaction and may contain corrosive properties. If no further Projects are developed on the Project site, no structures would be built that would be exposed to these hazards. Because there would no development of the site, there would be no impacts related to erosion and/or land subsidence.

4.7.6 Cumulative Impacts

The geographic scope for the analysis of cumulative impacts associated with geologic hazards would be limited to the DQSP Project area. The presence of other projects in the cumulative scenario would have no effect on either the severity or the probability of geological hazards or geotechnical challenges associated with seismicity and/or the character of underlying soils. Such issues are site-specific, and are unaffected by the presence of other projects in the cumulative scenario. Therefore, there are no cumulative impacts associated with geologic hazards (impacts GEO-1, GEO-3 through GEO-6, GEO-8, and GEO-9), or with modification of topography (impact GEO-7).

For impacts to soil resources, including soil erosion, the geographic scope of impacts would include the watershed in which the Project is located. The applicable projects listed in Tables 4.1-1 and 4.1-2 which are in the watershed include Interstate 10, DPV1, West-wide Section 368 Energy Corridor, Blythe PV Project, DPV2, CRSS, RE Crimson Solar Project, Desert Southwest Transmission Line, and BMSP. The temporal scope of the Project's contribution to cumulative impacts would include the entire period from Project construction through Project decommissioning.

Alternative 1 – Proposed Action

Construction, Operations, and Decommissioning

The greatest potential for cumulative impacts with respect to soil erosion would be during the construction or decommissioning phases of any of the reasonably foreseeable future projects. Concurrent construction and decommissioning of the reasonably foreseeable future projects with the Proposed Action could potentially result in higher levels of impacts. The O&M phase of projects is also included in the temporal scope of cumulative impacts because minor alterations in topography and the addition of impervious surfaces could combine to produce cumulative impacts. However, impacts during the operational phase of the projects are expected to be minimal.

Project construction, O&M, and decommissioning of the Project could contribute to cumulative soil erosion impacts. However, SWPPPs (such as the one required in Mitigation Measure WATER-1), and Comprehensive Drainage, Stormwater, and Sedimentation Control Plans (such as the one required in Mitigation Measure WATER-2) are standard construction industry practice, as well as legal requirements for projects over specified thresholds. The DQSP would be required to operate under these requirements, as would the other projects in the watershed. Because soil erosion would be controlled on each individual project, the potential for cumulative soil erosion impacts would be low, and the Project would not contribute to cumulative impacts associated with soil erosion (impacts GEO-2, and GEO-10 through GEO-12).

Alternative 2 – Resource Avoidance Alternative

Construction, Operations, and Decommissioning

The contribution of Alternative 2 to cumulative soil erosion impacts would be lower from those associated with the Proposed Action, because Alternative 2 would occupy only a portion of the entire study area, and would avoid major active drainages. As with the Proposed Action, Alternative 2 would require implementation of a SWPPP under Mitigation Measure WATER-1), and a Comprehensive Drainage, Stormwater, and Sedimentation Control Plan under Mitigation Measure WATER-2. Other projects in the watershed would also be required to comply with similar regulatory requirements.

Alternative 3 – Reduced Project Alternative

Construction, Operations, and Decommissioning

The contribution of Alternative 3 to cumulative soil erosion impacts would be lower from those associated with the Proposed Action and Alternative 2, because Alternative 3 would a smaller portion of the Project area, and would avoid major active drainages. As with the Proposed Action, Alternative 3 would require implementation of a SWPPP under Mitigation Measure WATER-1, and a Comprehensive Drainage, Stormwater, and Sedimentation Control Plan under Mitigation Measure WATER-2. Other projects in the watershed would also be required to comply with similar regulatory requirements.

Alternative 4 – No Action

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project, and the DQSP would not be implemented. The public lands in the Project area would continue to be managed by BLM in accordance with existing land use designations in the CDCA Plan, which could include a different solar project, or other development. There would be no change to the existing stormwater drainage on the Project site, and therefore no contribution to cumulative soil erosion impacts.

4.7.7 Residual Impacts

Following implementation of the BMPs described in WATER-1 and WATER-2, all adverse impacts on geology and soil resources resulting from construction, operations, and decommissioning of the Project and alternatives would be avoided or substantially reduced.

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4.8 Global Climate Change

4.8.1 Methodology for Analysis

This section evaluates the effects of greenhouse gas (GHG) emissions that would be generated from the Project, as well as the consistency of the Project with the applicable plans and programs that have been implemented by various Federal, state, and local agencies with jurisdiction over the Project area. The section quantifies the potential GHG emissions from construction and operation, as well as reduction of GHG emissions due to fossil-fuel based electricity displacement.

4.8.1.1 CEQA Significance Criteria

The effects of Project-specific GHG emissions are cumulative, and therefore global climate change impacts are addressed as a cumulative, rather than a direct, impact. The guidance for determining significance of impacts has been developed from the requirements of AB 32. The guideline addresses the potential cumulative impacts that a project's GHG emissions could have on global climate change. Based on Appendix G of the state CEQA Guidelines and the County of Riverside CEQA Environmental Assessment Form, the following criteria indicate that a project could have potentially significant impacts to global climate change if it would:

GHG-1) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

GHG-2) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

As discussed in Section 15064.4 of the CEQA Regulations, the determination of the significance of GHG emissions requires a good-faith effort to assess the significance of impacts from GHG emissions, considering:

1. The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting.
2. Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
3. The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

The MDAQMD CEQA and Federal Conformity Guidelines (August 2011) specifies 100,000 tons per year (tpy) CO_2e and 548,000 pounds per day (lbs/day) CO_2e as thresholds for significance. Riverside County uses a significance threshold of 3,000 MT CO_2e per year. For projects that exceed this threshold, project-specific mitigation is required, and should demonstrate a 25 percent reduction from the business as usual scenario. These significance criteria are used to provide a context for the magnitude of Project emissions in relation to its contribution to the cumulative impact of global climate change.

4.8.1.2 Methodology for Estimating GHG Emissions

Project GHG emissions estimates were developed by the Applicant, and reported in their Air Quality and Greenhouse Gas Technical Study (URS 2015). This study was peer reviewed by BLM staff and consultants. In addition, to supplement the technical GHG emissions information prepared by URS, BLM conducted additional calculations of estimated carbon sequestration and fossil fuel displacement. The methods used to estimate Project construction, operation, and decommissioning emissions are described in Section 4.8.3 below.

4.8.1.3 GHG Emissions Impact Analysis

Independent of NEPA, but pursuant to 40 CFR Part 98, *Mandatory Reporting of Greenhouse Gases Rule,* the US Environmental Protection Agency (USEPA) requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 metric tons of CO_2e emissions per year (USEPA 2013).

For the purposes of this analysis, the annualized GHG emissions for the Project and alternatives are compared to the Federal GHG mandatory emissions reporting threshold of 25,000 MT per year to determine whether the GHG emissions would contribute substantially to global climate change. Annualized emissions are calculated by adding the total emissions associated with construction, operations, and decommissioning, and then dividing them by the total lifespan of the Project, which is 30 years. For purposes of CEQA analysis, annualized GHG emissions for the Project and alternatives are compared to the MDAQMD threshold of 100,000 tons per year, and the Riverside County threshold of 3,000 MT per year, to determine whether the GHG emissions are significant under CEQA. Comparison of Project emissions to these thresholds is presented in Table 4.8-2.

4.8.1.4 Climate Change

Climate change is expected to result in a suite of additional potential changes that could affect the natural environment, in a manner that is relevant to the Project. The potential for climate change to affect the Project is discussed qualitatively.

4.8.2 Applicant-Proposed Measures

There are no APMs proposed to address potential effects from GHGs and global climate change.

4.8.3 Direct and Indirect Impacts

4.8.3.1 Alternative 1: Proposed Action

Construction

Direct GHG emissions associated with construction are associated with vehicles, equipment, and generators. These emissions were estimated using equipment lists and construction scheduling information from the Applicant. Mass emissions of all criteria pollutants and GHGs from onsite diesel-fueled construction equipment were estimated using equipment-specific OFFROAD2011/2007 software published by the CARB. ARB's EMFAC2014 model was used to generate vehicle class specific emission factors for GHGs for diesel and gasoline fueled on-road vehicles. The analysis used an assumption of a 25-month construction period with 5 construction days per week (21 work-days per month). The weight and speed for equipment and vehicles were assumed from EMFAC/OFFROAD guidance, EPA AP-42, and experience from other similar solar and construction projects.

The analysis included emissions from vehicles and equipment used both onsite and offsite during construction. Onsite equipment and vehicles included earth moving equipment for site preparation, delivery vehicles, worker vehicles, water trucks, and fuel trucks. The analysis assumed that electricity to support Project construction would be supplied by four onsite generators. Offsite equipment and vehicles included worker vehicles, as well as delivery trucks for Project components, fuel, concrete, aggregate, and water.

The emissions were calculated for each month during the construction period. To allow comparison of the emissions to the regulatory standards based on annualized emissions, the 12 months which represented the highest emissions, months 10 through 21, were used.

The analysis assumed a maximum of 810 vehicle trips per day during peak construction. Workers were assumed to commute an average of 35 miles. A total of 14,400 truck deliveries of equipment, materials, and fuel were estimated throughout the construction period. Distances assumed for deliveries were 10 miles for fuel, 13 miles for aggregate and concrete, and 30.5 miles for equipment and materials. In addition, the analysis assumed that water to be used for construction would be trucked from offsite, resulting in an additional 57,000 truck deliveries during the construction period. All emissions were assumed to occur within the MDAB.

The analysis assumed there would be no indirect emissions associated with Project construction. The power supply for construction was assumed to be onsite generators, so there would be no offsite emissions associated with offsite power supply sources.

Table 4.8-1 shows the total GHG emissions for each month of Project construction. Construction would generate a total of 20,084 MT CO_2e over a period of 25 months. This results in annualized construction emissions of 669 MT per year over the 30 year direction of the Project.

Table 4.8-1. Monthly GHG Emissions Associated with Project Construction

Month	CO_2 (MT)	CH_4 (MT)	N_2O (MT)	Total CO_2e (MT)
1	219.14	0.01	0.01	221.15
2	422.69	0.03	0.01	426.75
3	203.56	0.01	0.01	205.60
4	426.72	0.03	0.01	431.04
5	581.18	0.04	0.02	587.30
6	957.47	0.06	0.03	966.94
7	957.47	0.06	0.03	966.94
8	957.47	0.06	0.03	966.94
9	957.47	0.06	0.03	966.94
10	957.47	0.06	0.03	966.94
11	957.47	0.06	0.03	966.94
12	957.47	0.06	0.03	966.94
13	957.47	0.06	0.03	966.94

Table 4.8-1. Monthly GHG Emissions Associated with Project Construction

Month	CO_2 (MT)	CH_4 (MT)	N_2O (MT)	Total CO_2e (MT)
14	957.47	0.06	0.03	966.94
15	957.47	0.06	0.03	966.94
16	957.47	0.06	0.03	966.94
17	1,232.42	0.07	0.03	1,244.18
18	1,232.42	0.07	0.03	1,244.18
19	1,232.47	0.07	0.03	1,244.23
20	1,123.36	0.07	0.03	1,134.17
21	1,123.36	0.07	0.03	1,134.17
22	900.16	0.05	0.02	908.69
23	470.74	0.03	0.01	475.18
24	94.48	0.01	0.00	95.57
25	94.48	0.01	0.00	95.57
Total for Construction				**20,084**

Operation and Maintenance

Vehicle Exhaust

The GHG emissions from vehicles and equipment used during operation were estimated using the same methodology described above for construction. The analysis assumed five full-time workers, and water trucks to transport up to 38 AF of water per year. A total of 25 trips per day were assumed for worker commuting and deliveries of materials. As shown in Table 4.8-2, onsite emissions are estimated to be 1.3 tons per year of CO_2e, and offsite emissions are estimated to be 306 tons per year of CO_2e.

Circuit Breaker Fugitive Sulfur Hexafluoride (SF_6)

Emissions of sulfur hexafluoride (SF_6) could be released into the atmosphere due to equipment failure or leakage from electrical equipment such as circuit breakers and transformers that contain SF_6. Although the Applicant has not provided detailed descriptions of the type of electrical equipment or estimates of volumes of SF_6 that would be present onsite, it is likely that Project electrical components would include this material. Project components are commercially available that are hermetically sealed to prevent the escape of SF_6 into the atmosphere. Emissions of SF_6 from a hermetically sealed circuit breaker can only occur due to equipment failure as there is no ability for the user to refill or extract SF_6 due to the factory seal. The California Air Resources Board (CARB) defines hermetically sealed circuit breakers as being designed to be gas-tight and sealed for life (CARB 2014). Project analyses for other power plant projects typically include an assumption that there could be a small leak rate even for hermetically sealed equipment, and generally conclude that the contribution of SF_6 to the overall estimates of Project GHG emissions are not significant. However, to ensure that actual Project operations are consistent with this analysis, a Mitigation Measure, GHG-1, is required to ensure that any electrical equipment that contains SF_6 be hermetically-sealed.

Carbon Sequestration

Occupation of the Project site by solar arrays would eliminate carbon sequestration that currently occurs by vegetation. The rate of existing carbon uptake by desert vegetation is estimated to be equivalent to 1.48 MT of CO_2 per acre per year, based on a study of Mojave Desert vegetation (Wohlfahrt et al. 2008). Based on the proposed Project acreage of 3,831 acres, the equivalent loss in carbon uptake would be 5,670 MT of CO_2e per year.

Emissions from Equivalent Fossil Fuel-Based Energy

The Project is proposed to produce approximately 450 MW of electrical energy, which would be more than 2.25 billion kilowatt hours (kWh) of electrical energy per year. The Project is not directly resulting in the closure, or preventing the construction of, a fossil fuel facility, so is not being directly credited with GHG reductions. However, for comparison, GHG emissions for a conventional fossil-fuel combustion power plant producing the same electrical energy (kWh) per year as the Project facility are 0.35 and 1.0 MT CO_2e per MWh of electricity produced by gas turbine and coal-fired plants, respectively. Gas turbine and coal-fired plants are estimated to produce approximately 787,500 and 2,250,000 MT CO_2e, respectively, as compared to 1,280 MT CO_2e per year from the Project.

Decommissioning

Decommissioning of the Project would involve removal of the solar equipment and facilities, and transporting all components offsite. Equipment used for decommissioning would generally be similar to that used for construction. However, decommissioning is expected to occur over a shorter duration of approximately one year. Conservatively, the annual GHG emissions for decommissioning are estimated to be one-half that of construction.

Comparison to Thresholds

The combined, annualized emissions of Project construction, operations, and decommissioning are presented in Table 4.8-2. Comparison of those annualized emissions to the MDAQMD and Riverside County thresholds shows that the Project would not exceed any of the thresholds, and therefore is not expected to contribute significantly to climate change through the emission of GHGs.

Table 4.8-2. Annualized GHG Emissions Associated with Proposed Action Construction,

Annual Emissions	CO_2 (tons)	CH_4 (tons)	N_2O (tons)	Total GHG – CO_2e (tons)	Total GHG – CO_2e (MT)
Total construction emissions (amortized over 30 years)[2]	729	0.05	0.02	736	669
Onsite emissions in operation[3]	1.31	0.00	0.00	1.3	1.2
Offsite emissions in operation[3]	304	0.01	0.00	306	278
Estimated decommissioning emisssions[4]	365	0.02	0.01	368	334
Total Project (tons/year)	1,399	0.08	0.03	1,411	1,282

Table 4.8-2. Annualized GHG Emissions Associated with Proposed Action Construction,

Annual Emissions	CO_2 (tons)	CH_4 (tons)	N_2O (tons)	Total GHG – CO_2e (tons)	Total GHG – CO_2e (MT)
MDAQMD CEQA annual threshold (tons/year)	NA	NA	NA	100,000	NA
Riverside County CEQA threshold (MT/year)	NA	NA	NA	NA	3,000
Exceed the thresholds (yes/no)	NA	NA	NA	No	No

Notes:
1 – Note that values in Table 4.8-1 are in MT, while Table 4.8-2 presents emissions in both tons and MT. Comparison of values among tables is not exact due to rounding.
2 – Summed from 25 monthly emissions estimates in URS (2015), then divided by 30 year period.
3 – From Table 4-4 in URS (2015)
4 – Estimated to be assumed to be one-half of construction, amortized over a 30-year period, tons/year.

4.8.3.2 Alternative 2: Resource Avoidance Alternative

The GHG emissions associated with Alternative 2 are expected to be the same as those associated with the Proposed Action. The analysis of Alternative 2 assumed that construction would involve the same number of construction workers and duration of construction, the same number of onsite construction vehicles and equipment, and the same number of truck deliveries of project components and equipment. Alternative 2 would involve ground disturbance of a smaller area than the Proposed Action, but the reduction in GHG emissions associated with grading of a smaller area would not be substantial, and overall GHG emissions would be affected only slightly by this difference in the alternatives.

Because the output of Alternative 2 would be the same as Alternative 1, the amount of fossil fuel-based GHG emissions that would be avoided would be the same as Alternative 1. Gas turbine and coal-fired plants are estimated to produce approximately 787,500 and 2,250,000 MT CO_2e, respectively, as compared to 1,280 MT CO_2e per year from Alternative 2.

Based on the rate of existing carbon uptake by desert vegetation and the Alternative 2 size of 2,845 acres, the equivalent loss in carbon uptake would be 4,211 MT CO_2e per year.

Because the GHG emissions of Alternative 2 would be the same as the Proposed Action, GHG emissions associated with Alternative 2 would not exceed any of the thresholds, and therefore are not expected to contribute significantly to climate change through the emission of GHGs.

4.8.3.3 Alternative 3: Reduced Project Alternative

The GHG emissions associated with Alternative 3 would be slightly lower than those associated with the Proposed Action. The analysis of Alternative 3 assumed that construction would involve the same number of construction workers and duration of construction, and the same number of onsite construction vehicles and equipment. Alternative 3 would involve ground disturbance of a smaller area than the Proposed Action, but the reduction in GHG emissions associated with grading of a smaller area would not be substantial. The primary difference in GHG emissions would be emissions associated with truck deliveries of Project components and equipment. Under Alternative 3, truck deliveries would be reduced by about 25 percent, as compared to the Proposed Action and Alternative 2.

The output of Alternative 3 would be 285 MW, or approximately 63 percent that of the Project. The equivalent amount of fossil fuel-based GHG emissions that would be avoided would be the same as Alternative 1. Gas turbine and coal-fired plants are estimated to produce approximately 496,125 MT CO_2e for gas turbine and 1,417,500 MT CO_2e for coal-fired, as compared to 1,261 MT CO_2e per year from Alternative 3.

Based on the rate of existing carbon uptake by desert vegetation and the Alternative 3 size of 2,112 acres, the equivalent loss in carbon uptake would be 3,126 MT CO_2e per year.

The combined, annualized emissions of construction, operations, and decommissioning for Alternative 3 are presented in Table 4.8-3. Comparison of those annualized emissions to the MDAQMD and Riverside County thresholds shows that Alternative 3 would not exceed any of the thresholds, and therefore is not expected to contribute significantly to climate change through the emission of GHGs.

Table 4.8-3. Annualized GHG Emissions Associated with Alternative 3 Construction, Operation, and Decommissioning

Annual Emissions	CO_2	CH_4	N2O	Total GHG – CO_2e
Total construction emissions (amortized over 30 years, tons/year)[1]	715	0.04	0.02	722
Onsite emissions in operation (tons/year)[2]	1.31	0.00	0.00	1.3
Offsite emissions in operation (tons/year)[2]	304	0.01	0.00	306
Estimated decommissioning emissions (tons/year)[3]	358	0.02	0.01	361
Total Project (tons/year)	1,378	0.07	0.03	1,390
Total Project (MT/year)	1,250	0.06	0.03	1,261
MDAQMD CEQA annual threshold (tons/year)	NA	NA	NA	100,000
Riverside County CEQA threshold (MT/year)	NA	NA	NA	3,000
Exceed the thresholds (yes/no)	NA	NA	NA	No

Notes:
1 – Summed from 25 monthly emissions estimates in URS (2015), scaled down for reduced number of truck deliveries, then divided by 30 year period.
2 – From Table 4-4 in URS (2015)
3 – Estimated to be assumed to be one-half of construction, amortized over a 30-year period, tons/year.

4.8.4 Climate Change Effects on the Project

4.8.4.1 Alternative 1: Proposed Action

Climate change is expected to result in environmental changes that could affect the natural environment in the Project area. The potential for climate change effects on the Project is discussed below.

Hydrologic Resources

In California and much of the western U.S., climate change is expected to result in several potential effects related to water resources. These include potential sea level rise, potential changes to snowpack and snowmelt periods, changes to the water flow available to dilute wastewater, changes to surface water temperature, changes in the frequency of flooding and droughts, and potential reductions in surface water supply (DWR 2008; DWR 2011). Of these, the issues of sea level rise, snowpack and snowmelt, dilution of wastewater, and change in surface water temperature are not relevant to the Project.

Flooding, Drainage, and Erosion

Climate change is anticipated to affect the frequency and intensity of extreme weather events, including large storm events and droughts in western watersheds, such as the Colorado River basin where the Project is located (DWR 2008; DWR 2011). Although the degree of change is a subject of substantial debate, most investigations concur that the Colorado River watershed, including the Project site and its vicinity, would experience an increase in the frequency and intensity of high rainfall and flood events (Cooley et al. 2009). This could result in an increase in potential stormwater runoff and flooding, and an increase in erosion and sedimentation onsite and downstream from the site. Increases in the intensity or frequency of droughts are discussed in terms of water resources availability, below.

As discussed in Section 2.3.7.9, the current stormwater flow system into and through the Project would be maintained, and stormwater would not be diverted. The analysis of the effect of stormwater flow on Project structures, presented in Section 4.20, shows that, although site grading and vegetation removal would alter stormwater flow onsite, the amount of scour that would occur would not threaten the stability of Project structures.

Water Resources Availability

As discussed in Section 3.20, the Project site and immediate vicinity contain only ephemeral drainages and washes. There are no perennial streams or other perennial waterways located on site, or upstream of the site. The project may use surface water from PVID for water supply during construction or operation. The impact of this use is evaluated in Section 4.20, and indicates that there would be no impacts to surface water supplies. Therefore, changes to surface water availability in the region would not affect the Project.

The Project may rely on groundwater for water supply during both construction and operation. An analysis of the amount of groundwater available for the Project is presented in Section 4.20, and concludes that sufficient groundwater is available to support Project construction. Estimates of the potential effects of climate change on the frequency and amount of rainfall in the west vary; however, most studies concur that in the desert southwest, some degree of reduction of precipitation would occur. Seager et al. (2007) and Christensen et al. (2004) completed extensive reviews and modeling of potential climate change effects on the Colorado River watershed and other southwestern watersheds, including several climate change scenarios. The authors concluded that precipitation and runoff within the watershed could generally decrease, while periods of drought could increase, resulting in an overall reduction in the availability of groundwater in the region. These scenarios could result in moderate to substantial effects on water supply availability, and could affect the ability of water rights holders along the Colorado River to divert their full entitlements. However, the timeframe of these changes would be long-term. The Project would only rely on relatively large volumes of groundwater for Project construction, which would be completed within 25 to 48 months. Long-term climate changes would not be expected to substantially affect groundwater availability within this short timeframe. Therefore, a reduction in groundwater availability due to global climate change is not expected to affect the Project.

Biological Resources

Biological resources could be affected as a result of climate change in California. Distribution patterns of species are generally expected to shift according to regional changes in temperature and precipitation, while the location of wildlife migration corridors and the extent of invasive species also could be altered (USFWS 2010).

Fisheries

The Project would not contain any perennial or other surface waters that contain fisheries resources, and would not affect or be affected by changes in fisheries characteristics.

Habitat Values of Mitigation Lands

As discussed in Sections 4.3 and 4.4, the Project would require mitigation for biological resources values that would be lost as a result of the loss of habitat associated with the Project. The proposed mitigation lands would be required to be equivalent in terms of habitat value and at replacement ratios as specified in Sections 4.3 and 4.4. Climate change could result in adverse effects on biological resources located on these mitigation lands. However, given that mitigation lands must be similar in biological resources value as compared to lost resources on site, it is anticipated that the effect of climate change on the mitigation lands would be similar to the effect that would have occurred on the Project site, if the Project were not built. Therefore, potential reductions in the biological resources values of mitigation land values resulting from climate change are expected to be similar to onsite conditions in the absence of the Project.

Hazards

Climate change studies have concluded that hazards associated with wildland fires and increased potential for heat stress for workers during heat waves could increase as a result of climate change (IPCC 2007; ISDR 2008).

Wildland Fire Risks

Potential risks associated with wildland fire are discussed in Section 4.21, *Wildland Fire*. As described in Section 3.21, the risk of wildland fire to the Project would be moderate based on the FHSZ, due to the sparse vegetation. As discussed in Section 2.3.7.3, fire protection systems would be included in the Project design. Although risks for wildland fire could increase due to an increase in the frequency of extreme weather events that could generate wildfires, such as increased frequency of drought and heat waves (IPCC 2007; ISDR 2008), the potential for wildland fire to affect Project structures would still be low. Therefore, no additional mitigation is recommended.

Heat Waves

The frequency of occurrence and the severity of heat waves could increase as a result of climate change (IPCC 2007; ISDR 2008). Heat waves could result in increased potential risk to Project employees working outside, especially during construction. All Project activities would occur under a site-specific Health and Safety Plan, as well as Federal OSHA and CalOSHA requirements. The Applicant proposes to modify work schedules as needed, in summer, to protect workers from heat stress. No further actions are recommended.

Soil Moisture

As discussed in Section 3.20, almost all rainfall that occurs in this region of California is lost through evaporation and evapotranspiration, and therefore soil moisture levels at the Project site are characteristically low. Because climate change could result in increases in droughts and heat waves, and an overall reduction in precipitation, long-term effects of climate change could include a reduction in soil moisture content at the site and regionally. However, reductions in soil moisture content would not affect Project-related operations, and would not require any change in water resources usage.

Fugitive Dust

As discussed in Section 4.2, *Air Resources*, fugitive dust emissions would require mitigation during operation of the Project. Mitigation Measure AQ-2 would mitigate operation period fugitive dust emissions to ensure compliance with state and Federal regulations and requirements. Although climate change could result in some degree of reduction of soil moisture, as discussed above, soil moisture is already very low under current conditions. Any further reductions in soil moisture would not be substantial in terms of the absolute amount of water contained in onsite soils. Therefore, any potential further reduction in soil moisture associated with climate change is not anticipated to result in a substantial increase in fugitive dust emissions.

4.8.4.2 Alternative 2: Resource Avoidance Alternative

The potential effects of climate change on Alternative 2 would be the same as those discussed for Alternative 1, except that the area affected by Alternative 2 would be reduced.

4.8.4.3 Alternative 3: Reduced Project Alternative

The potential effects of climate change on Alternative 3 would be the same as those discussed for Alternative 1, except that the area affected by Alternative 3 would be reduced.

4.8.5 Application of CEQA Significance Thresholds

GHG-1) Would the Project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

As shown in Table 4.8-2, Alternative 1 would not generate GHG emissions that would exceed applicable thresholds of significance for GHG emissions. The GHG emissions associated with

Alternative 2 are expected to be the same as those associated with Alternative 1. As shown in Table 4.8-3, the GHG emissions of Alternative 3 would be reduced from those associated with Alternative 1. Overall, the total GHG emissions for all phases amortized over the life of Alternatives 1, 2, or 3 would not exceed MDAQMD or Riverside County thresholds, and would be less than significant. In addition, Alternatives 1, 2, or 3 would result in a substantial benefit by offsetting GHG emission from fossil-fuel-generated electricity, and would assist in meeting the state's adopted Renewable Portfolio Standard (RPS).

GHG-2) Would the Project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Since Alternatives 1, 2, or 3 would result in a significant offset of regional air emissions associated with energy production from fossil fuels, a net reduction in GHG emissions could result. Alternatives 1, 2, or 3 would serve to meet the state's goals for the RPS, which has been identified by the state as a means of meeting the goals of AB 32 to reduce emissions to 1990 levels by the year 2020.

However, because Alternative 3 would generate 285 MW, as compared to the 450 MW that would be generated under Alternative 1 or Alternative 2, Alternative 3 would not be as effective as the other action alternatives in off-setting GHG emissions from fossil fuels.

4.8.6 Alternative 4: No Action Alternative

4.8.6.1 Direct and Indirect Impacts

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, the BLM would continue to manage the land under its jurisdiction consistent with the site's multiple use classification as described in the CDCA Plan, as amended by the Western Solar Plan.

If the site remained undeveloped, the existing environmental setting described in Section 3.8 would be maintained. None of the GHG emissions-related impacts of the action alternatives would occur. However, Alternative 4 would not displace the generation of GHG emissions from existing fossil-fueled power plants and would result in the continued long-term adverse impact associated with annual GHG emissions compared to implementation of any of the action alternatives.

4.8.7 Cumulative Impacts

By definition, the global climate change impacts discussed in Section 4.8 constitute a cumulative impact analysis, because they are the result of the cumulative GHG emissions from all sources world-wide.

All Action Alternatives

Construction, Operations, and Decommissioning

The direct GHG emissions associated with construction, operation, and decommissioning of any of the action alternatives would contribute to cumulative global climate change effects on resources not just within the Project area, but throughout the world. The Proposed Action and

Alternative 2 would generate approximately 1,280 MT per year CO_2e, and Alternative 3 would generate approximately 1,261 MT per year CO_2e, which would not contribute considerably to a cumulative GHG impact. In addition, the removal of plants from within the Project area would reduce the amount of carbon intake from terrestrial vegetation, but only by a minimal amount. Virtually all of the cumulative projects described in Section 4.1.5, Cumulative Scenario Approach, would also contribute to global warming due to the generation of short-term and/or long-term GHG emissions associated with their construction, operation, and decommissioning.

As discussed in the Final Western Solar Plan issued in July 2012 (BLM and DOE 2012), utility-scale solar energy development contributes relatively minor GHG emissions, generally from emissions from heavy equipment used during the construction phase, and from vehicular emissions. However, utility-scale solar energy production also results in reduced CO_2 emissions from utilities by offsetting emissions from new fossil fuel energy sources. Overall, CO_2 emission offsets from increased solar energy production can range from a few percentage points to more than twenty percent in some study area states. According to the analysis in the Western Solar Plan, "an estimated 716 kg (1,578 lb) of CO_2 would be displaced annually per megawatt-hour of solar energy produced" (BLM and DOE 2012, § 5.11.1.2. Table 5.11-1, and § 5.11.4). Since GHG emissions are aggregated across the global atmosphere and cumulatively contribute to climate change, it is not possible to determine the specific impact on global climate change from GHG emissions associated with the action alternatives, or with the other cumulative projects (impact GHG-1).

The reduction in overall GHG emissions associated with the displacement of fossil fuel power production as a result of the Project would contribute, beneficially, to a reduction in global climate change impacts throughout the world. The renewable energy projects included among the cumulative projects would similarly result in long-term decreases in GHG emissions by displacing electricity from fossil fuel-fired power plants.

Because an objective of the Project is to comply with Federal and state policies intended to reduce GHG emissions, the Project would not contribute to cumulative conflicts with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases (impact GHG-2).

Alternative 4 – No Action

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project, and the DQSP would not be implemented. The public lands in the Project area would continue to be managed by BLM in accordance with existing land use designations in the CDCA Plan, which could include a different solar project, or other development. Alternative 4 would not generate any GHG emissions. However, the No Project Alternative also would not assist in meeting AB 32 or Executive Order S-3-05 emission reduction targets, nor would it offset emissions generated by fossil-fuel-based sources of energy. Therefore, the No Project Alternative could have a greater contribution to global climate change than the action alternatives.

4.8.8 Residual Impacts

The long-term displacement of GHG emissions from fossil fuel-based power would be a residual beneficial impact of the Project. There would still be GHG emissions after mitigation has been incorporated; however, they would not be a substantial contribution to climate change.

4.9 Hazards and Hazardous Materials

4.9.1 Methodology for Analysis

This analysis of potential impacts of the Proposed Action and Alternatives related to Hazards and Hazardous Materials focuses on possible impacts to the health and safety of the public. Impacts are identified and evaluated based on relevant BLM standards, policies, and guidelines. The analysis is based on information provided in the POD, the Applicant's Preliminary Hazardous Materials Management and Emergency Response Plan, and the Phase I Environmental Site Assessment.

Environmental Site Contamination

The analysis evaluates the potential for ground-disturbing activities to expose workers or members of the public to pre-existing site contamination.

Unexploded Ordnance

The analysis evaluates the potential for ground-disturbing activities to encounter unexploded ordnance (UXO).

Risk of Accidents and Spills of Hazardous Materials

This analysis reviews and assesses the potential for the transportation, storage, and use of hazardous materials to impact the health and safety of the public. Hazardous materials, including fuels, lubricants, solvents, adhesives, and soil stabilizers, must be used for Project construction and operation. The analysis examines the type hazardous materials to be used, and the Applicant's proposed procedures for handling, storing, transporting, and disposing of hazardous materials and hazardous wastes.

In their POD and Preliminary Hazardous Materials Management and Emergency Response Plan, the Applicant proposes to use engineering and administrative controls as part of the Proposed Action and Alternatives. Engineering controls are the physical or mechanical systems that can prevent the spill of hazardous material from occurring, or that can either limit the amount of a spill or to a confined area. Examples of engineering controls are storage tanks and secondary containment basins. Administrative controls are the rules and procedures that workers at the facility must follow that would help to prevent accidents or to minimize releases if they do occur. These procedures typically are established in worker safety training and emergency response plans. Both engineering and administrative controls can act as methods of prevention or as methods of response and minimization. In both cases, the goal is to prevent a spill from moving off-site and from causing harm to the public or the environment.

This analysis reviews and evaluates the Applicant's proposed use of hazardous materials as described by the Applicant. In conducting this analysis, these three steps were followed:

Step 1: Review the types and quantities of hazardous materials proposed for onsite use as listed in the POD and Preliminary Hazardous Materials Management and Emergency Response Plan.

Step 2: Review and evaluate the engineering and administrative controls proposed by the Applicant to prevent spills and respond to accidents.

Step 3: Evaluate the potential impacts on the public of a greatest-consequence spill of hazardous materials, as reduced by the engineering and administrative controls proposed by the Applicant. When such controls would be sufficient to prevent impacts, no further mitigation is recommended. If additional mitigation measures would further reduce or avoid impacts of the Proposed Action or an Alternative, additional prevention and response controls are proposed.

Public Health

The analysis evaluates the potential for the Proposed Action and Alternatives to increase public exposure to vector-borne diseases and to Coccidioidomycosis, commonly known as valley fever.

Transmission Line Safety and Nuisance

This analysis of potential effects of the Proposed Action and alternatives related to transmission line safety and nuisance evaluates the applicable requirements of design-related laws, ordinances, regulations, standards, and policies. If the gen-tie line and distribution line that would be constructed comply with applicable laws, then the Proposed Action and alternatives would not have a measurable effect related to Transmission Line Safety and Nuisance. Other potential hazards considered include interference with radio- frequency communication, hazardous shocks, nuisance shocks, and EMF exposure. Impacts related to noise from corona discharge are addressed in Section 4.12, *Noise*, and impacts related to fire hazard-related risks are addressed in Section 4.21, *Wildland Fire*.

Emergency Response

The analysis evaluates the Proposed Action and Alternatives to assess potential impacts to public safety that could result if the Proposed Action or an Alternative were to impair implementation of an emergency response or evacuation plan. This assessment first determines whether local emergency response or evacuation plans have been adopted, and then whether the Proposed Action or an Alternative would impede emergency evacuation routes or emergency response actions.

Aircraft Operations

The analysis reviews the Proposed Action and Alternatives with respect to the RCALUCP for Blythe Airport.

Intentionally Destructive Acts

Intentionally destructive acts could include malicious mischief, vandalism, or terrorist attacks. This analysis of impacts related to intentionally destructive acts is based on the screening criteria for vulnerability assessments of chemical facilities and electric power infrastructure and assesses the following questions: Is the Project a critical electric infrastructure facility? Does the facility use any of the chemicals on the list of regulated substances in 40 CFR §68.130? What would be the estimated severity of impact from a release of hazardous materials from the site or from power disruption?

Abandoned Mine Lands

The Applicant's Phase I Environmental Site Assessment did not identify any abandoned mine lands within one mile of the Project site. Therefore, the Proposed Action and alternatives would result in no impacts related to abandoned mine lands.

4.9.1.1 CEQA Significance Criteria

The criteria listed below were used to determine if the Project would cause or exacerbate hazards on and in the vicinity of the Project. These criteria are the same as the significance criteria for Hazards and Hazardous Materials listed in the CEQA Environmental Checklist, Appendix G of the state CEQA Guidelines. Under CEQA, the proposed Project and alternatives would have a significant impact on hazards and hazardous materials if they would:

HAZ-1) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

HAZ-2) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

HAZ-3) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.

HAZ-4) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment.

HAZ-5) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would result in a safety hazard for people residing or working in the project area.

HAZ-6) For a project within the vicinity of a private airstrip, would result in a safety hazard for people residing or working in the project area.

HAZ-7) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

HAZ-8) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

The following additional significance criteria from the County of Riverside CEQA Environmental Assessment Form are used in the analysis. A Project could have potentially significant impacts if it would:

HAZ-9) Result in an inconsistency with an Airport Master Plan.

HAZ-10) Require review by the Airport Land Use Commission.

4.9.2 Applicant-Proposed Measures

Section 2.3.7.1 describes the elements of the Applicant's Preliminary Hazardous Materials Management and Emergency Response Plan, which would be completed and provided to BLM and the County for review and approval prior to the beginning of construction. The completed Plan would identify expected wastestreams; specify how waste would be sampled, analyzed, and characterized; and specify potential waste disposal locations for different categories of wastes. Elements of the Plan relevant to waste management would include waste determination procedures, waste disposal locations, container management, inspection requirements, preparedness and prevention requirements, and requirements for packaging, placarding, manifests, and record-keeping and reporting. The Plan would also specify BMPs to be used in the case of discovery of unanticipated hazardous materials.

BMPs to be implemented during construction would include:

- Keep materials in their original containers with the original manufacturer's label and resealed when possible;
- Avoid storage of excessive quantities of chemicals by procuring and storing only the amounts needed;
- Encourage mobile refueling of vehicles on site to minimize stationary tank storage of fuel and other hazardous materials;
- Follow manufacturer's recommendation for proper handling and disposal;
- Conduct routine inspections to ensure that all chemicals on-site are being stored, used, and disposed of appropriately;
- Perform timely maintenance on vehicles/equipment that are leaking oil or other fluids, and place drip plans under the leak when the vehicle/equipment is parked prior to the maintenance event;
- Ensure that no hazardous materials, chemicals, fuels, or lubricating oils would be stored within 100 feet of any wetland, water body, or water supply well, or within any designated municipal watershed;
- Refuel all construction equipment at least 100 feet from any water body, water well or wetland;
- Ensure that all personnel dealing with hazardous materials are properly trained in the use and disposal of these materials in accordance with local, state, and Federal regulations;
- Ensure that all storage tanks proposed to be brought on site will meet applicable codes; and
- Maintain Material Safety Data Sheets available on the site for use during Project construction and operation.

Oil storage on site will be limited to the minimum amount necessary to safely maintain and operate equipment and transformers during construction and O&M.

The Applicant proposes to store up to 2,500 gallons each of diesel and gasoline during construction, which exceeds 55 gallons of a liquid, 500 pounds of a solid, or 200 cubic feet of compressed gas, or extremely hazardous substances above the threshold planning quantity. As a result, the Applicant would develop and implement a Hazardous Materials Business Plan (HMPB) in coordination with Riverside County Department of Environmental Health and County fire officials. In addition, because the Project would involve onsite storage of more than 1,320 gallons of oil or oil products, the Applicant would develop and implement a Spill Prevention, Control, and Countermeasure (SPCC) Plan. The Applicant has developed a summary outline of an SPCC Plan, which describes the issues that would be addressed in a completed Plan. Issues to be addressed would include a diagram showing the facility and locations of oil storage, description of the type of oil, methods used to prevent and control releases, and requirements for inspections, testing, employee training, and reporting. Appropriately sized and supplied spill containment kits would be maintained onsite in the area of the O&M Building, and operations employees would be trained on the appropriate spill prevention, response, and containment procedures.

The Applicant has developed a preliminary summary of a SWPPP, which would be developed and implemented prior to Project construction. These would include managing and disposing of wastes in accordance with applicable regulations and prohibiting the storage of hazardous materials or re-fueling of vehicles within 100 feet of a wetland, water body, or water supply well.

If the Project implements ESSs, the units would be situated in pre-fabricated metal containers that have an appropriate fire suppression system designed in compliance with Section 608 of the International Fire Code. The units would also have apron containment systems to prevent the escape of spills or leaks of fluids. The units would also be designed to comply with Article 480 of the electrical code, which specifies requirements for insulation and venting.

As discussed in Section 4.1.6, the impact analysis assumes that the APMs have been implemented, and these measures are therefore requirements for approval of the Project. The APMs are to be incorporated into the EICMPP/MMRCP, along with the agency-required mitigation measures.

4.9.3 Direct and Indirect Impacts

4.9.3.1 Alternative 1: Proposed Action

Environmental Site Contamination

Construction

Construction would require earth-moving, grading, trenching, and other activities which would disturb site soils. These activities could result in release of contaminated materials, exposure of site workers to metals and other contaminants present in the soils, and/or exposure of the public to contaminants if fugitive dust was to be blown offsite.

As described in Section 3.9.1.1, the Phase I Environmental Site Assessment conducted for the Project site in 2015 did not identify evidence of any releases of hazardous substances or petroleum products on the BLM portion of the Project site, or in the one-mile search radius, based on records searches and visual surveys. The site is undeveloped, so no past use of hazardous materials on the site has been documented. De minimis conditions identified on the BLM land during the site reconnaissance included trash and debris. Therefore, the potential for encountering hazardous substances in containers or in contaminated soils on the BLM land is low.

The Phase I ESA documented that two nearby groundwater supply wells on BLM land were observed to be open and unsecured, presenting the potential for groundwater contamination to be present. There have been no subsequent response actions, including securing of the groundwater wells or sampling of environmental media, to verify whether groundwater contamination currently exists.

Hazardous substances, in the form of partially-filled oil and lubricant containers and other trash and debris, were observed on the private land parcel. There has been no further investigation or environmental sampling to determine if soil or groundwater contamination has resulted. Therefore, there is a potential for encountering hazardous substances, contaminated soil, and/or contaminated groundwater during intrusive work on the private land parcel.

During construction activities for the Proposed Action, the potential exists that undocumented subsurface utilities or tanks might be encountered and damaged, resulting in a release of a hazardous material. Based on the results of the Applicant's Phase I Environmental Site Assessment, the potential for the presence of subsurface utilities is expected to be low. However, the potential for such incidents would be further reduced by thoroughly screening for subsurface structures in areas prior to commencement of any subsurface work. Screening activities would include use of DigAlert (Underground Services Alert of Southern California), visual observations, hand digging, and use of buried line locating equipment.

To establish baseline environmental conditions, Mitigation Measure HAZ-1 requires the Applicant to perform a Phase II Environmental Site Assessment (ESA) prior to beginning construction. The scope of the Phase II ESA would include groundwater sampling in the vicinity of the two uncapped onsite wells, followed by capping of the onsite wells, to establish baseline groundwater quality and protect against future releases. In addition, the Phase II ESA would include removal of oil and lubricant containers identified on the private land parcel in the Phase I ESA, sampling of soil to identify potentially contaminated areas, and removal of any identified contaminated soil.

Fugitive dust would be generated during construction activities. Because construction would be temporary, long-term exposures of site workers to fugitive dusts are not anticipated to occur. Implementation of dust suppression measures in Mitigation Measures AQ-1 and AQ-2 would reduce the potential for worker exposure to any hazardous materials that may be present in site soils by reducing the amount of dust released from construction activities.

Operation and Maintenance

Operations would involve a much lower amount of ground disturbance than construction, and would thus have a lower potential for exposing site workers or the public to hazardous substances in site soils. Ground disturbance during operations would be limited to small-scale repair and maintenance projects. In addition, these activities would likely occur in areas which had already been disturbed during construction, and would therefore be unlikely to encounter unexpected hazardous substances.

Fugitive dust generation associated with disturbance would also be of a much smaller scale than that associated with construction. Implementation of Mitigation Measure HAZ-1, which requires the Applicant to prepare and implement a site-specific Hazardous Materials Management and Emergency Response Plan, would also apply to operations and maintenance activities.

Decommissioning

Like construction, decommissioning is also expected to require earth-moving, grading, trenching, and other activities which would disturb site soils. The scale of these activities would be reduced from that of construction. In addition, these activities would likely occur in areas which had already been disturbed during construction, and would therefore be unlikely to encounter unexpected hazardous substances. Therefore, the potential for exposure of site workers and the public to hazardous substances during decommissioning is expected to be lower than that for construction.

Fugitive dust would be generated during decommissioning activities. Because decommissioning would be temporary, long-term exposures of site workers to fugitive dusts are not anticipated to occur. Mitigation Measures AQ-1, AQ-2, and HAZ-1 would apply to decommissioning, so would minimize potential exposures to existing hazardous materials during decommissioning.

Unexploded Ordnance

Construction

As discussed in Section 3.9.1.1, ordnance was used at the former Blythe Army Airfield located approximately 1.5 miles north of the Project site, and UXO discoveries have been reported during cultural resource studies in the area, and as part of construction efforts at the Modified BSPP site north of I-10. No indication was found suggesting these materials were present on the Project area during the Phase I ESA. However, because of the former use of public lands in the area for military training, there is potential for discarded military munitions, other explosives, and unexploded ordnance (collectively, UXO) to be encountered on the surface, or in subsurface excavations.

UXO presents an immediate risk of acute physical injury from fire or explosion resulting from accidental or unintentional detonation. Surface and shallow sub-surface UXO could be disturbed by vehicles, workers walking, and/or excavation using shovels or similar hand tools, and deeper subsurface UXO could be disturbed by the earth movement and excavation processes that would be required for development of the Proposed Action. With proper training of site workers in the recognition, avoidance, and procedures to be implemented if suspect UXO are discovered, as required by Mitigation Measure UXO-1, the potential risks to workers from encountering UXO would be reduced, but not completely avoided.

Operation and Maintenance

Operations would involve a much lower amount of ground disturbance than construction, and would thus have a lower potential for exposing site workers or the public to UXO. Ground disturbance during operations would be limited to small-scale repair and maintenance projects. In addition, these activities would likely occur in areas which had already been disturbed during construction, and would therefore be unlikely to encounter UXO.

Decommissioning

Like construction, decommissioning is also expected to require earth-moving, grading, trenching, and other activities which would disturb site soils. The scale of these activities would be reduced from that of construction. In addition, these activities would likely occur in areas which had already been disturbed during construction, and would therefore be unlikely to encounter UXO. Therefore, the potential for exposure of site workers and the public to UXO during decommissioning is expected to be lower than that for construction.

Risk of Accidents and Spills of Hazardous Materials

Construction

Hazardous materials which would be used for construction of the Proposed Action include fuels, herbicides, lubricants, solvents, adhesives, and soil stabilizers. The use, storage, and disposal of hazardous materials and wastes associated with the Proposed Action could result in potential adverse health and environmental impacts if these materials were released to the environment through accidents or spills. Potential direct and indirect impacts of such releases could include degradation of soil and water quality, or exposure of humans and wildlife to hazardous materials.

As discussed in Sections 2.3.7.1 and 4.9.2, the Applicant has developed preliminary management plans related to hazardous materials and waste management. These include the Preliminary Hazardous Materials Management and Emergency Response Plan, Hazardous Materials Business Plan (HMBP), SWPPP, and SPCC Plans. These plans specify procedures for storage, use, transport, and disposal of hazardous materials and waste.

The Applicant proposes to store up to 2,500 gallons each of diesel and gasoline during construction, which exceeds 55 gallons of a liquid, 500 pounds of a solid, or 200 cubic feet of compressed gas, or extremely hazardous substances above the threshold planning quantity. As a result, the Applicant would develop and implement a HMBP in coordination with Riverside County Department of Environmental Health and County fire officials. The HMBP would include an inventory of hazardous materials, site map and building floor plans, emergency response plan, training information, a description of hazardous materials handling and segregation, and plans for monitoring.

Because the Project would involve onsite storage of more than 1,320 gallons of oil or oil products, the Applicant would develop and implement a Spill Prevention, Control, and Countermeasure (SPCC) Plan. The Applicant has developed a summary outline of an SPCC Plan, which describes the issues that would be addressed in a completed Plan. Issues to be addressed would include a diagram showing the facility and locations of oil storage, description of the type of oil, methods used to prevent and control releases, and requirements for inspections, testing, employee training, and reporting. Appropriately sized and supplied spill containment kits would be maintained onsite in the area of the O&M Building, and operations employees would be trained on the appropriate spill prevention, response, and containment procedures.

The SWPPP would define procedures for managing and disposing of wastes in accordance with applicable regulations, and would also define storage locations and fueling procedures to protect water resources. The SPCC Plan would address the storage of oil or oil products, and would include a diagram showing the facility and locations of oil storage, description of the type of oil, methods used to prevent and control releases, methods to be used to clean-up and dispose of recovered materials, and requirements for inspections, testing, employee training, and reporting.

Compliance with existing regulations would reduce hazards, but would not completely avoid hazards to construction workers, the public, and the environment. Although the Applicant proposes to refuel construction equipment at least 100 feet from any water body, water well or wetland, soil and groundwater contamination could still result from releases from fuel tanks on mobile fuel trucks or equipment, or as a result of the refueling process. Mitigation Measure WATER-1 would require that all refueling and maintenance would occur at a designated area, within secondary containment with a volume sufficient to contain the largest fuel tank. In addition to the spill response and reporting requirements of the HMBP, SPCC, and SWPPP, Mitigation Measure WATER-1 would require the Applicant to notify BLM within 24 hours of any release outside of containment. Once construction has begun, Mitigation Measure WATER-1 would require periodic sampling and analysis of groundwater to verify that Project construction does not release contamination.

Routine transportation of hazardous materials to the site, and wastes from the site, could create a hazard to the public or the environment if materials were improperly handled, or indirectly could result in an incremental increase in the potential for accidents. The Applicant would comply with Federal and state regulations regarding the transportation of hazardous materials and wastes, with stringent packaging requirements, licensing and training for hazardous materials truck operators, chemical handlers, and hazardous waste haulers.

Because of the relatively low volumes of hazardous materials and fuels onsite at any time, requirements for immediate response to releases, and flat topography that limits site runoff, it is unlikely that any releases would extend beyond the boundaries of the Project area before they are identified and addressed. The closest residence (apparent occupied mobile home trailer) is located approximately 3,700 feet north of the northeast corner of the Proposed Action boundary. The next two closest sensitive air quality receptors are located in the residential community of Nicholls Warm Springs/Mesa Verde approximately 4,800 feet north of the northeast corner of the Proposed Action boundary. Although members of the public could potentially be present outside the Proposed Action area fence, there are no adjacent land uses or local residents which would result in the presence of large number of people who could be impacted by a release of hazardous materials.

Operation and Maintenance

Operation and maintenance of the Proposed Action would require the transport, use, and disposal of hazardous materials and hazardous wastes similar to those associated with construction. During operation, the only chemicals would be fuels and lubricants for vehicles. The Hazardous Materials Management and Emergency Response Plan, HMBP, SWPPP, and SPCC Plans described for construction would also be applicable to operation of the Proposed Action. The HMBP would be reviewed and approved by the local CUPA, the Riverside County Department of Environmental Health, which would be responsible for facility inspections. In general, the amounts of hazardous materials onsite during operations are expected to be much lower than those associated with construction. Therefore, the potential for releases of hazardous materials to present a risk to the public is expected to be lower than that associated with construction.

Limited pesticide use to control noxious weeds would occur, in accordance with a BLM-approved Integrated Weed Management Plan (IWMP). Pesticide use, if needed, would be limited to non-persistent, immobile pesticides applied only in accordance with manufacturer directions and all regulations for pesticide use. Any pesticide applications would be conducted within the framework of BLM and Department of Interior policies.

Similar to construction, compliance with existing regulations would reduce hazards, but would not completely avoid the potential for releases. During operations, Mitigation Measure WATER-1 would require periodic site inspection, sampling, and analysis of groundwater and the leach field area to verify that Project operations do not release contamination.

Decommissioning

As discussed in Section 2.3.6, the Applicant has developed a Draft Decommissioning and Site Reclamation Plan (Desert Quartzite 2015) which describes the general outlines of the proposed decommissioning activities. Prior to decommissioning, a new Phase I Environmental Site Assessment would be conducted to document existing conditions at the time, including the potential presence of hazardous materials or environmental conditions that occurred ruing construction or operations. If hazardous materials or environmental conditions are identified, a Phase II ESA that would include sampling and, if necessary, response actions, would be undertaken before decommissioning begins. All hazardous materials would be removed from the site before structures are removed. Most of the Proposed Action facilities would be composed of materials that can be recycled, including glass, semiconductor material, aluminum, steel, and wiring. Materials to be removed from the site and recycled or resold include the steel tables and posts, wiring, and PV modules themselves. PV modules damaged during construction or removed at the end of the life of the Proposed Action would either be recycled or resold, or would be disposed of in accordance with local, state, and Federal regulations. Decommissioning of the Proposed Action would require the use of fuel and lubricants for construction vehicles and equipment, as well as the transport and disposal of hazardous materials used at the facility.

As with construction and operations, compliance with existing laws and regulations would reduce, but not completely avoid potential impacts related to the routine use, storage, transportation, and disposal of hazardous materials associated with decommissioning. The site inspection, monitoring, and other requirements of Mitigation Measure WATER-1 would apply throughout decommissioning, to verify that decommissioning activities do not release contamination.

Public Health

Construction, Operations, and Decommissioning

As described in Section 3.9.1.2, incidence of WNV in Riverside County, and therefore the risk to public health from this vector-borne disease, is extremely low. Implementation of Mitigation Measure WATER-2, which requires a comprehensive drainage, stormwater, and sedimentation control plan, would reduce the potential for unintentional ponding of water onsite or downstream of the Proposed Action area. This would reduce the risk of mosquito breeding on or near the site, and therefore would reduce the risk for workers and the public of contracting vector-borne diseases.

Also described in Section 3.9.1.2, incidence of valley fever in Riverside County is low. Fugitive dust generated during construction, operations, or decommissioning could expose workers to *Coccidioides* fungal spores that may be present in desert soils. Implementation of Mitigation Measure AQ-1 would reduce fugitive dust during the construction phase, which would reduce the risk to workers of contracting valley fever.

Transmission Line Safety and Nuisance

Construction and Decommissioning

As the gen-tie line would not be energized except during operations, there would be no hazard or nuisance from the gen-tie line associated with construction or decommissioning.

Operations

Transmission line safety and nuisance issues may be associated with operation of the Project gen-tie line. Impacts associated with operation of the gen-tie line may include interference with radio-frequency communication, hazardous and nuisance shocks, and electro-magnetic field (EMF) exposure.

Interference with Radio-Frequency Communication

Transmission lines may have surface irregularities, surface discontinuities, and related corona discharge which may affect radio-frequency communication. Although corona can generate high frequency energy that may interfere with broadcast signals or electronic equipment, this is generally a concern only for lines of 345 kV and above. Gap discharges or arcs also can be a source of high frequency energy. Gap discharges occur when an arc forms across a gap in loose or worn line hardware. It is estimated that over 90 percent of interference problems for electric transmission lines are due to gap discharges. When identified, gap discharges can be located and remedied by utilities. Although corona or gap discharges related to high frequency radio and television interference impacts would be limited and very localized.

To reduce the potential for radio frequency interference, Mitigation Measure TLSN-1 would require the Applicant to limit the conductor surface electric gradient in accordance with the IEEE Radio Noise Design Guide for High-Voltage Transmission Lines, and to provide a mechanism for resolution of any interference complaints. In addition, the proposed gen-tie line would be built and maintained in accordance with applicable standards and regulations, including those prescribed by the CPUC and State of California Rules for Overhead Electric Line Construction, General Order No. 95 (GO-95).

Hazardous and Nuisance Shocks

Operation of the proposed gen-tie line could result in hazardous and/or nuisance shocks. The Applicant would be responsible in all cases for ensuring compliance with regulations and industry standards for grounding-related practices within and near the right-of-way, which would minimize the potential for such shocks.

Electric and Magnetic Field Exposure

Operation of the proposed gen-tie line could generate EMF. Public concerns exist regarding EMF and the possibility of deleterious health effects from living near high-voltage lines, as well as CRT computer monitor interference.

Available evidence as evaluated by the CPUC, CEC, and other regulatory agencies is that a significant health hazard to humans exposed to such fields has not been established (see, e.g., CPUC 2006). There are no health-based Federal regulations or industry codes specifying environmental limits on the strengths of fields from power lines. Most regulatory agencies believe that health-based limits are inappropriate at this time and the industry should continue its current practice of siting power lines to reduce exposure.

The gen-tie line would be situated in uninhabited, open desert land with no existing structures. The proposed gen-tie would traverse BLM-administered land, with the nearest residences more than 3,000 feet north. The general absence of residences in the immediate vicinity of the gen-tie line means that there would be no residential field exposure.

Although there is a potential for EMF to cause CRT computer monitor interference, the proposed gen-tie line would be situated on largely uninhabited desert land where computer monitor use is not common. Further, the liquid crystal display (LCD) technology used for portable computer monitors has replaced the CRT technology in most computer monitor applications. Moreover, recognition of computer monitor interference as a problem in the monitor industry has resulted in manufacturers who specialize in shielding enclosures and software programs that adjust the monitor's vertical refresh rate. Therefore, there are not expected to be any impacts associated with CRT computer monitor interference.

Emergency Response

Construction, Operations, and Decommissioning

The Proposed Action site is located on undeveloped land in a rural area, and would be accessed by secondary roads. The Riverside County Operational Area Emergency Operations Plan (RCFD 2006) does not designate emergency evacuation routes. Therefore, the Proposed Action would not impair implementation of, or physically interfere with, an adopted emergency response or evacuation plan. Local roads are unlikely to be used as emergency routes because of the remote location of the Proposed Action site.

There would be two access routes to the Proposed Action area. Primary access for construction and operations would be from Exit 236 off of I-10, following State Route 78 and 16th Avenue/Seeley Avenue to the facility gate. An emergency access route would be from 22nd Avenue. The Applicant's Hazardous Materials Management and Emergency Response Plan would comply with applicable Riverside County regulations, and would be coordinated with the Riverside County Fire Department.

Aircraft Operations

As discussed in Section 3.9.1.5, the Proposed Action would be located approximately 1.5 miles from the Blythe Airport. The 160-acre private land area subject to the Riverside County Conditional Use Permit is located outside of the Blythe Airport Influence Area (AIA). As shown in Figure 3.9-1, a portion of the BLM land is located within the AIA, within airport Compatibility Zone E. The relationship between the Proposed Action, Resource Avoidance Alternative, and Reduced Project Alternative to the airport is shown in Table 4.9-1.

Table 4.9-1. Relationship of Action Alternatives to Blythe Airport

	Alt. 1 - Proposed Action	Alt. 2 – Reduced Acreage	Alt. 3 – Reduced Project
Distance to Airport Boundary (miles)	1.59	1.51	1.62
Acreage of Overlap with Compatibility Zone E (acres)	424	311	56
Length of Gen-Tie Line within Compatibility Zone E (miles)	0	1.08	1.08

The compatibility criteria for projects within Compatibility Zone E are shown in Table 3.9-1. In Zone E, airspace review is required for structures on private land greater than 100 feet in height, but there are no other specific land use restrictions. Although a portion of the Proposed Action area would be located within Zone E, the gen-tie line for the Proposed Action would be located outside of Zone E, and no portion of it would be located on private lands. Therefore, the Proposed Action would not involve structures on private land greater than 100 feet in height within Compatibility Zone E.

Section 1.5.3 of the RCALUCP lists major land use actions within an AIA which may require review by the ALUC. These actions include those which have the potential to create electrical or visual hazards to aircraft in flight, including electrical interference, lighting, glare, impaired visibility, and actions that have the potential to cause attraction of birds. The ALUC performed a review of consistency with the RCALUCP, and found on November 6, 2015, that the Project would be consistent with the RCALUCP.

Portions of a transmission line that are not in an AIA still could potentially be subject to Federal Aviation Administration (FAA) review through the Form 7460-1 process if within 20,000 feet (3.8 miles) of a runway, especially if located at a higher elevation than the runway. For projects that involve transmission line and poles which could affect navigable airspace, the FAA requires the Applicant to file Forms 7460-1, Notice of Proposed Construction or Alteration, and 7460-2, Notice of Actual Construction or Alteration. Following the Applicant's submittal of Form 7460-1 for the FAA's safety assessment at least 45 days prior to the start date of construction, the FAA would conduct a safety analysis to determine the effect of the proposed towers and transmission line on aircraft operations. The Proposed Action must receive a "Determination of No Hazard to Air Navigation" in order to proceed.

The FAA conducted a similar safety analysis for the adjacent BMSP, which would share the same gen-tie corridor as the DQSP. For that project, the FAA issued "No Hazard to Air Navigation" Determinations for the 230 kV gen-tie line structures. However, because the gen-tie line would be located within 20,000 feet of a runway, it still could potentially be subject to FAA review through the Form 7460-1 process. The height of the proposed gen-tie line towers for the DQSP has not been established, but they may be up to 135 feet in height. Therefore, it is unknown if the DQSP would receive a similar "No Hazard" determination, which would be required prior to construction of the Proposed Action. Mitigation Measure HAZ-3 requires that the Applicant receive a "Determination of No Hazard to Air Navigation" in order to proceed.

Construction

Construction of a portion of the Proposed Action would occur within the Blythe Airport Compatibility Zone E. Construction would include the use of cranes to install gen-tie support poles up to 135 feet in height along a length of 2.79 miles of transmission line outside of Zone E, but within 20,000 feet of a runway. During pole installation, the total height of the cranes would extend higher than the proposed towers. In such a situation, a separate notice to the FAA is required. The FAA would consider the proposed construction method, including use of cranes, in its safety assessment. With receipt of an FAA "Determination of No Hazards to Air Navigation," as required by Mitigation Measure HAZ-3, construction of the Proposed Action would not have an adverse effect on aircraft operations.

Operation and Maintenance

Within 5 days of completing construction within the Airport Compatibility Area, the Applicant would be required to submit Form 7460-2 notifying the FAA of completion of construction. With prior receipt of a “No Hazard” determination, DQSP operation and maintenance would not have an adverse effect on aircraft operations.

Decommissioning

Decommissioning activities would be similar to construction activities, and would be considered as part of the safety assessment performed by the FAA. The Applicant may be required to submit Forms 7460-1 and 7460-2 to notify the FAA of any proposed alterations to the gen-tie line and support poles. With receipt of a “No Hazard” determination as required by Mitigation Measure HAZ-3, decommissioning would not have an adverse effect on aircraft operations.

Intentionally Destructive Acts

Construction

As discussed in Section 2.3.3.7, the Proposed Action area would be fenced, with security staffing at the facility entrance gate, throughout construction. The risk to workers or the public from intentionally destructive acts during construction would be low, as public access to the proposed construction and staging areas would be controlled by security and fencing.

Operation and Maintenance

None of the chemicals proposed for use or storage at the solar plant site are on the list of regulated substances in 40 CFR §68.130. Therefore, the DQSP facility would not be covered by the security standards for chemical facilities. The consequences of release of all the hazardous materials used at the facility (diesel fuel, mineral oil, and hydraulic fluid) would not cause a threat to the health and safety of the surrounding community due to the limited quantity and toxicity of the substances, and the large distance to the nearest receptors. As discussed in Section 2.3.3.7, the Proposed Action area would be fenced, with security staffing at the facility entrance gate, throughout operations.

The level of security needed for a particular power plant depends on the threat imposed, the likelihood of an adversarial attack, the likelihood of success in causing a catastrophic event, and the severity of consequences of that event. To determine an appropriate level of security for the nearby BSPP, the CEQA and NEPA lead agencies for that project used an internal vulnerability assessment decision matrix modeled after the U.S. Department of Justice Chemical Vulnerability Assessment Methodology, NERC guidelines, and U.S. Department of Homeland Security regulations to determine that the Proposed Action would fall into the “low vulnerability” category.

Given the similarities in location and the general type of proposed facility for the DQSP, and the site security measures proposed by the Applicant, the BLM has determined that the DQSP also would fall into the “low vulnerability” category. The Applicant’s security measures would minimize the potential for power disruptions or hazardous materials release caused by outside parties. The risk to workers or the public from damage to the DQSP as a result of intentionally destructive acts would be low because public access would be controlled by security and fencing.

Once the Proposed Action is constructed, site security would be provided 24 hours per day, 7 days per week, through a combination of the fencing, lighting, security patrols, and remote monitoring by electronic security systems. Surveillance systems such as security cameras, motion detectors, or heat sensors may be installed along the site perimeter.

Decommissioning

The risk to workers or the public from intentional acts during decommissioning would be low, because public access to construction and staging areas would be controlled by security and fencing.

4.9.3.2 Alternative 2: Resource Avoidance Alternative

Environmental Site Contamination

Construction, Operations, and Decommissioning

The results of the Phase I ESA discussed in Section 4.9.3.1, including the identification of oil and lubricant containers on the private land parcel and the lack of locked caps on two nearby groundwater supply wells, also apply to Alternative 2. The Phase I Environmental Site Assessment conducted for the Project site in 2015 did not identify evidence of any releases of hazardous substances or petroleum products on the BLM portion of the Project site, or in the immediate vicinity, based on records searches and visual surveys. Hazardous substances, in the form of partially-filled oil and lubricant containers and other trash and debris, were observed on the private land parcel, which would be included within Alternative 2. Therefore, the potential for the presence of contaminated soil or groundwater is expected to be the same as the Proposed Action.

To establish baseline environmental conditions, Mitigation Measure HAZ-1 requires the Applicant to perform a Phase II Environmental Site Assessment (ESA) prior to beginning construction. The scope of the Phase II ESA would include groundwater sampling in the vicinity of the two uncapped onsite wells, followed by capping of the onsite wells, to establish baseline groundwater quality and protect against future releases. In addition, the Phase II ESA would include removal of oil and lubricant containers identified on the private land parcel in the Phase I ESA, sampling of soil to identify potentially contaminated areas, and removal of any identified contaminated soil.

Fugitive dust would be generated during construction, operation, and decommissioning of Alternative 2. Implementation of dust suppression measures in Mitigation Measures AQ-1 and AQ-2 would reduce the potential for worker exposure to any hazardous materials that may be present in site soils by reducing the amount of dust released. In addition, implementation of Mitigation Measure HAZ-1, which requires the Applicant to prepare and implement a site-specific Hazardous Materials Management and Emergency Response Plan, would minimize potential exposures to existing hazardous materials if such materials are found to be present on site.

Unexploded Ordnance

Construction, Operations, and Decommissioning

Because all of the land area associated with Alternative 2 is also included within the Proposed Action area, the potential for the presence of UXO is expected to be the same or lower than the Proposed Action.

Risk of Accidents and Spills of Hazardous Materials

Construction

Construction of Alternative 2 would present the same risk of accidents and spills as described for the Proposed Action. The types and volumes of hazardous materials and fuels, and the procedures and regulatory requirements for their management, would be the same as for the Proposed Action. The Preliminary Hazardous Materials Management and Emergency Response Plan, HMBP, SWPPP, and SPCC Plans described for the Proposed Action would also apply to Alternative 2. Mitigation Measure WATER-1 would require that all refueling and maintenance would occur at a designated area, within secondary containment with a volume sufficient to contain the largest fuel tank. In addition to the spill response and reporting requirements of the HMBP, SPCC, and SWPPP, Mitigation Measure WATER-1 would require the Applicant to notify BLM within 24 hours of any release outside of containment. Once construction has begun, Mitigation Measure WATER-1 would require periodic sampling and analysis of groundwater to verify that Project construction does not release contamination.

Compliance with existing regulations would reduce hazards, but would not completely avoid hazards to construction workers, the public, and the environment. Because the solar array area would be smaller for Alternative 2 than for the Proposed Action, Alternative 2 would involve a smaller geographic area and shorter construction period than the Proposed Action. Consequently, the potential for impacts related to releases of hazardous materials associated with the construction of Alternative 2 would be lower than those of Proposed Action. In addition, the potential for onsite releases of hazardous materials to impact the public under Alternative 2 is lower that the Proposed Action because the northern boundary of the solar array field under Alternative 2 would be a further distance from the nearest residents.

Operation and Maintenance

Operation of Alternative 2 would present the same risk of accidents and spills as described for the Proposed Action. The types and volumes of hazardous materials and fuels, and the procedures and regulatory requirements for their management, would be the same as for the Proposed Action. The Preliminary Hazardous Materials Management and Emergency Response Plan, HMBP, SWPPP, and SPCC Plans described for the Proposed Action would also apply to Alternative 2. Mitigation Measure WATER-1 would require that all refueling and maintenance would occur at a designated area, within secondary containment with a volume sufficient to contain the largest fuel tank. In addition to the spill response and reporting requirements of the HMBP, SPCC, and SWPPP, Mitigation Measure WATER-1 would require the Applicant to notify BLM within 24 hours of any release outside of containment. Once construction has begun, Mitigation Measure WATER-1 would require periodic sampling and analysis of groundwater to verify that Project construction does not release contamination.

As discussed in Section 2.5, the Resource Avoidance Alternative would use PV panels that contain a thin semiconductor layer containing CdTe. While CdTe itself is a hazardous substance in an isolated form, the CdTe in the PV panels is bound and sealed within the glass sheets and a laminate material (Fthenakis 2003, Fthenakis 2008). A report by the Norwegian Geotechnical Institute (NGI) notes that "If the modules are destroyed during use and are exposed to rain, emissions can occur; however, a very low vapour pressure and water solubility are expected to result in only trace emissions into the environment" (NGI 2010, p. 13). Additionally, an article that examined the potential for CdTe leaching from commercial rooftop solar PV installations found the worst-case modeled environmental concentrations in soil, air, and groundwater in a California-based scenario, are one to five orders of magnitude below human health screening levels (Sinha et al. 2012). If the Applicant chooses to use CdTe PV panels or panels containing another potentially toxic semiconductor material, implementation of Mitigation Measure HAZ-2, which requires the Applicant to prepare and implement a Broken PV Module Detection and Handling Plan, would minimize the potential for semiconductor leaching from damaged panels and would be required for operations as for construction.

Similar to construction, compliance with existing regulations would reduce hazards, but would not completely avoid the potential for releases. During operations, Mitigation Measure WATER-1 would require periodic site inspection, sampling, and analysis of groundwater and the leach field area to verify that Project operations do not release contamination. The potential for onsite releases of hazardous materials to impact the public under Alternative 2 is lower that the Proposed Action because the northern boundary of the solar array field under Alternative 2 would be a further distance from the nearest residents.

Decommissioning

Decommissioning of Alternative 2 would present the same risk of accidents and spills as described for the Proposed Action. Because the solar array area would be smaller for Alternative 2 than for the Proposed Action, Alternative 2 would involve a smaller geographic area and shorter decommissioning period than the Proposed Action. Consequently, the potential for impacts related to releases of hazardous materials associated with the decommissioning of Alternative 2 would be lower than those of Proposed Action. The Preliminary Hazardous Materials Management and Emergency Response Plan, HMBP, SWPPP, and SPCC Plans described for the Proposed Action would also apply to Alternative 2. In addition, the Applicant's Decommissioning and Site Reclamation Plan would also apply to Alternative 2.

As with construction and operations, compliance with existing laws and regulations would reduce, but not completely avoid potential impacts related to the routine use, storage, transportation, and disposal of hazardous materials associated with decommissioning. The site inspection, monitoring, and other requirements of Mitigation Measure WATER-1 would apply throughout decommissioning, to verify that decommissioning activities do not release contamination. The potential for onsite releases of hazardous materials to impact the public under Alternative 2 is lower that the Proposed Action because the northern boundary of the solar array field under Alternative 2 would be a further distance from the nearest residents.

Public Health

Construction, Operations, and Decommissioning

The impacts of Alternative 2 on public health would be the same as for the Proposed Action. Implementation of Mitigation Measure WATER-2, which requires a comprehensive drainage, stormwater, and sedimentation control plan, would reduce the potential for unintentional ponding of water onsite or downstream of the site. Implementation of Mitigation Measure AQ-1 would reduce fugitive dust during the construction phase of Alternative 2, which would reduce the risk to workers of contracting valley fever.

Transmission Line Safety and Nuisance

The location and operation of the gen-tie line under Alternative 2 would generally be the same as that under the Proposed Action, except the gen-tie line would be longer (3.89 miles in Alternative 2, as compared to 2.79 miles in the Proposed Action). The additional length would not result in the gen-tie line being any closer to residences. Therefore, there would be no impacts associated with Alternative 2.

Emergency Response

Construction, Operations, and Decommissioning

The impacts of Alternative 2 on emergency response capability would be the same as for the Proposed Action. The use of access roads for Alternative 2 would be the same, and the duration of peak construction and total number of truck trips may be reduced from that of the Proposed Action.

Aircraft Operations

Construction, Operations, and Decommissioning

As shown in Table 4.9-1, the distance between the Alternative 2 boundary and the airport property would be approximately the same as the Proposed Action. The acreage which overlaps Compatibility Zone E under Alternative 2 would be reduced to 311 acres, as compared to 424 acres under the Proposed Action. Because there are no open space or density restrictions in Zone E, this difference would not affect any impacts.

For structures on private land, ALUC review of projects for consistency with the ALUCP is required for all structures greater than 100 feet in height in Zone E. The ALUC conducted a similar consistency analysis for the adjacent BMSP, which would share the same gen-tie corridor as the DQSP. For that project, the ALUC found the project to be consistent with the RCALUCP. The height of the proposed gen-tie line towers for the DQSP would be 135 feet in height, similar to that of the BMSP gen-tie line. The RCALUC reviewed Alternative 2, and made a determination on October 21, 2016, that the alternative is consistent with the RCALUCP.

Because the transmission line and poles could affect navigable airspace, the FAA requires the Applicant to file Forms 7460-1, Notice of Proposed Construction or Alteration, and 7460-2, Notice of Actual Construction or Alteration. Following the Applicant's submittal of Form 7460-1 for the FAA's safety assessment at least 45 days prior to the start date of construction, the FAA would conduct a safety analysis to determine the effect of the proposed towers and transmission line on aircraft operations. The FAA conducted a similar safety analysis for the adjacent BMSP, which would share the same gen-tie corridor as the DQSP. For that project, the FAA issued "No Hazard to Air Navigation" Determinations for the 230 kV gen-tie line structures. Mitigation Measure HAZ-3 requires that Alternative 2 must receive a similar "Determination of No Hazard to Air Navigation" in order to proceed.

Intentionally Destructive Acts

Construction, Operations, and Decommissioning

The potential for intentionally destructive acts associated with Alternative 2 would be the same as for the Proposed Action.

4.9.3.3 Alternative 3: Reduced Project Alternative

Environmental Site Contamination

Construction, Operations, and Decommissioning

The results of the Phase I ESA discussed in Section 4.9.3.1, including the identification of oil and lubricant containers on the private land parcel and the lack of locked caps on two nearby groundwater supply wells, also apply to Alternative 3. The Phase I Environmental Site Assessment conducted for the Project site in 2015 did not identify evidence of any releases of hazardous substances or petroleum products on the BLM portion of the Project site, or in the immediate vicinity, based on records searches and visual surveys. Hazardous substances, in the form of partially-filled oil and lubricant containers and other trash and debris, were observed on the private land parcel, which would be included within Alternative 3. Therefore, the potential for the presence of contaminated soil or groundwater is the same as the Proposed Action.

To establish baseline environmental conditions, Mitigation Measure HAZ-1 requires the Applicant to perform a Phase II Environmental Site Assessment (ESA) prior to beginning construction. The scope of the Phase II ESA would include groundwater sampling in the vicinity of the two uncapped onsite wells, followed by capping of the onsite wells, to establish baseline groundwater quality and protect against future releases. In addition, the Phase II ESA would include removal of oil and lubricant containers identified on the private land parcel in the Phase I ESA, sampling of soil to identify potentially contaminated areas, and removal of any identified contaminated soil.

Fugitive dust would be generated during construction, operation, and decommissioning of Alternative 3. Implementation of dust suppression measures in Mitigation Measures AQ-1 and AQ-2 would reduce the potential for worker exposure to any hazardous materials that may be present in site soils by reducing the amount of dust released. In addition, implementation of Mitigation Measure HAZ-1, which requires the Applicant to prepare and implement a site-specific Hazardous Materials Management and Emergency Response Plan, would minimize potential exposures to existing hazardous materials if such materials are found to be present on site.

Unexploded Ordnance

Construction, Operations, and Decommissioning

Because all of the land area associated with Alternative 3 is also included within the Proposed Action area, the potential for the presence of UXO is expected to be the same or lower than the Proposed Action.

Risk of Accidents and Spills of Hazardous Materials

Construction

Construction of Alternative 3 would present the same risk of accidents and spills as described for the Proposed Action. The types and volumes of hazardous materials and fuels, and the procedures and regulatory requirements for their management, would be the same as for the Proposed Action. The Preliminary Hazardous Materials Management and Emergency Response Plan, HMBP, SWPPP, and SPCC Plans described for the Proposed Action would also apply to Alternative 3. Mitigation Measure WATER-1 would require that all refueling and maintenance would occur at a designated area, within secondary containment with a volume sufficient to contain the largest fuel tank. In addition to the spill response and reporting requirements of the HMBP, SPCC, and SWPPP, Mitigation Measure WATER-1 would require the Applicant to notify BLM within 24 hours of any release outside of containment. Once construction has begun, Mitigation Measure WATER-1 would require periodic sampling and analysis of groundwater to verify that Project construction does not release contamination.

Compliance with existing regulations would reduce hazards, but would not completely avoid hazards to construction workers, the public, and the environment. Because the solar array area would be smaller for Alternative 3 than for the Proposed Action, Alternative 3 would involve a smaller geographic area and shorter construction period than the Proposed Action. Consequently, the potential for impacts related to releases of hazardous materials associated with the construction of Alternative 3 would be lower than those of Proposed Action. In addition, the potential for onsite releases of hazardous materials to impact the public under Alternative 3 is lower that the Proposed Action because the northern boundary of the solar array field under Alternative 3 would be a further distance from the nearest residents.

Operation and Maintenance

Operation of Alternative 3 would present the same risk of accidents and spills as described for the Proposed Action. The types and volumes of hazardous materials and fuels, and the procedures and regulatory requirements for their management, would be the same as for the Proposed Action. The Preliminary Hazardous Materials Management and Emergency Response Plan, HMBP, SWPPP, and SPCC Plans described for the Proposed Action would also apply to Alternative 2. Mitigation Measure WATER-1 would require that all refueling and maintenance would occur at a designated area, within secondary containment with a volume sufficient to contain the largest fuel tank. In addition to the spill response and reporting requirements of the HMBP, SPCC, and SWPPP, Mitigation Measure WATER-1 would require the Applicant to notify BLM within 24 hours of any release outside of containment. Once construction has begun, Mitigation Measure WATER-1 would require periodic sampling and analysis of groundwater to verify that Project construction does not release contamination.

Similar to Alternative 2, Alternative 3 would use PV panels that contain a thin semiconductor layer containing CdTe. If the Applicant chooses to use CdTe PV panels or panels containing another potentially toxic semiconductor material, implementation of Mitigation Measure HAZ-2, which requires the Applicant to prepare and implement a Broken PV Module Detection and Handling Plan, would minimize the potential for semiconductor leaching from damaged panels and would be required for operations as for construction.

Similar to construction, compliance with existing regulations would reduce hazards, but would not completely avoid the potential for releases. During operations, Mitigation Measure WATER-1 would require periodic site inspection, sampling, and analysis of groundwater and the leach field area to verify that Project operations do not release contamination. The potential for onsite releases of hazardous materials to impact the public under Alternative 3 is lower that the Proposed Action because the northern boundary of the solar array field under Alternative 3 would be a further distance from the nearest residents.

Decommissioning

Decommissioning of Alternative 3 would present the same risk of accidents and spills as described for the Proposed Action. Because the solar array area would be smaller for Alternative 3 than for the Proposed Action, Alternative 3 would involve a smaller geographic area and shorter decommissioning period than the Proposed Action. Consequently, the potential for impacts related to releases of hazardous materials associated with the decommissioning of Alternative 3 would be lower than those of Proposed Action. The Preliminary Hazardous Materials Management and Emergency Response Plan, HMBP, SWPPP, and SPCC Plans described for the Proposed Action would also apply to Alternative 3. In addition, the Applicant's Decommissioning and Site Reclamation Plan would also apply to Alternative 3.

As with construction and operations, compliance with existing laws and regulations would reduce, but not completely avoid potential impacts related to the routine use, storage, transportation, and disposal of hazardous materials associated with decommissioning. The site inspection, monitoring, and other requirements of Mitigation Measure WATER-1 would apply throughout decommissioning, to verify that decommissioning activities do not release contamination. The potential for onsite releases of hazardous materials to impact the public under Alternative 3 is lower that the Proposed Action because the northern boundary of the solar array field under Alternative 3 would be a further distance from the nearest residents.

Public Health

Construction, Operations, and Decommissioning

The impacts of Alternative 3 on public health would be the same as for the Proposed Action. Implementation of Mitigation Measure WATER-2, which requires a comprehensive drainage, stormwater, and sedimentation control plan, would reduce the potential for unintentional ponding of water onsite or downstream of the site. Implementation of Mitigation Measure AQ-1 would reduce fugitive dust during the construction phase of Alternative 3, which would reduce the risk to workers of contracting valley fever.

Transmission Line Safety and Nuisance

The location and operation of the gen-tie line under Alternative 3 would generally be the same as that under the Proposed Action, except the gen-tie line would be longer (4.18 miles in Alternative 3, as compared to 2.79 miles in the Proposed Action). The additional length would not result in the gen-tie line being any closer to residences. Therefore, there would be no impacts associated with Alternative 3.

Emergency Response

Construction, Operations, and Decommissioning

The impacts of Alternative 3 on emergency response capability would be the same as for the Proposed Action. The use of access roads for Alternative 3 would be the same, and the duration of peak construction and total number of truck trips may be reduced from that of the Proposed Action.

Aircraft Operations

Construction, Operations, and Decommissioning

As shown in Table 4.9-1, the distance between the Alternative 3 boundary and the airport property would be 1.92 miles, as compared to approximately 1.6 miles under the Proposed Action and Alternative 2. The acreage which overlaps Compatibility Zone E under Alternative 3 would be reduced to 56 acres, as compared to 424 acres under the Proposed Action. Because there are no open space or density restrictions in Zone E, this difference would not affect any impacts.

For structures on private land, ALUC review of projects for consistency with the ALUCP is required for all structures greater than 100 feet in height in Zone E. The ALUC conducted a similar consistency analysis for the adjacent BMSP, which would share the same gen-tie corridor as the DQSP. For that project, the ALUC found the project to be consistent with the RCALUCP. The height of the proposed gen-tie line towers for the DQSP would be 135 feet in height, similar to that of the BMSP gen-tie line. The RCALUC reviewed Alternative 3, and made a determination on October 21, 2016, that the alternative is consistent with the RCALUCP.

Because the transmission line and poles could affect navigable airspace, the FAA requires the Applicant to file Forms 7460-1, Notice of Proposed Construction or Alteration, and 7460-2, Notice of Actual Construction or Alteration. Following the Applicant's submittal of Form 7460-1 for the FAA's safety assessment at least 45 days prior to the start date of construction, the FAA would conduct a safety analysis to determine the effect of the proposed towers and transmission line on aircraft operations. The FAA conducted a similar safety analysis for the adjacent BMSP, which would share the same gen-tie corridor as the DQSP. For that project, the FAA issued "No Hazard to Air Navigation" Determinations for the 230 kV gen-tie line structures. Mitigation Measure HAZ-3 requires that Alternative 3 must receive a similar "Determination of No Hazard to Air Navigation" in order to proceed.

Intentionally Destructive Acts

Construction, Operations, and Decommissioning

The potential for intentionally destructive acts associated with Alternative 3 would be the same as for the Proposed Action.

4.9.4 Application of CEQA Significance Thresholds

HAZ-1) Would the Project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

As discussed in Section 4.9.2, the Applicant has developed preliminary management plans related to the routine transport, use, and disposal of hazardous materials. There would be no routine emissions of hazardous materials from the facility under Alternatives 1, 2, or 3. Specifications and procedures for storage, use, transport, and disposal of hazardous materials and waste would be defined in the Hazardous Materials Management and Emergency Response Plan, HMBP, SWPPP, and SPCC Plans. The Hazardous Materials Management and Emergency Response Plan would define specific hazardous materials, as well as estimated volumes. The HMBP would include an inventory of hazardous materials, site map and building floor plans, training information, a description of hazardous materials handling and segregation, and plans for monitoring. The SWPPP would define procedures for managing and disposing of wastes in accordance with applicable regulations, and would also define storage locations and fueling procedures to protect water resources. The SPCC Plan would address the storage of oil or oil products, and would include a diagram showing the facility and locations of oil storage, description of the type of oil, methods used to prevent and control releases, and requirements for inspections, testing, employee training, and reporting. Limited pesticide use to control noxious weeds would occur, in accordance with a BLM-approved Integrated Weed Management Plan (IWMP). Pesticide use, if needed, would be limited to non-persistent, immobile pesticides applied only in accordance with manufacturer directions and all regulations for pesticide use. Any pesticide applications would be conducted within the framework of BLM and Department of Interior policies.

The only routine waste discharge would be associated with sanitary wastes disposed in the septic system. Mitigation Measure WATER-1 would require periodic site inspection, sampling, and analysis of groundwater and the leach field area to verify that routine Project activities do not release contamination.

With implementation of Mitigation Measures HAZ-1, HAZ-2, and WATER-1, impacts regarding the routine transport, use, and handling of hazardous materials during construction, operation, and decommissioning of Alternatives 1, 2, or 3 would be reduced to less than significant levels.

HAZ-2) Would the Project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

As discussed in Section 4.9.2, the Applicant has developed preliminary management plans related to the transport, use, and disposal of hazardous materials. The purpose of these procedures is to minimize the potential for upset and accident conditions to occur. In addition, these plans define procedures to be used to respond to accidental releases of hazardous materials into the environment. The HMBP would define an emergency response plan, include requirements for monitoring hazardous materials storage locations to ensure that any accidental release are identified and addressed in a timely manner. The SPCC Plan would address the methods used to prevent and control releases, and methods to be used to clean-up and dispose of recovered materials.

Implementation of Mitigation Measure HAZ-1 would be required under Alternatives 1, 2, or 3. Mitigation Measure HAZ-1 requires the Applicant to prepare and implement a site-specific Hazardous Materials Management and Emergency Response Plan, which would minimize potential exposures to existing hazardous materials if such materials are found to be present on site. If the Applicant chooses to use CdTe PV panels or panels containing another potentially toxic semiconductor material, implementation of Mitigation Measure HAZ-2, which requires the Applicant to prepare and implement a Broken PV Module Detection and Handling Plan, would minimize the potential for semiconductor leaching from damaged panels.

Compliance with existing regulations would reduce the potential for releases, but would not completely avoid hazards to construction workers, the public, and the environment. Although the Applicant proposes to refuel construction equipment at least 100 feet from any water body, water well or wetland, soil and groundwater contamination could still result from releases from fuel tanks on mobile fuel trucks or equipment, or as a result of the refueling process. Mitigation Measure WATER-1 would require that all refueling and maintenance would occur at a designated area, within secondary containment with a volume sufficient to contain the largest fuel tank. In addition to the spill response and reporting requirements of the HMBP, SPCC, and SWPPP, Mitigation Measure WATER-1 would require the Applicant to notify BLM within 24 hours of any release outside of containment. Mitigation Measure WATER-1 would require periodic sampling and analysis of groundwater to verify that Project construction, operations, and decommissioning do not release contamination.

Because of the relatively low volumes of hazardous materials and fuels onsite at any time, requirements for immediate response to releases, and flat topography that limits site runoff, it is unlikely that any accidental releases would extend beyond the boundaries of the Project area before they are identified and addressed. The closest residence (apparent occupied mobile home trailer) is located approximately 3,700 feet north of the northeast corner of the Proposed Action boundary. The next two closest sensitive air quality receptors are located in the residential community of Nicholls Warm Springs/Mesa Verde approximately 4,800 feet north of the northeast corner of the Proposed Action boundary. Although members of the public could potentially be present outside the Proposed Action area fence, there are no adjacent land uses or local residents which would result in the presence of large number of people who could be impacted by a release of hazardous materials.

With implementation of Mitigation Measures HAZ-1, HAZ-2, and WATER-1, impacts associated with the accidental release of hazardous materials during construction, operation, and decommissioning of Alternatives 1, 2, or 3 would be reduced to less than significant levels.

HAZ-3) Would the Project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Alternatives 1, 2, or 3 would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. No impacts would occur.

HAZ-4) Would the Project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment?

The Applicant's Phase I Environmental Site Assessment included a search for environmentally affected sites and other sites that are within a one-mile radius surrounding the proposed Project area, which includes the sites for Alternatives 2 and 3. The report (URS 2015) includes descriptions of each agency database, site names and addresses, and status, with some repetition existing among the different databases. There were no hazardous sites identified within the Project site, nor within the one-mile search radius of the Project site. Therefore, there would be no impact.

HAZ-5) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project result in a safety hazard for people residing or working in the project area?

Construction of a portion of the proposed Project would occur within the Blythe Airport Compatibility Zone E. Construction of the proposed Project would include the use of cranes to install gen-tie support poles up to 135 feet in height along a length of 2.79 miles of transmission line outside of Zone E, but within 20,000 feet of a runway. Construction of a portion of Alternatives 2 and 3 would occur within the Blythe Airport Compatibility Zone E, including a segment of the gen-tie line 1.08 miles long. Construction of Alternative 2 would include the use of cranes to install gen-tie support poles up to 135 feet in height along a length of 2.81 miles of transmission line outside of Zone E, and 1.08 miles within Zone E. Construction of Alternative 3 would include the use of cranes to install gen-tie support poles up to 135 feet in height along a length of 3.1 miles of transmission line outside of Zone E, and 1.08 miles within Zone E.

During pole installation for Alternatives 1, 2, or 3, the total height of the cranes would extend higher than the proposed towers. In such a situation, a separate notice to the FAA is required. The FAA would consider the proposed construction method, including use of cranes, in its safety assessment. With implementation of Mitigation Measure HAZ-3, which requires that the Applicant receive a "Determination of No Hazard to Air Navigation" in order to proceed, impacts would be less than significant.

HAZ-6) For a project within the vicinity of a private airstrip, would the Project result in a safety hazard for people residing or working in the project area?

Alternatives 1, 2, or 3 would not be within the vicinity of a private airstrip; therefore, no impact would occur.

HAZ-7) Would the Project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Alternatives 1, 2, or 3 would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; therefore, no impact would occur.

HAZ-8) Would the Project expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

Alternatives 1, 2, or 3 would not expose people or structures to a significant risk of loss, injury, or death involving wildland fires; therefore, no impact would occur.

HAZ-9) Would the Project result in an inconsistency with an Airport Master Plan?

The RCALUC reviewed the Project, and made a determination on November 6, 2015 that the Project is consistent with the RCALUCP. Impacts would be less than significant.

The RCALUC reviewed Alternative 2 and Alternative 3, and made a determination on October 21, 2016 that both are consistent with the RCALUCP. Impacts would be less than significant.

HAZ-10) Would the Project require review by the Airport Land Use Commission?

The RCALUC reviewed the Project, and made a determination on November 6, 2015, that the Project is consistent with the RCALUCP. Impacts would be less than significant.

The RCALUC reviewed Alternative 2 and Alternative 3, and made a determination on October 21, 2016 that both are consistent with the RCALUCP. Impacts would be less than significant.

4.9.5 Alternative 4: No Action Alternative

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, the BLM would continue to manage the land under its land use jurisdiction consistent with the site's multiple use classification as described in the CDCA Plan, as it was amended by the Western Solar Plan.

If the site remained undeveloped, the existing environmental setting described in Section 3.9 would be maintained. No hazardous materials would be brought to the Project area, no disturbance of site soils would occur, and no gen-tie line would be constructed, and therefore Alternative 4 would not result in any impacts associated with hazards or hazardous materials.

4.9.6 Cumulative Impacts

The geographic scope considered for cumulative impacts associated with hazardous materials, emergency response, environmental site contamination, and public health is the area within a one mile of the boundary of the Project. One mile is the standard search distance for hazardous materials in a Phase I Environmental Site Assessment, and also includes all areas within which a receptor might be expected to experience impacts from a release of hazardous materials from the Project. The geographic scope for cumulative effects related to aviation safety is the Blythe

Airport Influence Area. The temporal scope of hazardous materials and aviation safety impacts would occur throughout the life of the Project, but would cease following Project decommissioning. Although transmission lines could accommodate power from other nearby electricity generation projects following decommissioning, such use is speculative, and not associated with any reasonably foreseeable future project.

Alternative 1 – Proposed Action

Construction, Operations, and Decommissioning

As discussed in Section 4.9.3.1, the potential for the Proposed Action to release hazardous materials which would present a risk to workers or the public is low. The APMs discussed in Section 4.9.2, including implementation of the Preliminary Hazardous Materials Management and Emergency Response Plan, HMBP, SWPPP, and SPCC Plans, and Mitigation Measures HAZ-1 and HAZ-2, would minimize the potential for a release of hazardous materials. The only past, present, and reasonably foreseeable future projects within one mile include the RE Crimson Solar Project, NRG Blythe PV Project, BMSP, and transmission lines within the corridors along the southwestern and northern boundaries of the Proposed Action area. These projects would each require an Environmental Site Assessment to identify site conditions before construction begins, and would each be subject to same agency regulations that address the handling and accidental release of hazardous materials. For the Proposed Action, implementation of Mitigation Measure WATER-2, which requires a comprehensive drainage, stormwater, and sedimentation control plan, would reduce the potential risk of mosquito breeding on or near the site, and therefore would reduce the risk for workers and the public of contracting vector-borne diseases. Similarly, implementation of Mitigation Measure AQ-1 would reduce fugitive dust during the construction phase, which would reduce the risk to workers of contracting valley fever. The past, present, and reasonably foreseeable future projects would be subject to similar agency regulations, APMs, and agency-required mitigation measures to reduce the potential for public health hazards. Therefore, each would also have a limited potential for releasing hazardous materials, and the contribution of the Project to cumulative impacts associated with hazardous materials would not be cumulatively considerable (impacts HAZ-1 through HAZ-4, and HAZ-8). None of the past, present, or reasonably foreseeable future projects within one mile are expected to have impacts to emergency response capabilities. During operations, transmission lines and solar power plant projects have limited numbers of workers and associated traffic. If there were overlapping construction periods for the DQSP, BMSP, RE Crimson Solar Project, and gen-tie lines for other projects, traffic levels could increase and potentially affect emergency response capability in limited local areas. However, concurrent construction of all of these projects is unlikely, given their different timeframes for environmental analysis and permitting. In addition, all of these projects are located in undeveloped, rural areas, and would not impact emergency response in populated areas at the Nichols Warm Springs/Mesa Verde community or in Blythe. Therefore, the incremental effects of the Proposed Action, when considered together with the effects of past, present, and reasonably foreseeable projects, would not create a cumulatively considerable impact to emergency response capability (impact HAZ-7).

Several of the current projects involve transmission lines constructed within the Blythe AIA. The Project would share Corridor K/30-52 with the gen-tie lines of other local solar projects, including the adjacent BMSP. Each individual power plant and transmission line must be evaluated by the FAA for its potential impact to air navigation. For the BMSP, the FAA has issued "No Hazard to Air Navigation" Determinations for the 230 kV gen-tie line structures. In general, multiple parallel transmission lines at the same height and distance from the airport would not be expected to create a cumulative risk to aircraft safety that is greater than the risk posed by an individual transmission line. However, the BMSP towers would be 85 to 125 feet high, while the height of the proposed gen-tie line towers for the DQSP may be up to 135 feet in height. Therefore, it is unknown if the DQSP would receive a similar "No Hazard" determination, which would be required prior to construction of the Proposed Action. Mitigation Measure HAZ-3 requires that the Applicant receive a "Determination of No Hazard to Air Navigation" in order to proceed. The FAA "Determination of No Hazard to Air Navigation" must address the "Cumulative impact resulting from the proposed construction or alteration of a structure when combined with the impact of other existing or proposed structures" (USDOT 2013). The issuance of this determination for the DQSP would signify that no adverse cumulative impact would result from the Proposed Action in combination with other projects within the Blythe Airport Compatibility Area. With this determination required under Mitigation Measure HAZ-3, the Proposed Action would not incrementally contribute to any risk to aircraft safety (impacts HAZ-5, HAZ-6, HAZ-9, and HAZ-10).

With respect to intentionally destructive acts, potential cumulative impacts could occur if such acts on multiple facilities could release hazardous materials or result in power disruption. Individually, each of the past, present, and reasonably foreseeable future projects, including the DQSP, would contribute an incremental "low vulnerability" determination with respect to intentionally destructive acts, because each would have security measures in place and public access would be strictly controlled. Although possible, it seems unlikely that the targeting of multiple renewable energy facilities in the area could occur, and even less likely that it would result in a catastrophic event. Therefore, there is a low potential that the Proposed Action could combine with the individual threat levels of other past, present, or reasonably foreseeable future energy generation projects to create a cumulative impact.

Alternative 2 – Resource Avoidance Alternative

Construction, Operations, and Decommissioning

As discussed in Section 4.9.3.2, the impacts of Alternative 2 with respect to hazardous materials and environmental site contamination, public health, emergency response, aircraft operations, and intentionally destructive acts are, in all cases, the same or slightly lower than that described for the Proposed Action. Alternative 2 would occupy a smaller land area, and would involve a reduced duration and level of effort required for construction and decommissioning. The regulatory requirements, APMs, and agency-imposed mitigation measures would be the same for Alternative 2 as for the Proposed Action. Therefore, the potential for Alternative 2 to contribute incrementally to cumulative impacts with respect to hazardous materials and environmental site contamination, public health, emergency response, and intentionally destructive acts would be approximately the same as those described for the Proposed Action.

Alternative 3 – Reduced Project Alternative

Construction, Operations, and Decommissioning

As discussed in Section 4.9.3.3, the impacts of Alternative 3 with respect to hazardous materials and environmental site contamination, public health, emergency response, aircraft operations, and intentionally destructive acts are, in all cases, the same or slightly lower than that described for the Proposed Action. Alternative 3 would occupy a smaller land area, and would involve a reduced duration and level of effort required for construction and decommissioning. The regulatory requirements, APMs, and agency-imposed mitigation measures would be the same for Alternative 3 as for the Proposed Action. Therefore, the potential for Alternative 3 to contribute incrementally to cumulative impacts with respect to hazardous materials and environmental site contamination, public health, emergency response, and intentionally destructive acts would be approximately the same as those described for the Proposed Action.

Alternative 4 – No Action

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project, and the DQSP would not be implemented. The public lands in the Project area would continue to be managed by BLM in accordance with existing land use designations in the CDCA Plan, which could include a different solar project, or other development. Alternative 4 would not contribute to cumulative hazardous materials impacts.

4.9.7 Residual Impacts

Following implementation of Mitigation Measures HAZ-1, HAZ-2, HAZ-3, UXO-1, and TSLN-1, as well as AQ-1, AQ-2, and WATER-2, potential impacts related to hazards and hazardous materials would be avoided or substantially reduced. However, hazardous materials would always be present on the Project site, and although compliance with mitigation measures and existing regulations would reduce hazards, they would not completely avoid hazards to construction workers, the public, and the environment.

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4.10 Lands, Realty, and Agricultural and Forestry Resources

4.10.1 Methodology for Analysis

4.10.1.1 NEPA Requirements

Evaluation of potential land use impacts of the Proposed Action and Alternatives is based on review of the BLM Master Title Plats and Land & Mineral Legacy Rehost 2000 System (LR2000) to obtain information related to pending and authorized uses on the lands potentially affected by the Project and its ancillary facilities.

The assessment is based on impacts from the Project on rights-of-way and land use permits for the Project site and adjacent BLM lands. Potential land use conflicts are identified and evaluated based on existing land uses, land uses proposed as part of the Proposed Action and Alternatives, Federal land use designations established in the CDCA Plan and its amendments, and BLM standards and policies related to land use. Land use compatibility is based on the intensity and patterns of adjacent land use to determine whether the Project would result in incompatible uses or nuisances. Potential land use conflicts may result from environmental effects, such as generation of noise, dust, or heavy truck traffic.

The analysis of CDCA Plan Consistency presented in Appendix F is based on review of the Multiple-Use Class (MUC) Guidelines provided in Table 1 of the CDCA Plan. As discussed in Section 3.10.1.3, the DRECP established new land use designations which replace the MUCs that are currently in effect under the CDCA Plan. In the DRECP, the Project site has been designated as a Development Focus Area (DFA), which is an area where activities associated with solar, wind, and geothermal energy are allowed, streamlined, and incentivized. Because the application is not subject to the terms of the DRECP, the multiple-use class designations of the CDCA Plan are still applicable. Another reason that the analysis of the Project in this PA/EIS/EIR is not based on the DRECP is that it is based on the land use designations and visual resource classifications that were in effect on March 6, 2015, the date of the NOI. DRECP's designations and classifications were not issued until 18 months later. Therefore, this analysis was prepared by reviewing the applicable CDCA Plan requirements and concepts (including multiple-use, sustained yield, and maintenance of environmental quality) for MUC-M land, and evaluating the Project to determine whether it would be consistent with them. A discussion of the differences between the CDCA Plan and the DRECP land use allocations, and their effect on the analysis of the Project in this PA/EIS/EIR, is presented in Appendix E.

Appendix B of the ROD for the Designation of Energy Corridors on Bureau of Land Management-Administered Lands in the 11 Western States (BLM 2009) specifies IOPs to meet the Section 368 requirement to improve the ROW application process and to meet NEPA requirements to provide practicable means to avoid or minimize environmental harm which may result from future ROW grants within the designated corridors. The IOPs specify regulatory compliance, agency coordination, government-to-government consultation, project design, and resource-specific considerations that must be addressed through NEPA analysis of the proposed use of the corridor. The manner in which the Project and the PA/EIS/EIR conforms to the IOPs is presented in Appendix F, Table F-1.

The privately owned parcel under Riverside County jurisdiction is designated as Open Space-Rural in the Riverside County General Plan (Riverside County 2015a). The policies that are relevant to the Project are presented within the discussion of each resource throughout Chapter 3. The conformance of the Project with these policies is evaluated through Chapter 4, and is summarized in Appendix F, Table F-2.

4.10.1.2 CEQA Significance Criteria

The criteria listed below were used to determine if the proposed Project would result in impacts to land use. These criteria were obtained from the CEQA Environmental Checklist, Appendix G of the state CEQA Guidelines for Land Use and Planning. Under CEQA, the proposed Project and alternatives would have a significant impact on land use if they would:

> LU-1) Physically divide an established community.
>
> LU-2) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project (including but not limited to the general plan, specific plan, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect.
>
> LU-3) Conflict with any applicable habitat conservation plan or natural community conservation plan.

The following additional significance criteria from the County of Riverside CEQA Environmental Assessment form are used in the analysis. A project could have potentially significant impacts if it would:

> LU-4) Result in a substantial alteration of the present or planned land use of an area.
>
> LU-5) Affect land use within a city sphere of influence and/or within adjacent city or county boundaries.
>
> LU-6) Be inconsistent with the site’s existing or proposed zoning.
>
> LU-7) Be incompatible with existing surrounding zoning.
>
> LU-8) Disrupt or divide the physical arrangement of an established community (including a low income or minority community).

This section also evaluates impacts related to agricultural and forestry resources. These criteria were obtained from the CEQA Environmental Checklist, Appendix G of the state CEQA Guidelines for Agriculture and Forest Resources. Under CEQA, the proposed Project and alternatives would have a significant impact on agriculture or forestry resources if they would:

> AG-1) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the map prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.
>
> AG-2) Conflict with existing zoning for agricultural use, or a Williamson Act contract.
>
> AG-3) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 1220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g)).
>
> AG-4) Result in the loss of forest land or conversion of forest land to non-forest use.

AG-5) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use.

The following additional significance criteria from the County of Riverside CEQA Environmental Assessment Form are also used in the analysis. A project could have potentially significant impacts if it would:

AG-6) Conflict with land within a Riverside County Agricultural Preserve.

AG-7) Cause development of non-agricultural uses within 300 feet of agriculturally zoned property (Ordinance No. 625, "Right-to-Farm").

4.10.2 Applicant-Proposed Measures

There are no APMs proposed to address potential effects to lands and realty.

4.10.3 Direct and Indirect Impacts

4.10.3.1 Alternative 1: Proposed Action

This impact assessment is based on known impacts from construction, operation, maintenance, and decommissioning on ROWs and land use permits of all types on BLM-administered land. Potential land use conflicts are identified and evaluated based on existing land uses, land uses proposed as part of the Proposed Action, Federal land use designations established in the CDCA Plan, and BLM land use-related standards and policies. Land use compatibility is based on the intensity and patterns of land use to determine whether the Proposed Action would result in incompatible uses or nuisances.

Occupation of Land Area

The acreage that would be occupied by the Proposed Action is presented in Table 2-4. The Proposed Action would occupy 3,616 acres of BLM public land, and 154 acres of private land. As the Project site is undeveloped, the only land use expected to be disrupted would be dispersed recreation and OHV use, which are discussed in Section 4.14, *Recreation and Public Access*. BLM would retain the right to issue other compatible ROWs within the boundary of the DQSP ROW. The Proposed Action would also temporarily occupy 61 acres of BLM public land for construction. Following construction, this land area would again become available for other land uses.

Impacts to Land Use Plans

The Applicant has requested a ROW grant (Application CACA-049397) from the BLM for approximately 5,115 acres of public land. The Proposed Action site is within the BLM's California Desert District and within the planning boundaries of the CDCA Plan. As discussed in Section 2.2.3, the Final Western Solar Plan recognizes the DQSP as a "pending" ROW application (Western Solar Plan §9.4.22.2, p. 9.4-133). Pending applications like the DQSP are not subject to the Western Solar Plan (Western Solar Plan ROD Section B.1.2) or to the CDCA Plan amendments made in that decision. Therefore, if the BLM elects to approve the ROW grant application for the DQSP, a Project-specific CDCA Plan Amendment (PA) to identify the development footprint as suitable for the proposed type of solar energy use would be required.

The CDCA Plan would also need to be amended to authorize the portion of the gen-tie corridor which is located outside of BLM's Utility Corridor K and Section 368 Federal Energy Corridor 30-52.

An evaluation of the conformance of the Project with the specific elements of the CDCA Plan is presented in Appendix F. No changes in the MUC-M classification would be required prior to approving the ROW grant, and as discussed in the consistency analysis in Appendix F, the land use activities associated with the Proposed Action would be consistent with MUC Guidelines.

A portion of the Proposed Action would also be constructed on approximately 154 acres of private land under the land use authority of Riverside County. The compliance of the Project with the Riverside County General Plan (Riverside County 2015a), Palo Verde Valley Area Plan (Riverside County 2015b), and Riverside County Zoning Ordinance is discussed in Appendix F and Table F-2. With approval of the conditional use permit by the Riverside County Board of Supervisors, a solar power plant on a lot 10 acres or larger would be a permitted use on private land that is zoned W-2-10.

Impacts to Designated Corridors

As shown in Figure 3.10-2, the proposed ROW overlies portions of Utility Corridor J and Corridor K/30-52. Use of the land within either corridor for the gen-tie line, solar arrays, or for other uses could impact current uses of the corridors, as well as limit future uses of the corridors for other projects.

The gen-tie line for the Proposed Action would be sited almost entirely within utility Corridor K/30-52. As discussed in Appendix D, Section D.10.1, Appendix B of the Resource Management Plan Amendments/Record of Decision (ROD) for Designation of Energy Corridors on Bureau of Land Management-Administered Lands in the 11 Western States (BLM 2009) specifies Interagency Operating Procedures (IOPs) to meet the Section 368 requirement to improve the ROW application process and to meet NEPA requirements to provide practicable means to avoid or minimize environmental harm which may result from future ROW grants within the designated corridors. An evaluation of the conformance of the Project with the IOPs is presented in Appendix F, Table F-1.

With respect to the use of the corridor by the gen-tie line, the majority of the line and the new access road would parallel other approved transmission lines already present or approved within the corridor. Only at the entrance to the CRSS would the gen-tie line need to cross other existing transmission lines. The Applicant has coordinated with the operators of other transmission lines in the corridor to minimize conflicts, and the Proposed Action gen-tie line would be collocated with other transmission lines to the extent feasible. Project components would be consistent with the requirements of CPUC General Order No. 95 regarding the configurations of utility lines in shared ROWs. Construction and operation of these new linear facilities using industry SOPs and BMPs for crossing over existing authorized uses would effectively mitigate potential negative impacts to existing authorized users. Although there are other ROWs currently authorized within Corridor K/30-52, several thousand feet of width would remain within the corridors to accommodate the gen-tie line, leaving sufficient space to accommodate anticipated near-future needs. However, the use of the energy transmission corridor by a gen-tie line would have an impact on siting of energy transmission within the corridor, for if constructed, the physical space occupied by the gen-tie would likely preclude siting of transmission in that same space.

In addition to the gen-tie line, underground, hard-wired fiber-optic cable would partially run perpendicular to Corridor K/30-52 to connect the site to existing communications cables, located approximately one mile to the north. With modern technology, impacts from the perpendicular cable and power lines would be expected to be minimal, easily mitigated and would not preclude continued and future use of either designated corridor. As noted above, future use would be slightly constrained by placement of additional facilities within the corridors.

Any existing authorization that would be affected by the Proposed Action has “priority rights” in the sense that any new authorization(s) would be issued “subject to” the previously granted rights of the existing ROW holders. Therefore, the Applicant would be required to mitigate any potential impact to the existing users at the Applicant’s expense. This would mean bearing all costs for relocating or modifying any facilities such as power poles or conductors that might be necessary to accommodate the new use. This priority right attaches when a ROW is granted; subsequent grants of ROW would be issued subject to the rights of prior grants. Here, if and after the proposed ROW is granted for the Proposed Action, subsequent applicants would have to mitigate any impact of their proposals to the Project.

As shown in Figure 3.10-2, the solar arrays associated with the Proposed Action would not conflict with any current uses within Corridors J or K/30-52. However, future uses within Corridor J could be impacted, because the Proposed Action solar arrays would overlie portions of the corridor. The width of Corridor J in this area is approximately 11,500 feet, and the solar arrays of the Proposed Action would occupy approximately 5,500 feet (48 percent) of this width.

As discussed in Section 2.2.3, the Proposed Action gen-tie line would be sited almost entirely within utility Corridor K/30-52. Because the CRSS is sited approximately 1,500 feet south of the southern boundary of Corridor K/30-52, the portion of the gen-tie corridor between the corridor and the CRSS would be located outside of the corridor, and would require consideration through the CDCA Plan Amendment process. Therefore, if the BLM elects to approve the ROW grant application for the Proposed Action, a Project-specific PA would be required.

4.10.3.2 Alternative 2: Resource Avoidance Alternative

In general, the types of land use impacts that would occur as a result of Alternative 2 are the same as those which would occur under the Proposed Action. The acreage that would be occupied by Alternative 2 is presented in Table 2-5. Alternative 2 would occupy 2,622 acres of BLM public land, and 160 acres of private land. Alternative 2 would also temporarily occupy 63.6 acres of BLM public land for construction. Following construction, this land area would again become available for other land uses. As with the Proposed Action, the only land use expected to be disrupted would be dispersed recreation and OHV use. BLM would retain the right to issue other compatible ROWs within the boundary of the DQSP ROW.

The relationship of the Alternative 2 site to applicable land use plans is the same as described for the Proposed Action. The entire BLM land area is classified as MUC-M, and a Project-specific PA to identify the development footprint as suitable for the proposed type of solar energy use would be required. The CDCA Plan would also need to be amended to authorize the portion of the gen-tie corridor which is located outside of BLM’s Utility Corridor K and Section 368 Federal Energy Corridor 30-52. The use of the private land would be approximately the same under the Proposed Action and Alternative 2. With approval of the conditional use permit by the

Riverside County Board of Supervisors, a solar power plant on a lot 10 acres or larger would be a permitted use on private land that is zoned W-2-10.

The ROW associated with Alternative 2 would overly portions of both Utility Corridor J and Corridor K/30-52, similar to the Proposed Action. The use of Corridor K/30-52 for the gen-tie line and new access road would be the same as for the Proposed Action. The gen-tie line would be collocated with other transmission lines to the extent feasible. Project components would be consistent with the requirements of CPUC General Order No. 95 regarding the configurations of utility lines in shared ROWs. Construction and operation of these new linear facilities using industry SOPs and BMPs for crossing over existing authorized uses would effectively mitigate potential negative impacts to existing authorized users. Several thousand feet of width would remain within the corridors to accommodate the gen-tie line, leaving sufficient space to accommodate anticipated future needs.

As with the Proposed Action, the solar arrays associated with Alternative 2 could impact future uses within Corridor J, because they would overlie portions of the corridor. The width of Corridor J in this area is approximately 11,500 feet, and the solar arrays of Alternative 2 would occupy approximately 5,219 feet (45 percent) of this width.

The gen-tie line for Alternative 2 would be sited almost entirely within utility Corridor K/30-52 but, like the Proposed Action, would include segments located outside of the corridor. Because the CRSS is sited approximately 1,500 feet south of the southern boundary of Corridor K/30-52, the portion of the gen-tie corridor between the corridor and the CRSS would be located outside of the corridor, and would require consideration through the CDCA Plan Amendment process. In addition, a short segment of the gen-tie line extending north from the On-Site Substation to the corridor would be located outside of the corridor. Therefore, if the BLM elects to approve the ROW grant application for Alternative 2, a Project-specific PA would be required.

4.10.3.3 Alternative 3: Reduced Project Alternative

In general, the types of land use impacts that would occur as a result of Alternative 3 are the same as those which would occur under the Proposed Action. The acreage that would be occupied by Alternative 3 is presented in Table 2-6. Alternative 3 would occupy 1,887 acres of BLM public land, and 160 acres of private land. Alternative 3 would also temporarily occupy 65 acres of BLM public land for construction. Following construction, this land area would again become available for other land uses. As with the Proposed Action, the only land use expected to be disrupted would be dispersed recreation and OHV use. BLM would retain the right to issue other compatible ROWs within the boundary of the DQSP ROW.

The relationship of the Alternative 3 site to applicable land use plans is the same as described for the Proposed Action. The entire BLM land area is classified as MUC-M, and a Project-specific PA to identify the development footprint as suitable for the proposed type of solar energy use would be required. The CDCA Plan would also need to be amended to authorize the portion of the gen-tie corridor which is located outside of BLM's Utility Corridor K and Section 368 Federal Energy Corridor 30-52. The use of the private land would be approximately the same under the Proposed Action and Alternative 3. With approval of the conditional use permit by the Riverside County Board of Supervisors, a solar power plant on a lot 10 acres or larger would be a permitted use on private land that is zoned W-2-10.

The ROW associated with Alternative 3 would overly portions of both Utility Corridor J and Corridor K/30-52, similar to the Proposed Action. The use of Corridor K/30-52 for the gen-tie line and new access road would be the same as for the Proposed Action. The gen-tie line would be collocated with other transmission lines to the extent feasible. Project components would be consistent with the requirements of CPUC General Order No. 95 regarding the configurations of utility lines in shared ROWs. Construction and operation of these new linear facilities using industry SOPs and BMPs for crossing over existing authorized uses would effectively mitigate potential negative impacts to existing authorized users. Several thousand feet of width would remain within the corridors to accommodate the gen-tie line, leaving sufficient space to accommodate anticipated future needs.

As with the Proposed Action, the solar arrays associated with Alternative 3 could impact future uses within Corridor J, because they would overlie portions of the corridor. The width of Corridor J in this area is approximately 11,500 feet, and the solar arrays of Alternative 3 would occupy approximately 5,219 feet (45 percent) of this width.

The gen-tie line for Alternative 3 would be sited almost entirely within utility Corridor K/30-52 but, like the Proposed Action, would include segments located outside of the corridor. Because the CRSS is sited approximately 1,500 feet south of the southern boundary of Corridor K/30-52, the portion of the gen-tie corridor between the corridor and the CRSS would be located outside of the corridor, and would require consideration through the CDCA Plan Amendment process. In addition, a short segment of the gen-tie line extending north from the On-Site Substation to the corridor would be located outside of the corridor. Therefore, if the BLM elects to approve the ROW grant application for Alternative 3, a Project-specific PA would be required.

4.10.4 Application of CEQA Significance Thresholds

The proposed Project area does not include any designated farmlands or forest lands and therefore would not convert these uses to non-agricultural or non-forest land uses. The proposed Project would be consistent with current zoning and applicable land use plans. Therefore, impacts would be less than significant during construction, operation, maintenance, and decommissioning.

LU-1) Would the Project physically divide an established community?

Alternatives 1, 2, or 3 would not physically divide an established community. The Alternative 1, 2, and 3 areas would each be southwest of an existing community (Nicholls Warm Springs/Mesa Verde) and no part of Alternatives 1, 2, or 3 would be located through an established community. No impacts would occur.

LU-2) Would the Project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project (including but not limited to the general plan, specific plan, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

The private land portion of Alternatives 1, 2, or 3 would be subject to the RCGP and PVVAP. The BLM portion of Alternatives 1, 2, or 3 would be subject to the CDCA Plan and its amendments. An evaluation of the conformance of the Project with the specific elements of the

CDCA Plan is presented in Appendix F, and the compliance of the Project with the Riverside County General Plan (Riverside County 2015a), Palo Verde Valley Area Plan (Riverside County 2015b), and Riverside County Zoning Ordinance is discussed in Appendix F and Table F-2.

With approval of the conditional use permit by the Riverside County Board of Supervisors, a solar power plant on a lot 10 acres or larger would be a permitted use on private land that is zoned W-2-10.

The Alternative 1, Alternative 2, or Alternative 3 gen-tie line would be sited almost entirely within BLM's Utility Corridor K/30-52. Because the CRSS is sited approximately 1,500 feet south of the southern boundary of Corridor K/30-52, the portion of the gen-tie corridor between Corridor K/30-52 and the CRSS would be located outside of the utility corridor, and would require consideration through the CDCA Plan Amendment process. In addition, for Alternative 2 or Alternative 3, a short segment of the gen-tie line extending north from the On-Site Substation to the corridor would be located outside of the corridor. The CDCA Plan would also be amended to identify the development footprint as suitable for the proposed type of solar energy use. Impacts would be considered less than significant.

LU-3) Would the Project conflict with any applicable habitat conservation plan or natural community conservation plan?

As discussed in Sections 4.3, *Biological Resources - Vegetation* and 4.4, *Biological Resources - Wildlife*, Alternatives 1, 2, or 3 would not be within the jurisdiction of any adopted habitat conservation plan or natural community conservation plan; therefore, no impacts would occur.

LU-4) Would the Project result in a substantial alteration of the present or planned land use of an area?

Alternatives 1, 2, and 3 would be partially located on private lands that would be conditionally consistent (with approval of the conditional use permit) with the RCGP and the PVVAP. The gen-tie line and remaining solar facilities would be located on BLM-managed lands within the Riverside East SEZ and thus would be consistent with the CDCA Plan and NECO Plan Amendment to the CDCA Plan, though a land use plan amendment would be required for part of the gen-tie line (near the CRSS) because it would be located outside of Corridor K/30-52. Alternatives 1, 2, and 3 would also require a CDCA Plan amendment to identify the development footprint as suitable for the proposed type of solar energy use, consistent with provisions already included in the CDCA Plan. Therefore, Alternatives 1, 2, and 3 would be consistent with present or planned land use of the area; impacts would be less than significant.

LU-5) Would the Project affect land use within a city sphere of influence and/or within adjacent city or county boundaries?

Alternatives 1, 2, and 3 are located outside of the City of Blythe's boundary and outside the City of Blythe's Sphere of Influence. Therefore, no impacts would occur to land uses within Blythe or the City's sphere of influence.

LU-6) Would the Project be inconsistent with the site's existing or proposed zoning?

As described for LU-2, Alternatives 1, 2, and 3 would be conditionally consistent with the existing zoning designation (W-2-10) for the privately-owned 160 acre inholding within the Project area with the approval of the conditional use permit. The gen-tie line and solar facilities located on BLM lands would be consistent with the CDCA Plan and NECO Plan Amendment to the CDCA Plan as described in LU-4. Alternatives 1, 2, or 3 would not require a zone change or general plan amendment. Therefore, the proposed Project would be consistent with the site's existing zoning. No impacts would occur.

LU-7) Would the Project be incompatible with existing surrounding zoning?

The zoning surrounding the Alternatives 1, 2, and 3 areas is similar to that of those areas (private property is zoned W-2-10). Therefore, Alternatives 1, 2, and 3 would each be compatible with existing surrounding zoning. No impacts would occur.

LU-8) Would the Project disrupt or divide the physical arrangement of an established community (including a low-income or minority community)?

Alternatives 1, 2, or 3 would not be located through an established community (see LU-1). No impacts would occur.

AG-1) Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the map prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

As stated in Section 3.10, there are no Prime Farmland, Unique Farmland, or Farmland of Statewide Importance lands within the Alternative 1, 2, or 3 areas (California Department of Conservation 2014). The 160-acre private property inholding within the Project area was formerly used to grow jojoba, but is not designated Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. None of the BLM lands are identified as Prime, Unique, or Farmland of Statewide Importance. No impacts would occur.

AG-2) Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

As stated in Section 3.10, there are no Williamson Act contracts on lands within or adjacent to the Alternative 1, 2, or 3 areas (California Department of Conservation 2012). The privately-owned inholding within the proposed Project area is currently zoned Controlled Development Areas (W-2-10) (10-acre minimum) (Riverside County 2015b). Within the zoning ordinance under e. Public Utilities Uses, (2) Structures and the pertinent facilities necessary and incidental to the development and transmission of electrical power and gas such as hydroelectric power plants, booster or conversion plants, transmission lines, pipe lines and the like are allowed within the W-2 zone with issuance of the conditional use permit. Therefore, Alternatives 1, 2, and 3 would not conflict with existing zoning or a Williamson Act contract. No impacts would occur.

AG-3) Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 1220(g)), timberland (as defined by Public

Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

As described in Section 3.10, there are no forest lands, timberland or timberland zoned Timberland Production within the Alternative 1, 2, or 3 areas. Therefore no impacts would occur.

AG-4) Would the project result in the loss of forest land or conversion of forest land to non-forest use?

As described in Section 3.10, there are no forest lands within the Alternative 1, 2, or 3 areas. Therefore no impacts would occur.

AG-5) Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use.

As described in Section 3.10, there are no forest lands within the Alternative 1, 2, or 3 areas. Thus there would be no conversion of forest land to non-forest use. Though the 160-acre private property inholding was formerly used to grow jojoba, the property is not currently used for agriculture. Therefore, use of the property for Alternatives 1, 2, or 3 would not result in the conversion of farmland to non-agricultural use. No impacts would occur.

AG-6) Would the project conflict with land within a Riverside County Agricultural Preserve?

Alternatives 1, 2, and 3 are not located within a Riverside County Agricultural Preserve. Therefore no impacts would occur.

AG-7) Would the project cause development of non-agricultural uses within 300 feet of agriculturally zoned property (Ordinance No. 625, "Right-to-Farm")?

Alternatives 1, 2, and 3 would be allowed as a conditional use on County lands zoned for Controlled Development Areas. As explained earlier, the proposed Project would not create use conflicts with agricultural use or otherwise interfere with use of agricultural-zoned property adjacent to the Alternative 1, 2, or 3 areas. The impact would be less than significant.

4.10.5 Alternative 4: No Action Alternative

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, the BLM would continue to manage the land under its land use jurisdiction consistent with the site's multiple use classification as described in the CDCA Plan, as it was amended by the Western Solar Plan.

If the site remained undeveloped, the existing environmental setting described in Section 3.10 would be maintained. Existing land uses would continue uninterrupted, and there would be no impact on future land uses. Therefore Alternative 4 would not result in any land use impacts.

4.10.6 Cumulative Impacts

The geographic scope of the cumulative effects analysis for lands and realty includes other MUC-M land in eastern Riverside County, the Project site and the location of ancillary facilities, adjacent land uses, and the designated utility corridors. Potential cumulative effects on lands and realty could occur during the Project's proposed 46-month construction period, 30-year projected lifespan, and decommissioning and closure period, as well as during the lifespan of other projects whose features may be located based on constraints imposed by implementation of the Project.

Alternative 1 – Proposed Action

Construction, Operations, and Decommissioning

Implementation of the Proposed Action and other past, present, and reasonably foreseeable future projects would potentially preclude the development of other uses on the Project site and could, thereby, affect the type of land use opportunities on lands within the CDCA Plan area.

The effects of past actions on MUC-M land are reflected in the discussion of each resource in Chapter 3. Effects of the Proposed Action on MUC-M lands relate to the opportunity cost of implementing the Project. If the Project or an alternative is developed on the site, the site cannot be used for other MUC-M use opportunities that otherwise would be available. Past, present, and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1.5. Among them, projects that also would be developed wholly or partially on lands designated as MUC-M would similarly restrict recreational opportunities within that classification for the duration of those projects. These projects include Palen Solar, Genesis Solar, Desert Sunlight, Desert Harvest, and RE Crimson. The Proposed Action would occupy approximately 3,616 acres, and the other MUC-M projects would occupy approximately 25,000 acres, for a total of approximately 28,600 acres. Of the total MUC-M lands in eastern Riverside County, the Proposed Action represents less than 1 percent, with a total cumulative effect of approximately 8 percent. Since more than 350,000 acres of MUC-M lands in eastern Riverside County would remain available for other uses; other classes of lands can also support some of the same uses MUC-M lands allow; and upon completion of decommissioning these lands would be available for other uses, no cumulative impact would result from the contribution of the Proposed Action to the impact of the past, present, and reasonably foreseeable future projects.

The Proposed Action would be one of three projects which propose transmission lines within Corridor K/30-52, connecting to the CRSS. The MSEP and BMSP would also have gen-tie lines within this corridor. The Applicant has coordinated with the operators of other transmission lines in the corridor to minimize conflicts, and the Proposed Action gen-tie line would be collocated with other transmission lines to the extent feasible. Project components would be consistent with the requirements of CPUC General Order No. 95 regarding the configurations of utility lines in shared ROWs. Construction and operation of these new linear facilities using industry SOPs and BMPs for crossing over existing authorized uses would effectively mitigate potential negative impacts to existing authorized users.

The Project would not physically divide an established community (impact LU-1 and LU-8), and would not conflict with any applicable land use plan or habitat conservation plan (impact LU-2 and LU-3), so would not contribute to these cumulative impacts. Both the BLM and private land portions of the Project would be consistent with present or planned land use and zoning of the area, so would not contribute to cumulative impacts associated with land use (impact LU-4, LU-

6, and LU-7). The Project is not located within a city sphere of influence and/or within adjacent city or county boundaries (impact LU-5). The Project would not contribute to the conversion of farmlands to a non-agricultural use (impact AG-1), and would not conflict with a Williamson Act contract (impact AG-2). The Project would not conflict with zoning for, or cause rezoning of, forest land (impact AG-3), and would not result in the loss of forest land or conversion of forest land to non-forest use (impact AG-4). The Project would not involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to non-agricultural use or forest land to non- forest use; conflict with land within the Riverside County Agricultural Preserve; or cause development of non-agricultural uses within 300 feet of agriculturally zoned property (impacts AG-5, AG-6, and AG-7).

Alternative 2 – Resource Avoidance Alternative

Construction, Operations, and Decommissioning

The contribution of Alternative 2 to cumulative land use impacts would be approximately the same as the Proposed Action. Alternative 2 would occupy approximately 2,622 acres, and the other MUC-M projects would occupy approximately 25,000 acres, for a total of approximately 27,622 acres. Of the total MUC-M lands in eastern Riverside County, the Alternative 2 represents less than 1 percent, with a total cumulative effect of approximately 8 percent. Since more than 350,000 acres of MUC-M lands in eastern Riverside County would remain available for other uses; other classes of lands can also support some of the same uses MUC-M lands allow; and upon completion of decommissioning these lands would be available for other uses, no significant cumulative impact would result from the contribution of Alternative 2 to the impact of the past, present, and reasonably foreseeable future projects. The location of the gen-tie line within Corridor K/30-52 would be approximately the same under Alternative 2 as the Proposed Action, and would therefore have a similar contribution to cumulative impacts to land uses within this corridor.

Alternative 3 – Reduced Project Alternative

Construction, Operations, and Decommissioning

The contribution of Alternative 3 to cumulative land use impacts would be approximately the same as the Proposed Action. Alternative 3 would occupy approximately 1,887 acres, and the other MUC-M projects would occupy approximately 25,000 acres, for a total of approximately 26,887 acres. Of the total MUC-M lands in eastern Riverside County, the Alternative 3 represents less than 1 percent, with a total cumulative effect of approximately 8 percent. Since more than 350,000 acres of MUC-M lands in eastern Riverside County would remain available for other uses; other classes of lands can also support some of the same uses MUC-M lands allow; and upon completion of decommissioning these lands would be available for other uses, no significant cumulative impact would result from the contribution of Alternative 3 to the impact of the past, present, and reasonably foreseeable future projects. The location of the gen-tie line within Corridor K/30-52 would be approximately the same under Alternative 3 as the Proposed Action, and would therefore have a similar contribution to cumulative impacts to land uses within this corridor.

Alternative 4 – No Action

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project, and the DQSP would not be implemented. The public lands in the Project area would continue to be managed by BLM in accordance with existing land use designations in the CDCA Plan, which could include a different solar project, or other development. There would be no use of land area within MUC-M or designated utility corridors, and therefore no contribution to cumulative land use impacts.

4.10.7 Residual Impacts

Because no mitigation measures are recommended, impacts to lands and realty would be the same as discussed for the Proposed Action.

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4.11 Mineral Resources

4.11.1 Methodology for Analysis

The impacts of the Project on mineral resources were assessed by evaluating whether the Project would reduce the availability of mineral resources, or interfere with access to mineral resources, region. Information on the type and extent of mineral resources present in the region was described in Section 3.11, *Mineral Resources*, using applicable geologic maps and mineral resource databases. Construction, operation, maintenance, and decommissioning activities for the Project are analyzed in terms of their direct and indirect effects on existing mineral leases and claims, and the future availability of or access to areas containing mineral resources.

4.11.1.1 CEQA Significance Criteria

The criteria used to determine the significance of potential impacts to mineral resources are based on Appendix G of the state CEQA Guidelines. The Project would result in a significant impact under CEQA related to mineral resources if it would:

MR-1) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state.

MR-2) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

The following additional significance criteria from the County of Riverside CEQA Environmental Assessment Form are used in the analysis. A project could have potentially significant impacts if it would:

MR-3) Be an incompatible land use located adjacent to a state classified or designated area or existing surface mine.

MR-4) Expose people or property to hazards from proposed, existing or abandoned quarries or mines.

4.11.2 Applicant-Proposed Measures

There are no APMs to address potential effects to mineral resources.

4.11.3 Direct and Indirect Impacts

4.11.3.1 Alternative 1: Proposed Action

Construction, Operations, and Decommissioning

As discussed in Section 3.11, *Mineral Resources*, the Project site is not currently used for mineral production, nor is it under claim, lease, or permit for the production of locatable, leasable, or salable minerals or mineral materials. In addition, the Riverside East SEZ was withdrawn from location and entry under the United States mining laws, subject to valid existing rights, for a period of 20 years, under Public Land Order No. 7818. The lands remain open to mineral and geothermal leasing, and mineral material sales.

During construction, operation, maintenance, and decommissioning of the Project, approximately 3,616 acres of land may be unavailable for mineral and geothermal leasing, and mineral material sales. This would not directly impact the current production of locatable or leasable minerals because none are known on the Project site. However, the Project site is underlain by sand and gravel, which potentially could represent a source of saleable minerals or mineral materials if there is a sufficient local demand for construction aggregate.

Indirect impacts could occur if the Project were to block access routes to any off-site mineral resource areas. As discussed in Section 4.14, *Recreation and Public Access*, and Section 4.17, *Transportation and Traffic*, the Project would not block or otherwise impair access to any major public roadway. While the Project would result in closing some open routes, other open routes in close proximity to the Project site could be used to access the same areas. The presence of the Project would not prevent permitted prospectors or owners of mineral leases in the surrounding region from accessing areas outside the footprint of the Project because there are other routes available to access the surrounding mountains.

4.11.3.2 Alternative 2: Resource Avoidance Alternative

Alternative 2 would cause the same types of impacts to mineral resources as the Proposed Action. Because the Project area would be smaller for Alternative 2 than for the Proposed Action, the construction, operation, maintenance, and decommissioning activities associated with Alternative 2 would affect and occupy a smaller area and, thereby, result in a reduced acreage removed from potential mineral production for the duration of the Project.

4.11.3.3 Alternative 3: Reduced Project Alternative

Alternative 3 would cause the same types of impacts to mineral resources as Alternatives 1 and 2. Because the Project area would be smaller for Alternative 3 than for either Alternatives 1 or 2, the construction, operation, maintenance, and decommissioning activities associated with Alternative 3 would affect and occupy a smaller area and, thereby, result in a reduced acreage removed from potential mineral production for the duration of the Project.

4.11.4 Application of CEQA Significance Thresholds

MR-1) Would the Project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

The Alternative 1, 2, and 3 areas are designated as MRZ-4, an area where there is not enough information available to determine the presence or absence of mineral deposits. Therefore, these alternatives would not result in the loss of availability of a known mineral resource classified by the state, and there would be no impact.

MR-2) Would the Project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

The Alternative 1, 2, and 3 areas are not identified in the Riverside County General Plan or the Palo Verde Valley Area Plan as a locally important mineral resource recovery site. Therefore, the loss of availability of a delineated locally important mineral resource recovery site would not occur. There would be no impact.

MR-3) Would the Project be an incompatible land use located adjacent to a state classified or designated area or existing surface mine?

Alternatives 1, 2, or 3 would not be located adjacent to, or prevent access to, a state designated area or existing surface mine. Therefore, these alternatives would not be an incompatible land use with a state-classified or designated area for mining operations. No impact would occur.

MR-4) Would the Project expose people or property to hazards from proposed, existing or abandoned quarries or mines?

The Alternative 1, 2, and 3 areas are not used for mineral production, nor are the areas under claim, lease, or permit for the production of locatable, leasable, or salable minerals or mineral materials. These alternatives would not expose people or property to hazards from proposed, existing, or abandoned quarries or mines. No impact would occur.

4.11.5 Alternative 4: No Action Alternative

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, the BLM would continue to manage the land under its land use jurisdiction consistent with the site's multiple use classification as described in the CDCA Plan, as it was amended by the Western Solar Plan.

If the site remained undeveloped, the existing environmental setting described in Section 3.11 would be maintained. The Project area would remain available for applications to the BLM for solar development, mineral exploration, or other uses consistent with the CDCA Plan, and there would be no impacts to mineral resources.

4.11.6 Cumulative Impacts

The geographic scope of cumulative effects with respect to mineral resources includes all areas underlain by sand and gravel within eastern Riverside County. Past, present, and reasonably foreseeable future projects that occupy land area for non-mining uses, such as urban development or the construction of energy facilities, could combine to reduce the availability of, or access to, sand and gravel. Therefore, all of the projects listed in Tables 4.1-1 and 4.1-2 are considered within the geographic scope of analysis. The temporal scope of the analysis would include the duration of the Project through decommissioning. Following decommissioning, the Project area would again become available for development of mineral resources.

Alternative 1 – Proposed Action

Construction, Operations, and Decommissioning

In general, the cumulative projects are expected to have had a minor adverse impact on the availability of mineral resources, since sand and gravel is a widespread resource that underlies most of the desert basins in the region. If all of the projects in the cumulative scenario were to be implemented, the resulting loss of land could amount to as much as 316,675 acres, 225,000 of which would be for the purpose of renewable energy development. The contribution of the Project to this total would be 3,616 acres, or about one percent of the total land area. There are approximately 1,544,000 acres of land underlain by Quaternary geologic units within eastern Riverside County. Even if all projects were implemented and were in operation at the same time, over 1,200,000 acres would remain available for aggregate resource exploration and production, and cumulative impacts associated with the availability of minerals (impact MR-1 and MR-2) would be less than significant.

The issues of compatibility of site use with adjacent mines or state designated mineral areas (impact MR-3) and exposure of people to hazards associated with mining (impact MR-4) are site-specific, and are unaffected by the presence of other projects in the cumulative scenario. Therefore, there are no cumulative impacts associated with these criteria.

Alternative 2 – Resource Avoidance Alternative

Construction, Operations, and Decommissioning

The contribution of Alternative 2 to the land area made unavailable for mineral development would be lower than that of the Proposed Action. Therefore, the contribution of Alternative 2 to cumulative impacts would be minimal.

Alternative 3 – Reduced Project Alternative

Construction, Operations, and Decommissioning

The contribution of Alternative 3 to the land area made unavailable for mineral development would be lower than that of either Alternatives 1 or 2. Therefore, the contribution of Alternative 3 to cumulative impacts would be minimal.

Alternative 4 – No Action

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project, and the DQSP would not be implemented. The public lands in the Project area would continue to be managed by BLM in accordance with existing land use designations in the CDCA Plan, which could include a different solar project, development of mineral resources, or other development. Alternative 4 would not contribute to cumulative impacts to mineral resources.

4.11.7 Residual Impacts

Once the Project is decommissioned, the land area would be made available for development of mineral resources, so there would be no residual effect from the Project.

4.12 Noise

4.12.1 Methodology for Analysis

This analysis evaluates potential noise impacts of the Proposed Action and Alternatives based on review of sensitive receptors, ambient noise levels, and projected noise levels that would be associated with construction, operation, maintenance, and decommissioning of the Project and alternatives. Impact discussions are based, in part, on the modeled noise levels of the Project as presented in the Noise Technical Report prepared by the Applicant (URS 2015; provided in Appendix R), and peer reviewed by BLM. The following methods were used to evaluate impacts.

Short-Term Construction and Decommissioning Noise Impacts and Criteria

Project construction noise was estimated by determining the contributing sound sources associated with each construction activity, and calculating the aggregate sound levels that propagate to a representative receptor location. Table 4.12-1 shows the nine construction activities which were evaluated, and how they are expected to overlap to result in aggregate noise levels. Three representative noise-sensitive receptors were selected based on the locations of residents and sensitive receptors, as shown in Figure 3.12-1, as well as the ambient noise measurements results presented in Table 3.12-2. Figure 3.12-1 shows that locations ST03, ST05, and Nearest Noise Sensitive Receptor (NNSR) are situated in the nearby Nicholls Warm Springs/Mesa Verde residential community. Location ST11 is located closer to the Project area, but is not a sensitive receptor location; thus locations ST03, ST05, and NNSR represent the nearest sensitive receptor locations. The ambient noise measurement results also show that locations ST03, ST05, and NNSR have the lowest ambient noise levels measured in the study area, probably because they are the most distant from Interstate 10.

Table 4.12-1. Construction Activity Breakdown for Noise Analysis (assumes 25 month construction schedule)

Activity[1]	Timeframe[2]	Working Days	Max No. Workers[3]	Activity Description
1	Dec. 2016 – Jan. 2017	42	60	Move On (grading of laydown, construction trailers, and parking areas)
2	Jan. 2017 – June 2018	378	80	Grading – site preparation/ clearing/grading and balance of retention basins
3	Mar. 2017 – Aug. 2018	378	160	Construction – solar array structural components (posts, tilts, rails, trackers)
4	Apr. 2017 – Sept. 2018	378	80	Trenching – PCS excavation, PCS placement, underground cable trenching
5	May 2017 – Oct. 2018	378	310	Construction – solar module installation
6	Apr. 2018 – Sept. 2018	126	60	Construction – On-Site Substation
7	Apr. 2018 – Sept. 2018	126	60	Construction – Gen-Tie
8	Apr. 2018 – Sept. 2018	126	60	Construction – Operations and Maintenance Building

Table 4.12-1. Construction Activity Breakdown for Noise Analysis (assumes 25 month construction schedule)

Activity[1]	Timeframe[2]	Working Days	Max No. Workers[3]	Activity Description
9	July 2018 – Dec. 2018	126	60	Construction – testing, cleanup, and restoration

Notes:

1 – The specific activities are defined in the Noise Technical Report prepared by the Applicant (URS 2015; provided in Appendix R)

2 - Exact dates are likely to vary. Timeframe is presented only to show how overlap of activities is used to calculate aggregate noise levels.

3 - Peak workforce estimated at 810 workers due to overlapping of construction activities. Workforce numbers may vary.

Noise impacts can occur under either of two separate conditions: (1) when noise from a project would exceed an absolute level that is set as a standard for the receiving land use; or (2) when noise from a project would increase existing ambient noise levels by some substantial degree. Since construction noise impacts are temporary, criteria based on long term land use impacts would not apply. However, construction would increase ambient levels during the construction period. While BLM has not established an agency-wide criteria for substantial noise increases, the Federal Highway Administration has compiled a report that indicates most state agencies consider an increase of 10-15 dBA (energy equivalent level, or Leq) to be “substantial” (FWHA 1995). This finding supports the 10 dBA increase criterion that Riverside County and BLM have used on similar, nearby projects such as the Blythe Mesa Solar Project (Riverside County 2014). While a 5 dBA increase would be “readily perceptible,” it would not be considered as substantial as an increase in noise level of 10 dBA, which is judged by most people as a doubling of the sound level (Riverside County 2017). Therefore, noise from onsite construction activity or offsite traffic noise would be considered an adverse impact if its acoustical contribution caused an increase above the baseline outdoor ambient sound level (Leq) by more than 10 dBA. For construction workers, the OSHA maximum time-weighted average noise exposure level of 90 dBA over an eight-hour work shift, regulated by Cal/OSHA, is considered to be an adverse noise impact.

Long-Term Operation and Maintenance Noise Impacts and Criteria

The Applicant used the Cadna/A® Noise Prediction Model (Version 4.5.147) to estimate the propagation of sound from aggregate Project operations, and thereby predict noise levels at various distances from the Project, including the representative noise- sensitive receptors selected for the ambient sound survey.

Impact criteria associated with aggregate noise from stationary sources would include the following daytime and nighttime sound levels from the Riverside County General Plan Noise Element and the County’s Noise Ordinance:

- From 7:00 a.m. to 10:00 p.m., 65 dBA Leq (10 minute); and
- From 10:00 p.m. to 7:00 a.m., 45 dBA Leq (10 minute).

Vibration Impacts

The general procedures for addressing vibration issues that are specified in the California Department of Transportation (CalTrans) Transportation and Construction Vibration Guidance Manual were used to assess potential vibration impacts from the Project (Caltrans 2013). A peak particle velocity threshold identified by Caltrans is used in this analysis to determine the level of vibration impacts related to adverse human reaction and risk of architectural damage to normal buildings. The peak particle velocity threshold is 0.20 inches per second (in/sec) (Caltrans 2013). This peak particle velocity level has been found to be annoying to people in buildings and can pose a risk of architectural damage to buildings.

4.12.1.1 CEQA Significance Criteria

The criteria listed below were used to determine if the proposed Project would result in significant impacts from noise under CEQA. These criteria were obtained from the CEQA Environmental Checklist, Appendix G of the state CEQA Guidelines. Under CEQA, the proposed Project and alternatives would have a significant impact from noise if they would cause:

NOI-1) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

NOI-2) Substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

NOI-3) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

NOI-4) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, the exposure of people residing or working in the project area to excessive noise levels.

NOI-5) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

NOI-6) For a project within the vicinity of a private airstrip, the exposure of people residing or working in the project area to excessive noise levels.

The following additional significance criterion from the County of Riverside Environmental Assessment form is used in the analysis. A project could potentially have significant impacts if it results in:

NOI-7) Impacts from railroad or highway noise.

CEQA does not set absolute noise level standards for receiving land uses (NOI-1) nor define what noise level increase would be considered substantial either temporarily (NOI-2) or permanently (NOI-5). In its Noise Ordinance, Riverside County has established absolute maximum levels (Lmax) allowed in various general plan land use designations (Riverside County 2007). This ordinance exempts construction activities from these requirements when the construction project is located a quarter mile or more from the nearest inhabited dwelling, which is the case for the DQSP. Neither the County's General Plan nor Municipal Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers, or maximum temporary or periodic noise increases (Riverside County 2017). Therefore, the 10 dBA increase criteria noted above, which has been used by both BLM and Riverside County on previous similar projects, is used to assess impact significance for NOI-2.

Vibration-sensitive land uses such as high-precision manufacturing facilities or research facilities with optical and electron microscopes do not occur in the Project area. Therefore, a substantial impact resulting from excessive groundborne vibration would depend on whether a nuisance, annoyance, or physical damage to any structure could occur.

4.12.2 Applicant-Proposed Measures

In their Noise Technical report, the Applicant proposed a measure to orient their post installation equipment in a manner to reduce noise impacts at the locations of the nearest sensitive receptors. Based on noise measurements conducted during post driving operations at a similar facility, sound levels are approximately 7 dBA quieter at the back end of the equipment when compared to the front end. In order to reduce impacts at the NNSR, any Project locations within 6,560 feet (2 kilometers) of the NNSR would have the post installation equipment oriented with its back facing towards the northeast (towards the NNSR. At locations outside of a radial distance of 6,560 feet from the NNSR, orientation of the post installation equipment would not affect noise levels at the NNSR. The 6,560 foot radius is shown on Figure 4.12-1.

In their analysis of noise from construction-related traffic, the Applicant assumed that construction vehicles would be maintained according to manufacturers' instructions and recommendations, and would employ factory-approved exhaust mufflers. In addition, trucks hauling materials and equipment would comply with local ordinances and regulations with respect to travel speed and, if applicable, limitations on usage of compression-type braking.

To protect construction workers from equipment noise levels which exceed the maximum time-weighted average noise exposure level of 90 dBA over an eight-hour work shift, the Applicant proposes to instruct Project contractors to post warnings with respect to areas that may be noise level hazards, and to provide construction workers with OSHA approved hearing protection devices as part of an applicable hearing conservation program.

As discussed in Section 4.1.6, the impact analysis assumes that the APMs have been implemented, and these measures are therefore requirements for approval of the Project. The APMs are to be incorporated into the EICMPP/MMRCP, along with the agency-required mitigation measures.

4.12.3 Direct and Indirect Impacts

4.12.3.1 Alternative 1: Proposed Action

Construction

Onsite Construction

As shown in Table 4.12-2, during months 6 through 21 of Project construction, construction activities would cause aggregate construction noise levels at the NNSR to be 12 dBA higher than the measured baseline daytime outdoor ambient sound level. This situation would occur primarily due to the overlap of construction activity #3 and activity #5. Therefore, a temporary, but adverse impact would result in these months because the ambient sound level would increase more than 10 dBA. However, by orienting the post installation equipment as discussed in Section 4.12.2, the sound levels are approximately 7 dBA quieter at the back end of the equipment when compared to the front end, and therefore the aggregate construction noise level is expected to increase by less than 10 dBA. Mitigation Measure NOISE-1 would require monitoring during construction to verify that the orientation of the post installation equipment has this effect.

For other construction months, and for the other two nearest noise sensitive receptors (ST03 and ST05), a less than 10 dBA change in daytime outdoor ambient sound levels would occur under down-wind conditions. Under upwind and calm meteorological conditions, a less than 10 dBA change in ambient noise levels would be expected during the day for all three noise sensitive receptor locations.

While construction activities are not expected to occur at night, some limited quantities of certain equipment such as generators (to provide lighting and HVAC for offices and security personnel on-site) are anticipated to operate through nighttime hours. Noise modeling shows that no ambient noise changes over 10 dBA are expected at any of the three nearest noise sensitive receptors under any of the modeled meteorological conditions.

Table 4.12-2. Predicted Daytime On-Site Project Construction Noise Per Activity at Nearest Noise Sensitive Receptor (NNSR)

Month	Construction Activity Noise (Estimated dBA per Indicated Activity) under Down-Wind Conditions									Aggr. (dBA)	Base (dBA)	Future (dBA)	Diff.
	1	2	3	4	5	6	7	8	9				
1	36									36	41	42	1
2	36	36								39	41	43	2
3		36								36	41	42	1
4		36	49							50	41	51	10
5		36	49	41		29				50	41	51	10
6[1]		36	49	41	49	29				53	41	53	**12**
7[1]		36	49	41	49	29				53	41	53	**12**
8[1]		36	49	41	49	29				53	41	53	**12**
9[1]		36	49	41	49	29				53	41	53	**12**
10[1]		36	49	41	49	29				53	41	53	**12**
11[1]		36	49	41	49	29				53	41	53	**12**
12[1]		36	49	41	49	29				53	41	53	**12**
13[1]		36	49	41	49	29				53	41	53	**12**
14[1]		36	49	41	49	29				53	41	53	**12**
15[1]		36	49	41	49	29				53	41	53	**12**
16[1]		36	49	41	49	29				53	41	53	**12**
17[1]		36	49	41	49	29	30	27		53	41	53	**12**
18[1]		36	49	41	49	29	30	27		53	41	53	**12**
19[1]		36	49	41	49	29	30	27		53	41	53	**12**
20[1]			49	41	49	29	30	27	31	53	41	53	**12**
21[1]			49	41	49	29	30	27	31	53	41	53	**12**
22				41	49	29	30	27	31	50	41	51	10
23					49				31	49	41	50	9
24									31	31	41	41	0
25									31	31	41	41	0

Table 4.12-2. Predicted Daytime On-Site Project Construction Noise Per Activity at Nearest Noise Sensitive Receptor (NNSR)

Month	Construction Activity Noise (Estimated dBA per Indicated Activity) under Down-Wind Conditions									Aggr. (dBA)	Base (dBA)	Future (dBA)	Diff.
	1	2	3	4	5	6	7	8	9				

Sources: US Department of Transportation 2006; URS 2015
Notes:
Aggr. = aggregate predicted noise level from all activities.
Base = measured baseline (i.e., existing outdoor ambient sound level).
Future = logarithmic sum of Aggr. and Base.
Diff. = arithmetic difference (in dBA) between Future and Base. A difference of > 10 dBA indicates a noise impact (value in **bold**).
1 - Noise levels presented for months 6 -21 include post driving machines and do not consider noise mitigation. Noise mitigation is expected to reduce the noise associated with activity 3 (installation of posts) from 49 to approximately 42 dBA, the aggregate for those months to below 51 dBA, and the Differential to below 10 dBA.

Construction Traffic

Construction would result in an increase in roadway traffic on State Route 78 and 16th Avenue/Seeley Avenue for personnel and deliveries of construction materials and equipment. Some of the representative noise sensitive receptors are located long those roads, near measurement locations ST09 and ST10 (see Figure 3.12-1). Although the noise from each individual vehicle would generally be the same as vehicles which currently travel on those roads, the number of these individual noise events would increase. The increase in peak hour traffic noise levels (Leq) associated with construction traffic are both calculated to be less than 10 dBA (2.85 and 7.34 dBA, respectively) at the State Route 78/16th Avenue/Seeley Avenue intersection. Therefore, the increase in traffic noise due to Project construction would be less than 10 dBA.

Construction Occupational Noise Exposure

Outdoor sound levels during construction may exceed the OSHA 90 dBA threshold near certain operating or idling powered mobile and stationary equipment. These noise levels would diminish with distance from the equipment, and would be limited to areas within the Project boundary. The Applicant proposes to mitigate the potential impact by requiring Project contractors to post warnings with respect to areas that may be noise level hazards, and to provide construction workers with OSHA approved hearing protection devices as part of an applicable hearing conservation program.

Construction Laydown, Staging and Parking Areas

As shown in Figure 2-2, the Project would include three construction laydown and parking areas. The area which is closest to the noise sensitive receptors is the one at the site entrance on the northern boundary of the facility. This is also the area which would be subject to the most noise generating activity, as it is the primary site entrance and staging area for equipment. Therefore an evaluation of noise sources at this location presents the most conservative analysis of noise associated with the temporary construction laydown areas.

The most prominent noise source for the construction laydown areas is the truck staging area, where trucks may idle with their engines running and equipment such as forklifts may be used to offload materials. The composite noise level associated with these items is estimated to be 79 dBA L_{max} at 50 feet. Because the NNSR is located approximately 4,800 feet away, the expected noise level from the northern laydown/staging area would be no greater than 22 dBA, which is lower than the measured existing baseline level of 41 dBA at the NNSR.

Vibration

Temporary ground-borne vibration during construction could result from the operation of heavy construction equipment such as graders, bulldozers, and loaded haul trucks. These pieces of equipment can generate vibration levels of up to 0.09 in/sec at a distance of 25 feet (Caltrans 2013), but would attenuate within a short distance of the source. Because the NNSR is located approximately 4,800 feet away, there would be no expected vibration impacts.

Operation and Maintenance

Potential sources of long-term noise during operations include onsite operation and maintenance of the solar power plant equipment, traffic associated with operations, and gen-tie corona noise.

Onsite Operations

Noise sources for operations are expected to be much lower than those associated with construction. Operations are unlikely to involve use of post installation equipment, and would also involve much lower volumes of truck traffic. As shown in Table 4.12-3, Project operational noise levels at ST03, ST05, and the NNSR are expected to be lower than existing outdoor ambient sound levels. Operational noise levels would all be lower than 45 dBA L_{eq} (10-minute period), as required by the Riverside County Noise Element. Therefore, Project operational noise is not anticipated to cause an increase in ambient noise level of 10 dBA or more at the three nearest noise sensitive receptors.

Operational Traffic

Traffic to support Project operations involves only a small number of vehicles, resulting in only a minor increase in existing levels of roadway traffic. The noise impacts would be much lower than those associated with Project construction, and would not cause an increase in ambient noise level of 10 dBA or more at the three nearest noise sensitive receptors.

Gen-Tie Line Corona Noise

The term corona is used to describe the breakdown of air into charged particles caused by the electrical field at the surface of a conductor. Audible noise levels generated by corona discharge vary depending on weather conditions as well as the voltage and condition of the line. Wet weather conditions often increase corona discharge due to accumulation of raindrops, fog, frost, or condensation on the conductor surface, which causes surface irregularities thereby promoting corona discharge. Corona noise levels for a transmission line with similar voltage (220 kV) as the proposed 230 kV gen-tie line have been estimated to be approximately 30 dBA at the edge of the transmission line ROW during dry conditions (CPUC 2010). During adverse weather conditions such as fog or rain, which are rare in the study area, corona discharge could be up to 20 dBA higher than in dry conditions. Therefore, under worst-case conditions, corona noise could be as high as 50 dBA at the edge of the proposed gen-tie line ROW.

Table 4.12-3. Predicted Project Operational Noise Levels

Meteorological Condition	ST03				ST05				Nearest Noise Sensitive Receptor (NNSR)			
	PL (dBA)	BL (dBA)	Future (dBA)	Diff. (dBA)	PL (dBA)	BL (dBA)	Future (dBA)	Diff. (dBA)	PL (dBA)	BL (dBA)	Future (dBA)	Diff. (dBA)
Wind neutral[1]	29	39	39	0	28	40	40	0	31	41	41	0
Temperature inversion[2]	33	39	40	1	32	40	41	1	35	41	42	1
9 mps wind from N[3]	26	39	39	0	25	40	40	0	28	41	41	0
9 mps wind from S[4]	33	39	40	1	32	40	41	1	35	41	42	1

Source: URS 2015

Notes:

1 - Calm meteorological conditions (winds less than 0.5 meters per second [mps] in any direction), CONCAWE Stability Class D.
2 - Calm meteorological conditions (no wind), CONCAWE Stability Class G.
3 - Winds are from the north, at 9 mps (29.5 feet per second [fps]), CONCAWE Stability Class D.
4 - Winds are from the south, at 9 mps (29.5 fps), CONCAWE Stability Class D.
ST03 = short-term (ST) baseline ambient sound level survey position “ST03.”
ST05 = short-term (ST) baseline ambient sound level survey position “ST05.”
NNSR = nearest noise sensitive receptor (“unknown structures” located between LT1 and ST11).
PL = predicted sound pressure level, dBA.
BL = measured baseline level (from daytime short-term measurement in field), dBA.
Future = logarithmic sum of PL and BL.
Diff. = arithmetic difference (in dBA) between Future and BL. A difference of > 10 dBA indicates a noise impact (value in **bold**).

The closest noise sensitive receptor along the proposed gen-tie line route is location ST11, at a distance of approximately two miles. Assuming a maximum noise level of 50 dBA at the edge of the ROW during wet weather conditions and accounting for how noise levels from line sources attenuate over soft surfaces, corona noise would attenuate to lower than measured background noise (41 dBA) over two miles. Therefore, corona noise levels that would be associated with the proposed gen-tie line would not conflict with USEPA noise guidelines for residences (i.e., 55 dBA L_{dn}).

Vibration

Operation and maintenance of the Project would not introduce any new sources of perceivable groundborne vibration to the study area. Consequently, the Project would cause no operation- or maintenance-related adverse effects associated with groundborne vibration. Because implementation of the Project would not result in exposure of persons to or generation of excessive groundborne vibration, it also would not expose them to or generate excessive ground-borne noise levels.

Decommissioning

At the end of the 30-year term of the BLM ROW grant, Project operation would cease and associated facilities would be decommissioned and dismantled, and the site would be restored. Decommissioning activities could generate temporary noise levels similar to those that would occur during construction of the Project, though slightly lower because post installation equipment would not be necessary. Therefore, it is unlikely that noise during decommissioning activities would increase ambient noise by more than 10 dBA.

4.12.3.2 Alternative 2: Resource Avoidance Alternative

Construction

The sources of noise and vibrations associated with Project construction would be the same under Alternative 2 as under the Proposed Action. The primary difference between Alternative 2 and the Proposed Action would be location of the noise and vibration sources. Under Alternative 2, the Project area would be reduced in size relative to that of the Proposed Action. Although the On-Site Substation, gen-tie line, site access roads and entrance, and temporary staging areas would be located further to the east than in the Proposed Action, they would be approximately the same distance from the sensitive receptors. However, the northern boundary of the solar arrays would be moved further to the south under Alternative 2. As discussed in Section 4.12.3.1, the primary source of noise associated with construction, and the only noise source which would contribute to an increase of more than 10 dBA in the ambient sound level, is the post installation equipment. The post installation equipment would be used only in the solar arrays, for installation of solar panels. Therefore, the most substantial noise source under Alternative 2 would be moved further from the location of the NNSR, and construction noise impacts to sensitive receptors would therefore be lower than under the Proposed Action.

All other noise and vibration sources associated with construction of Alternative 2, including construction traffic, occupational noise, and noise in the construction laydown areas, would be about the same, and in the same locations, as those for the Proposed Action. As discussed in

Section 4.12.3.1, none of these other noise sources are expected to result in an increase of more than 10 dBA in the ambient sound level at the NNSR.

Operation and Maintenance

The noise and vibration sources associated with Alternative 2 would be about the same, and in the same locations, as those associated with the Proposed Action. Any noise or vibration sources that would be directly associated with the solar array fields would be moved to the south, further away from any sensitive receptors. Therefore, the impact of these noise sources would be lower than those associated with the proposed Action. All other noise sources associated with Alternative 2 would be the same, and in the same location, as those for the Proposed Action. As discussed in Section 4.12.3.1, none of these other noise source is expected to result in an increase of more than 10 dBA in the ambient sound level at the NNSR.

Decommissioning

Decommissioning activities under Alternative 2 could generate temporary noise and vibration levels similar to those that would occur during construction of the Proposed Action, though noise from decommissioning activities would be slightly lower because post-installation equipment would not be necessary. In addition, noise sources associated with removal of the solar arrays would be moved further to the south, away from the sensitive noise receptors. Therefore, it is unlikely that noise during decommissioning activities would increase ambient noise by more than 10 dBA.

4.12.3.3 Alternative 3: Reduced Project Alternative

Construction

The sources of noise and vibrations associated with Project construction would be the same under Alternative 3 as under the Proposed Action. The primary difference between Alternative 3 and the Proposed Action would be location of the noise and vibration sources. Under Alternative 3, the Project area would be reduced in size relative to that of both Alternatives 1 and 2. Although the On-Site Substation, gen-tie line, site access roads and entrance, and temporary staging areas would be located further to the east under Alternative 3, they would be approximately the same distance from the sensitive receptors as in Alternatives 1 and 2. However, the northern boundary of the solar arrays would be moved further to the south under Alternative 3, and thus located further from the sensitive receptors than in Alternatives 1 and 2. As discussed in Section 4.12.3.1, the primary source of noise associated with construction, and the only noise source which would contribute to an increase of more than 10 dBA in the ambient sound level is the post installation equipment. The post installation equipment would be used only in the solar arrays, for installation of solar panels. Therefore, the most substantial noise source under Alternative 3 would be moved further from the location of the NNSR, and construction noise impacts to sensitive receptors would therefore be lower than under Alternatives 1 or 2.

All other noise and vibration sources associated with construction of Alternative 3, including construction traffic, occupational noise, and noise in the construction laydown areas, would be about the same, and in the same locations, as those for Alternatives 1 and 2. As discussed in

Section 4.12.3.1, none of these other noise source is expected to result in an increase of more than 10 dBA in the ambient sound level at the NNSR.

Operation and Maintenance

The noise and vibration sources associated with Alternative 3 would be about the same, and in the same locations, as those associated with the Proposed Action. Any noise or vibration sources that would be directly associated with the solar array fields would be moved to the south, further away from any sensitive receptors. Therefore, the impact of these noise sources would be lower than those associated with Alternatives 1 and 2. All other noise sources associated with Alternative 3 would be the same, and in the same location, as those for the Proposed Action As discussed in Section 4.12.3.1, none of these other noise source is expected to result in an increase of more than 10 dBA in the ambient sound level at the NNSR.

Decommissioning

Decommissioning activities under Alternative 3 could generate temporary noise and vibration levels similar to those that would occur during construction of Alternative 2, though noise from decommissioning activities would be slightly lower because post-installation equipment would not be necessary. In addition, noise sources associated with removal of the solar arrays would be moved further to the south, away from the sensitive noise receptors. Therefore, it is unlikely that noise during decommissioning activities would increase ambient noise by more than 10 dBA.

4.12.4 Application of CEQA Significance Thresholds

NOI-1) Would the Project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

The applicable noise ordinance is Riverside County Ordinance 847, which includes a daytime or nighttime noise limit of 45 dBA L_{max} as the maximum decibel level allowed in Rural Residential areas, but only if the distance between the Project site and the nearest inhabited dwelling is less than one quarter-mile. Alternatives 1, 2, and 3 are exempt from this ordinance because the NNSR is more than one quarter-mile away (approximately 4,800 feet) from the Project boundary. There would be no impact.

NOI-2) Would the Project result in substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

Temporary or periodic increases in ambient noise levels would occur during construction, and the construction noise would be perceptible at the locations of the nearest residences. The construction noise impact to ambient noise levels would be intermittent, and would diminish with distance. The impact would be temporary, occurring only for the duration of construction, and would occur only in the daytime. However, the increase in noise levels would be sufficient to create annoyance. As shown in Table 4.12-2, concurrent construction activities (Activities 3 and 5) would cause aggregate construction noise levels at the NNSR to be 12 dBA higher than the measured baseline daytime outdoor ambient sound level. Therefore, a temporary significant impact would result in Months 6 through 21. However, with implementation of the Applicant's proposed measure to orient post installation equipment away from the NNSR, this impact would be reduced to less than significant.

Under Alternatives 2 and 3, the post installation equipment would be operated further to the south, at a further distance from the sensitive receptors, than under Alternative 1 and would be subject to the same APM to be oriented away from the sensitive receptors. Therefore, the noise impacts associated with Alternatives 2 and 3 would be lower than those of Alternative 1. With implementation of the monitoring requirement of Mitigation Measure NOISE-1, the impact from Alternatives 2 and 3 would also be less than significant.

NOI-3) Would the Project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Temporary sources of groundborne vibration and noise during construction of Alternative 1, Alternative 2, or Alternative 3 would result from operation of conventional heavy construction equipment such as graders, bulldozers, and loaded haul trucks. These pieces of equipment can generate vibration levels of up to 0.09 in/sec at a distance of 25 feet (Caltrans 2013), but would attenuate within a short distance of the source. Because the NNSR is located approximately 4,800 feet away from the Project boundary under Alternative 1, 4,300 feet away from the Project boundary under Alternative 2, and 7,350 feet away from the Project boundary under Alternative 3, there would be no expected vibration impacts. Sources of vibration during operations and decommissioning of Alternatives 1, 2, or 3 would be lower than those for construction, and would also likely be located further away from the sensitive receptors. Therefore, vibration impacts from all phases of Alternatives 1, 2, and 3 would be less than significant.

NOI-4) Would the Project result in for a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, where people residing or working in the project area would be exposed to excessive noise levels?

Alternatives 1 and 2 would be located approximately 1.5 miles from the Blythe Airport; Alternative 3 would be located approximately 1.7 miles from the Blythe Airport. Given this distance, noise from construction, operations and maintenance, and decommissioning would attenuate to below ambient noise levels at the airport. Therefore, noise impacts during construction, operation and decommissioning of these alternatives would be less than significant.

NOI-5) Would the Project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

Alternatives 1, 2, and 3 would generate noise associated with the operation and maintenance of the Project, operational traffic, and gen-tie line corona discharge. Operational noise, operational traffic noise, and corona noise levels for these alternatives would not result in substantial changes to noise levels. As shown in Table 4.12-3, Project operational noise is expected to be quieter than existing outdoor ambient sound levels. The change in the traffic noise level due to operational traffic would be less than 3 dBA. Due to noise attenuation over 2 miles to the closest noise sensitive receptor, corona noise levels that would be associated with the proposed gen-tie line would not exceed the Riverside County General Plan or Noise Ordinance limits for residences in the area (i.e., 45 dBA L_{dn}), and noise impacts during operations would be less than significant.

NOI-6) Would the Project within the vicinity of a private airstrip, result in people residing or working in the project area being exposed to excessive noise levels?

Alternatives 1, 2, and 3 are not located near a private airstrip. There would be no impacts under any of the alternatives.

NOI-7) Would the Project result in impacts from railroad or highway noise?

Alternatives 1, 2, or 3 would not utilize railroad service for delivery of materials or workers; therefore, no impacts related to railroad noise would occur. During construction of Alternative 1, workers commuting to the Project area and delivery of materials would result in a slight increase in traffic along State Route 78. The anticipated change in daily and afternoon peak hour traffic noise levels (L_{eq}) for Alternative 1 are both calculated to be less than 10 dBA (2.85 and 7.34 dBA, respectively) at the State Route 78/16th Avenue/Seeley Avenue intersection. Traffic to support Project operations involves only a small number of vehicles, resulting in only a minor increase in existing levels of roadway traffic. The noise impacts would be much lower than those associated with Project construction. The impacts of highway noise under Alternatives 2 or 3 would be about the same as those for Alternative 1. Therefore, the increase in highway noise due to Project construction and operation would be less than significant.

4.12.5 Alternative 4: No Action Alternative

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, the BLM would continue to manage the land under its land use jurisdiction consistent with the site's multiple use classification as described in the CDCA Plan, as it was amended by the Western Solar Plan.

If the site remained undeveloped, the existing environmental setting described in Section 3.12 would be maintained. Noise and vibration levels in the vicinity of the Project site would not be expected to change noticeably from existing conditions.

4.12.6 Cumulative Impacts

Noise levels tend to diminish quickly with distance from a source; therefore, the geographic scope for cumulative impacts associated with noise would be limited to projects located within approximately one-half mile of the Project, including the gen-tie line. The temporal scope for cumulative impacts associated with noise would include the construction, operation, maintenance, and decommissioning phases of the Project. Once decommissioning is completed, there would be no residual noise impacts associated with the Project.

Alternative 1 – Proposed Action

Construction, Operations, and Decommissioning

The ambient noise levels reported in Section 3.12.1.2 represent the cumulative noise levels of all existing projects, and the analysis presented in Table 4.12-2 is a cumulative analysis of the contribution of the Project construction to those cumulative noise levels. As shown in Table 4.12-2, noise sources associated with the Project construction would combine with other existing noise sources, and would result in an increase in ambient noise levels at the locations of ST03, ST05, and the NNSR. The increase would be temporary during construction, and would be mitigated by the Applicant's proposal to orient the post installation equipment away from the locations of the sensitive receptors. With mitigation, the contribution of the Project would not be cumulatively considerable (impact NOI-1 and NOI-2). As shown in Table 4.12-3, the contribution of Project operations to these ambient noise levels is expected to be minimal, so any contribution of the Project to cumulative noise impacts would be temporary (impact NOI-5).

The only past, present, and reasonably foreseeable future projects within one-half mile include the RE Crimson Solar Project, NRG Blythe PV Project, BMSP, and transmission lines within the corridors along the southwestern and northern boundaries of the Project area. If there were overlapping construction periods for the DQSP, BMSP, RE Crimson Solar Project, and gen-tie lines for other projects, noise levels associated with onsite construction and associated traffic could increase, potentially creating cumulative noise impacts. However, concurrent construction of all of these projects is unlikely, given their different timeframes for environmental analysis and permitting. The incremental effects of the Project would be negligible, and would not be cumulatively considerable (impact NOI-7).

During operations, corona noise impacts of multiple gen-tie lines in the gen-tie corridor would occur simultaneously. As discussed in Section 4.12.3.1, the closest noise sensitive receptor along the proposed gen-tie line route is location ST11, at a distance of approximately two miles, and corona noise would attenuate to lower than measured background noise (41 dBA) over this distance. Therefore, the cumulative effect of the corona noise of the gen-tie lines in the corridor would not be noticeable by local residents.

Vibration associated with the cumulative projects would attenuate within a short distance of each of the project sites, so would not overlap with other projects to create a cumulative impact (impact NOI-3). Although the Project area is located in an Airport Land Use Plan area, noise from construction, operations and maintenance, and decommissioning would attenuate to below ambient noise levels at the airport, so the contribution from the Project would not be cumulatively considerable (impact NOI-4). The Project is not located near a private airport, so would not contribute to cumulative impacts (impact NOI-6).

Alternative 2 – Resource Avoidance Alternative

Construction, Operations, and Decommissioning

As discussed in Section 4.12.3.2, the northern boundary of the solar arrays would be moved further to the south under Alternative 2. Because the only noise source that would contribute to an increase of more than 10 dBA in the ambient sound level would be the post installation equipment, the most substantial noise source would be moved further from the location of the NNSR. In addition, the Applicant's proposal to orient the post installation equipment away from the locations of the sensitive receptors would apply to Alternative 2. Therefore, the incremental contribution of Alternative 2 to cumulative noise impacts to sensitive receptors would be lower than under the Proposed Action.

Alternative 3 – Reduced Project Alternative

Construction, Operations, and Decommissioning

As discussed in Section 4.12.3.3, the northern boundary of the solar arrays would be moved further to the south under Alternative 3. Because the only noise source that would contribute to an increase of more than 10 dBA in the ambient sound level would be the post installation equipment, the most substantial noise source would be moved further from the location of the NNSR. In addition, the Applicant's proposal to orient the post installation equipment away from the locations of the sensitive receptors would apply to Alternative 3. Therefore, the incremental contribution of Alternative 3 to cumulative noise impacts to sensitive receptors would be lower than under Alternatives 1 or 2.

Alternative 4 – No Action

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project, and the DQSP would not be implemented. The public lands in the Project area would continue to be managed by BLM in accordance with existing land use designations in the CDCA Plan, which could include a different solar project, or other development. Alternative 4 would not contribute to cumulative noise impacts.

4.12.7 Residual Impacts

There would be no residual adverse impacts after the Applicant's proposed mitigation has been incorporated.

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4.13 Paleontological Resources

4.13.1 Methodology for Analysis

This analysis of potential effects of the Proposed Action and Alternatives on paleontological resources is based on a review of relevant literature and site-specific information provided by the Applicant. Archival searches were conducted by the Natural History Museum of Los Angeles County Department of Vertebrate Paleontology (LACM), and the San Bernardino County Museum (SBCM), to identify additional information on fossil localities, and to document the occurrence of any other previously recorded but unpublished fossil locality from stratigraphic units in or near the Project site. The results of the archival search, and other literature research, were provided in the Paleontological Resources Assessment Technical Report (Reynolds and Lander 2016), which is provided in Appendix T. The information was used to assign geologic units within the area to a preliminary PFYC class, which classifies the units with respect to the potential for yielding significant fossils, in accordance with BLM protocol.

4.13.1.1 CEQA Significance Criteria

CEQA significance thresholds are based on criteria identified in Appendix G of the state CEQA Guidelines (CCR, Title 14, Division 6, Chapter 3, Sections 1500- 15387). A cultural resources impact is considered significant if implementation of the proposed Project would do any of the following:

- cause a substantial adverse change in the significance of a historical resource as defined in §15064.5;
- cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5;
- directly or indirectly destroy a unique paleontological resource or site or unique geologic feature; or
- disturb any human remains, including those interred outside of formal cemeteries.

Based on these thresholds, a project could have potentially significant impacts to paleontological resources if it would:

> PALEO-1) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

4.13.2 Applicant-Proposed Measures

In their POD, the Applicant proposed the following APMs to minimize impacts to paleontological resources.

APM Paleo-1: Pre-Construction Survey

The Applicant proposes that a paleontological resources survey of the Project area would be conducted prior to site construction or surface disturbance in requirements. A pre-construction field survey of the Project area is required to finalize the preliminary BLM PFYC evaluation presented in Section 3.13.

A detailed description of the proposed survey is provided in the recommendations of the Paleontological Resources Assessment Technical Report (Reynolds and Lander 2016). The survey would provide ground truth verification of the preliminary PFYC assignment for each sedimentary unit exposed on the Project site, or justification for changing such an assignment.

During the pre-construction field survey, any newly discovered fossil localities would be documented, and the fossil remains recovered and fully treated in accordance with BLM and County requirements. Strata with a demonstrated potential for containing fossil remains (e.g., soils, paleosols, playa or lacustrine strata) would be noted. Specific components of the field survey include:

1. The pre-construction field survey will be conducted over the entire Project area to verify the PFYC assignment for each stratigraphic unit;
2. The survey will include mapping of the Bullhead Alluvium to clarify its stratigraphic and outcrop relations to other sedimentary units;
3. The results of the survey will be used to prepare a Project-specific Paleontological Resource Impact Mitigation Plan (PRIMP); and
4. Fossil remains recovered during the survey, as well as those recovered during construction-related earth-moving activities, will be managed as follows:
    a. The location of any larger fossil specimens will be documented using a hand-held GPS unit and recording NAD 83 UTM coordinates;
    b. The stratigraphic unit and level producing the specimen will be recorded;
    c. Corresponding specimen data and geographic and geologic locality data will accompany the specimen during recovery, transport to a laboratory facility, and the treatment process;
    d. Specimen stabilization, if necessary, will occur before removal and transport, and will include saturating the remains with hardening solution and enclosing them in protective plaster jacket;
    e. Fine-grained sediment surrounding specimen will be test screened to allow for the recovery of smaller fossil remains that are too small to be observed in the field;
    f. Larger fine-grained sediment or rock samples with volumes totaling amounts prescribed by SVP (2010) will be collected to allow for the recovery of additional small remains;
    g. Each specimen recovered during the field survey or construction-related earth-moving activities will be prepared to point allowing identification to lowest taxonomic level possible;
    h. The skeletal element(s) represented by the specimen will be identified by a knowledgeable paleontologist, who will also identify the specimen to the lowest taxonomic level possible;

i. The specimen will be catalogued with individual specimen and locality numbers provided by a designated museum repository;

j. A fossil specimen catalog and a fossil locality inventory will be compiled; and

k. The entire collection from the Project site will be transferred to the repository, where the collection will be permanently stored, maintained, and made available to qualified investigators for scientific research.

The treatment plan would be implemented under the PRIMP. A curation and storage agreement with the repository would be arranged prior to the pre-construction field survey. A suitable repository would be the Western Science Center in Hemet.

APM Paleo-2: Paleontological Resource Impact Mitigation Plan

A preliminary PRIMP has been developed based on data from the Paleontological Resources Assessment Technical Report (Reynolds and Lander 2016). The PRIMP will be revised, if necessary, based on the final PFYC determinations following the pre-construction survey. The PRIMP will identify areas to be monitored by a qualified paleontological professional. The final PRIMP will be submitted to BLM and the County for approval before any Project construction-related earth-moving activity begins. The Plan will be implemented during any construction activities that might disturb potentially fossil-bearing sediments. As described in the Paleontological Resources Assessment Technical Report (Reynolds and Lander 2016), the PRIMP will include:

1. A worker environmental awareness training program, to be prepared by a Project paleontologist, who will discuss fossil recognition and procedures to be implemented by earth-moving equipment operators when remains are encountered, particularly when a trained paleontologic monitor is not on site (e.g., avoidance of fossil locality, notification of appropriate Project, agency staff, and PRIMP personnel);
2. Paleontologic construction monitoring of earth-moving activities by a qualified (trained) monitor in portions of the Project area determined to have moderate or high sensitivity during the pre-construction field survey, thereby allowing for the discovery and recovery of any larger fossil remains exposed by such activities;
3. Assignment of additional field staff to recover an unusually large fossil specimen, thereby avoiding any diversion of the monitor from their designated task;
4. Collecting and processing fine-grained sediment samples to allow for the recovery of smaller remains;
5. Recording of associated specimen data (element, preliminary taxonomic identification, sample and locality data);
6. Full treatment of any remains recovered as a result of monitoring or sample processing (e.g., specimen preparation, identification, curation, cataloging); and
7. Preparation of a comprehensive final mitigation report of results and findings for submission to the BLM and the museum repository receiving the fossil collection.

The level of monitoring and the collection of sediment samples would be based on the PFYC assignment for the underling stratigraphic unit, and as determined appropriate based on pre-construction field survey results. The specific Project activities requiring monitoring, as well as duration of monitoring in the event resources are not identified by monitoring activities, will be defined in the PRIMP. Acceptance of the final report by the BLM would signify completion of the PRIMP, and would demonstrate Project compliance with CEQA, NEPA, BLM guidelines, and mitigation measures developed during the environmental impact review process for the Project.

As discussed in Section 4.1.6, the impact analysis assumes that the APMs have been implemented, and these measures are therefore requirements for approval of the Project. The APMs are to be incorporated into the EICMPP/MMRCP, along with the agency-required mitigation measures.

4.13.3 Direct and Indirect Impacts

4.13.3.1 Alternative 1: Proposed Action

Construction

Project construction would include activities that require ground disturbance, including grading of roads and solar array areas, excavation of foundations, trenching for placement of underground cables, and installation of steel piles to hold solar panels. Excavations and grading may result in disturbance of soils and underlying sedimentary units up to a depth of 10 feet. For the Proposed Action, these activities are expected to result in the disturbance of approximately 3,831 acres of land. These ground disturbing actions have the potential to impact surface and subsurface paleontological resources in rock units and sediments that contain such resources.

Direct impacts to paleontological resources may include destruction due to breakage and fragmentation and loss of context in the stratigraphic record. Indirect impacts may result from increased accessibility to paleontological resources, resulting in an increased likelihood of looting or vandalism. Cumulative impacts could result from the Project in combination with other past, present, or reasonably foreseeable future projects' incremental contributions to impacts on paleontological resources located in similar stratigraphic units throughout eastern Riverside County. All impacts would result in a permanent loss of scientific information that might otherwise have been gained through preservation, recovery, and/or salvage of fossil resources.

The results of the Applicant's Paleontological Resources Assessment Technical Report (SRI 2016) are discussed in Section 3.13.1.3. The assessment was based on literature research, and did not include a field survey for paleontological resources. Therefore, the PFY Classifications and SVP Categories, discussed in Section 3.13.1.3 and repeated below, are preliminary, and may change based on the results of the pre-construction survey conducted as part of APM Paleo-1.

The assessment evaluated the potential for significant fossils to be presented in the stratigraphic units identified on the Project site (see Figure 3.7-1, Table 3.13-1, and Table 3.13-2). Of these, three units, including the active alluvial fan deposits, active aeolian sand dune deposits, and active alluvial wash deposits, were determined to have a low potential for significant fossils, due to their age of less than 10,000 years old. In general, these three units comprise a small percentage of the overall Project area. The active aeolian sand dune deposits are found only in the proposed location of the gen-tie line, and would not be affected by solar arrays. The active alluvial wash and alluvial fan deposits are found only on the western fringe of the solar array area.

One of the units evaluated, the Bullhead Alluvium (equivalent to unit Qa3 on Figure 3.7-1), was assigned a preliminary PFYC of 3a (Moderate) or 4a (High). However, this unit is not included within the footprint of the Proposed Action, or any of the alternatives, and is unlikely to be impacted by the Project.

The stabilized alluvial fan deposits (Qf2; equivalent to unit Qa6 on Figure 3.7-1) were assigned a preliminary PFYC of 3b (Unknown). This unit comprises the northwestern portion of the Project area, and would be subject to ground disturbance associated with Project construction. Therefore, previously unknown, significant fossils may be impacted within this unit.

The largest area of the Project site, including the entire private land parcel, is comprised of the old terrace deposits (Qot; equivalent to unit Qpv on Figure 3.7-1), which were assigned a preliminary PFYC of 5a (Very High), and a SVP Category of High Potential. Because the largest area of the ground disturbance would occur in this area of high potential for the presence of significant fossils, construction of the Proposed Action has the potential to have direct, adverse impacts to paleontological resources.

Prior to beginning any ground disturbing activities, the Applicant would conduct a pre-construction field survey, as described in APM Paleo-1, and would finalize a PRIMP and provide it to BLM and the County for approval, as described in APM Paleo-2. These measures would reduce impacts to sensitive paleontological resources by identifying surficial resources in advance of ground disturbance; identifying areas with high potential for significant resources, which can be the focus of monitoring; training construction workers to identify fossil resources, including measures to take if they identify such resources; and ensuring that a qualified paleontologist is present for all earth disturbing work in sensitive areas (geologic units with PFYC Class 3(a) of higher). These measures would effectively identify fossil resources in the field during construction, and would ensure that their status is evaluated by qualified personnel, recorded, and recovered if appropriate. Implementation of the APMs as part of the Project would result in the avoidance or substantial reduction of adverse impacts to paleontological resources. Should unique fossil resources be salvaged during Project-related grading and construction, implementation of the APMs would result in an improved scientific understanding of the natural history and geology of the area that would not have been gained otherwise.

Implementation of the aforementioned APMs would not completely avoid or eliminate all potential impacts on paleontological resources resulting from Project construction, especially for activities requiring soil borings and driving of piles. Use of these methods may mean that site workers and/or paleontological monitors are unable to identify fossil resources prior to their disturbance or destruction. While intact fossils still may be found in drill cuttings, and fossils damaged by excavation equipment can sometimes be repaired in a laboratory, the nature of some of the construction methods to be used on-site means that implementation of the APMs may be unable to avoid impacts on paleontological resources.

Much of the ground disturbance associated with Project construction would be done with backhoes and graders, which would allow monitors to know the potential for significant fossils and to observe the ground before it is disturbed. As a result, construction of the Project could result in a net gain to the science of paleontology by allowing fossils that would not otherwise have been found to be identified, studied, and, if appropriate, recovered and preserved.

Operations

Operation and maintenance of the Project would not impact paleontological resources, because no earth disturbance would occur as a result of these activities.

Decommissioning

Decommissioning and closure of the Project site would not impact paleontological resources. The ground disturbed during these activities already would have been disturbed during construction, and would also be subjected to the APMs that would be required for construction.

4.13.3.2 Alternative 2: Resource Avoidance Alternative

Alternative 2 would cause the same type of paleontological resource-related impacts (beneficial and adverse) as the Proposed Action. As discussed in Section 3.13.1.3, the Project study area is comprised of seven different stratigraphic units, which have differing potentials for the presence of significant fossils. Of these, the most widely distributed in the Project area is the old terrace deposits (Qot), which has a preliminary PFYC of 5a (Very High) and SVP Category of High Potential. Although the total acreage of the Project under Alternative 2 would be reduced from that of the Proposed Action, the areas that would be left undisturbed under Alternative 2 are within the stratigraphic units that have PFYC classifications of either low or unknown potential. The portion of the Project area that overlies the old terrace deposits would be approximately the same as that of the Proposed Action. Although there would be a slight reduction of ground disturbance in the area of the old terrace deposits, the reduction would not be substantial, and the potential for impacts to fossils in the old terrace deposits would be approximately the same as that of the Proposed Action.

As with the Proposed Action, the implementation of APMs Paleo-1 and Paleo-2 would minimize the impact of construction-related activities by providing a mechanism for significant fossils to be identified before ground disturbance takes place; identifying areas with high potential for significant resources, which can be the focus of monitoring; training construction workers to identify fossil resources, including measures to take if they identify such resources; and ensuring that a qualified paleontologist is present for all earth disturbing work in sensitive paleontological areas.

4.13.3.3 Alternative 3: Reduced Project Alternative

Alternative 3 would cause the same type of paleontological resource-related impacts (beneficial and adverse) as the Proposed Action. However, because the size of the footprint of the solar arrays located on the old terrace deposits (Qot) would be smaller than that of the Proposed Action or Alternative 2, ground disturbance associated with construction activities on this stratigraphic unit would be reduced, and therefore the potential for adverse impacts to significant paleontological resources would be smaller.

As with the Proposed Action, the implementation of APMs Paleo-1 and Paleo-2 would minimize the impact of construction-related activities by providing a mechanism for significant fossils to be identified before ground disturbance takes place; identifying areas with high potential for significant resources, which can be the focus of monitoring; training construction workers to identify fossil resources, including measures to take if they identify such resources; and ensuring that a qualified paleontologist is present for all earth disturbing work in sensitive areas.

4.13.4 Application of CEQA Significance Thresholds

PALEO-1) Would the Project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Ground disturbance associated with construction of Alternatives 1, 2, and 3 would have the potential to adversely impact significant non-renewable paleontological resources that may be present within the Project area. Because the actual occurrence of these resources is unknown, the impact is potentially significant. The large extent of the old terrace deposits (Qot), which have a Very High potential for discovery of unknown significant paleontological resources, makes it impossible to avoid impacts by re-configuring the Project area. The acreage of ground disturbance on the Qot would be approximately the same under Alternative 2 as with Alternative 1. The potential for ground disturbance associated with construction of Alternative 3 to adversely impact significant non-renewable paleontological resources would be lower than that associated with Alternatives 1 and 2 due to the reduced acreage of ground disturbance on the Qot. However, the impact would still be potentially significant for Alternatives 1, 2, or 3.

The implementation of APMs Paleo-1 and Paleo-2 would minimize the impact of construction-related activities by providing a mechanism for significant fossils to be identified before ground disturbance takes place; identifying areas with high potential for significant resources, which can be the focus of monitoring; training construction workers to identify fossil resources, including measures to take if they identify such resources; and ensuring that a qualified paleontologist is present for all earth disturbing work in sensitive paleontological areas. When implemented, the pre-construction survey to be conducted as part of APM Paleo-1, and the PRIMP required as part of APM Paleo-2, would reduce adverse construction-related impacts on paleontological resources of Alternatives 1, 2, or 3 to a level that is less than significant.

No impacts to paleontological resources are anticipated during operation, maintenance, or decommissioning activities of Alternatives 1, 2, or 3. Should any ground disturbance occur during operations, the Applicant would follow the requirements of APM Paleo-1 and Paleo-2. Any areas disturbed during decommissioning would have already been disturbed during construction, so it is unlikely that additional undiscovered resources would be present. In addition, the requirements of APM Paleo-1 and Paleo-2 would also apply to decommissioning. Accordingly, the impact of Alternatives 1, 2, and 3 would be less than significant.

4.13.5 Alternative 4: No Action Alternative

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, the BLM would continue to manage the land under its jurisdiction consistent with the site's multiple use classification as described in the CDCA Plan, as amended by the Western Solar Plan.

If the site remained undeveloped, the existing environmental setting described in Section 3.13 would be maintained. Alternative 4 would cause no adverse impact to paleontological resources.

However, the potential benefits associated with the discovery, study, and preservation of paleontological resources that could occur as a result of the Project would not be realized.

4.13.6 Cumulative Impacts

All of the past, present, and reasonably foreseeable future projects discussed in Tables 4.1-1 and 4.1-2 are primarily located on the same Holocene alluvium, Pleistocene alluvium, and dry desert washes as the DQSP. Therefore, all of the projects are considered within the geographic scope of analysis with respect to cumulative impacts on paleontological resources. Because paleontological resources are non-renewable, the temporal scope of the potential cumulative impacts is permanent.

Alternative 1 – Proposed Action

Construction

Ground disturbance associated with construction of individual projects in the cumulative scenario, if not properly mitigated, could combine to cause a cumulative loss of scientific information through disturbance or destruction of potentially significant fossil resources. Cumulative impacts to paleontological resources include the loss of non-recoverable scientifically important fossils and associated data, and the incremental loss to science and society of these resources over time.

In general, the cumulative projects are expected to have a minor adverse impact on paleontological resources, because of the volume of ground disturbance as compared to the overall volume of potentially fossil-bearing sediments. If all of the projects in the cumulative scenario were to be implemented, the resulting area of ground disturbance could amount to as much as 316,675 acres, 225,000 of which would be for the purpose of renewable energy development. The contribution of the Project to this total would be 3,831 acres, or about one percent of the total land area. Although the total land area occupied by the cumulative projects represents a considerable amount of land, there are approximately 1,544,000 acres of land underlain by Quaternary geologic units within eastern Riverside County. Even if all projects were implemented and were in operation at the same time, over 1,200,000 acres would remain undisturbed. The impact on the basis of volume results in even less of an impact. Ground disturbance associated with each project is expected to be limited to less than 10 feet, and would probably be limited to less than 3 feet across most of the Project area. This depth is negligible compared to the overall thickness of potentially fossil-bearing sediments in the area.

Implementation of APMs, such as Paleo-1 and Paleo-2, would be implemented as part of the DQSP, and would also be implemented as part of many of the cumulative projects, including most of the future projects. These APMs would substantially reduce the cumulative effects of such projects on paleontological resources, and resulted in the beneficial cumulative effect of making any discovered fossils available for scientific research and education by placing them in museum collections. The cumulative projects would also comply with Riverside County regulations and the proposed guidelines of the Society of Vertebrate Paleontology. Therefore, the Project would not adversely affect paleontological resources under NEPA or contribute to significant cumulative paleontological resource impacts under CEQA (impact PALEO-1).

Operation and Decommissioning

Operation of the cumulative projects would generally not involve ground disturbance, and thus would not contribute to cumulative impacts to paleontological resources. Decommissioning of the projects may involve ground disturbance, but only in areas that had previously been disturbed during construction. As with construction, implementation of APMs and compliance with Riverside County regulations and the proposed guidelines of the Society of Vertebrate Paleontology would be required as part of decommissioning. Therefore, no cumulative impacts would be expected as part of the operation and decommissioning of the cumulative projects.

Alternative 2 – Resource Avoidance Alternative

Construction, Operations, and Decommissioning

The contribution of Alternative 2 to cumulative impacts to paleontological resources would be the same as the Proposed Action. Therefore, Alternative 2 would not adversely affect paleontological resources under NEPA or contribute to significant cumulative paleontological resource impacts under CEQA.

Alternative 3 – Reduced Project Alternative

Construction, Operations, and Decommissioning

The contribution of Alternative 3 to cumulative impacts to paleontological resources would be lower than the Proposed Action, due to the reduced acreage of ground disturbance on the old terrace deposits (Qot), which have a Very High potential for discovery of unknown significant paleontological resources. Therefore, Alternative 3 would not adversely affect paleontological resources under NEPA or contribute to significant cumulative paleontological resource impacts under CEQA.

Alternative 4 – No Action

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project, and the DQSP would not be implemented. The public lands in the Project area would continue to be managed by BLM in accordance with existing land use designations in the CDCA Plan, which could include a different solar project, or other development. Alternative 4 would not contribute to cumulative impacts to paleontological resources.

4.13.7 Residual Impacts

Unavoidable adverse impacts to paleontological resources could occur after mitigation measures were implemented because resources could be destroyed or dislocated during construction. However, implementation of mitigation measures (MM PAL-1 through MM PAL-8) would minimize these impacts because they would ensure that destruction would not occur, or would occur alongside an appropriate program of study. Mitigation measures would also result in a beneficial increase in knowledge related to the science of paleontology. Fossils that would not otherwise have been found would be recovered, identified, studied, and preserved. The information gained from these discoveries would further scientific knowledge of the nature and depths of subsurface geological units in the region. This expansion of knowledge would also benefit society because fossils would be stored at museums for educational use.

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4.14 Recreation and Public Access

4.14.1 Methodology for Analysis

The analysis of the Proposed Action and alternatives assesses the impacts to land acreage as well as types of known recreational uses including hiking, backpacking and long-term camping in established Federal, state, or local recreation areas and/or wilderness areas. The CDCA Plan recognizes that the California Desert is "a reservoir of open space and as a place for outdoor recreation." The CDCA Plan notes that the diverse landscape of the California desert provides for a variety of physical settings. Further, the CDCA Plan identifies the wide variety of desert recreation uses, ranging from off-road vehicles to outdoor preservationists, and the increasing challenge to accommodate these varied and sometimes competing uses. For example, LTVA visitors typically enjoy backcountry vehicle touring on routes and washes and in the surrounding areas and would therefore be affected by the closures of open vehicle routes in the vicinity of the Project. The CDCA Plan and NECO Plan Amendment to the CDCA Plan, which includes a detailed inventory and designation of open routes in the vicinity of the Project, were reviewed to determine impacts to open routes.

Under the DRECP, land use allocations under the CDCA Plan were changed. The new land use allocations included designation of Special Recreation Management Areas (SRMAs) and Extensive Recreation Management Areas (ERMAs). As an application in the Riverside East SEZ filed before June 30, 2009, the DQSP is not, and will not be, subject to the terms of the DRECP. See section II.3.3.3.5 and page II.3-126 of the DRECP. In addition, the analysis of the Project in this PA/EIS/EIR is based on the land use designations and visual resource classifications that were in effect on March 6, 2015, the date of the NOI, which do not include SRMAs and ERMAs. A discussion of the differences between the CDCA Plan and the DRECP land use allocations, and their effect on the analysis of the Project in this PA/EIS/EIR, is presented in Appendix E.

4.14.1.1 CEQA Significance Criteria

The criteria used to determine the significance of potential recreation and public access impacts are based on Appendix G of the state CEQA Guidelines. The Project would result in a significant impact under CEQA related to recreation if it would:

> REC-1) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.
>
> REC-2) Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

The following additional significance criterion from the County of Riverside CEQA Environmental Assessment Form is used in the analysis. A project could have potentially significant impacts if it would be:

> REC-3) Located within a Community Service Area (CSA) or recreation and park district with a Community Parks and Recreation Plan (Quimby fees).

4.14.2 Applicant-Proposed Measures

There are no APMs proposed to address potential effects to recreation and public access.

4.14.3 Direct and Indirect Impacts

4.14.3.1 Alternative 1: Proposed Action

Onsite Recreation and OHV Use

Construction and Decommissioning

During construction and decommissioning of the gen-tie line near the SCE CRSS, temporary closure of route 660703, which is along an existing transmission line, may be necessary to pull and string the gen-tie line, which crosses this route. Operation and maintenance of the gen-tie line may also periodically necessitate the temporary closure of this route. Route 660703 is an open route of travel. Temporary closure of the route would affect OHV access for recreationists. To reduce temporary impacts to current users, Mitigation Measure REC-2 would require the Applicant to coordinate with BLM to temporarily close route 660703 if needed during construction and/or maintenance of the gen-tie line, and to post a public notice of the temporary route closure. Use of route 660703 would temporarily be displaced to nearby routes. Route 660703 closure would be temporary, and OHV users would be impacted by the temporary displacement of use.

All Phases

Once construction begins, BLM lands within the Project area would become inaccessible for all recreational uses until after decommissioning. Development of the Project would remove 3,616 acres from public recreation use and close 6.8 miles of routes of travel until after decommissioning, resulting in long-term impacts to public access and recreation. Recreationists would no longer be able to utilize the Project site for dispersed recreational opportunities during construction, operation, maintenance, and decommissioning.

When construction begins, the Project area will be fenced off and 6.8 miles of open OHV routes will be closed to public use throughout the duration of the Project. Development of the Project would remove six OHV routes from public recreation use until after decommissioning, resulting in long-term impacts to public access and recreation. These routes include all or portions of routes 660862, 660863, 660866, 661092, 661102, and 661501. Three of these routes provide access to the private property inholding (660862, 660866, and 661501) within the Project area and three routes provide access to the Mule Mountains (660863, 661092, and 661102). Access to the private property inholding would no longer be necessary with the Project and there are alternative routes to the east and south of the Project area that provide access to the Mule Mountains. Mitigation Measure REC-1 would require announcement of the closure of these routes to the public at various nearby BLM recreation facilities to reduce the likelihood of decreased recreation experience quality due to unknown route closures and redirection to open routes. With the closure of the three routes that access the Mule Mountains, use of these routes would be displaced to other nearby routes that provide similar access. The alternative access route to the Mule Mountains ACEC is shown on Figure 3.14-3. This access would become from 22nd Avenue to Gravel Pit Road, west on an unpaved extension of 24th Avenue, north on existing open route 660683, and then southwest on route 661093 to the ACEC. Due to the displacement of users of projected closed routes, the project will create increase of surface impact on the routes and require more scheduled maintenance. To ensure that this alternative access is accessible and known to persons wishing to access the area, Mitigation Measure REC-1 requires that the Applicant perform light clearing and grading prior to Project construction, and then periodically as needed during construction, operations, and decommissioning.

For all phases of the Project, activity at the site and installation of a new industrial feature could attract OHV users in the surrounding viewshed to the site boundary via designated OHV open routes or over land. This could increase the opportunities for vandalism, illegal cross-country use, and other disruptive behavior. However, this risk is estimated to very low given the presence of existing solar projects in the area, low use of the routes within the Project vicinity, and availability of several existing OHV routes in the area.

Any recreationists displaced from the Project site would likely visit nearby recreation areas, thus leading to additional recreation use in other areas and corresponding impacts (noise, crowding, wildlife displacement, etc.). There are no specifically known resources or deposits that attract rockhounding onsite. Given that use of the Project site is likely very low, and therefore there would be very little displacement, impacts from additional use would be minimal.

After decommissioning, recreational users would experience a beneficial impact as the site would be restored to its natural undeveloped state and it would be available for recreational use. The primary access routes of travel 660862 and 660863 closed by the Project, trending south from the Nichols Warm Springs exit on Interstate 10, would be re-established after decommissioning, thus re-establishing access from Interstate 10 to the Mule Mountain ACEC.

Offsite Recreation

Construction and Decommissioning

It is anticipated that some construction workers may need to reside in RV campers at the Mule Mountain and Midland LTVAs in California and possibly the La Posa LTVA south of Quartzsite in Arizona, or camp on public lands in the vicinity of the Project site during the construction phase of the Project. Although the BLM offers developed campgrounds within commuting distance of the Project (Coon Hollow and Wiley's Well Campgrounds), only the LTVAs allow long-term camping, which would be more conducive to a 25-48 month construction period. The Midland and Mule Mountains LTVAs allow camping up to 7 months (September 15 to April 15) with purchase of a long-term permit, otherwise camping is allowed for up to 14 days with purchase of a short-term permit (BLM 2015). However, the short-term permit is intended for recreational uses and not for construction housing. The applicant would need additional authorization from the BLM to allow use of the LTVA for construction housing. Between April 15 and September 15, there is no trash pick-up and toilets are closed. Because construction and decommissioning would occur year round, workers may choose to use the LTVAs during any season. Although the number of workers who may choose to use LTVAs cannot be estimated, the maximum number of construction workers present in the area would be 850.

The presence of a large number of construction workers at the LTVAs could affect the recreation experience for users of the LTVAs by reducing spacing between campers and decreasing solitude. This reduction in recreation experience quality could displace some seasonal long-term visitors to other LTVAs in Arizona or Imperial County, thus increasing crowding at these already popular sites and thus reducing the quality of the recreation experience for users of these other LVTAs. If there is significant use of the LTVAs by construction workers, BLM may need to increase law enforcement patrols at the LTVAs, reducing patrols on public lands elsewhere.

Use of the LTVAs by a large number of construction workers could also affect the physical infrastructure of the LTVAs. However, the LTVAs contain minimal facilities because campers must use self-contained RVs and there are no assigned or designated sites, except at the Wiley's Well and Coon Hollow Campgrounds within the Mule Mountain LTVA. Except for the designated campsites at Wiley's Well and Coon Hollow, each LTVA can accommodate several hundred RV units with a minimum distance of 15 feet between units, which is far beyond the existing level of use.

The temporary increase in demand for accommodations during construction that might be caused by an influx of workers and the resulting potential impact on LTVAs and other nearby recreation areas would be reduced by Mitigation Measure REC-3. REC-3 requires the Applicant to encourage workers to utilize local housing opportunities or private RV parks in Blythe and other nearby communities instead of public lands, and to seek additional authorization from BLM for use of the LTVAs.

All Phases

The Mule Mountains ACEC is one mile from the Project site and as discussed in Section 4.12, *Noise*, construction noise would attenuate such that the sound would be barely audible to recreational users in the ACEC. As discussed in Section 4.2, *Air Resources*, construction, operation, maintenance, and decommissioning activities could generate dust in the form of PM_{10} and $PM_{2.5}$. However, the worst-case $PM_{2.5}$ and PM_{10} impacts would occur at the fence line and drop off quickly with distance and thus would not affect recreationists in the ACEC. Other nearby BLM recreation areas are more than four miles away, and therefore would not be impacted by noise and/or dust created by construction, operation, maintenance, and decommissioning activities.

The Mule Mountains LTVA is located about 8.3 miles southwest of the Project site. Visitors camping at this LTVA are seeking opportunities for recreation experiences with similar users in a semi-primitive environment. Due to the distance of the LTVA from the Project site, there would be no impact to campers from noise and/or dust created by construction, operation, maintenance, and decommissioning activities.

Although it is possible that unauthorized use of LTVAs could occur when they are closed from April 16 to September 14, such use would be unlikely because this area experiences extremely hot weather during the closed season. However, it is likely there would be additional use during the shoulder season from April to May and September to October.

Regional and Local Recreation Resources

Due to the location of regional and local recreational facilities throughout the region, there would be no impact to users of these facilities from noise and/or dust created by construction, operation, maintenance, and decommissioning activities.

Impacts to the regional parks that provide camping (Mayflower Park, Riviera Marina Park, McIntyre Park, and Palo Verde Park) would be similar to impacts described above for LVTAs. In addition, depending on the number of construction workers using the camping facilities at these parks, the availability of, and recreation experiences related to, other non-camping recreation uses at these parks could be affected due to increased demand.

DRECP

Under the DRECP, an area south of the Project area, north of the Palo Verde Mountains Wilderness, designated as a SRMA. However, the Project area itself is not located within or adjacent to the SRMA and would not impact recreation within the SRMA.

4.14.3.2 Alternative 2: Resource Avoidance Alternative

The type of impact of Alternative 2 on onsite recreational opportunities would be the same as for the Proposed Action. However, the onsite acreage affected would be reduced from that of the Proposed Action. Development of Alternative 2 would remove 2,622 acres from public recreation use and close 6.8 miles of routes of travel until after decommissioning, resulting in long-term impacts to public access and recreation.

Similar to the Proposed Action, construction and decommissioning of the gen-tie line for Alternative 2 would require the temporary closure of route 660703, and operation and maintenance of the gen-tie line may periodically require temporary closure of this route. Mitigation Measure REC-2, which would require the Applicant to coordinate with BLM to temporarily close route 660703 if needed during construction and/or maintenance of the gen-tie line, would apply under Alternative 2.

Construction, operation, and maintenance of Alternative 2 would require closure of 6.8 miles of open routes to public use throughout the duration of the Project. The routes which would be affected are the same as those affected by the Proposed Action, including all or portions of routes 660862, 660863, 660866, 661092, 661102, and 661501. Although Alternative 2 would involve a smaller amount of acreage than the Proposed Action, the areas which be disturbed would include at least a portion of all of these routes, so would require the same closures as would be required under the Proposed Action. Mitigation Measure REC-1, which requires announcement of the closure of these routes to the public at various nearby BLM recreation facilities, would apply to Alternative 2. For all phases of Alternative 2, activity at the site and installation of a new industrial feature could attract OHV users in the surrounding viewshed to the site boundary via designated OHV open routes or over land. This could increase the opportunities for vandalism, illegal cross-country use, and other disruptive behavior.

The impacts of construction and decommissioning workers of Alternative 2 on offsite recreation would be the same as those of the Proposed Action. The total number of workers would be the same for both alternatives, although the duration of construction and decommissioning may be shorter for Alternative 2. Similar to the Proposed Action, use of LTVAs by construction and/or decommissioning workers could impact the recreation experience for users of the LTVAs, and could also impact the physical infrastructure of the LTVAs.

The impacts of air emissions and noise from Alternative 2 on nearby recreation areas would be approximately the same as for the Proposed Action. Alternative 2 would be approximately the same distance from the Mule Mountains ACEC, and would have approximately the same peak level air emissions and noise.

4.14.3.3 Alternative 3: Reduced Project Alternative

The type of impact of Alternative 3 on onsite recreational opportunities would be the same as for the Proposed Action. However, the onsite acreage affected would be reduced from that of the Proposed Action. Development of Alternative 3 would remove 1,887 acres from public recreation use and close 6.5 miles of routes of travel until after decommissioning, resulting in long-term impacts to public access and recreation.

Similar to the Proposed Action, construction and decommissioning of the gen-tie line for Alternative 3 would also require the temporary closure of route 660703, and operation and maintenance of the gen-tie line may periodically require temporary closure of this route. Mitigation Measure REC-2, which would require the Applicant to coordinate with BLM to temporarily close route 660703 if needed during construction and/or maintenance of the gen-tie line, would apply under Alternative 3.

Construction, operation, and maintenance of Alternative 3 would require closure of 6.5 miles of open routes to public use throughout the duration of the Project. The routes which would be affected are the same as those affected by the Proposed Action and Alternative 2, including all or portions of routes 660862, 660863, 660866, 661092, 661102, and 661501. Although Alternative 3 would involve a smaller amount of acreage than the Proposed Action, the areas which be disturbed would include at least a portion of all of these routes, so would require the same closures as would be required under the Proposed Action. Mitigation Measure REC-1, which requires announcement of the closure of these routes to the public at various nearby BLM recreation facilities, would apply to Alternative 3. For all phases of Alternative 3, activity at the site and installation of a new industrial feature could attract OHV users in the surrounding viewshed to the site boundary via designated OHV open routes or over land. This could increase the opportunities for vandalism, illegal cross-country use, and other disruptive behavior.

The impacts of construction and decommissioning workers of Alternative 3 on offsite recreation would be the same as those of the Proposed Action and Alternative 2. The total number of workers would be the same for all three action alternatives, although the duration of construction and decommissioning may be shorter for Alternative 3. Similar to the Proposed Action, use of LTVAs by construction and/or decommissioning workers could impact the recreation experience for users of the LTVAs, and could also impact the physical infrastructure of the LTVAs.

The impacts of air emissions and noise from Alternative 3 on nearby recreation areas would be approximately the same as for the Proposed Action and Alternative 2. Alternative 3 would be approximately the same distance from the Mule Mountains ACEC, and would have approximately the same peak level air emissions and noise.

4.14.4 Application of CEQA Significance Thresholds

The DQSP would not include any recreational facilities, but would result in a temporary increase in population associated with construction, which would have a peak workforce of 810 employees. The presence of these workers for the 25 to 48 month long construction Project could affect use of recreation facilities in the region, although not to the point where substantial deterioration of the facilities would occur. Therefore, impacts would be considered less than significant during construction, operation, maintenance, and decommissioning.

REC-1) Would the Project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

Alternatives 1, 2, and 3 would not involve the use of existing neighborhood or regional parks, or other recreational facilities. However, during construction and decommissioning of any of the action alternatives, there would be a temporary increase in population that may utilize existing recreational facilities in the Project vicinity. As described in Section 4.15, *Social and Economic Effects*, it is assumed that most construction workers would utilize seasonal and vacation home rentals, which have high vacancy rates within the Project vicinity. It is unlikely that the additional workers would be concentrated in a single location, and therefore no one recreation facility would receive an increased level of use that would lead to the substantial physical deterioration of the facility.

Closure of the current access routes to the Mule Mountains could result in increased use, and therefore degradation, of the alternative access roads south and west of the Project area. To ensure that this alternative access is accessible and known to persons wishing to access the area, Mitigation Measure REC-1 requires that the Applicant perform light clearing and grading prior to Project construction, and then periodically as needed during construction, operations, and decommissioning.

The temporary use of LTVAs by construction and decommissioning workers for Alternatives 1, 2, or 3 may result in physical deterioration of the facilities. Both Wiley Well and Coon Hollow LTVAs have limited water available, and it is unlikely the LTVAs can accommodate significantly higher water use by Project employees. The LTVAs include only minimal facilities because campers must use self-contained RVs, and the LTVAs may not have the capability to accommodate significantly more water use than they currently experience. Excessive use may accelerate physical deterioration of recreational facilities such as toilets and tables, and may disrupt the experience of solitude the LTVA campers seek. Excessive use could also lead to deterioration of Wiley's Well Road, which is unpaved and maintained by Riverside County after significant rainstorms. The current motorized vehicle use creates washboards and blow-outs, making the road difficult for motorhome and trailer travel. Increased travel on the road by Project workers may make the road inaccessible to visitor's camping vehicles. Therefore, impacts to LTVAs as a result of use by workers may be significant.

During operation, the number of employees for Alternatives 1, 2, or 3 would be minimal (approximately five), and any potential impact on recreational facilities would be negligible. The five permanent workers are not expected to use temporary housing in the LTVAs. No impact would occur.

Mitigation Measure REC-1 would ensure that the alternative access roads to recreational areas in the Mule Mountains would remain accessible. Mitigation Measure REC-3 would require the Applicant to encourage workers to utilize local housing opportunities or private RV parks in nearby communities instead of public lands, and to coordinate with the County to address any deterioration in the condition of the access roads. REC-3 would also require that the workers supply their own potable water, limiting the impact on the limited water available at the LTVAs. With monitoring of impacts and corrective actions associated with Mitigation Measures REC-1 and REC-3, impacts would be reduced to less than significant for Alternatives 1, 2, or 3.

REC-2) Would the Project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

Alternatives 1, 2, and 3 would not include any recreational facilities. These alternatives would result in negligible long-term increases in population. As a result, these alternatives would not require the construction or expansion of recreational facilities. No impacts would occur.

REC-3) Would the Project be located within a Community Service Area or recreation and park district with a Community Parks and Recreation Plan (Quimby fees)?

Alternatives 1, 2, and 3 would not be within a Community Service Area and would not include recreational facilities. These alternatives would not add significantly to the local population necessitating the construction or expansion of recreational facilities or cause or accelerate physical deterioration of recreational facilities. No impacts would occur.

4.14.5 Alternative 4: No Action Alternative

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, the BLM would continue to manage the land under its land use jurisdiction consistent with the site's multiple use classification as described in the CDCA Plan, as it was amended by the Western Solar Plan.

If the site remained undeveloped, the existing environmental setting described in Section 3.14 would be maintained. The Project site would remain available for recreational uses, and the existing open routes would remain open for public use. No workers would be brought to the area, so there would be no increase of use of existing recreational facilities. There would be no air emissions or noise that would affect nearby recreation areas. Therefore, Alternative 4 would not result in any impacts to recreation resources.

4.14.6 Cumulative Impacts

The geographic scope of impacts to onsite recreational resources and OHV routes associated with the cumulative projects is eastern Riverside County. The geographic scope for increased use of LTVAs and other offsite recreational facilities by workers is Blythe and the other nearby communities which are expected to house the workers. The geographic scope of impacts from Project-related air emissions or noise to offsite recreational resources in LTVAs, parks, ACECs, and other recreation areas is limited to the immediate vicinity of each area, in which emissions or noise from one or more cumulative projects could combine to degrade the recreational qualities of that area. The temporal scope for these impacts is the duration of construction, operation, and decommissioning of the Project.

Alternative 1 – Proposed Action

Construction, Operations, and Decommissioning

Past, present, and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1. Among them, projects that also would be developed wholly or partially on lands designated as MUC-M would restrict recreational opportunities within that classification for the duration of those projects. These projects include Palen Solar, Genesis Solar, Desert Sunlight, Desert Harvest, and RE Crimson. Each of these projects would occupy land area which would otherwise have been available for recreation and OHV use. Upon the beginning of construction for each project, and continuing through decommissioning, each of these projects would eliminate use of the land area for recreational purposes. The displacement of dispersed recreation from the Project site and other projects' development footprints could reduce the availability of short-term recreational uses for other visitors to the area. The Proposed Action would occupy approximately 3,616 acres, and the other MUC-M projects would occupy approximately 25,000 acres, for a total of approximately 28,600 acres. Of the total MUC-M and MUC-L lands in eastern Riverside County, the Proposed Action represents less than 1 percent, with a total cumulative effect of approximately 3 percent. Since more than 900,000 acres of MUC-M and MUC-L lands in eastern Riverside County would remain available for recreation, and upon completion of decommissioning these lands would again become available for recreation, no cumulative impact would result from the contribution of the Proposed Action to the impact of the past, present, and reasonably foreseeable future projects.

Each of the cumulative projects would also result in the closure of OHV open routes in the California Desert. The closures would have an adverse effect on the availability of OHV routes for recreational uses, and may result in some users seeking out other areas, legally or illegally, for their activities and experiences. In general, implementation of each project would include replacement of closed routes with other routes, so that public access to specific locations is not eliminated. However, the overall size of the network available for OHV recreation would be reduced. The effect of the overall cumulative past, present, and reasonably foreseeable projects in eastern Riverside County, in combination with the closure of OHV routes by the Proposed Action, would adversely affect OHV open routes through closures, rerouting, and use restrictions. Decommissioning activities would make these lands available for OHV opportunities, if BLM chooses to re-develop and re-open designated routes.

The Project's incremental contribution to temporary, construction-related impacts to OHV routes would be reduced through implementation of Mitigation Measures REC-1 and REC-2. Mitigation Measure REC-1 would require announcement of the closure of OHV routes to the public at various nearby BLM recreation facilities to reduce the likelihood of decreased recreation experience quality due to unknown route closures and redirection to open routes. Mitigation Measures REC-2 requires coordination of temporary closure of OHV routes during construction with the BLM.

It is anticipated that construction or decommissioning workers for the Project could reside in RV campers at the Mule Mountain and Midland LTVAs in California and the La Posa LTVA south of Quartzsite in Arizona. Each LTVA can accommodate several hundred RV units, and current use is much lower than capacity. Other projects in the cumulative scenario would also result in an influx of construction workers who may choose to reside in LTVAs during the permitted season. Impacts to LTVAs from maximum authorized use by construction workers would be to reduce the availability of these areas to recreational campers. This would have an adverse impact on the social and recreation experience of winter users, as well as to the potential need for increased law enforcement patrols, reducing the available patrols for other public lands. Implementation of Mitigation Measure REC-3 would require the Applicant to encourage workers to utilize local housing or private RV parks, and to seek additional authorization from BLM for use of the LTVAs, thus reducing the Project's contribution to these cumulative impacts.

The cumulative projects could potentially impact recreational facilities and/or the recreational experience for other visitors if the influx of project workers substantially increases demand for use of local or regional parks, LTVAs, and other specific recreational areas. The cumulative projects are not expected to individually result in substantial adverse impacts to recreation. Although each of the projects would potentially increase local populations and demand for recreation during their construction phases, this increase would likely be temporary for each project, and would also probably not overlap for all projects during the same time period. Because construction of each of the projects would be temporary, and the size of the operational workforces would be nominal, the cumulative projects are not expected to induce substantial growth to the regional population levels. As such, the cumulative effect on recreational facilities would be nominal, and cumulative impacts would be less than significant (impact REC-1).

Each of the cumulative projects could also potentially impact the recreational experience for other visitors if they were to generate air emissions or noise in the vicinity of local or regional parks, LTVAs, and other specific recreational areas. The ability of each individual project to have such an impact would decrease with distance away from the project, so only projects within a very limited area around each individual recreation area could combine to create a cumulative impact to that area. As discussed in Section 4.14.3.1, air emissions and noise from the Project are not expected to be noticeable in the closest recreation area, which is the Mule Mountains ACEC. Two other local projects, the RE Crimson Solar facility and the Mule Mountain III Solar facility, would be located near the ACEC, and may contribute air emissions and noise which could impact that area. However, the incremental contribution of the Proposed Action to that impact would not be noticeable.

The Project would not require construction of recreation facilities (impact REC-2), and would not be located in a Community Service Area or recreation and park district with a Community Parks and Recreation Plan (impact REC-3).

Alternative 2 – Resource Avoidance Alternative

Construction, Operations, and Decommissioning

The contribution of Alternative 2 to cumulative impacts to recreation would be approximately the same as the Proposed Action. Alternative 2 would occupy approximately 2,622 acres, and the other MUC-M projects would occupy approximately 25,000 acres, for a total of approximately 27,622 acres. Of the total MUC-M and MUC-L lands in eastern Riverside County, Alternative 2 represents less than 1 percent, with a total cumulative effect of approximately 3 percent. Since more than 900,000 acres of MUC-M and MUC-L lands in eastern Riverside County would remain available for recreation, and upon completion of decommissioning these lands would again become available for recreation, no significant cumulative impact would result from the contribution of Alternative 2 to the impact of the past, present, and reasonably foreseeable future projects. Mitigation Measure REC-1 would require announcement of the closure of these routes to the public at various nearby BLM recreation facilities to reduce the likelihood of decreased recreation experience quality due to unknown route closures and redirection to open routes. Mitigation Measure REC-2 would require the Applicant to coordinate short-term closures during construction with BLM.

The contribution of Alternative 2 to other cumulative impacts to recreation, including OHV routes, LTVAs, ACECs, and other local or regional parks, would be the same as those described for the Proposed Action. Mitigation Measure REC-3 would require the Applicant to encourage workers to utilize local housing or private RV parks, and to seek additional authorization from BLM for use of the LTVAs, reducing potential impacts associated with use of the LTVAs for housing workers.

Alternative 3 – Reduced Project Alternative

Construction, Operations, and Decommissioning

The contribution of Alternative 3 to cumulative impacts to recreation would be approximately the same as the Proposed Action. Alternative 3 would occupy approximately 1,887 acres, and the other MUC-M projects would occupy approximately 25,000 acres, for a total of approximately 26,887 acres. Of the total MUC-M and MUC-L lands in eastern Riverside County, Alternative 3 represents less than 1 percent, with a total cumulative effect of approximately 3 percent. Since more than 900,000 acres of MUC-M and MUC-L lands in eastern Riverside County would remain available for recreation, and upon completion of decommissioning these lands would again become available for recreation, no significant cumulative impact would result from the contribution of Alternative 3 to the impact of the past, present, and reasonably foreseeable future projects. Mitigation Measure REC-1 would require announcement of the closure of these routes to the public at various nearby BLM recreation facilities to reduce the likelihood of decreased recreation experience quality due to unknown route closures and redirection to open routes. Mitigation Measure REC-2 would require the Applicant to coordinate short-term closures during construction with BLM.

The contribution of Alternative 3 to other cumulative impacts to recreation, including OHV routes, LTVAs, ACECs, and other local or regional parks, would be the same as those described for the Proposed Action. Mitigation Measure REC-3 would require the Applicant to encourage workers to utilize local housing or private RV parks, and to seek additional authorization from BLM for use of the LTVAs, reducing potential impacts associated with use of the LTVAs for housing workers.

Alternative 4 – No Action

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project, and the DQSP would not be implemented. The public lands in the Project area would continue to be managed by BLM in accordance with existing land use designations in the CDCA Plan, which could include a different solar project, or other development. There would be no occupation of land area which would interfere with current recreational uses or OHV routes, no use of recreational facilities by workers, and no air emissions or noise which could affect recreational experiences. Therefore, the No Action Alternative would not contribute to cumulative recreation impacts.

4.14.7 Residual Impacts

Following implementation of mitigation measures, all adverse impacts on recreation and OHV access resulting from construction, operations and maintenance, and decommissioning of the Project and alternatives would be avoided or substantially reduced.

4.15 Social and Economic Effects

4.15.1 Methodology for Analysis

The CEQ's *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 CFR Parts 1500-1508; reprinted in CEQ, 2005) provides guidelines for addressing social and economic effects in preparing an environmental impact statement. Section 1508.14 of these regulations states that:

> "Human environment" shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment. . . . This means that economic or social effects are not intended by themselves to require preparation of an environmental impact statement. When an environmental impact statement is prepared and economic or social and natural or physical environmental effects are interrelated, then the environmental impact statement will discuss all of these effects on the human environment.

In §1508.8(b), the regulations state that indirect effects of an action "may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems."

Consistent with these regulations, the analysis of socioeconomic impacts includes examination of impacts of the Project and alternatives with respect to the following issues:

1. Housing availability and the character of local communities that may result from employment of workers for the construction, operation, and decommissioning;
2. Employment and economy of Riverside County from spending and employment; and
3. Revenues of the County government which would provide local public services.

The analysis of potential socioeconomic effects of the Proposed Action and alternatives takes place in the context of physical effects related to population and housing. An input-output model (IMPLAN) was used to estimate the indirect and induced economic impacts from construction operation, maintenance, and decommissioning of the DQSP.

4.15.1.1 CEQA Significance Criteria

The criteria used to determine the significance of the Project-related socioeconomic impacts are based on the criteria identified in the state CEQA Guidelines, Appendix G. Project-related impacts would be considered significant if they:

SOC-1) Induce substantial population growth in an area, either directly or indirectly.

SOC-2) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere.

SOC-3) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

The following additional significance criteria from the County of Riverside Environmental Assessment form are used in the analysis. A project could have potentially significant impacts if it would:

SOC-4) Create a demand for additional housing, particularly housing affordable to households earning 80% or less of the County's median income.

SOC-5) Affect a County Redevelopment Project Area.

SOC-6) Cumulatively exceed official regional or local population projections.

4.15.2 Applicant-Proposed Measures

There are no APMs to address potential social and economic effects.

4.15.3 Direct and Indirect Impacts

4.15.3.1 Alternative 1: Proposed Action

Construction

Housing and Community

Construction employment and spending for the Project is the primary mechanism by which the DQSP would cause a socioeconomic impact. Construction would be temporary and is expected to last for a maximum of 48 months. Given the absence of existing significant economic uses of the site, Project construction would not displace any current economic activity. As discussed in Section 3.15, *Social and Economic Setting*, the location of construction workers is a key factor determining the extent of potential impacts to the local economy and communities. Income from employment primarily would benefit the communities in which the construction workers and their families reside because this is where most household expenditures occur. Also, the distance between workers' residences and the DQSP site would affect the choice of transportation and decision on whether to engage in "weekly commuting" or other forms of temporary relocation while working on the Project.

The number of construction workers on-site would be a maximum of 810, with an average workforce of 450 workers. Most construction workers are expected to come from western Riverside County, where, along with San Bernardino County, a substantial number of workers in relevant occupations reside (over 159,000 workers; Table 3.15-7). It is possible, however, that some workers will come from Imperial County, La Paz County, or Maricopa County.

With the exception of eastern Coachella Valley, most of western Riverside County is two hours or more travel time away from the Project site (see Figure 3.15-1). Since construction is a temporary assignment, it is not expected that workers from outside the Blythe area would relocate to Blythe permanently in order to work at the Project site. Data reviewed in Section 3.15.1 also indicate that some workers may engage in "weekly commuting," in which they find temporary or transient housing closer to the jobsite during the workweek. It is expected that such workers would seek temporary housing in the Blythe area, where both rental housing as well as a large number of hotel or motel rooms would be available.

According to the 2009-2013 American Community Survey, there were 196 housing units for rent in the City of Blythe and an additional 60 units in the nearby communities of Ehrenberg and Mesa Verde (Table 3.15-2). As indicated in Section 3.15, there are more than 1,000 hotel rooms in Blythe, four additional hotels in Ehrenburg and Quartzsite, and another 14,842 hotel rooms within a 1 to 2 hour drive. In addition, there are numerous RV facilities, mobile home sites, and campgrounds in Blythe and surrounding areas, which could provide alternative forms of temporary housing. Thus, there would be a sufficient supply of temporary housing options to accommodate workers who may seek temporary housing near the jobsite.

Regional Employment and Economy

With unemployment rates of 6.3 percent in Riverside County and 8.2 percent in La Paz County (September 2015), employment of workers for Project construction would have a beneficial effect in helping to reduce unemployment.

Project construction would create a temporary, positive impact on the local economic base and fiscal resources. Construction employment wages and salaries would provide additional income to the area, as would expenditures within Riverside County for construction materials and services. The Project construction payroll has been estimated at approximately $80 million a year. Capital expenditures and local spending on construction materials and equipment within Riverside Count is estimated to average $20 million annually. Project construction is expected to directly create an average of 450 annual full-time employees over 48 months, with a peak monthly employment of 800 full-time workers.

Employment and resulting labor income also would have beneficial effects in Riverside County as a whole. These are estimated using a regional input-output model of Riverside County's economy (MIG 2015). Starting with expenditures or employment for a given project, also called the *direct* impact, an input-output model represents major inter-industry (i.e., business-to-business) transactions in the region of interest, as well as transactions with households, government, and import/export with economies outside the region. Multipliers derived from the model can be used to estimate *indirect* impacts (business-to-business, or supplier, transactions following expenditures by a project) and *induced* impacts (expenditures by households of workers employed by the Project and by the chain of suppliers to the Project). The sum of direct, indirect, and induced impacts represents the total economic or employment impact to the region. For purposes of this analysis, Riverside County is the region of interest, since the majority of workers are expected to come from the County and Project-related direct impacts would occur in the County.

For the purpose of the input-output model, the following Project expenditures (rounded values) were assumed to be the Project expenditures that would benefit the Riverside economy: 1) estimated annual payroll ($800 million); 2) estimated annual local capital expenditures and materials ($10.4 million); and 3) estimated annual average employment (450 employees).

Based on these assumptions, the total estimated annual beneficial economic impacts from the 25 to 48-month construction phase within Riverside County would be $72.5 million, as shown in Table 4.15-1.

Table 4.15-1. Regional Employment and Income Impacts from Project Construction

Construction	Employment (Jobs)	Labor Income ($ Million)	Output ($ Million)
Direct Effect	450.0	80.0	20.0
Indirect Effect	32.1	1.2	3.9
Induced Effect	411.2	14.8	48.6
Total Effect	893.3	96.0	72.5

Table 4.15-1. Regional Employment and Income Impacts from Project Construction

Construction	Employment (Jobs)	Labor Income ($ Million)	Output ($ Million)

Note: Sector modeled is 54 Construction of new power and communication structures.
Region is Riverside County. Income and output are in 2014 dollars. Figures may not add to totals as shown due to rounding.
Source: MIG 2015

The top five industries that would benefit the most in terms of economic output impacts include: construction, real estate, limited-service restaurants, full-service restaurants, and individual and family services (e.g., activity centers, community social services).

Also, using the assumptions above during the construction phase, the Project's estimated annual job creation within the study area would be 893.3 positions (Table 4.15-1).

Riverside County Revenues

The economic benefits of increased income and employment would result in indirect and induced revenue, and potential expenditures in the surrounding counties; however, the precise distribution of labor force among these counties is not known. Because Riverside County would provide most of the local government services to the Project, such as police and fire protection, this analysis focuses on Riverside County.

During construction, the primary revenue source for the County would be the sales and use taxes levied on construction materials and supplies. The current sales tax rate applicable to unincorporated Riverside County is 8.0 percent, of which the County directly receives 1.5 percent, with 0.5 percent for the Riverside County Transportation Commission, 0.25 percent for County transportation funds, and 0.75 percent for County operations (California State Board of Equalization (BOE) 2013; BOE 2015a).

Sales and use taxes are levied on materials and supplies used for construction in the jurisdiction where the jobsite is located. For the Project, the principal materials subject to these taxes would be components of the solar energy generating system, including PV modules or panels, mounting and tracking systems, electrical components, inverters, and other materials. Based on data collected by National Renewable Energy Laboratory (NREL 2011), these components are estimated to cost $2,268 per kW.

The NREL cost estimate includes $1,598 per kW for solar PV modules (thin film), the most expensive component of the energy generating system. Other materials tabulated by the NREL cost estimate include mountings (rails, clamps, fittings, etc.), at $178 per kW; electrical materials (wire, connectors, breakers, etc.), at $202 per kW; and inverters, at $290 per kW. Based on these estimates, the total material cost for a 450 MW facility would be approximately $719 million. Sales tax revenues allocated to the County (1.5 percent) would be approximately $10.8 million.

The BOE generally distributes sales and use tax revenues from construction materials and supplies to local governments through a countywide pool, unless a special procedure is used to allocate all such revenues to the jurisdiction of the jobsite. Under the countywide pool, the unincorporated county would receive a percentage of the revenues, which varies by quarter according to sales and use taxes collected. In the third quarter of 2015, the County received 8.0 percent of the countywide pool (BOE 2015b). Under such an allocation, the County would receive about $864,000 in sales tax revenues from construction materials.

Operation and Maintenance

Housing and Community

Permanent operating staff for the Project would number approximately 5 workers. In contrast to construction employment, it is expected that these workers would be either hired locally or, if hired from outside the Blythe area, would relocate to the area. Due to the numbers of vacant homes for sale (62 units in the City of Blythe) or for rent (196 units in the city), there would be minimal impact to the local housing supply or the community, even if all permanent workers were to relocate to the Blythe area.

Regional Employment and Economy

The employment of 5 workers for operation and maintenance would not adversely affect the regional labor market with current (September 2015) unemployment rates of 6.3 percent in Riverside County and 8.2 percent in La Paz County, but instead would have a beneficial effect.

An input-output model was used to estimate economic impacts within Riverside County based on operation-phase Project expenditures that would benefit the local economies. For input-output analysis, it is assumed that the 5-person operating staff would consist of workers in the following industries: 3 workers in electric power generation and transmission and 2 workers in electronic and precision equipment maintenance. Annual expenditures were based on assumed values for Riverside County for these two industries. Payroll was estimated by the Applicant to be $500,000 annually.

Table 4.15-2 shows that total employment and economic impact in the County, including direct, indirect, and induced impacts, would be 10.7 workers, with total income impact of $0.7 million, and output impact of $3.0 million per year.

Table 4.15-2. Regional Employment and Income Impacts from Project Operation

Operation	Employment	Labor Income ($ Million)	Output ($ Million)
Direct Effect	5.0	0.5	2.3
Indirect Effect	2.6	0.1	0.3
Induced Effect	3.1	0.1	0.4
Total Effect	10.7	0.7	3.0

Note: Sectors modeled are 44 Electric Power Generation – Solar and 506 Electronic and Precision Equipment Repair and Maintenance.
Region is Riverside County. Income and output are in 2014 dollars. Figures may not add to totals as shown due to rounding.
Source: MIG 2015

Riverside County Revenues

Consistent with Board Policy No. B-29 regarding solar power plant payments, the solar power plant owner shall annually pay to the County a public benefit payment of $150 per acre for land involved in the power production process. This shall be done through a negotiated development agreement between the County and solar power plant owner. Additionally, the development agreement will contain terms requiring the solar power plant owner to take actions to ensure allocation directly to the County of the sales and use taxes payable in connection with the construction of the solar power plant, to the maximum extent possible under the law. The estimated tax revenue to the County under the Proposed Action would be approximately $565,000 per year.

The largest improvement of the Project that would be subject to property taxation is the gen-tie line. Even when constructed on tax-exempt BLM land, private improvements such as the gen-tie line are taxable as possessory interest. The estimated length of this line, including both inside and outside the Project site boundaries, is 3.0 miles. The Applicant has not provided a cost estimate for the gen-tie line. However, an economic study of a similar solar PV energy project in Imperial County (Imperial County 2011) estimated that construction of a 5-mile gen-tie line over BLM land would cost $12.4 million, or approximately $2.48 million per mile. Based on this example, it is estimated that the taxable value of the proposed gen-tie line, excluding land, would be nearly $7.5 million.

The average rate of property taxation in the County in fiscal year (FY) 2013-14 was 1.158 percent, generating total taxes of approximately $2.4 billion (BOE 2014). This was distributed to the County, cities, schools, special districts, and other agencies. According to the Riverside County Assessor-County Clerk-Recorder's (ACR) office, property taxes distributed to local agencies in FY 2013-2014 totaled $2.2 billion, of which 7.1 percent went to cities, 11.2 percent to the County, and the remainder to other agencies (Riverside County 2015e).

For purposes of this analysis, it is assumed that the County would receive 18.3 percent of the 1.158 percent tax collected from the Project site. Estimated property tax revenue to the County from the gen-tie line thus would be approximately $15,800 per year.

Although it is likely that the Project would generate additional property tax revenues from onsite improvements not directly related to solar energy generation, no cost estimates are available for these improvements.

Decommissioning

After 30 years of operation, the Project would be decommissioned, with all equipment and improvements dismantled and removed from the site, and the site would be restored to an undeveloped condition. Decommissioning is expected to take up to a year to complete. As discussed in Section 2.3.6, the workforce required for decommissioning is expected to be approximately the same size as that required for construction.

Housing and Community

As in the case of Project construction, the temporary decommissioning workforce would likely come mostly from western Riverside County and a smaller number from the Blythe area and La Paz County. Although the size of the workforce would be approximately the same size as that for construction, the duration of decommissioning, about one year, would be shorter than that for construction. As a result, it is likely that a larger proportion of workers would commute, as opposed to relocating to the area. Therefore, although it is not possible to estimate the availability of rental properties and hotel accommodations that would be available in the area at that time, it is likely that the demand on those accommodations would be lower than that associated with Project construction.

Regional Employment and Economy

It is difficult to forecast employment conditions for 30 years into the future. Even if unemployment rates in Riverside and La Paz counties decline to lower levels, such as those projected for the near-term, demand for workers for decommissioning of the Project would not have an adverse impact on the regional or local labor market. Expenditures for decommissioning, including payments to workers, would have a beneficial effect on the regional economy. However, the linear input-output model of 2014 cannot be applied to the decommissioning work, since the regional economy undoubtedly will experience substantial changes in the intervening years.

Riverside County Revenues

No substantial sales or property tax revenues would be generated during or after decommissioning because the improvements which were the basis for the tax revenue would cease to exist.

4.15.3.2 Alternative 2: Resource Avoidance Alternative

Construction

The construction workforce for Alternative 2 is expected to be approximately the same as for the Proposed Action; therefore, there would be a sufficient supply of temporary housing options to accommodate workers who may seek temporary housing near the jobsite. Additionally, estimated impacts on regional employment, worker income, and the output of construction companies are the same as those shown in Table 4.15-1. Due to the reduced acreage, the duration of construction would be reduced incrementally from that of the Proposed Action, but the average and peak workforces would be similar to those of the Proposed Action. Therefore, impacts of construction of Alternative 2 would be similar to those of the Proposed Action, but would occur for a shorter timeframe.

The total material cost of Alternative 2 materials and supplies is also expected to be approximately the same as the Proposed Action. Therefore, the total estimated annual beneficial economic impacts from the construction phase within Riverside County would be $72.5 million, as shown in Table 4.15-1. Similarly, the Riverside County revenue would be the same as for the Proposed Action, or approximately $864,000.

Operation and Maintenance

Housing and Community

Permanent operating staff for Alternative 2 would be the same as for the Proposed Action, or approximately 5 workers. As with the Proposed Action, there would be minimal impact to the local housing supply or the community, even if all permanent workers were to relocate to the Blythe area.

Regional Employment and Economy

The employment of 5 workers for operation and maintenance for Alternative 2 would not adversely affect the regional labor market with current (September 2015) unemployment rates of

6.3 percent in Riverside County and 8.2 percent in La Paz County, but instead would have a beneficial effect.

The input-output model used to estimate economic impacts within Riverside County for the Proposed Action is also applicable to Alternative 2. Table 4.15-2 shows that total employment and economic impact, including direct, indirect, and induced impacts, would be 10.7 workers, with total income impact of $0.7 million, and output impact of $3.0 million per year.

Riverside County Revenues

Consistent with Board Policy No. B-29 regarding solar power plant payments, the solar power plant owner shall annually pay to the County a public benefit payment of $150 per acre of land involved in the power production process. This shall be done through a negotiated development agreement between the County and solar power plant owner. Additionally, the development agreement will contain terms requiring the solar power plant owner to take actions to ensure allocation directly to the County of the sales and use taxes payable in connection with the construction of the solar power plant, to the maximum extent possible under the law. The estimated tax revenue to the County under Alternative 2 would be $439,500 per year.

During operation and maintenance of Alternative 2, another revenue source for the County would be property tax revenue based on the private improvements of the gen-tie line. The estimated length of this line, including both inside and outside the Alternative 2 site boundaries, is 4.0 miles. The Applicant has not provided a cost estimate for the gen-tie line. However, an economic study of a similar solar PV energy project in Imperial County (Imperial County 2011) estimated that construction of a 5-mile gen-tie line over BLM land would cost $12.4 million, or approximately $2.48 million per mile. Based on this example, it is estimated that the taxable value of the proposed gen-tie line, excluding land, would be approximately $9.9 million. Using the assumption that the County would receive 18.3 percent of the 1.158 percent tax collected on the gen-tie line, the estimated property tax revenue to the County under Alternative 2 would be approximately $20,000 per year.

Although it is likely that Alternative 2 would generate additional property tax revenues from onsite improvements not directly related to solar energy generation, no cost estimates are available for these improvements.

Decommissioning

After 30 years of operation, Alternative 2 would be decommissioned, with all equipment and improvements dismantled and removed from the site, and the site would be restored to an undeveloped condition. Decommissioning is expected to take up to a year to complete, and is expected to require a workforce substantially smaller than that required for construction.

Housing and Community

As in the case of Alternative 2 construction, the temporary decommissioning workforce would likely come mostly from western Riverside County and a smaller number from the Blythe area and La Paz County. Many workers would likely commute to the site. For workers who choose to commute weekly and temporarily relocate to the Blythe area during the workweek, it is expected that sufficient numbers of rental properties and hotel and motel accommodations would be available in the area.

Regional Employment and Economy

It is difficult to forecast employment conditions for 30 years into the future. Even if unemployment rates in Riverside and La Paz counties decline to lower levels, such as those projected for the near-term, demand for workers for decommissioning of Alternative 2 would not have an adverse impact on the regional or local labor market. Expenditures for decommissioning, including payments to workers, would have a beneficial effect on the regional economy. However, the linear input-output model of 2014 cannot be applied to the decommissioning work, since the regional economy will experience substantial changes in the intervening years.

Riverside County Revenues

No substantial sales or property tax revenues would be generated during or after decommissioning because the improvements which were the basis for the tax revenue would cease to exist.

4.15.3.3 Alternative 3: Reduced Project Alternative

Construction

The construction workforce for Alternative 3 is expected to be approximately the same as for the Proposed Action; therefore, there would be a sufficient supply of temporary housing options to accommodate workers who may seek temporary housing near the jobsite. Additionally, estimated impacts on regional employment, worker income, and the output of construction companies are the same as those shown in Table 4.15-1. Due to the reduced acreage, the duration of construction would be reduced incrementally from that of the Proposed Action and of Alternative 2, but the average and peak workforces would be similar to those of the Proposed Action. Therefore, impacts of construction of Alternative 3 would be similar to those of the Proposed Action, but would occur for a shorter timeframe.

The total material cost of Alternative 3 materials and supplies is expected to be approximately the same as the Proposed Action. Therefore, the total estimated annual beneficial economic impacts from the construction phase within Riverside County would be $72.5 million, as shown in Table 4.15-1. Similarly, the Riverside County revenue would be the same as for the Proposed Action, or approximately $864,000.

Operation and Maintenance

Housing and Community

Permanent operating staff for Alternative 3 would be the same as for the Proposed Action, or approximately 5 workers. As with the Proposed Action, there would be minimal impact to the local housing supply or the community, even if all permanent workers were to relocate to the Blythe area.

Regional Employment and Economy

The employment of 5 workers for operation and maintenance for Alternative 3 would not adversely affect the regional labor market with current (September 2015) unemployment rates of 6.3 percent in Riverside County and 8.2 percent in La Paz County, but instead would have a beneficial effect.

The input-output model used to estimate economic impacts within Riverside County for the Proposed Action is also applicable to Alternative 3. Table 4.15-2 shows that total employment and economic impact, including direct, indirect, and induced impacts, would be 10.7 workers, with total income impact of $0.7 million, and output impact of $3.0 million per year.

Riverside County Revenues

Consistent with Board Policy No. B-29 regarding solar power plant payments, the solar power plant owner shall annually pay to the County a public benefit payment of $150 per acre of land involved in the power production process. This shall be done through a negotiated development agreement between the County and solar power plant owner. Additionally, the development agreement will contain terms requiring the solar power plant owner to take actions to ensure allocation directly to the County of the sales and use taxes payable in connection with the construction of the solar power plant, to the maximum extent possible under the law. The estimated tax revenue to the County under Alternative 3 would be $299,400 per year.

During operation and maintenance of Alternative 3, another revenue source for the County would be property tax revenue based on the private improvements of the gen-tie line. The estimated length of this line, including both inside and outside the Alternative 3 site boundaries, is 4.0 miles, the same as for Alternative 2. The Applicant has not provided a cost estimate for the gen-tie line. However, an economic study of a similar solar PV energy project in Imperial County (Imperial County 2011) estimated that construction of a 5-mile gen-tie line over BLM land would cost $12.4 million, or approximately $2.48 million per mile. Based on this example, it is estimated that the taxable value of the proposed gen-tie line, excluding land, would be approximately $9.9 million. Using the assumption that the County would receive 18.3 percent of the 1.158 percent tax collected on the gen-tie line, the estimated property tax revenue to the County under Alternative 3 would be approximately $20,000 per year.

Although it is likely that Alternative 3 would generate additional property tax revenues from onsite improvements not directly related to solar energy generation, no cost estimates are available for these improvements.

Decommissioning

After 30 years of operation, Alternative 3 would be decommissioned, with all equipment and improvements dismantled and removed from the site, and the site would be restored to an undeveloped condition. Decommissioning is expected to take up to a year to complete, and is expected to require a workforce substantially smaller than that required for construction.

Housing and Community

As in the case of Alternative 3 construction, the temporary decommissioning workforce would likely come mostly from western Riverside County and a smaller number from the Blythe area and La Paz County. Many workers would likely commute to the site. For workers who choose to commute weekly and temporarily relocate to the Blythe area during the workweek, it is expected that sufficient numbers of rental properties and hotel and motel accommodations would be available in the area.

Regional Employment and Economy

It is difficult to forecast employment conditions for 30 years into the future. Even if unemployment rates in Riverside and La Paz counties decline to lower levels, such as those projected for the near-term, demand for workers for decommissioning of Alternative 3 would not have an adverse impact on the regional or local labor market. Expenditures for decommissioning, including payments to workers, would have a beneficial effect on the regional economy. However, the linear input-output model of 2014 cannot be applied to the decommissioning work, since the regional economy will experience substantial changes in the intervening years.

Riverside County Revenues

No substantial sales or property tax revenues would be generated during or after decommissioning because the improvements which were the basis for the tax revenue would cease to exist.

4.15.4 Application of CEQA Significance Thresholds

SOC-1) Would the Project induce substantial population growth in an area, either directly or indirectly?

The construction of Alternatives 1, 2, or 3 would temporarily increase population growth in the area; however, it would not be substantial. This is because the required construction and operational workforce is not projected to trigger the need for new housing. As illustrated in Table 3.15-3, vacancy rates in the population and housing study area are high (8.0 to 48.2 percent), which include seasonal, recreational, and occasional use units. Additionally, within an hour commute, there are a high number transient lodging opportunities to serve construction employees. Furthermore, vacancy rates within the study area offer ample available housing to operational employees wishing to relocate within the local study area. Therefore, no significant construction- or operation-related impacts are expected for the study area housing supply, availability, or demand. Alternatives 1, 2, or 3 would not displace populations or existing housing, and it would not necessitate construction of replacement housing elsewhere. Impacts would be less than significant.

SOC-2) Would the Project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

Alternatives 1, 2, or 3 would not displace existing housing units. No impacts to existing housing would occur.

SOC-3) Would the Project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

Alternatives 1, 2, or 3 would not displace substantial numbers of people, necessitating the construction of replacement housing elsewhere. No impacts would occur.

SOC-4) Would the Project create a demand for additional housing, particularly housing affordable to households earning 80% or less of the County's median income?

Alternatives 1, 2, or 3 would not result in a permanent increase in the population which would increase the permanent demand for housing, or temporarily increase demand for housing. Due to the temporary nature of Alternatives 1, 2, and 3 construction activities, it is unlikely that construction workers would permanently relocate closer to the area with their families.

Operation of Alternatives 1, 2, or 3 would require a nominal workforce and are not anticipated to increase the local population. Therefore, Alternative 1, 2 or 3 would not create a demand for additional housing. Impacts would be less than significant impact.

SOC-5) Would the Project affect a County Redevelopment Project Area?

Alternatives 1, 2, and 3 and their immediate vicinity would not be within a former County Redevelopment Project Area. No impact would occur.

SOC-6) Would the Project cumulatively exceed official regional or local population projections?

See SOC-4 above. Alternatives 1, 2, or 3 would temporarily increase the population during construction; however, they would not include housing and would require a nominal operational workforce. Alternatives 1, 2, or 3 would not permanently increase the local population, nor would they cumulatively exceed regional or local population projections. Impacts would be less than significant.

4.15.5 Alternative 4: No Action Alternative

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, the BLM would continue to manage the land under its land use jurisdiction consistent with the site's multiple use classification as described in the CDCA Plan, as it was amended by the Western Solar Plan.

If the site remained undeveloped, the existing environmental setting described in Section 3.15 would be maintained. There would be no employment or expenditures that would generate a beneficial economic impact.

4.15.6 Cumulative Impacts

The potential for cumulative socioeconomic impacts exists where there are multiple projects proposed in an area that have overlapping construction schedules and/or project operations that could affect similar resources. Projects with overlapping construction schedules and/or operations could collectively result in a demand for labor that cannot be met by the region's labor pool, which could lead to an influx of non-local workers and possibly their dependents. This population increase could impact social and economic resources if there are insufficient housing resources and/or infrastructure and public services to accommodate the new residents' needs.

Section 4.1.5 identifies current solar and non-solar projects that have been or could be developed in the foreseeable future within eastern Riverside County. While a large number of projects may be planned, and so considered to be possible for future development, not all of them are expected to be built due to construction funding constraints, schedule, and/or delays. Given the uncertain and challenging economic circumstances facing Federal and state economies as well as private developers, it is far from assured that future funding and other necessary support will be sufficiently available for all of the proposed projects to be realized within the projected schedules.

As shown in Table 4.1-2, currently eight BLM renewable energy projects are identified in the cumulative project scenario for the social and economic analysis. In addition, eight other projects are also identified that could require workers with similar skills to the Project, including non-BLM renewable energy projects, transmission lines, and electrical substations. The geographic scope of the cumulative impacts analysis includes populated areas within a 2-hour commute distance of any of these projects, which would extend as far west as Moreno Valley, given the locations of the cumulative projects. Although the 2-hour commute distance would also extend into Arizona, the low population in western Arizona would contribute minimally to the available labor pool in the geographic scope. Therefore, the analysis for employment focuses on the California portion of this area.

There are 12 solar projects proposed or under construction along the I-10 corridor predominantly between Desert Center and Blythe. Some of these projects have already completed construction. Based on the currently available data for these various projects (information obtained from Plans of Development and other project documents), and assuming all projects move forward, these projects would be constructed in the same general timeframe as the Proposed Action (i.e. between 2017 and 2020).

The cumulative analysis conservatively assumes that the construction of all of the proposed solar projects would be under construction within the 48-month cumulative timeframe for construction-related impacts of the Project. This cumulative impacts discussion is based on available data with respect to both construction schedules and the projects' labor requirements. If construction and operating labor requirements are not known for some projects, average work force levels of other comparable projects and professional judgments have been used to develop conservative estimates of expected cumulative labor requirements for these projects.

4.15.6.1 Alternative 1 – Proposed Action

4.15.6.1.1 Economic

Construction

Cumulative Construction Labor Needs

Table 4.15-3 shows the estimated construction workforces for several of the projects in the cumulative scenario and the DQSP. The workforce numbers from other recent projects for which these data are available (Modified BSPP, Desert Quartzite, MSEP, BMSP, Palo Verde Mesa Solar, Genesis Solar, Desert Harvest, and Desert Sunlight) were used to estimate the average and peak construction workforces per MW of solar projects. The average and peak workforce per MW was then used to estimate the workforce for those reasonably foreseeable future projects for which no workforce data is available.

If all proposed solar projects identified in eastern Riverside County are constructed (including the Project), a total of 3,606 MW of new solar power would be developed. The average solar power project would be approximately 400 MW in size and may be expected to require an average of approximately 318 full-time workers to be built. The average peak labor force may be up to 586 workers. Because the precise construction schedules for each project are currently unknown, this analysis assumes that the peak construction periods of the solar projects in the cumulative scenario would be of a similar length to the Project (three years).

Table 4.15-3. Average and Peak Construction Employment for Future Solar Projects

Project	MW	Average Workers	Peak Workers
Modified Blythe Solar Power Project	485	340	500
Desert Quartzite	450	450	810
Palen Solar Project	500	566	1145
Rio Mesa Solar Electric Generating	500	365[1]	715[1]
Desert Harvest	100	100	250
Palo Verde Mesa	486	300	500
RE Crimson	450	329[1]	644[1]
Mule Mountain III	150	110[1]	215[1]
Blythe Mesa Solar Project	485	300	500
Column Total	3,606	2,860	5,279
Average for all Projects (per MW)		0.83	1.53

Note:
1 - Employment estimated by extrapolation from MW.

Project developers would likely seek to minimize the construction occurring during the hottest summer months and may therefore stagger their construction periods accordingly. Consequently, some seasonality may be expected to occur as developers favor more construction during the region's cooler winter months. It is assumed that peak construction needs for each of the solar projects would be approximately evenly spread throughout the 48-month period for cumulative construction-related impacts. If all of the projects experienced their peak construction during the 48-month cumulative temporal scope, the regional labor need for a realistic "worst case condition" would be for four projects to have peak labor needs during the same winter season. Therefore, the equivalent of four average (400 MW) solar projects could experience peak construction at one time. This gives a peak cumulative solar workforce of approximately 2,400 workers, in addition to an average workforce for the other five solar projects (approximately 1,600 workers), for a total worst-case projection of 4,000 workers.

Because not all four of the cumulative solar projects would be under construction for the entire 48-month Project construction period, the actual cumulative construction workforce is expected to be lower. However, it is reasonable to assume that some of the other cumulative projects listed in Table 4.1-3 may begin construction in this time period. For this reason, a rounded winter-season peak of approximately 4,000 construction workers is used in this analysis. The Project's maximum potential contribution to this cumulative effect would be approximately 20 percent during its own peak construction period. The Project's average contribution to the cumulative impact would be approximately 11.25 percent during its non-peak construction.

Regional Labor Force Supply

As discussed previously, the total work force of skilled construction workers currently living in Riverside County is estimated to be approximately 72,017 (Table 3.15-4). Assuming that these workers are evenly distributed throughout Riverside County, the total construction work force within the geographic scope would be approximately 24 percent of this, or 17,284 workers. Although the population of skilled construction workers in the Riverside-San Bernardino-Ontario MSA is expect to increase by approximately 5 percent by 2022 (Table 3.15-7), even if this level of growth occurred in the geographic scope, the cumulative labor force demand would still represent more than the region's currently forecasted future skilled construction labor force.

The current unemployment rate in Riverside County is estimated to be 6.3 percent (see Table 3.15-8). Applying this rate to the construction workers in the geographic scope yields an estimate of approximately 1,089 unemployed construction workers, which is fewer than the cumulative construction worker demand for the solar projects. Therefore, future demand for 4,000 construction workers would exceed the capacity of the current skilled labor force. Despite this need, and the possibility that many of the region's currently unemployed residents may lack transferable skills or have the physical aptitude to acquire the necessary skills required to serve the cumulative labor demand, many residents could be trained to be employable by these projects. Further, some of the construction work would be more entry-level positions which may be suitable for less skilled workers. Some of the regional workforce currently employed in other sectors also could have the capabilities to qualify for Project construction work. In such cases, some job transferring may occur, particularly because the construction jobs may be expected to be relatively well-paid and attractive for many local residents. The less skilled or desirable jobs vacated by individuals transferring to construction work could be filled by other less skilled unemployed residents. Therefore, there would be a demand for construction workers that would exceed the available labor supply within the geographic scope. It is assumed that those job positions would be filled by workers relocating into the region from beyond the geographic scope of the cumulative projects.

Housing and Lodging Impacts within the Local Study Area

Given the numerous variables discussed above, it is difficult to project the extent of future weekly commuting or other in-migration that would be necessary to meet the future cumulative labor needs within the region. However, as a conservative assumption, it is assumed that up to 4,000 construction workers could require temporary housing in the local or regional area.

The skilled construction labor force within the areas of Riverside County outside of the geographic scope is estimated to be approximately 54,733. This suggests that there is likely to be a considerable additional potential labor force available willing to commute weekly or to relocate temporarily to the area. Consequently, from a broader geographic and labor force perspective, no significant shortages of adequately skilled construction workers is foreseen, provided that adequate suitable housing is available for relocating near the work sites.

The cumulative influx in construction labor to the area could create demand for temporary housing that is greater than the existing supply of temporary lodging. As discussed in the previous construction impact analysis, private and public RV/campgrounds are not expected to be suitable or attractive lodging options for most construction workers seeking local accommodations. There are expected to be approximately 238 vacant rental units and 349 vacant hotel and motel rooms available in the local area. Assuming that about half of the construction workers might be willing to share accommodations to save on their lodging costs, the existing local rental units, hotels, and motels could be able to house up to 1,174 construction workers seeking local temporary housing. If these workers were willing to commute up to 2 hours to the site daily, the supply of vacant rental units (4,708) and hotel and motel rooms (4,334) increases substantially, potentially housing up to 9,042 construction workers, or more than double the number needed to temporarily house the approximately 4,000 construction workers that could move into the area as a result of the cumulative projects. Because there is an ample supply of housing units to accommodate workers drawn from within the two hour commuting distance, the incremental effects of the Project, when considered together with other past, present, and reasonably foreseeable future projects, would not result in cumulatively significant, adverse impacts to housing supply during construction (impact SOC-4).

Irrespective of the availability of temporary housing, it may be expected that, even under future cumulative conditions, a relatively small proportion of construction workers would choose to relocate permanently to the local communities where they would be employed during construction. This is because many construction workers could choose to commute relatively long distances to their work sites and may expect to seek work within the more populated areas of Riverside and San Bernardino counties in the future.

Furthermore, during the same time period with the greatest potential for adverse impacts resulting from the cumulative demand for construction worker housing, there also would be a major positive economic stimulus to the Blythe area and eastern Riverside County economies associated with the solar development. This economic infusion could result in the construction or availability of additional rental/hotel units and so could offset a portion of the housing need-related impact.

In summary, there is potential for short-term adverse cumulative social and economic impacts in the Blythe area associated with the demand for skilled construction labor for the cumulative projects proposed for future development within eastern Riverside County. Analysis suggests that future construction labor demand would exceed the existing local work force within eastern Riverside County. Therefore, there may be increased demand for temporary local housing from construction workers seeking to commute weekly to the local area. Given the estimated availability of lodging and possible rental housing, it is expected that there could be a shortage of adequate and suitable housing to meet all future construction worker temporary housing demand. Therefore, adverse housing impacts could result if the cumulative demand for housing increased the price for local residents seeking housing. Economic impacts could also occur if hotel and motel vacancy rates fell such that rooms were not available for potential visitors to the area who would otherwise generate economic stimulus from vacation-related spending.

The Project would not displace existing housing (impact SOC-2) or people (impact SOC-3), so would not contribute to cumulative impacts to housing. The Project is not located in a Community Redevelopment Project area (impact SOC-5). The Project is not expected to induce population growth (impact SOC-1) or contribute to an exceedance of population projections (impact SOC-6).

Operations

If all of the cumulative projects are constructed, a total of 5,206 MW of solar power projects would operate concurrently. As shown in Table 4.15-4, the average solar project is estimated to require approximately 0.11 operational employees for each MW of solar power production.

Consequently, if full build-out of the planned solar development occurs, the future cumulative operational employment in the region would be approximately 573. The five operational jobs associated with the DQSP represent a contribution of approximately 0.9 percent to the cumulative operation- and maintenance-related need. Because the other cumulative projects for social and economic effects include an expanded electrical substation and transmission lines, it is not anticipated that these would add noticeably to the cumulative employment demand.

Table 4.15-4. Operational Employment for Existing and Future Solar Projects

Project	MW	Employees
Modified Blythe Solar Power Project	485	20
Desert Quartzite	450	5
Desert Sunlight	550	15
Genesis Solar Energy Project	250	65
McCoy Solar Energy Project	750	20
Palen Solar Project	500	134
Rio Mesa Solar Electric Generating Facility	500	80[1]
Desert Harvest	150	8
Palo Verde Mesa	486	77
RE Crimson	450	72[1]
Mule Mountain III	150	24[1]
Blythe Mesa Solar Project	485	12
Column Total	5,206	573
Average for all Projects (per MW)		0.11

Note:
1 - Employment estimated by extrapolation from MW.

As shown in Table 3.15-4, there are 47,094 workers in the "Transportation, Warehousing & Utilities" industry group in Riverside County, for a total of approximately 11,302 workers within the geographic scope. Although not all workers in this category may possess the skills required for solar power plant operation and maintenance, the transferability of other skills, on-the-job and local community college training opportunities, and the lower skilled qualification requirements for some of the jobs suggest that there would be many others outside this category who would be able to meet the cumulative operational labor needs. Therefore, in the absence of more precise data on available skills, this industry group is used as the available labor pool for this analysis.

Based on current unemployment rates, it is assumed that approximately 712 of the 11,302 workers within the geographic scope would be available to meet operational labor needs.

Because there are an estimated 712 workers available, and a cumulative operations labor force of approximately 573 workers, there may be an in-migration of operational workers to meet the cumulative labor need. As described in Section 3.15.1.2, there are 238 vacant housing units for rent in the immediate area (i.e., Blythe and Ehrenberg). Estimates from the U.S. Census also show 146 homes for sale in the Blythe, Ehrenberg, and Quartzsite communities. Additionally, as shown in Table 4.1-3, there are a number of residential developments proposed in Blythe that could be expected to be built by the start of the solar power plants' operation. Furthermore, the relatively limited number of new residents would not be expected to result in any noticeable change to the local communities' social composition or character. The future operations of the solar projects would also generate significant annual economic benefits in local employment, direct and indirect spending at local businesses and positive sales and other tax benefits for the local area. Consequently, the cumulative social and economic effect of the future operations of the solar projects would be minor and primarily beneficial, although the increased demand for housing and subsequent decrease in supply could increase housing prices in the local area, a potentially adverse effect for current residents or others seeking to move into the area.

Decommissioning

Evaluating the Project's cumulative impacts when future facility decommissioning occurs is highly speculative. Decommissioning is expected to occur after 30 years of operation. It is not possible to project with confidence the likely future social and economic conditions of the local and regional study area. Similarly, the extent to which the projects in the cumulative scenario would undergo decommissioning concurrently is unknown.

Nonetheless, Project decommissioning is expected to require a workforce similar to the construction phase, and the Project is expected to be one of many similar solar projects within eastern Riverside County. As such, its contribution to cumulative social and economic effects would be proportional to: (a) its size relative to the other development projects in the region; and (b) the collective size of projects undergoing decommissioning or construction at that time. Although the cumulative effects of construction were found to be potentially adverse based on a shortage of temporary housing, decommissioning would not likely overlap with as many projects as construction, and in over 30 years' time, based on regional population growth trends, it is likely that there would be more local workers and more temporary housing options available to accommodate decommissioning needs.

4.15.6.1.2 Social

Construction

The cumulative impact of the many proposed future solar and non-solar development projects in eastern Riverside County would result in considerable short-term construction activity at many locations throughout the region. As described previously, future cumulative demand for construction workers for these projects could exceed the available supply of skilled construction workers living in the region. In this case, construction workers from elsewhere could be attracted to the area by the construction employment opportunities.

The ongoing construction activity in the region, influx of construction workers both commuting daily to the site and those who could choose to temporarily live in the local area could noticeably alter the social character and environment within Blythe and the other local communities. An in-migration of 4,000 construction workers would be equivalent to approximately 17 percent of the total population of the Blythe, Ehrenberg, and Quartzsite communities and, consequently, would likely be very noticeable.

The potential influx of construction workers to the local area would be accompanied by an increase in economic activity from their spending in local business establishments. In addition, the planned new development projects would also make purchases from local businesses for construction materials and supplies and various kinds of services.

The effects of the increased activity on local attitudes and quality of life may vary among residents. While some residents may be displeased by increased traffic, new visitors and temporary residents (particularly those employed or otherwise benefiting economically from the construction) could welcome the development.

However, an influx of new workers also could increase the demand for certain kinds of government services and infrastructure (e.g., police and fire services and medical facilities and services). There have been other past instances of rapid growth in rural areas as a result of energy-related development, most notably the energy boom in the 1970s, in places like Wyoming, and the relatively recent shale oil boom in North Dakota. A number of communities, such as Rock Springs, Wyoming, and Watford City, North Dakota, became known as "boomtowns," and the local economic benefits from the new energy development in the region were accompanied by some social changes that were not seen as positive by many existing residents. These included changes such as growth in number of bars, higher crime rates, and perceived (by some) aesthetic degradation due to rapid growth occurring to accommodate the sudden increase in population.

The presence of existing larger communities (such as Indio and Coachella) that are within possible commuting range for construction workers could suggest that circumstances may differ substantially from those facing the more isolated Wyoming and North Dakota boomtown communities in the past. However, there would remain a potential for temporary social impacts in the Blythe, Ehrenberg, and Quartzsite areas.

Operation and Maintenance

As discussed in the corresponding economic cumulative analysis, Project operation and maintenance would be expected to have a minor and beneficial effect on the local and eastern Riverside County economy. In the cumulative scenario, there may be an in-migration of solar plant operation and maintenance workers. There is likely to be more than sufficient available local housing to accommodate the housing needs of these workers and their families. Furthermore, the relatively limited number of new residents would not be expected to result in any noticeable change to the local communities' social composition or character. The existence and operation of the solar projects themselves could result in changes to the character and culture of the area by converting open space, one of the primary land uses in eastern Riverside County, to solar plants. The PVVAP (Riverside County 2015b) notes that "The character of the area is reflected by the prominence of the Open Space-Rural and Agriculture land use designations here." A reduction in the amount of open space in eastern Riverside County due to solar plant development could result in cultural changes to the area, such as reduced use of desert recreational opportunities and an altered sense of the character of the area relative to that described in the PVVAP. The future operations of the solar projects also would generate significant annual economic benefits in local employment, direct and indirect spending at local businesses, and positive sales and other tax benefits for the local area. The cumulative social and economic effect of the future operations of the solar projects would be minor and beneficial.

Decommissioning

As discussed in the corresponding economic cumulative analysis, there is insufficient information to reliably project the conditions when decommissioning of the proposed facilities would occur in 30 or more years into the future. Consequently, it would be speculative to try to characterize the future situation and circumstances under which facility decommissioning would occur. Similar to the economic cumulative analysis, it is anticipated that the effects from decommissioning could be of the same type and nature as those from construction, but would not likely be of the same magnitude.

4.15.6.2 Alternative 2 – Resource Avoidance Alternative

Construction, Operations, and Decommissioning

As discussed in Section 4.15.3.2, the construction spending and workforce requirements for Alternative 2 are expected to be similar to those of the Proposed Action, although the duration of construction may be shorter. Consequently, the contribution of Alternative 2 to a cumulative impact during construction and decommissioning would be less than the Proposed Action, because it would occur over a shorter time period.

4.15.6.3 Alternative 3 – Reduced Project Alternative

Construction, Operations, and Decommissioning

As discussed in Section 4.15.3.3, the construction spending and workforce requirements for Alternative 3 are expected to be similar to those of the Proposed Action, although the duration of construction may be shorter. Consequently, the contribution of Alternative 3 to a cumulative impact during construction and decommissioning would be less than the Proposed Action and Alternative 2, because it would occur over a shorter time period.

4.15.6.4 Alternative 4 – No Action

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project, and the DQSP would not be implemented. The public lands in the Project area would continue to be managed by BLM in accordance with existing land use designations in the CDCA Plan, which could include a different solar project, or other development. The Project would not result in in-migration of construction or operational workers, so would not contribute to adverse cumulative impacts associated with housing and social conditions. There would be no spending or tax revenues associated with the Project, so the Project would not contribute to a cumulative beneficial impact to economic conditions.

4.15.7 Residual Impacts

Because no mitigation measures are recommended, residual social and economic effects would be the same as discussed in Section 4.15.3.1, Alternative 1: Proposed Action.

4.16 Special Designations and Lands with Wilderness Characteristics

4.16.1 Methodology for Analysis

The analysis of the Proposed Action and alternatives assesses whether construction, operation, maintenance, and decommissioning of the Project would conflict with the status or management goals of the specially designated areas or lands with wilderness characteristics in the vicinity of the Project. These designations include Wilderness Areas, Areas of Critical Environmental Concern (ACECs), and a National Back Country Byway.

The analysis reviews the Project in relationship to the specific legislation and guidance which are required in the designation and management of Special Designations. These are: FLPMA, CDCA, NECO, the Wilderness Act of 1964, and the National Back Country Byways Program. Additional discussion related to impacts within special designation areas is found in Sections 4.3, *Biological Resources – Vegetation*; 4.4, *Biological Resources – Wildlife*; 4.10, *Lands, Realty*, *and Agricultural and Forestry Resources*, and 4.14, *Recreation and Public Access*.

The MUC class designations and some special designations were changed under the DRECP. Changes to Special Designations included modification of ACECs, designation of SRMAs and ERMAs, and designation of DFAs. As an application in the Riverside East SEZ filed before June 30, 2009, the DQSP is not, and will not be, subject to the terms of the DRECP. In addition, the analysis of the Project in this PA/EIS/EIR is based on the land use designations and visual resource classifications that were in effect on March 6, 2015, the date of the NOI, which do not include the newly designated ACECs and DFAs. A discussion of the differences between the CDCA Plan and the DRECP land use allocations, and their effect on the analysis of the Project in this PA/EIS/EIR, is presented in Appendix E.

4.16.1.1 CEQA Significance Criteria

There are no criteria listed in Appendix G of the CEQA Guidelines related to special designations (wilderness areas, ACECs, etc.). Criteria related to the designation of lands as farmland or forestland are included within Section 4.10, *Lands, Realty*, *and Agricultural and Forestry Resources*.

4.16.2 Applicant-Proposed Measures

There are no APMs proposed to address potential effects to special designations or lands with wilderness characteristics.

4.16.3 Direct and Indirect Impacts

4.16.3.1 Alternative 1: Proposed Action

Because the Project site itself is not subject to any special designation, the Proposed Action would have no direct impact on existing special designations or lands with wilderness characteristics in the Project vicinity, specifically Wilderness Areas, ACECs, and a National Back Country Byway. The Project may have indirect impacts on special designation areas if it has dust emissions, noise, or visual intrusions which would conflict with the status or management goals of the area.

As discussed in Section 3.16.1.5, there are five ACECs located in the vicinity of the site. Of these, four ACECs range in distance from 7 to 19 miles from the Project site, and would therefore not be affected by dust emissions, noise, or the visual appearance of the Project. The Mule Mountains ACEC is located approximately one mile southwest of the site, and could potentially be exposed to fugitive dust or noise generated by the Project. However, this ACEC was established to manage cultural resources, with the goal of protecting cultural values while providing for compatible public uses. While the analysis of noise impacts presented in Section 4.12 shows that noise from the construction of the Project may be noticeable to persons at this distance, noise would not have any effect on cultural resources within the ACEC, and would therefore not conflict with the status or management goals of the area. Similarly, fugitive dust in the form of PM_{10} and $PM_{2.5}$ may reach this area, but would not have any effect on cultural resources within the ACEC.

As there are no Wilderness Areas or lands with wilderness characteristics within or adjacent to the Project area, there would be no direct impacts on Wilderness Areas or lands with wilderness characteristics from the Proposed Action. Similar to the ACECs, the Project could result in indirect impacts to Wilderness Areas or lands with wilderness characteristics through noise or air emissions. The closest Wilderness Area is the Palen-McCoy Wilderness Area, located approximately 7 miles northwest of the Project area. The closest lands with wilderness characteristics are located approximately 10 miles southwest of the Project site, on the other side of the Mule Mountains. Given the distance to these lands, it is unlikely that construction-related noise or air quality impacts could affect the wilderness characteristics of these areas.

As discussed in Sections 4.3, *Biological Resources – Vegetation*, and 4.4, *Biological Resources – Wildlife*, indirect effects to vegetation and wildlife could occur as a result of the spread of invasive species outside of the Project area. The Project does not propose to use off-site roads within lands with wilderness characteristics outside of the Project fence line, and would not introduce invasive species within these lands. Although the Project would create a movement barrier for large wildlife due to the exclusion fencing, within off-site lands with wilderness characteristics, the Project would have no effect on wildlife habitat connectivity. The Project would not indirectly affect the natural condition of these lands with wilderness characteristics. The Project area under the Proposed Action would also be consistent with the designation of the land area as a DFA under DRECP.

4.16.3.2 Alternative 2: Resource Avoidance Alternative

Similar to the Proposed Action, the land area associated with Alternative 2 is not a special designation area, so there would be no direct impacts. As with the Proposed Action, air emissions or noise from the Project could have an indirect impact on special designation areas, if such emissions or noise were to be detectable in the special designation area, and would conflict with the status or management goals of the area. Because the land are associated with Alternative 2 is reduced from that of the Proposed Action, any air emissions or noise would be located at the same, or a reduced, distance from the Mule Mountains ACEC. Because the Proposed Action would not create a conflict with the status or management goals of this ACEC, neither would Alternative 2. The Project area under Alternative 2 would also be consistent with the designation of the land area as a DFA under DRECP.

4.16.3.3 Alternative 3: Reduced Project Alternative

Similar to the Proposed Action, the land area associated with Alternative 3 is not a special designation area, so there would be no direct impacts. As with the Proposed Action, air emissions or noise from the Project could have an indirect impact on special designation areas, if such emissions or noise were to be detectable in the special designation area, and would conflict with the status or management goals of the area. Because the land are associated with Alternative 3 is reduced from that of the Proposed Action and Alternative 2, any air emissions or noise would be located at the same, or a reduced, distance from the Mule Mountains ACEC. Because the Proposed Action would not create a conflict with the status or management goals of this ACEC, neither would Alternative 3. The Project area under Alternative 3 would also be consistent with the designation of the land area as a DFA under DRECP.

4.16.4 Application of CEQA Significance Thresholds

There are no criteria listed in Appendix G of the state CEQA Guidelines related to special designations as described in Section 3.16 (Wilderness Areas, ACECs, lands with wilderness characteristics, and a Back Country Byway). Criteria related to the designation of lands as farmland or forestland are included within Section 4.10 *Lands, Realty*, *and Agricultural and Forestry Resources*.

4.16.5 Alternative 4: No Action Alternative

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, the BLM would continue to manage the land under its land use jurisdiction consistent with the site's multiple use classification as described in the CDCA Plan, as it was amended by the Western Solar Plan.

If the site remained undeveloped, the existing environmental setting described in Section 3.16 would be maintained. There would be no project developed within a special designation area, and no project which could indirectly impact a special designation area through air emissions or noise. Therefore Alternative 4 would not result in any impacts associated with special designation areas.

4.16.6 Cumulative Impacts

The Proposed Action, Resource Avoidance Alternative, and Reduced Project Alternative would have no impacts on special designations such as Wilderness Areas, ACECs, the National Back Country Byway, or lands with wilderness characteristics. Therefore, they would not cause or contribute to any cumulative impact to these areas.

4.16.7 Residual Impacts

Because no mitigation measures are recommended, impacts to special designations and lands with wilderness characteristics would be the same as discussed in Section 4.16.3.1, *Alternative 1: Proposed Action*.

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4.17 Transportation and Traffic

4.17.1 Methodology for Analysis

This section evaluates the potential impacts of the Proposed Action and Alternatives on transportation and traffic. The analysis is based on the *Traffic Impact Analysis for the Desert Quartzite Solar Project* prepared by URS Corporation (2016), which has been independently reviewed on behalf of the BLM by its environmental consultant. The Traffic Impact Analysis evaluates impacts based on estimates of the amount of traffic that would be added to area roads during Project construction, operations, and decommissioning, as a result of commuting workers, delivery of Project materials, and potentially truck delivery of water for construction.

As discussed in Section 3.17, impacts to transportation systems were evaluated based on Level of Service (LOS) determinations, which is a generally accepted measure used by traffic engineers, planners, and decision-makers to describe and quantify the congestion level on a particular roadway or intersection based on specific characteristics of traffic flow. LOS determinations are made both on the roadway segments, and on the length of delay at intersections.

The LOS on roadway segments is based on the ratio of the traffic volume to capacity (V/C). The vehicular capacity is determined based on the physical and operational characteristics of the roadway, such as lane configuration and flow speed (typical speed along a roadway segment), and the volume is based on actual traffic counts (for existing conditions) or predicted traffic counts (for analysis of impacts). The V/C ratio is assigned a corresponding letter grade to represent the overall condition of the roadway or level of service. The LOS at intersections is based on observed average delay times, in seconds per vehicle. The grades range from LOS A (best operating conditions characterized by free-flow traffic, low volumes, and little or no restrictions on maneuverability) to LOS F (worst operating conditions characterized by forced traffic flow with high traffic densities, slow travel speeds, and often stop-and-go conditions).

The threshold for significance of impacts to transportation and traffic is generally based on the expected change in LOS. In their Guide for the Preparation of Traffic Impact Studies (Caltrans 2002), Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D. The Riverside County Transportation Commission (RCTC) 2010 Congestion Management Program (CMP) establishes a minimum LOS of E for regional roadways and highways. The Riverside County General Plan (Riverside County 2015a) strives to maintain LOS C along County-maintained roads and state highways, with an exception that LOS D may be allowed within Community Development Areas at certain types of intersections.

4.17.1.1 CEQA Significance Criteria

The criteria used to determine the significance of the Project-related traffic and transportation impacts are based on the criteria identified in the state CEQA Guidelines, Appendix G. Project-related impacts would be considered significant if they would:

> TRA-1) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.

TRA-2) Conflict with an applicable congestion management program, including, but not limited to, level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.

TRA-3) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.

TRA-4) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

TRA-5) Result in inadequate emergency access.

TRA-6) Conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

The following additional significance criteria from the County of Riverside Environmental Assessment form are used in the analysis. A project could have potentially significant impacts if it would:

TRA-7) Alter waterborne, rail or air traffic.

TRA-8) Cause an effect, or a need for new or altered maintenance of roads.

TRA-9) Cause an effect upon circulation during the project's construction.

TRA-10) Affect bike trails.

4.17.2 Applicant-Proposed Measures

In their *Traffic Impact Analysis for the Desert Quartzite Solar Project* prepared by URS Corporation (2016), the Applicant proposed the following APMs to minimize impacts on Transportation and Traffic from the Project. The impact analysis in Section 4.17.3 assumes that these APMs would be implemented as part of the Project to address the impacts discussed below:

APM TRA-1: Worker Vehicle Reduction (Project Construction – PM Peak Hour)

In their *Traffic Impact Analysis for the Desert Quartzite Solar Project* (URS 2016b), the Applicant calculated that a maximum 650 construction worker vehicle threshold during the afternoon (PM) peak period was the threshold at which the LOS at the intersection of SR-78/16th Avenue would degrade from A to F. To address this impact, the Applicant would limit construction worker vehicles leaving the Project site between 4:00 PM to 6:00 PM to 650 vehicles, resulting in LOS D at the SR-78/16th Avenue intersection. This limitation would thereby reduce the PM peak hour construction impact, which would be caused by up to 810 construction worker vehicles leaving the Project site between 4:00 to 6:00 PM during the peak construction period.

In order to ensure that Project-related traffic levels do not exceed 650 passenger vehicles (or passenger car equivalents [PCE] considering one truck or bus is equivalent to 3 PCEs) departing the construction site during the PM peak traffic period of 4:00 to 6:00 PM, the Applicant would monitor and enforce construction traffic limits to avoid and minimize construction traffic impacts. Available traffic count and monitoring technology would be used to ensure construction traffic limits are met, and would be performed and logged using one or more of the following methods:

- Automatic Counts (Tube Counters, Radar Counters, Machine Vision)
- Video Recording with Manual Counting in the Office
- Manual Counts at the gate/entry point

The monitoring would be conducted during the peak construction months only when the traffic limits are needed. Assuming a 25-month construction period, the peak construction workforce months are currently anticipated to occur in the latter parts of the overall construction phase (e.g., Months 17-21). In the event that the 650 passenger vehicle limit is exceeded during the PM peak period of 4:00 to 6:00 PM, the Applicant would implement and document one or more of the following traffic reduction measures to reduce PM peak traffic to at or below the 650 passenger vehicle (or PCE) limit:

- Encourage carpooling at the level needed to achieve the needed reduction in traffic; and/or
- Arrange for busing to and from the site for the needed number of employees to get below the 650 passenger vehicle limit.

Based on the Applicant's experience on other similar projects, construction workers are expected to voluntarily carpool and thereby help reduce the likelihood that the 650 passenger vehicle limit would be exceeded during the peak construction period. In the event that the 650 passenger vehicle limit is found to be exceeded, the Applicant would further evaluate carpool options and/or busing. Although not anticipated, if necessary, off-site busing locations will be identified at that time. The results of the monitoring, as well as information on any remedial actions, would be provided to BLM and the County.

APM TRA-2: Traffic Monitoring and Control Plan

Prior to the Notice to Proceed, the Applicant would develop a standard traffic monitoring and control plan designed to minimize impacts to traffic flow consistent with the size and scope of Project construction. The plan would be submitted to BLM and the County for review and approval prior to the beginning of construction.

Proposed measures, where applicable, include but are not limited to the following:

1. Use proper signs and traffic control measures in accordance with Caltrans and Riverside County requirements. All traffic signs, equipment, and control measures shall conform to the provisions specified in the Caltrans Manual of Uniform Traffic Control Devices for Streets and Highways. Specific jurisdictional requirements will be identified during the plan review and approval process.
2. Schedule traffic lane or road closures during off-peak hours whenever possible (e.g., during construction at road crossings, culverts or any Project activity that may encroach in the traveled way). No traffic lane or off-site road closures are currently planned for the proposed Project.
3. Limit vehicular traffic to designated access roads, construction laydown and worker parking areas, and the Project construction site.
4. Provide orientation and briefing to employees and contractors on the desired construction route.

5. Encourage worker carpooling to minimize drive-alone worker trips.

Prior to construction, the Applicant would coordinate with the Riverside County Transportation Department to discuss road maintenance requirements and plans to ensure that road conditions along 16th Avenue/Seeley Avenue are kept safe for Project-related traffic to traverse, including potential adverse roadway conditions following infrequent storm events in the area.

As discussed in Section 4.1.6, the impact analysis assumes that the APMs have been implemented, and these measures are therefore requirements for approval of the Project. The APMs are to be incorporated into the EICMPP/MMRCP, along with the agency-required mitigation measures.

4.17.3 Direct and Indirect Impacts

4.17.3.1 Alternative 1: Proposed Action

The impacts to transportation and traffic that could occur from the Project include reducing the availability of parking; interference with bus, bicycle, or pedestrian facilities; direct disruption of traffic on existing roadways by construction activities; and indirect disruption of traffic through an increase in the number of vehicles. The Project is not located in an area with public parking facilities. Although parking and staging areas would be required for Project-related vehicles and equipment, these areas would be incorporated into the Project, and would be designed to accommodate the expected numbers of vehicles. Similarly, there are no public bus, bicycle, or pedestrian facilities in the area, so there would be no impact to these from the Project. These impacts are not discussed further.

The Project would involve closure of a land area that currently contains routes that are open to the public, as well as an increase in traffic volumes on area roads. These impacts are discussed in the following subsections.

Construction

Direct Impacts to Existing Project Site Routes and Roads

As discussed in Section 4.14, fencing of the Project area would eliminate public access to six open routes for the duration of the Project. These routes include all or portions of routes 660862, 660863, 660866, 661092, 661102, and 661501. Three of these routes provide access to the private property inholding (660862, 660866, and 661501) within the Project area and three routes provide access to the Mule Mountains (660863, 661092, and 661102). Access to the private property inholding would no longer be necessary, once it is incorporated into the Project. Use of the routes that provide access to the Mule Mountains is expected to be primarily recreational use by OHVs. With the closure of the three routes that access the Mule Mountains, alternative access to the Mule Mountains would occur by traveling west on 22nd Avenue to Gravel Pit Road, southwest along Gravel Pit Road, and then west on an unpaved extension of 24th Avenue to BLM routes 660863 and 661093. Although access via alternative routes may be slightly longer, access would not be eliminated. With the closure of the three routes that access the Mule Mountains, use of these routes would be displaced to other nearby routes that provide similar access. Due to the estimated low use of the routes within the Project area, there would be minimal impacts from displaced use.

Construction of the gen-tie line near the CRSS would not require access or closure of Power Line Road, a paved road owned and maintained by SCE to access the CRSS. Construction would occur only within the BLM ROW for the gen-tie line. Construction of the gen-tie may require temporary closure of route 660703, which is along an existing transmission line, to pull and string the gen-tie line. Potential impacts would be reduced through implementation of APM TRA-2, as modified by Mitigation Measure TRN-1, which would require a Traffic Monitoring and Control Plan to limit impacts associated with temporary road closures. In addition, to reduce temporary impacts to access on this route, Mitigation Measure REC-2 (discussed in Appendix G, Section G.14) would require the Applicant to coordinate with BLM to temporarily close route 660703 if needed during construction and/or maintenance of the gen-tie line, and to post a public notice of the temporary route closure and penalties for any off-route OHV activities.

The Project access road, 16th Avenue/Seeley Avenue, would be used for up to 2,574 trips per day during construction, including 300 deliveries of construction material by truck, and 654 water deliveries by truck. Because the road is unimproved and would be subjected to intensive use by trucks, construction could result in degradation of the condition of the road to the extent that it could become unusable by emergency vehicles and current local users. To maintain the condition of the road, Mitigation Measure TRN-4 would require that the Applicant pave the segment between Neighbours Boulevard (State Route 78) and the site entrance, a length of approximately 5.6 miles, prior to beginning any other construction activities at the Project area.

Impacts due to Construction Traffic and Equipment

The analysis of impacts associated with construction traffic and equipment is based on the duration of construction, and magnitude of construction workers and vehicle trips, as discussed in Section 2.3.4.8. The analysis was calculated in PCE, to account for the greater impact that trucks have on traffic. Workers were assumed to commute in passenger cars, and the analysis assumed there would be no carpooling. Both construction deliveries and water deliveries were calculated assuming that one truck is equal to 3 PCEs.

The Applicant estimates that the construction workforce would average approximately 450 employees over the 25- to 48-month construction period, and would have a peak workforce of approximately 810 employees, resulting in an estimated maximum of 1,620 daily commuting trips. For purposes of a conservative estimate of traffic impacts, the Applicant assumed that the shortest construction duration, of 25 months, would apply.

Construction would also involve an estimated 300 daily trips by 50 vehicles to deliver materials to the Project site. The analysis assumed that 20 percent of these deliveries would occur during the peak morning hour, and the remainder would occur in non-peak traffic periods. In addition to truck deliveries of materials, truck deliveries of water for construction may be used. Although groundwater from on-site wells is the anticipated source for construction water needs, in the event an on-site source is not available, it may be necessary to truck water from an off-site source. If trucking water is required for the entire 25 month construction period, up to approximately 57,000 water truck deliveries (assuming 8,000 gallon capacity water trucks) could potentially be required. These trips are expected to originate within 10 miles of the Project site. The Applicant would require all water deliveries to occur during off-peak hours. Table 4.17-1 shows the number of trips that are estimated to occur in the peak month of construction.

Table 4.17-1. Estimated Number of Construction Trips in Peak Month

Category	Actual No. of Vehicles	Daily Trips (One-Way)	AM Peak Hours Trips (7:00 – 9:00 am)		PM Peak Hours Trips (4:00 – 6:00 pm)		Non-Peak Hours Trips	
			In	Out	In	Out	In	Out
Workers[1]	810	1,620	0	0	0	810	810	0
Construction deliveries[2]	50	300[2]	30	30	0	0	120	120
Water truck deliveries[3]	109	654[3]	0	0	0	0	327	327
Total	969	2,574	30	30	0	810	1,257	447

Source: URS 2016b

Notes:

1 – The Project would include 810 worker vehicles resulting 1,620 daily (in/out) one-way trips during the Peak Project Construction Months in the peak year. It is assumed that all the workers arrive at the Project site by 7:00 AM, thereby avoiding the 7:00–9:00 AM peak hours; 810 worker vehicles are assumed to depart the site at 5:00 PM during the 4:00–6:00 PM peak hours. The 810 worker vehicles estimate does not include consideration of carpooling.

2 - Construction deliveries were converted to Passenger Car Equivalent (PCE), assuming 1 truck equals to 3 passenger cars. During the Peak Project Construction Month, there are 50 (actual) trucks delivering on-site each day converted to 150 PCE resulting in 300 daily (combined in/out) one-way trips. It was assumed that up to 20 percent of the deliveries (60 trips) occur during the AM peak hours and the remaining deliveries are expected to occur during the non-peak traffic period (avoiding the 4:00– 6:00 PM peak hours).

3 - Water truck deliveries were converted to Passenger Car Equivalent (PCE), assuming 1 truck equals to 3 passenger cars. In the event that on-site groundwater is not available and trucking water to the Project site is necessary, there are an estimated 109 (actual) trucks delivering on-site each day converted to 327 PCE resulting in 654 daily (combined in/out) one-way trips. It was assumed that 100 percent of the water truck deliveries would occur during non-peak traffic periods (avoiding the 7:00–9:00 AM and 4:00–6:00 PM peak hour periods).

The majority of the construction workforce for the Project is expected to be drawn from the surrounding local and regional areas, including the Blythe and Indio areas (e.g., Coachella, Thermal, and Mecca), and the Arizona areas of Quartzite and Ehrenberg. Due to the length of the daily commute to the Project site from population centers, it is expected that the construction workers would be temporarily housed in either the Blythe or Indio areas, both of which have access to the Project area using I-10. The analysis assumed that approximately 80 percent of the construction traffic, including workers, equipment, and water, would access the Project area from the east, and approximately 20 percent would access the Project area from the west.

The peak year LOS for the intersections is presented in Table 3.17-2. The peak year shows that the intersections all operate at LOS A. The peak hour LOS conditions at the same intersections during construction are presented in Table 4.17-2.

Table 4.17-2 shows that, in the absence of APM TRA-1, the level of service at the SR-78/16th Avenue intersection would degrade to LOS F. As shown in Table 4.17-1, trips for deliveries of materials are assumed to occur during the AM peak hours, or during off-peak hours (i.e., the Applicant would schedule deliveries to avoid the PM peak hours). As a result, the impact identified in Table 4.17-2 is driven entirely by worker commuting vehicles, and is not affected by trips to deliver materials and equipment. As discussed in Section 4.17.2, APM TRA-1 would require the Applicant to control traffic leaving the Project area during the PM peak hours to a level that would ensure the LOS at the SR-78/16th Avenue intersection would be LOS D or better. Mitigation Measure TRN-3 would modify the APM to further reduce the number of worker vehicles leaving the Project site during the PM peak hour, such that the intersection of SR-78/16th Avenue operates at LOS C or better. In addition, Mitigation Measure TRN-4 would require paving of 16th Avenue/Seeley Avenue and improvement of the intersection of SR-78/16th Avenue to allow a turning lane from 16th Avenue onto SR-78. These improvements would facilitate traffic flow at the intersection, further improving the Level of Service.

Table 4.17-2. Peak Hour Intersection Level of Service in Peak Year Construction Conditions[1]

Intersection	AM Peak Hour		PM Peak Hour	
	LOS	Average Delay (seconds per vehicle)	LOS	Average Delay (seconds per vehicle)
SR-78 (Neighbours Blvd)/I-10 WB ramps	A	9.7	A	9.2
SR-78 (Neighbours Blvd)/I-10 EB ramps	A	9.0	B	12.8
SR-78 (Neighbours Blvd)/14th Avenue	A	9.9	D	31.9
SR-78 (Neighbours Blvd)/16th Avenue	A	9.9	F	78.2

Source: URS 2016b
Note:
1 – Analysis assumes APM TRA-1 is not in place.

The peak year LOS for the four Project roadway segments in presented in Table 3.17-3. The peak year shows that the roadways (I-10, SR-78, and 16th Avenue) operate at LOS C. The LOS conditions for the roadway segments during construction are presented in Table 4.17-3.

Table 4.17-3. Roadway Segment Level of Service in peak year Construction Conditions

Roadway	Segment	Cross-section Classification	Peak Year + Project Construction Average Daily Traffic	Roadway Capacity	Truck Percent	LOS
I-10	West of Mesa	4-Lane Freeway	28,380	68,900	38%	C
I-10	East of SR-78	4-Lane Freeway	31,164	68,900	37%	C
SR-78	South of I-10	2-Lane	4,847	16,200	30%	C
16th Avenue	West of SR-78	2-Lane Collector	2,700	11,700	30%	C

Source: URS 2016b

Table 4.17-3 shows that, although traffic would increase, the LOS on the freeway and roadways would continue to operate at an acceptable level (LOS C) during Project construction. Although construction traffic would be more noticeable on local roads (e.g., SR-78 and 16th Avenue), the increased traffic volumes would remain at levels less than the carrying capacity of these two-lane roads, which is approximately 12,000 to 16,000 vehicles per day. Because increases in traffic associated with Project construction activities would not be substantial relative to peak year conditions, the Project would not affect traffic conditions over the course of a workday. Furthermore, I-10 has sufficient capacity to accommodate Project construction-related traffic while maintaining acceptable LOS during the peak-hour periods.

Operations

Project operations would generate minimal traffic. As discussed in Section 2.3.5, Project operation and maintenance activities are expected to require approximately 5 permanent, full-time personnel who would operate in two 12-hour shifts, resulting in 10 commuting trips per day. An estimated 10 trips per day would occur for the delivery of materials. Additional workers may be onsite during ad-hoc activities, such as panel washing. The number of additional trips associated with these activities is expected to be minimal and would not have an adverse impact on transportation and traffic.

As with construction, operation and maintenance of the gen-tie line may also periodically necessitate the temporary closure of route 660703. Because route 660703 is an open route, temporary closure of the route would affect OHV and other users. Potential impacts would be reduced through implementation of APM TRA-2, as modified by Mitigation Measure TRN-1, which would require a Traffic Monitoring and Control Plan to limit impacts associated with temporary road closures. To further reduce temporary impacts to access on this route, Mitigation Measure REC-2 would require the Applicant to coordinate with BLM to temporarily close route 660703 if needed during maintenance of the gen-tie line.

Decommissioning

Similar to construction, decommissioning of most of the Project facilities would occur almost entirely onsite, and would not affect any roads other than the six open BLM routes that would be closed for the entire duration of the Project. As with construction, decommissioning of the gen-tie line may also necessitate the temporary closure of route 660703. Because route 660703 is an open route, temporary closure of the route would affect OHV and other users. Potential impacts would be reduced through implementation of APM TRA-2, as modified by Mitigation Measure TRN-1, which would require a Traffic Monitoring and Control Plan to limit impacts associated with temporary road closures. To further reduce temporary impacts to access on this route, Mitigation Measure REC-2 would require the Applicant to coordinate with BLM to temporarily close route 660703 if needed during maintenance of the gen-tie line.

As discussed in Section 2.3.6, decommissioning of the Project is expected to take up to a year to complete and require a workforce smaller than that associated with construction. For purposes of this analysis, it is assumed that the commuting workforce and number of truck trips is approximately half of the number associated with construction. Because the number of workers and trucks required during Project decommissioning activities would be less than what was required during the peak construction period in the peak year, increased traffic during decommissioning would have less effect on traffic conditions than during peak construction, and traffic flow at the intersections and roadways would operate at acceptable conditions during decommissioning.

4.17.3.2 Alternative 2: Resource Avoidance Alternative

Construction, Operations, and Decommissioning

Because the workforce and number of equipment trips for construction, operation, and decommissioning of Alternative 2 would be the same as that for the Proposed Action, daily worker commuting and haul truck trip volumes are also anticipated to be the same. Therefore, the impact of Alternative 2 on the LOS for roadways and intersections would be the same as the Proposed Action.

In the absence of APM TRA-1, the level of service at the SR-78/16th Avenue intersection would degrade to LOS F under Alternative 2. As discussed in Section 4.17.2, the Applicant proposes to control traffic leaving the Project area during the PM peak hours to a level that would ensure the LOS at the SR-78/16th Avenue intersection would be LOS D or better. Mitigation Measure TRN-3 would modify APM TRA-1 to further reduce the number of construction worker vehicles leaving the Project site during the PM peak hour, such that the intersection of SR-78/16th Avenue operates at LOS C or better. In addition, Mitigation Measure TRN-4 would require paving of 16th Avenue/Seeley Avenue and improvement of the intersection of SR-78/16th Avenue to allow a turning lane from 16th Avenue onto SR-78. These improvements would facilitate traffic flow at the intersection, further improving the Level of Service.

4.17.3.3 Alternative 3: Reduced Project Alternative

Construction, Operations, and Decommissioning

The workforce for construction, operation, and decommissioning of Alternative 3 would be the same as that of the Proposed Action. The total number of trips required to deliver materials and equipment for construction would be 10,800, lower than the 14,400 total trips required for the Proposed Action and Alternative 2. As discussed in Section 4.17.3.1, the adverse impact of construction traffic at intersection of SR-78 and 16th Avenue is driven entirely by worker commuting vehicles, and is not affected by trips to deliver materials and equipment. Therefore, although the reduction in delivery trips by about three-quarters would reduce impacts at the intersections, the adverse impact associated with commuting workers in the PM peak hours would still result in lowering the level of service to LOS F at the SR-78 intersection with 16th Avenue under Alternative 3. As discussed in Section 4.17.2, the Applicant proposes to control traffic leaving the Project area during the PM peak hours to a level that would ensure the LOS at the SR-78/16th Avenue intersection would be LOS D or better. Mitigation Measure TRN-3 would modify APM TRA-1 to further reduce the number of construction worker vehicles leaving the Project site during the PM peak hour, such that the intersection of SR-78/16th Avenue operates at LOS C or better. In addition, Mitigation Measure TRN-4 would require paving of 16th Avenue/Seeley Avenue and improvement of the intersection of SR-78/16th Avenue to allow a turning lane from 16th Avenue onto SR-78. These improvements would facilitate traffic flow at the intersection, further improving the Level of Service.

4.17.4 Application of CEQA Significance Thresholds

TRA-1) Would the Project conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking

into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

As shown in Table 4.17-2, construction of Alternatives 1 or 2 would result in operation of the intersection of SR-78 and 16th Avenue at a LOS F during peak PM hours, in the absence of APMs. This reduction in LOS would exceed the thresholds established in the Riverside County CMP and Riverside County General Plan, and would constitute a significant impact. Implementation of APM TRA-1 would reduce the number of vehicles leaving the Project to a level that allows the intersection of SR-78 and 16th Avenue to operate at LOS D. The measure would also improve the LOS at the intersection of SR-78 and 14th Avenue. However, even with implementation of APM TRA-1, the Project would result in LOS D, which would still not comply with the Riverside County General Plan target of LOS C along County-maintained roads and state highways. According to the Riverside County Traffic Impact Analysis Preparation Guide (Riverside County 2008), when Project traffic, added to existing traffic, will deteriorate the LOS to below the target LOS, and impacts are not mitigated, the impact is considered significant. Mitigation Measure TRN-3 would modify APM TRA-1 to further reduce the number of construction worker vehicles leaving the Project site during the PM peak hour, such that the intersection of SR-78/16th Avenue operates at LOS C or better. In addition, Mitigation Measure TRN-4 would require paving of 16th Avenue/Seeley Avenue and improvement of the intersection of SR-78/16th Avenue to allow a turning lane from 16th Avenue onto SR-78. These improvements would facilitate traffic flow at the intersection, further improving the Level of Service. With implementation of Mitigation Measures TRN-3 and TRN-4, the intersection would conform to the thresholds established in the Riverside County CMP and Riverside County General Plan, and impacts of Alternative 1 or Alternative 2 would be less than significant.

The total number of trips required to deliver materials and equipment for construction of Alternative 3 would be 10,800, lower than the 14,400 total trips required for Alternative 1 and Alternative 2. However, the number of workers would be the same, and therefore the impacts of commuting vehicles on traffic would be the same as that of the Proposed Action. As discussed in Section 4.17.3.1, the adverse impact of construction traffic at intersection of SR-78 and 16th Avenue is driven entirely by worker commuting vehicles, and is not affected by trips to deliver materials and equipment. Therefore, although the reduction in delivery trips by about three-quarters would reduce overall impacts at the intersections, the adverse impact associated with commuting workers in the PM peak hours would still result in lowering the level of service to LOS F at the SR-78 intersection with 16th Avenue under Alternative 3. Even with implementation of APM TRA-1, Alternative 3 would result in LOS D, which would still not comply with the Riverside County General Plan target of LOS C along County-maintained roads and state highways. According to the Riverside County Traffic Impact Analysis Preparation Guide (Riverside County 2008), when Project traffic, added to existing traffic, will deteriorate the LOS to below the target LOS, and impacts are not mitigated, the impact is considered significant. Mitigation Measure TRN-3 would modify APM TRA-1 to further reduce the number of construction worker vehicles leaving the Project site during the PM peak hour, such that the intersection of SR-78/16th Avenue operates at LOS C or better. In addition, Mitigation Measure TRN-4 would require paving of 16th Avenue/Seeley Avenue and improvement of the intersection of SR-78/16th Avenue to allow a turning lane from 16th Avenue onto SR-78. These improvements would facilitate traffic flow at the intersection, further improving the Level of

Service. With implementation of Mitigation Measures TRN-3 and TRN-4, the intersection would conform to the thresholds established in the Riverside County CMP and Riverside County General Plan, and impacts would be less than significant.

The impact of construction of Alternatives 1, 2, or 3 on traffic at the other three intersections, and on 16th Avenue, SR-78, and I-10 roadway segments, would be less than significant because they would all operate at LOS C or better.

The impacts of operation of Alternatives 1, 2, 3 are expected to be nominal, and the impacts of decommissioning on traffic would be less than those associated with construction. Alternatives 1, 2, or 3 construction and decommissioning would not have long-term significant traffic impacts on the transportation network, since construction- and decommissioning-related impacts are considered temporary.

TRA-2) Would the Project conflict with an applicable congestion management program, including, but not limited to, level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

The RCTC's adopted minimum LOS threshold is LOS E. When a CMP street or highway segment falls to LOS F, a deficiency plan would be required. As shown in Table 4.17-2, construction of Alternatives 1, 2, or 3 would result in operation of the intersection of SR-78 and 16th Avenue at a LOS F during peak PM hours, in the absence of APMs. This reduction in LOS would exceed the thresholds established in the Riverside County CMP, and would constitute a significant impact. However, implementation of APM TRA-1 would reduce the number of vehicles leaving the Project in the afternoon peak hours to a level that allows the intersection to operate at LOS D. With implementation of this APM, the impact on the intersection would not conflict with an applicable congestion management program established by the County congestion management agency for designated roads or highways, and impacts of Alternative 1, 2, or 3 would be less than significant. The impact of Alternatives 1, 2, or 3 operation on traffic at the other three intersections, and on 16th Avenue, SR-78, and I-10 roadway segments, would also be less than significant because they would all operate at LOS D or better.

The impact of Alternatives 1, 2, or 3 operation on traffic would be nominal and Project decommissioning would result in less traffic impacts than Project construction. Therefore, impacts of Alternatives 1, 2, or 3 operations and decommissioning would be less than significant.

TRA-3) Would the Project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

Alternatives 1, 2, or 3 would not result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks. Construction equipment that would be utilized for Alternatives 1, 2, or 3 would not obstruct navigable air space. No impacts would occur.

TRA-4) Would the Project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Alternatives 1, 2, or 3 would not require modification of roadways or intersections, or incompatible uses of the public roadways. No impacts would occur.

TRA-5) Would the Project result in inadequate emergency access?

Because 16th Avenue/Seeley Avenue is unimproved and would be subjected to intensive use by trucks, construction could result in degradation of the condition of the road to the extent that it could become unusable by emergency vehicles under Alternatives 1, 2, and 3, resulting in significant impacts to emergency access. To maintain the condition of the road, Mitigation Measure TRN-4 would require that the Applicant pave the segment between Neighbours Boulevard (State Route 78) and the site entrance, a length of approximately 5.6 miles, prior to beginning any other construction activities at the Project area.

The only potential road closure associated with Alternatives 1, 2, or 3 would be temporary closure of route 660703, which is along an existing transmission line, to pull and string the gen-tie line. Because temporary closure of the route could affect emergency access, Mitigation Measure REC-2 would require that the Applicant coordinate the closure with applicable emergency response agencies.

There would be two access routes to the Project area. Primary access for construction and operations would be from Exit 236 off of I-10, following SR-78 and 16th Avenue/Seeley Avenue to the facility gate. A secondary access route would be from 22nd Avenue. The Applicant's Hazardous Materials Management and Emergency Response Plan would comply with applicable Riverside County regulations, and would be coordinated with the Riverside County Fire Department. With paving of the access road, as required through Mitigation Measure TRN-4, and coordination of route closures, as required through Mitigation Measure REC-2, impacts to emergency access under Alternatives 1, 2, or 3 would be less than significant.

TRA-6) Would the Project conflict with adopted policies, plans, or programs regarding public transit, bicycle or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

Alternatives 1, 2, or 3 would not conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities. There are no bicycle or pedestrian facilities in the Project area. Due to the remote location of the Project, bicycling and walking are not major means of transportation, and substantial bicycle or pedestrian use is not projected in the future. Accordingly, Alternatives 1, 2, or 3 would not interfere with bicycle or pedestrian safety.

As shown in Table 4.17-2, construction traffic from Alternatives 1, 2, or 3 would increase delays at intersections on SR-78 (Neighbours Boulevard), which is used as a bus route by the Palo Verde Valley Transit Agency (PVVTA). The additional delay for buses at these intersections would be nominal (around 30 seconds). Therefore, impacts to public transit under Alternatives 1, 2, or 3 would be less than significant.

TRA-7) Would the Project alter waterborne, rail or air traffic?

Alternatives 1, 2, or 3 would not alter waterborne, rail, or air traffic. The Project would not utilize waterborne, rail, or air services to transport materials or the workforce. Therefore, no impacts to waterborne, rail or air traffic would occur.

TRA-8) Would the Project cause an effect, or a need for new or altered maintenance of roads?

As discussed in Section 4.17.3, construction traffic under Alternatives 1, 2, or 3 would cause degradation of 16th Avenue/Seeley Avenue, and could result in making the roadway unpassable for emergency vehicles or local traffic. Such degradation could be significant, requiring increased maintenance for the existing roadway, or construction of new roadway. To maintain the condition of the road, Mitigation Measure TRN-4 would require that the Applicant pave the segment between Neighbours Boulevard (State Route 78) and the site entrance, a length of approximately 5.6 miles, prior to beginning any other construction activities at the Project area. With paving of the access road, as required through Mitigation Measure TRN-4, impacts associated with the need for new roads or increased maintenance of existing roads under Alternative 1, Alternative 2, or Alternative 3 would be less than significant.

Closure of the current access routes to the Mule Mountains could result in increased use, and therefore degradation, of the alternative access roads south and west of the Project area. To ensure that this alternative access is accessible and known to persons wishing to access the area, Mitigation Measure REC-1 requires that the Applicant perform light clearing and grading prior to Project construction, and then periodically as needed during construction, operations, and decommissioning. With maintenance of this alternative access, as required by REC-1, impacts would be less than significant.

TRA-9) Would the Project cause an effect upon circulation during the project's construction?

As shown in Table 4.17-2, construction of Alternatives 1, 2, or 3 would result in operation of the intersection of SR-78 and 16th Avenue at a LOS F during peak PM hours, in the absence of APMs. Implementation of APM TRA-1 would reduce the number of vehicles leaving the site to a level that allows the intersection of SR-78 and 16th Avenue to operate at LOS D. The measure would also improve the LOS at the intersection of SR-78 and 14th Avenue. However, even with implementation of APM TRA-1, Alternatives 1, 2, or 3 would result in LOS D, which would still not comply with the Riverside County General Plan target of LOS C along County-maintained roads and state highways. According to the Riverside County Traffic Impact Analysis Preparation Guide (Riverside County 2008), when Project traffic, added to existing traffic, will deteriorate the LOS to below the target LOS, and impacts are not mitigated, the impact is considered significant. Mitigation Measure TRN-3 would modify APM TRA-1 to further reduce the number of construction worker vehicles leaving the Project site during the PM peak hour, such that the intersection of SR-78/16th Avenue operates at LOS C or better. In addition, Mitigation Measure TRN-4 would require paving of 16th Avenue/Seeley Avenue and improvement of the intersection of SR-78/16th Avenue to allow a turning lane from 16th Avenue onto SR-78. These improvements would facilitate traffic flow at the intersection, further improving the Level of Service. With implementation of Mitigation Measures TRN-3 and TRN-

4, the intersection would conform to the thresholds established in the Riverside County CMP and Riverside County General Plan, and impacts would be less than significant.

The impact of Alternative 1, 2, or 3 construction on traffic at the other three intersections, and on 16th Avenue, SR-78, and I-10 roadway segments, would be less than significant because they would all operate at LOS C or better.

The impacts of Alternative 1, 2, or 3 operations are expected to be nominal, and the impacts of decommissioning on traffic would be less than those associated with construction. Alternatives 1, 2, or 3 construction and decommissioning would not have long-term significant traffic impacts on the transportation network, since construction- and decommissioning-related impacts are considered temporary.

TRA-10) Would the Project affect bike trails?

There are no bike trails in the Project area. Therefore, there would be no impact under Alternatives 1, 2, or 3.

4.17.5 Alternative 4: No Action Alternative

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, the BLM would continue to manage the land under its land use jurisdiction consistent with the site's multiple use classification as described in the CDCA Plan, as it was amended by the Western Solar Plan.

If the site remained undeveloped, the existing environmental setting described in Section 3.17 would be maintained. There would be no increase in traffic associated with commuting workers, delivery of materials, or delivery of water, and no impacts to existing on-site routes. Therefore, Alternative 4 would not result in any impacts to transportation and traffic.

4.17.6 Cumulative Impacts

For the purposes of the cumulative analysis of transportation and traffic impacts, only other projects that make or would make a substantial contribution to traffic at the same roadway intersections or segments as the Proposed Action or alternatives are considered.

With respect to the impacts to the I-10 freeway segments, the geographic scope of the cumulative analysis is all projects in eastern Riverside County. Traffic could be affected by any of the projects listed in Tables 4.1-1 and 4.1-2, all of which would involve commuting workers and delivery of materials using I-10 for their primary access. In general, it is only the construction and decommissioning phases of these projects that would have the potential to contribute to cumulative traffic impacts, because the numbers of workers and deliveries associated with operations is nominal compared to the overall traffic volume on I-10. The contribution of operations to traffic impacts is already accounted for in the projected peak year baseline, which assumed a two percent growth per year in ambient conditions. However, the impacts of construction and decommissioning traffic could contribute to adverse cumulative impacts.

With respect to traffic on the SR-78 and 16th Avenue roadway segments, and at the intersections of 14th Avenue and 16th Avenue with SR-78, the geographic scope of the cumulative analysis is limited to the projects that would make a substantial contribution to traffic south of I-10. Based on a review of the geographic distribution of the cumulative projects in Figure 4.1-1, the only cumulative project that is likely to use SR-78 south of I-10 to support construction, operations, or decommissioning is the BMSP. The other cumulative projects are either located north of I-10, or are located closer to other exits on I-10 rather than the SR-78 exit, and would therefore contribute only minimally to traffic on SR-78 or 16th Avenue south of I-10. Again, because the number of operations workers and deliveries for both the DQSP and BMSP are nominal when compared to the overall volume of traffic on SR-78, the two projects would only contribute to an adverse cumulative impact if their construction and/or decommissioning phases were to be concurrent. The contribution to traffic impacts from operations of these two projects is already accounted for in the projected peak year baseline, which assumed a two percent growth per year in ambient conditions.

With respect to traffic at the intersections (exit ramps) of SR-78 with I-10, the geographic scope of the cumulative analysis is limited to the projects that would use SR-78 for access, either north or south of I-10. Based on a review of the geographic distribution of the cumulative projects in Figure 4.1-1, this is expected to include the BMSP, the Blythe Airport, MSEP, Blythe Airport Solar I Project, Palo Verde Mesa Solar Project, and the Modified BSPP. The other cumulative projects are located closer to other exits on I-10 rather than the SR-78 exit, and would therefore contribute only minimally to traffic at the intersection of SR-78 with I-10. Again, because the number of operations workers and deliveries for these projects are nominal when compared to the overall volume of traffic using the SR-78 interchange with I-10, the projects would only contribute to an adverse cumulative impact if their construction and/or decommissioning phases were to be concurrent. The contribution to traffic impacts from operations of these projects is already accounted for in the projected peak year baseline, which assumed a two percent growth per year in ambient conditions.

The projects listed in Table 4.1-2 have been implemented. Some of these projects existed previously, but are now closed (such as the Kaiser Mine), so they do not contribute to cumulative traffic impacts. Those that are currently in operation contribute ongoing operational traffic to area roadways and intersections. This traffic is already accounted for in the cumulative analysis because it contributes to the existing conditions, and in the projected peak year baseline, discussed in Section 3.17. Because the system is currently operating at an acceptable LOS, and is projected to operate at an acceptable LOS in the peak year, the existing projects do not conflict with established standards of performance of the vehicle circulation system in the area, and have not resulted in cumulatively adverse conditions.

Table 4.1-3 provides a list of reasonably foreseeable projects, including other proposed or approved renewable energy projects, various BLM-authorized actions/activities, proposed or approved projects within the County's jurisdiction, and other actions/activities that are considered reasonably foreseeable. The renewable energy and other infrastructure projects would contribute traffic to area roadways and intersections during their own construction, operations, and decommissioning phases.

Alternative 1 – Proposed Action

Construction and Decommissioning

I-10 Freeway Segment

As shown in Tables 3.17-3 and 4.17-3, Project construction would increase the average daily traffic on I-10 east of SR-78 from the peak year base of 29,700 to 31,164, as compared to a roadway capacity of 68,900. The change in traffic on I-10 west of Mesa Drive would be even smaller, from the peak year base of 28,080 to 28,380. An increase in traffic would also be associated with decommissioning of the DQSP, but the increase from decommissioning would be less than the increase associated with construction. As discussed in Section 4.17.3.1, these increases would not result in changing the LOS on this segment from its current LOS C.

Operational levels of traffic from the other projects would be nominal, and also would not result in changing the LOS from C to D. However, concurrent construction and/or decommissioning of other large-scale projects in the I-10 corridor could potentially increase traffic levels to result in LOS D or lower, which would be a significant impact. Although the construction and decommissioning period, workforce, and schedule for the majority of foreseeable future projects are generally unknown, in a worst-case scenario where construction and/or decommissioning peak periods overlapped for all projects proposed in the Project area, the LOS of I-10 could be temporarily degraded, but would not result in any permanent LOS degradation. Given the large difference between the capacity of I-10 and the peak year base average daily traffic (40,520), even a worst-case scenario would not likely exceed the capacity of I-10, which in this area has two lanes in both directions to accommodate the anticipated increase in traffic while maintaining adequate traffic flow along the freeway mainline.

SR-78 Roadway and Intersections

As shown in Tables 3.17-3 and 4.17-3, Project construction would increase the average daily traffic on SR-78 from the peak year base of 2,273 to 4,847, as compared to a roadway capacity of 16,200. The change in traffic on 16th Avenue would be from the peak year base of 126 to 2,700, as compared to a capacity of 11,700. In both cases, the increase would not result in a change of the peak year base LOS C. However, at the intersection of 14th Avenue with SR-78, the PM peak hour average delay would increase from 9.9 to 31.9 seconds/vehicle without mitigation, which would result in a change from the peak year base of LOS A to LOS D. At the intersection of 16th Avenue with SR-78, the PM peak hour average delay would increase from 9.8 to 78.2 seconds/vehicle without mitigation, which would result in a change from the peak year base of LOS A to LOS F, which would constitute a significant impact. Implementation of APM TRA-1 would reduce the number of vehicles leaving the Project during the afternoon peak hours to a level that allows the intersection to operate at LOS D, and would reduce the direct impact of the DQSP on this intersection. Mitigation Measure TRN-3 would modify APM TRA-1 to further reduce the number of construction worker vehicles leaving the Project site during the PM peak hour, such that the intersection of SR-78/16th Avenue operates at LOS C or better. In addition, Mitigation Measure TRN-4 would require paving of 16th Avenue/Seeley Avenue and improvement of the intersection of SR-78/16th Avenue to allow a turning lane from 16th Avenue onto SR-78. These improvements would facilitate traffic flow at the intersection, further improving the Level of Service. An increase in traffic at this interchange would also be associated with decommissioning of the DQSP. The increase in traffic from decommissioning would be lower than that associated with construction, but could still result in an unacceptable reduction in LOS at the intersection of 16th Avenue and SR-78.

Operational levels of traffic from the BMSP would be nominal, and would likely not result in a further reduction of the LOS at these locations. However, concurrent construction and/or decommissioning of the DQSP and BMSP could potentially increase traffic levels on SR-78 and 16th Avenue to result in LOS D or lower, and would also result in even longer average delays at the intersections. Even with implementation of APM TRA-1, construction or decommissioning traffic from the DQSP would be a considerable contributor to cumulative traffic impacts. Although the construction and decommissioning period, workforce, and schedule for the BMSP is not known, in a worst-case scenario where construction and/or decommissioning peak periods overlapped for DQSP and BMSP, the LOS of SR-78 and 16th Avenue could be temporarily degraded, but would not result in any permanent LOS degradation. Given the large difference between the capacity of SR-78 and 16th Avenue and the peak year base average daily traffic, even a worst-case scenario would not likely exceed the capacity of either roadway segment. However, the increase in the average delay associated with the DQSP is already a significant impact, and would be made even worse when combined with construction or decommissioning traffic from BMSP.

I-10/SR-78 Interchange

As shown in Tables 3.17-2 and 4.17-2, the contribution of construction traffic from DQSP would have only a minor effect on the average delay at the eastbound and westbound ramps to I-10. The AM peak hour average delay at the westbound ramp would increase from 9.2 to 9.7 sec/veh, but the LOS would remain at the peak year base of LOS A. The PM peak hour average delay at the eastbound ramp would increase from 9.4 to 12.8 sec/veh, which would result in a change from the peak year base of LOS A to LOS B, which would be a less than significant impact.

Operational levels of traffic from the other projects would be nominal, and likely would not result in changing the LOS lower than LOS B. However, concurrent construction and/or decommissioning of the DQSP and the other projects which use SR-78 for access could potentially increase traffic levels at the interchange to result in LOS D or lower, which would be a significant impact. Although the construction and decommissioning period, workforce, and schedule for the other projects is not known, in a worst-case scenario where construction and/or decommissioning peak periods overlapped for DQSP and the other projects, the LOS of the interchange could be temporarily degraded, but would not result in any permanent LOS degradation.

Summary

The DQSP is not expected to be a considerable contributor to cumulatively significant traffic impacts on the I-10, SR-78, or 16th Avenue roadway segments. I-10 west and east of SR-78 would operate at LOS C, and SR-78 and 16th Avenue would operate at LOS A. With the construction of the cumulative projects and DQSP, it is anticipated that the freeway would operate within Caltrans' acceptable LOS level.

The Project would contribute to traffic impacts at the SR-78 interchange with I-10. Impacts of the Project itself would be significant without mitigation, and the magnitude of the cumulative impact would depend on how many projects were undergoing concurrent construction or decommissioning. If enough projects are undergoing construction or decommissioning to result in a cumulatively considerable traffic impact at the interchange, the DQSP would be a contributor, but would not likely be a considerable contributor, to the cumulative traffic impact.

On its own, without mitigation, Project construction would cause significant traffic impacts at intersections of 14th Avenue and 16th Avenue with SR-78. These impacts would be reduced through implementation of APM TRA-1, which would reduce the number of vehicles leaving the Project to a level which allows the intersections to operate at LOS D or better. However, impacts at the 16th Avenue intersection would still be significant. Mitigation Measure TRN-3 would modify APM TRA-1 to further reduce the number of construction worker vehicles leaving the Project site during the PM peak hour, such that the intersection of SR-78/16th Avenue operates at LOS C or better. In addition, Mitigation Measure TRN-4 would require paving of 16th Avenue/Seeley Avenue and improvement of the intersection of SR-78/16th Avenue to allow a turning lane from 16th Avenue onto SR-78. These improvements would facilitate traffic flow at the intersection, further improving the Level of Service. With implementation of Mitigation Measures TRN-3 and TRN-4, the intersection would conform to the thresholds established in the Riverside County CMP and Riverside County General Plan, and impacts would be less than significant. If the BMSP should undergo concurrent construction, the cumulative impact at these intersections would likely be significant, even with implementation of APM TRA-1 and Mitigation Measure TRN-3 and TRN-4, and the DQSP would be a considerable contributor to these cumulative traffic impacts.

APM TRA-1 and Mitigation Measures TRN-3 and TRN-4 would reduce the Project's construction-related contribution to cumulative traffic impacts. Based on the short-term nature of construction, any increase in vehicle trips and transportation-related impacts would be temporary. However, even with implementation of the APMs during construction of the Project, implementation of a Coordinated Transportation Management Plan is recommended to reduce the Project's contribution to any potential traffic impacts to the surrounding network. With implementation of BMPs and mitigation measures, impacts to traffic and transportation would be minimized. Implementation of Mitigation Measure TRN-2, Coordinated Transportation Management Plan, would require the Applicant to address the transportation impact of the multiple overlapping construction projects within the vicinity of the Project in the region. TRN-2 would also require the Applicant to develop and implement protocols for updating the Coordinated Transportation Management Plan to account for delays or changes in the schedules of individual projects. With implementation of Mitigation Measure TRN-2, cumulative traffic impacts to the intersections would likely be improved to acceptable LOS levels. Therefore, the Project's contribution towards temporary, significant cumulative impacts during Project construction would be reduced to a level that is less than significant.

The Project would not result in a change to air traffic patterns (impact TRA-3), would not affect emergency access (impact TRA-5), would not affect public transit (impact TRA-6), would not affect waterborne, rail, or air transportation (impact TRA-7), and would not affect bike trails (impact TRA-10). The Project would not have design features which would increase hazards (impact TRA-4) on existing roads.

Operation and Maintenance

As discussed in Section 4.17.3.1, Project operations would generate minimal traffic. Project operation and maintenance activities are expected to require approximately 5 permanent, full-time personnel who would operate in two 12-hour shifts, resulting in 10 commuting trips per day. An estimated 10 trips per day would occur for the delivery of materials. Additional workers may be onsite during ad-hoc activities, such as washing of panels, but the number of additional trips associated with these activities is expected to be minimal. Overall, operations of the DQSP are expected to add fewer than 20 daily trips to a roadway (16th Avenue) which would have an estimated 126 trips during the peak year base, as compared to a capacity of more than 11,000 vehicles. Even if concurrent projects contributed traffic to the roadway segments and intersections to the extent that a cumulatively significant impact would occur, the contribution of the Project to that impact would not be cumulatively considerable.

Alternative 2 – Resource Avoidance Alternative

As discussed in Section 4.17.3.2, the workforce and number of equipment trips for construction, operation, and decommissioning of Alternative 2 would be the same as that for the Proposed Action. Therefore, daily worker commuting and haul truck trip volumes are also anticipated to be the same. Therefore, the contribution of Alternative 2 to cumulative traffic impacts on the LOS for roadways and intersections would be the same as those described for the Proposed Action.

Alternative 3 – Reduced Project Alternative

As discussed in Section 4.17.3.3, the workforce for construction, operation, and decommissioning of Alternative 3 would be the same as that of the Proposed Action. However, the total number of trips required to deliver materials and equipment for construction would be 10,800, lower than the 14,400 total trips required for the Proposed Action and Alternative 2. The adverse impact of construction traffic at intersection of SR-78 and 16th Avenue is driven entirely by worker commuting vehicles, and is not affected by trips to deliver materials and equipment. Therefore, although the reduction in delivery trips by about three-quarters would reduce impacts at the intersections, the adverse impact associated with commuting workers in the PM peak hour would still result in lowering the level of service to LOS F at the SR-78 intersection with 16th Avenue under Alternative 3. Therefore, the contribution of Alternative 3 to cumulative traffic impacts on the LOS for roadways and intersections would be the same as those described for the Proposed Action.

Alternative 4 – No Action

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project, and the DQSP would not be implemented. The public lands in the Project area would continue to be managed by BLM in accordance with existing land use designations in the CDCA Plan, which could include a different solar project, or other development. Alternative 4 would not contribute to cumulative transportation and traffic impacts.

4.17.7 Residual Impacts

The direct impacts of the Project on transportation and traffic are associated with the Project construction and decommissioning phases, each of which would be temporary. Construction would occur for a period of 25 to 48 months, and decommissioning would occur for a period of less than one year. Implementation of APM TRA-1 would reduce the number of vehicles leaving the Project to a level which allows the intersection of 16th Avenue and SR-78 to operate at LOS D. With implementation of this APM, the impact on the intersection would still not be reduced to a level less than significant. Mitigation Measure TRN-3 would modify APM TRA-1 to further reduce the number of construction worker vehicles leaving the Project site during the PM peak hour, such that the intersection of SR-78/16th Avenue operates at LOS C or better. In addition, Mitigation Measure TRN-4 would require paving of 16th Avenue/Seeley Avenue and improvement of the intersection of SR-78/16th Avenue to allow a turning lane from 16th Avenue onto SR-78. These improvements would facilitate traffic flow at the intersection, further improving the Level of Service. With implementation of Mitigation Measures TRN-3 and TRN-4, the intersection would conform to the thresholds established in the Riverside County CMP and Riverside County General Plan, and impacts would be less than significant.

The contribution of the Project to cumulative traffic impacts would be temporary. The operational trips associated with all of the cumulative projects would be nominal, as compared to the overall traffic volumes at these locations. Therefore, it is anticipated that the LOS for any of the roadway segments or intersections would be restored back to preconstruction conditions once construction of the projects is completed.

4.18 Utilities and Public Services

4.18.1 Methodology for Analysis

To evaluate water availability, the Applicant developed an analysis of groundwater availability in support of the Project (URS 2016a). Water demands of the Project are discussed in Chapter 2, *Proposed Action and Alternatives*, and in Section 3.18, *Utilities and Public Services*. An analysis of the effect of the proposed water use on regional groundwater resources is provided in Section 4.20, *Water Resources*. The Project's water demands were evaluated in comparison with the available water supply and historic regional water consumption levels.

The hazardous and non-hazardous wastes expected to be generated by the Project were evaluated in terms of local landfill capacity and compliance with applicable laws, ordinances, regulations, and policies, for solid wastes. The state and local environmental requirements listed in Section 3.18, *Utilities and Public Services*, have been established to ensure the safe and proper management of applicable wastes in order to protect human health and the environment.

Impacts to natural gas and electricity supplies were evaluated based on the potential for the Project to use these services, or to otherwise interfere with their delivery to other customers. Stormwater management impacts were evaluated based on the potential for the Project to interfere with publicly-operated stormwater management systems. Impacts to public services and facilities such as schools, hospitals, and emergency response capability were evaluated based on the potential for the Project to interfere with delivery of these services to others in the community.

4.18.1.1 CEQA Significance Criteria

The criteria used to determine the significance of the Project-related impacts to utilities and public services are based on the criteria identified in the state CEQA Guidelines, Appendix G. Project-related impacts would be considered significant if they:

USS-1) Result in substantial adverse environmental impacts associated with the provision of utility services. Substantial adverse environmental impacts may occur if the Project would:

1. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.
2. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
3. Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
4. Have insufficient water supplies available to serve the project from existing entitlements and resources, or require new or expanded entitlements.
5. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments.

6. Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs.
7. Fail to comply with Federal, state, and local statutes and regulations related to solid waste.

PS-1) Result in substantial adverse physical impacts associated with the provision of new or physically altered facilities to provide public services.

The following additional significance criteria from the County of Riverside Environmental Assessment Form are used in the analysis. A project could have potentially significant impacts if it would:

USS-2) Impact the following facilities requiring or resulting in the construction of new facilities or the expansion of existing facilities, the construction of which could cause significant environmental effects.

1. Electricity
2. Natural gas
3. Communications systems
4. Stormwater drainage
5. Street lighting
6. Maintenance of public facilities, including roads
7. Other government services

USS-3) Conflict with any adopted energy conservation plans.

4.18.2 Applicant-Proposed Measures

There are no APMs to address potential effects to utilities and public services.

4.18.3 Direct and Indirect Impacts

4.18.3.1 Alternative 1: Proposed Action

Construction, Operation, and Maintenance

Water Supply and Water Availability

As discussed in Sections 2.3.3.8 and 3.18.1.1, the Applicant would require a water source to supply water for use during construction and operations. There is no public water supply system in the Project area, and other water sources such as reclaimed water or surface waters would require entitlement. Therefore, the Project's water needs would either be met by onsite groundwater wells, or by water delivered to the Project by truck. This Draft PA/EIS/EIR analyses both potential scenarios.

An analysis of the effect of the potential production of water from onsite wells on regional groundwater resources is provided in Section 4.20, *Water Resources*. The Project's water demands were evaluated in comparison with the available water supply and historic regional water consumption levels. The Applicant estimates that the 25-month construction timeframe would require a total of approximately 1,400 AF of water, or 700 AFY, and that a 48-month construction timeframe would require approximately 1,800 AF of water, or 450 AFY. The Applicant estimates that operations would require up to 38 AFY, including 18 AFY for panel washing, and 20 AFY for other combined purposes. Assuming the use of 1,800 AF for construction, and a 30-year operations period, Project construction and operation would require a total of 2,940 AF of water.

As discussed in Section 3.20, *Water Resources*, onsite wells would access groundwater from within the Palo Verde Mesa Groundwater Basin (PVMGB), which directly underlies the Project site. The PVMGB is hydrologically continuous with the Palo Verde Valley Groundwater Basin (PVVGB). Therefore, both basins are considered together in support of the water supply assessment, for the purposes of evaluating potential water supply availability. The two basins are collectively referred to as the combined Palo Verde Groundwater Basin (PVGB) throughout the remainder of this section. Whether the source of the water is onsite groundwater wells or offsite supply brought to the Project by trucks, the source of the water is expected to be from within the PVGB. Therefore, the following analysis of water availability in the PVGB applies to both scenarios.

An evaluation of the groundwater availability and potential impacts to nearby groundwater users was conducted by the Applicant in support of the Project (URS 2016d). Table 3.20-1 presents the estimated annual groundwater budget for the PVGB. The California DWR estimates that the total groundwater storage capacity in the PVGB is approximately 6,840,000 AF, and the estimated recharge and outflow is approximately 426,600 AFY. The largest component of outflow of groundwater from the PVGB is discharge to the Palo Verde Irrigation District (PVID) drains, which return the water to the Colorado River. The drains comprise approximately 83.7 percent (357,000 AFY) of the total 426,600 AFY outflow from the PVGB. An additional 50,000 AFY (another 11.7 percent) is returned from the groundwater to the river through groundwater discharge in gaining sections of the river. The remaining 19,600 AFY (or approximately 4.6 percent) is pumped for use in agriculture (3,600 AFY), for municipal or domestic use (7,500 AFY), or lost through evapotranspiration by native riparian vegetation (8,500 AFY). In addition, the water level in the PVMGB has generally remained stable over the past few decades, except in areas immediately adjacent to some pumping wells (AECOM 2009). The relatively stable groundwater levels that have been measured over this period suggest that existing groundwater withdrawal from the underlying aquifer has not significantly changed the water balance within the PVMGB.

Project construction and operation would require a total of approximately 2,940 AF of water over the construction period plus the 30-year operation period. This volume of water represents about 0.04 percent of the total groundwater storage (6.84 million AF) available in the PVGB. The maximum annual use of 700 AFY represents 0.16 percent of the annual groundwater balance in the basin, and approximately 6.3 percent of the 11,100 AFY that is withdrawn from the basin to support agriculture, municipal, and domestic uses. That level of water use would occur only temporarily during the 25 month construction period, and would then be reduced to 38 AFY, which represents 0.3 percent of total agriculture, municipal, and domestic uses during Project operations. No water would be used to irrigate landscaping.

The Project would not access water from a public water supply system, and would therefore not have any impacts on existing public water supply systems. The onsite water system would be designed and constructed to meet just the needs of the Project, and would be classified as a non-community, non-transient water system because the Project's water system would only provide water for use by onsite employees and to support solar plant operation and maintenance. Based on the temporary nature of the water use during construction, and the small volume of the proposed water use compared to overall water availability and water use for other purposes, the potential effects of water use on the public water supply would be minimal over the life of the facility.

Solid Waste Management

As described in Section 2.3.7.1, the Project would generate solid waste during construction, operation, and maintenance. All handling and processing of solid and hazardous wastes during construction and operations would be in accordance with applicable regulatory requirements as described in Appendix D, Section D.18. Solid waste would include various construction materials and worker-generated waste that would include a combination of recyclable and non-recyclable materials. Excess materials and wastes would be recycled or resold to the maximum extent practicable. Non-recyclable, non-hazardous solid waste materials would be landfilled in accordance with state and local regulations.

The Riverside County Waste Management Department operates six landfills. There is also a privately-operated landfill within the County (El Sobrante Landfill), and five privately-operated transfer stations open to the public. The nearest landfills that serve the Project area include the Blythe Landfill at 1000 Midland Road, which is approximately 17 miles north of the Project site, and Desert Center Landfill at 17-991 Kaiser Road in Desert Center, which is approximately 40 miles west of the Project site.

The Solid Waste Facility Permit for the Blythe landfill, issued in 2011, estimates that the landfill had more than 4 million cubic yards of capacity remaining out of a total capacity of about 6 million cubic yards, and that the estimated closure year for the landfill is 2047 (CalRecycle 2016). As shown in Table 2-2, the total estimated volume of construction debris that may be sent to landfills for disposal is 14,328 cubic yards. Therefore, sufficient capacity is anticipated to be available for waste disposal.

Natural Gas and Electricity

The Project would not use or interfere with any natural gas supplies.

Power to support Project construction and operations would be supplied by connecting the site to the existing SCE local distribution system. The closest interconnection point to that system is located approximately one mile north of the Project site. Once constructed, the Project would result in the generation of electricity. Transmission of generated electricity would be facilitated by connection to the existing CRSS. It is anticipated that the CRSS has capacity sufficient to convey power from the Project, even in combination with other anticipated solar power projects along the I-10 corridor.

Stormwater Management Systems

There are no stormwater management facilities on the Project site. As discussed in Section 4.20, the Project would result in only very minor changes in stormwater flows leaving the site. Therefore, the Project would not affect the operation or function of existing stormwater management facilities, and would not require the expansion or modification of such facilities.

Public Services and Facilities

Because construction would occur only for a period of 25 to 48 months, and operations would require only five full-time workers, it is unlikely that the Project would substantially increase the long-term local population. The local population would temporarily increase during construction, but this increase is not expected to require construction of new or alteration of existing physical facilities to support education, law enforcement, recreation, medical case, or emergency response services.

The proposed Project would change the land use for the Project area from undeveloped and former agricultural lands to an electrical facility and gen-tie lines. The new facility may require new capability to handle technical rescues at electrical facilities, such as confined space/trench rescue/high angle rescue. These capabilities may require increased staffing, training, and specialized rescue equipment. Additional equipment, in turn, may require additional storage and maintenance capability to ensure optimal performance in the event of an emergency.

Decommissioning

Decommissioning of the Project would involve activities similar to construction, including the use of water and electrical power. In general, the scale of activities would be smaller, and would occur for a shorter duration, than those associated with construction. Therefore, the water use and electrical supply for decommissioning are not expected to impact public services or facilities. During decommissioning, Project facilities would be removed and the approximate original grade restored, so there would be no impact to stormwater flows.

Decommissioning would result in the generation of solid waste. Anticipated solid waste streams include concrete, metal, plastics, and photovoltaic panels. Recyclable materials would be removed from the waste stream and recycled or resold prior to disposal of solid waste in an approved landfill. Solar PV panels would be reused if possible and then recycled at the end of their useful life. Based on the CIWMP for Riverside County, it is anticipated that at least 15 years of capacity would be available in landfills, countywide, at the time of decommissioning. Therefore, sufficient capacity is anticipated to be available to support decommissioning.

4.18.3.2 Alternative 2: Resource Avoidance Alternative

Construction, Operation, and Maintenance

Project activities under Alternative 2 would be similar to those for Alternative 1. Similar to the Proposed Action, Alternative 2 would not result in or require alteration of offsite facilities or services. The total volume of solid waste generated during construction, operation, and maintenance of Alternative 2 would be of similar composition to that discussed for the Proposed Action, but slightly reduced in total volume, and therefore would have a slightly reduced effect on available landfill capacity. Similar to the Proposed Action, waste disposal would comply with applicable laws.

Decommissioning

Decommissioning of Alternative 2 would be similar to that described for the Proposed Action, except that activities would be slightly reduced in size and duration due to the reduced Project area under Alternative 2. Decommissioning of Alternative 2 would not affect the operation or function of other nearby facilities. Decommissioning would result in the generation of additional solid waste, but in slightly smaller volumes than the Proposed Action. Recyclable materials would be removed prior to disposal in an approved landfill, and similar to the Proposed Action, it is anticipated that sufficient landfill capacity would be available at the time of decommissioning, and decommissioning-related effects would be minimal.

4.18.3.3 Alternative 3: Reduced Project Alternative

Construction, Operation, and Maintenance

Project activities under Alternative 3 would be similar those for Alternative 1. Because Alternative 3 would involve a smaller Project area than Alternatives 1 or 2, all Project-related features and durations are expected to be reduced from those associated with those Alternatives. Construction of Alternative 3 would likely use a reduced amount of water, involve a reduced amount of construction traffic, and occur for a shorter duration than for Alternatives 1 and 2. Similar to the Proposed Action, Alternative 3 would not result in or require alteration of offsite facilities or services. The total volume of solid waste generated during construction, operation, and maintenance of Alternative 3 would be of similar composition to that discussed for the Proposed Action, but reduced in total volume, and therefore would have a reduced effect on available landfill capacity. Similar to the Proposed Action, waste disposal would comply with applicable laws.

Decommissioning

Decommissioning of Alternative 3 would be similar to that described for the Proposed Action, except that activities would be reduced in size and duration due to the reduced acreage of Alternative 3. Decommissioning of Alternative 3 would not affect the operation or function of other nearby facilities. Decommissioning would result in the generation of additional solid waste, but in smaller volumes than the Proposed Action or Alternative 2. Recyclable materials would be removed prior to disposal in an approved landfill, and similar to the Proposed Action, it is anticipated that sufficient landfill capacity would be available at the time of decommissioning, and decommissioning-related effects would be minimal.

4.18.4 Application of CEQA Significance Thresholds

USS-1) Would the Project result in substantial adverse environmental impacts associated with the provision of utility services?

Water and Wastewater

Alternatives 1, 2, or 3 would not require construction or expansion of public water treatment and/or service systems or additional entitlements or resources. These alternatives would use water during construction, either from onsite wells or trucked from offsite sources. Water use during construction would be temporary, and would not require new or expanded water facilities.

Restroom facilities during Alternatives 1, 2, or 3 construction would be provided by portable units to be serviced by licensed providers. During operations, the five workers would use a leach field and septic system. Alternatives 1, 2, or 3 would not exceed wastewater treatment requirements because the Project would not be connected to a public sewer system.

Natural Gas and Electricity

Alternatives 1, 2, or 3 would not involve the use of natural gas service. These alternatives would involve the installation of Project-specific communications cables, but would not interfere with existing services. Power to support construction of Alternatives 1, 2, or 3 would be supplied by generators. Power to support operations would be provided by backfeed power through the On-Site Substation, with long-term backup provided by a temporary diesel generator. No new or altered facilities would be needed. No impacts regarding these respective issues would occur.

Solid Waste Management

All handling and processing of solid and hazardous wastes from Alternatives 1, 2, or 3 would be in accordance with applicable regulatory requirements as described in Appendix D, Section D.18. Solid waste would include various construction materials and worker-generated waste that would include a combination of recyclable and non-recyclable materials. Excess materials and wastes would be recycled or resold to the maximum extent practicable. Non-recyclable, non-hazardous solid waste materials would be landfilled in accordance with state and local regulations. Alternative 1is not expected to generate four or more cubic yards of waste per week during operations, so would not be subject to the recycling requirements of Assembly Bill 1826.

The Solid Waste Facility Permit for the Blythe landfill, issued in 2011, estimates that the landfill had more than 4 million cubic yards of capacity remaining out of a total capacity of about 6 million cubic yards, and that the estimated closure year for the landfill is 2047. As shown in Table 2-2, the total estimated volume of debris from Alternative 1 construction that may be sent to landfills for disposal is 14,328 cubic yards. Therefore, sufficient capacity is anticipated to be available for waste disposal. The solid waste generated during construction, operation, and maintenance of Alternative 2 would be of similar composition to that discussed for Alternative 1, but slightly reduced in total volume, and that for Alternative 3 would be more reduced thank Alternative 2, and therefore would have a reduced effect on available landfill capacity. No impact would occur under any alternative, and no mitigation is recommended.

Stormwater Management Systems

There are no stormwater management facilities on Alternatives 1, 2, or 3. As discussed in Section 4.20, Alternatives 1, 2, or 3 would result in only very minor changes in stormwater flows leaving the site. Therefore, these alternatives would not affect the operation or function of existing stormwater management facilities, and would not require the expansion or modification of such facilities. Therefore, these alternatives would not result in significant environmental effects associated with expansion or modification of such facilities.

PS-1) Result in substantial adverse physical impacts associated with the provision of new or physically altered facilities to provide public services.

Alternatives 1, 2, or 3 would not result in substantial adverse environmental impacts associated with the provision of public services. The majority of the projected construction workforce for Alternatives 1, 2, or 3 would likely seek housing within an hour driving distance of the Project area, or seek temporary housing (such as seasonal, recreational, or occasional use housing; LTVAs; and hotel and motels) during the week and commute home over the weekend. Because construction would be temporary and the size of the operational workforce would be nominal, Alternatives 1 or 2 would not induce substantial growth of the regional population. The duration of construction of Alternative 3 would be even shorter than for Alternative 1 or Alternative 2. As such, the effect on the existing facilities related to education, law enforcement, fire protection, parks and recreation, and hospital facilities and emergency response would be nominal for Alternatives 1, 2, or 3. Adverse physical impacts to these facilities during are considered to be less than significant and no mitigation is recommended.

USS-2) Would the Project impact the following facilities requiring or resulting in the construction of new facilities or the expansion of existing facilities, the construction of which could cause significant environmental effects?

1. **Electricity**
2. **Natural gas**
3. **Communications systems**
4. **Stormwater drainage**
5. **Street lighting**
6. **Maintenance of public facilities, including roads**
7. **Other government services**

Construction of new utility facilities or the expansion of existing facilities would not be required for construction, operation and maintenance, and decommissioning of Alternatives 1, 2, or 3. Please refer to the previous discussions above under USS-1 with regard to electricity, natural gas, stormwater drainage, education, law enforcement, fire protection, parks and recreation, and hospital facilities and emergency response.

Construction traffic under Alternatives 1, 2, or 3 would cause degradation of 16th Avenue/Seeley Avenue, and could result in making the roadway unpassable for emergency vehicles or local traffic. Such degradation could be significant, requiring increased maintenance for the existing roadway, or construction of new roadway. To maintain the condition of the road, Mitigation Measure TRN-4 would require that the Applicant pave the segment between Neighbours Boulevard (State Route 78) and the site entrance, a length of approximately 5.6 miles, prior to beginning any construction activities at the Project area. With paving of the access road, as required through Mitigation Measure TRN-4, impacts associated with the need for new roads or increased maintenance of existing roads under Alternatives 1, 2, or 3 would be less than significant.

Closure of the current access routes to the Mule Mountains could result in increased use, and therefore degradation, of the alternative access roads south and west of the Project area. To ensure that this alternative access is accessible and known to persons wishing to access the area, Mitigation Measure REC-1 requires that the Applicant perform light clearing and grading prior to Project construction, and then periodically as needed during construction, operations, and decommissioning. With maintenance of this alternative access, as required by REC-1, impacts would be less than significant.

Alternatives 1, 2, or 3 would not require or result in the construction of new street lighting or additional maintenance to public facilities or roads, as construction traffic would be short-term and occur during daytime hours. The minimal amount of permanent employee vehicle trips on local roadways during Alternatives 1, 2, or 3 operations would not necessitate the expansion or construction of street lighting or cause additional burdens on local roadways resulting in increased maintenance.

USS-3) Would the Project conflict with any adopted energy conservation plans?

The power produced by Alternatives 1, 2, or 3 would produce renewable energy and support the goals of the RPS and would not conflict with adopted energy conservation plans. There would be no impact on any adopted energy conservation plan.

4.18.5 Alternative 4: No Action Alternative

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, the BLM would continue to manage the land under its jurisdiction consistent with the site's multiple use classification as described in the CDCA Plan, as amended by the Western Solar Plan.

If the site remained undeveloped, the existing environmental setting described in Section 3.18 would be maintained. There would be no increased water consumption or waste generation, and there would be no impact on the capacity of utilities and service systems to serve demand.

4.18.6 Cumulative Impacts

The geographic scope of the cumulative impacts analysis for water and wastewater is the PVGB. The geographic scope for cumulative solid waste management impacts is the area served by the Blythe Landfill. The geographic scope for analysis of cumulative impacts to stormwater facilities is the surface water drainage basin upstream and downstream of the solar facility. The geographic scope of cumulative impacts to public services and facilities is the area served by those facilities. The temporal scope of each of the cumulative impact analyses includes the construction, operation and maintenance, and decommissioning periods. The cumulative analysis provided here considers implementation of the Project in combination with other past, present, and reasonably foreseeable future projects described in Tables 4.1-1 and 4.1-2.

Alternative 1 – Proposed Action

Construction, Operations, and Decommissioning

As discussed in Section 4.20.6, the past, present, and reasonably foreseeable future projects each contribute to a reduction in groundwater availability in the PVGB. The analysis presented in Section 4.20 was a cumulative analysis, as it evaluated the impact of withdrawals on all known water users in the PVGB. The Project would not represent a noticeable contribution to the total use of groundwater from the PVGB. The contribution of the Project to the cumulative use of water would be temporary during construction, after which the use of water would be minimal.

The analysis of the impact of solid waste management presented in Section 4.18.3.1 above is a cumulative analysis. The projections of landfill capacity developed by the Riverside County Waste Management Department (RCWMD) are cumulative, considering future population growth, projected economic activity, and trends in waste diversion rates. The analysis shows that the landfill has more than 4 million cubic yards of capacity remaining out of a total capacity of about 6 million cubic yards, and that the estimated closure year for the landfill is 2047. Therefore, sufficient capacity is anticipated to be available for waste disposal for all of the cumulative projects.

Some of the past, present, and reasonably foreseeable projects provide stormwater drainage into drainage canals maintained by the PVID. Stormwater drainage from the Project may eventually enter the PVID drainage system after leaving the Project site and flowing off of the Palo Verde Mesa to the southeast. However, as shown in the hydrologic analysis discussed in Section 4.20.3.1, Project development is not expected to substantially increase the volume of stormwater flow leaving the facility. Therefore, the Project is not expected to result in increased flows in the PVID drain system, and would therefore not contribute to cumulative impacts.

The cumulative projects are not expected to result in substantial adverse environmental impacts associated with the provision of utility services. In general, utility services are designed in consideration of the existing and reasonably foreseeable future projects. Although each of the projects could potentially increase local populations and demand for utility services during their construction phases, any increase would likely be temporary for each project, and would probably not overlap for all projects during the same time period. Because construction of each of the projects would be temporary, and the size of the operational workforces would be nominal, the cumulative projects are not expected to induce substantial growth of the regional population. As such, the cumulative effect on the existing facilities related to electrical and natural gas systems; water and wastewater systems: solid waste; and drainage facilities would be nominal (impact USS-1). The Project would also not require new or expanded facilities for education, law enforcement, fire protection, parks and recreation, and hospital facilities and emergency response (impact USS-2), or conflict with any adopted energy conservation plan (impact USS-3).

Alternative 2 – Resource Avoidance Alternative

Construction, Operations, and Decommissioning

The analysis of groundwater availability in the PVGB presented in Section 4.20 was a cumulative analysis, as it evaluated the impact of withdrawals on all known water users in the PVGB. Because Alternative 2 would use the same amount of groundwater as the Proposed Action, its contribution to cumulative impacts would be the same as the Proposed Action. The contribution of Alternative 2 to the cumulative use of water would be temporary during construction, after which the use of water would be minimal.

The analysis of the impact of solid waste management presented in Section 4.18.3.1 above is a cumulative analysis. The projections of landfill capacity developed by the RCWMD are cumulative, considering all potential sources of waste, including industrial and commercial developments such as solar facilities. The analysis shows that the landfill has more than 4 million cubic yards of capacity remaining out of a total capacity of about 6 million cubic yards, and that the estimated closure year for the landfill is 2047. The solid waste generated during construction, operation, and maintenance of Alternative 2 would be of similar composition to that discussed for the Proposed Action, but slightly reduced in total volume, and therefore would have a reduced effect on available landfill capacity. Therefore, sufficient capacity is anticipated to be available for waste disposal for all of the cumulative projects, including Alternative 2.

Some of the past, present, and reasonably foreseeable projects provide stormwater drainage into drainage canals maintained by the PVID. Stormwater drainage from the Project may eventually enter the PVID drainage system after leaving the Project site and flowing off of the Palo Verde Mesa to the southeast. Alternative 2 would result in only very minor changes in stormwater flows leaving the site. Therefore, Alternative 2 is not expected to result in increased flows in the PVID drain system, and would therefore not contribute to cumulative impacts.

The cumulative projects are not expected to result in substantial adverse environmental impacts associated with the provision of utility services. In general, utility services are designed in consideration of the existing and reasonably foreseeable future projects. Although each of the projects could potentially increase local populations and demand for utility services during their construction phases, any increase would likely be temporary for each project, and would probably not overlap for all projects during the same time period. Because construction of each of the projects would be temporary, and the size of the operational workforces would be nominal, the cumulative projects are not expected to induce substantial growth of the regional population. As such, the cumulative effect on the existing facilities related to electrical and natural gas systems; water and wastewater systems: solid waste; drainage facilities; education; law enforcement; fire protection; parks and recreation; and hospital facilities and emergency response would be nominal.

Alternative 3 – Reduced Project Alternative

Construction, Operations, and Decommissioning

The analysis of groundwater availability in the PVGB presented in Section 4.20.6 was a cumulative analysis, as it evaluated the impact of withdrawals on all known water users in the PVGB. Because Alternative 3 would less groundwater than the Proposed Action and Alternative 2, its contribution to cumulative impacts would be lower than those of the other action alternatives. The contribution of Alternative 3 to the cumulative use of water would be temporary during construction, after which the use of water would be minimal.

The analysis of the impact of solid waste management presented in Section 4.18.3.1 above is a cumulative analysis. The projections of landfill capacity developed by the RCWMD are cumulative, considering all potential sources of waste, including industrial and commercial developments such as solar facilities. The analysis shows that the landfill has more than 4 million cubic yards of capacity remaining out of a total capacity of about 6 million cubic yards, and that the estimated closure year for the landfill is 2047. The solid waste generated during construction, operation, and maintenance of Alternative 3 would be of similar composition to that discussed for Alternatives 1 and 2, but reduced in total volume, and therefore would have a reduced effect on available landfill capacity. Therefore, sufficient capacity is anticipated to be available for waste disposal for all of the cumulative projects, including Alternative 3.

Some of the past, present, and reasonably foreseeable projects provide stormwater drainage into drainage canals maintained by the PVID. Stormwater drainage from the Project may eventually enter the PVID drainage system after leaving the Project site and flowing off of the Palo Verde Mesa to the southeast. Alternative 3 would result in only very minor changes in stormwater flows leaving the site. Therefore, Alternative 3 is not expected to result in increased flows in the PVID drain system, and would therefore not contribute to cumulative impacts.

The cumulative projects are not expected to result in substantial adverse environmental impacts associated with the provision of utility services. In general, utility services are designed in consideration of the existing and reasonably foreseeable future projects. Although each of the projects could potentially increase local populations and demand for utility services during their construction phases, any increase would likely be temporary for each project, and would probably not overlap for all projects during the same time period. Because construction of each of the projects would be temporary, and the size of the operational workforces would be nominal, the cumulative projects are not expected to induce substantial growth of the regional population. As such, the cumulative effect on the existing facilities related to electrical and natural gas systems; water and wastewater systems: solid waste; and drainage facilities; education; law enforcement; fire protection; parks and recreation; and hospital facilities and emergency response would be nominal.

Alternative 4 – No Action

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project, and the DQSP would not be implemented. The public lands in the Project area would continue to be managed by BLM in accordance with existing land use designations in the CDCA Plan, which could include a different solar project, or other development. Alternative 4 would not contribute to cumulative impacts on utilities and public services.

4.18.7 Residual Impacts

Residual impacts with respect to utilities and public services include increased use of groundwater during construction, and increased disposal volumes for solid waste during the lifetime of the Project, in comparison to the baseline. Total water supply available in the PVGB would be reduced slightly as a result of the Project; however, it is likely that such reductions would not be noticeable. The increases in solid waste disposal are anticipated to be manageable within available landfill capacities. Stormwater drainage conditions would be altered slightly as a result of Project implementation, and would remain altered throughout Project operations. However, this alteration is not expected to impact stormwater drainage systems. Following decommissioning, original Project area topography would be restored, and there would be no residual effects on stormwater flow.

4.19 Visual Resources

This section discusses effects on visual resources that would occur with implementation of the Proposed Action and alternatives, cumulative effects, and mitigation measures to reduce visual contrast. Overall, the DQSP would result in disturbance, and therefore long-term visual alteration, to approximately 3,831 acres of land, nearly all of which has been classified as B and C-Quality scenery. The land altered by the DQSP solar units and gen-tie line is considered to have high visual sensitivity.

4.19.1 Methodology for Analysis

There are two forms of visual analysis associated with the Proposed Action. The first visual analysis is to determine compliance with the Interim VRM Class. The second analysis is to determine the extent of visual impact or change from the existing condition that would result from the Proposed Action or alternatives.

Both analyses are achieved using the BLM Visual Resource Contrast Rating System (H-8431), which provides a method for systematically evaluating the visual contrast between a Proposed Action or alternatives and the existing landscape, including an assessment of ten human and environmental factors (distance, angle of observation, length of viewing time, size and scale, season of use, lighting conditions, recovery time, spatial relationships, atmospheric conditions, and motion). The results of the Visual Contrast Rating analysis provide a means for determining the source of visual contrast that exceeds what is allowable, as defined by the VRM Class Objective, and provides information to describe how the land modification will change the existing visual landscape.

Visual contrast is a measure of divergence in the classic design elements of form, line, color, and texture, and applied to landscapes in accordance with the BLM's Handbook H-8431. Compliance is found when the Proposed Action or an alternative meets the allowable level of visual contrast set by the Interim VRM Class objectives. If the Proposed Action or alternatives are nonconforming, then mitigation measures sufficient to bring the design into compliance would need to be identified and implemented. If a project cannot be mitigated to meet the VRM Class objective, then the application may be denied, or the proposal redesigned or relocated to meet the objective.

The assessment of visual contrast is distinct from conclusions of *visual impact* presented in this section. A measure of visual impact is evaluated by the underlying values of the VRI including changes to scenic quality, sensitivity levels, and visibility that would occur on the ground as a result of the development of the Proposed Action or alternatives.

Under the DRECP, VRM Classifications were established for the Project area. The Project area is designated as VRM Class IV. As an application in the Riverside East SEZ filed before June 30, 2009, the DQSP is not, and will not be, subject to the terms of the DRECP. See section II.3.3.3.5 and page II.3-126 of the DRECP. In addition, the analysis of the Project in this PA/EIS/EIR is based on the visual resource classifications that were in effect on March 6, 2015, the date of the NOI, which was VRM Class III. A discussion of the differences between the CDCA Plan and the DRECP land use allocations, and their effect on the analysis of the Project in this PA/EIS/EIR, is presented in Appendix E.

The DQSP is evaluated for conformance with the following VRM objective:

> **VRM Class III:** The objective of this class is to ***partially retain*** the existing character of the landscape. The level of change to characteristic landscape should be ***moderate***. Management activities may attract attention but ***should not dominate the view of the casual observer***. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Since the overall VRM goal is to minimize visual impacts, mitigation measures are recommended for all adverse contrasts that could be reduced, even if the DQSP or alternatives meet VRM objectives. In addition to visual contrast created in the landscape, the DQSP is analyzed for adverse effects of lighting and glare, as well as temporary construction disturbances.

4.19.1.1 Visual Contrast Rating Process

The degree to which the DQSP adversely affects the visual quality of a landscape relates directly to the amount of visual contrast between it and the existing landscape character. The degree of contrast is measured by separating the landscape into major features (land, water, vegetation, structures) then assessing the contrast introduced by the Project in terms of the design elements of form, line, color, and texture. The contrast of the DQSP with landscape elements then is rated as none, weak, moderate, or strong, as defined in Table 4.19-1. The purpose of this method is to reveal elements and features that cause the greatest visual contrast, and to guide efforts to reduce the visual impact of a proposed action or activity. This process is described in detail in Handbook H-8431-1, Visual Resource Contrast Rating (BLM 1986), and documented using BLM Form 8400-4.

The criteria for visual contrast are aligned with the management objectives for each Interim VRM Class. For example, if a project results in a weak visual contrast, it is likely to be in conformance with Interim VRM Class II, whereas a project that results in a moderate contrast would likely be in conformance with VRM Class III objectives but would not conform to VRM Class II objectives.

Table 4.19-1. Visual Contrast Ratings

Degree of Contrast	Criteria	Consistent with…
None	The element contrast is not visible or perceived.	VRM Class I - IV
Weak	The element contrast can be seen but does not attract attention.	VRM Class II - IV
Moderate	The element contrast begins to attract attention and begins to dominate the characteristic landscape.	VRM Class III - IV
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.	VRM Class IV only

4.19.1.2 Selection of Key Observation Points

The contrast rating is completed from the most critical viewpoints, or Key Observation Points (KOPs). The intent of establishing KOPs is to visualize the contrast created by the Proposed Action from locations most representative of how the public perceives the affected landscape. The "public" may include highway travelers, travelers on local roads, residents in surrounding interspersed private lands, OHV users, dispersed recreation users in surrounding wilderness areas, or users of BLM facilities, such as LTVAs. The sensitivity of these diverse user groups to changes in the landscape are influenced by a number of factors, including how prominent the view of the Proposed Action is (in terms of scale, distance, and angle of observation), the frequency and duration that viewers are exposed to the view, and whether the viewer groups are aware of their surroundings (BLM 1986).

Based on the above factors and in consultation with BLM staff, eight KOPs (see Figure 3.19-1) were selected to evaluate the change of visual contrast between DQSP site's existing conditions and proposed altered conditions. No KOPs were selected in the surrounding BLM wilderness areas because accessibility is limited, the level of use is low, and the DQSP would likely not be visible from the wilderness lands. The location and characteristics of each KOP are summarized in Table 4.19-2.

Table 4.19-2. KOP Locations and Characteristics

ID	Name	Viewer Geometry	View Distance and Direction	Viewer Type	Visual Exposure Description
KOP 1a-h	Interstate 10	At-grade	0.5-15 miles northwest to northeast	Motorists	Numerous travelers potentially exposed to foreground views of PV arrays and background views of transmission towers. Views are temporary/intermittent.
KOP 2	Chuckwalla Desert Tortoise ACEC	At-grade	5.0 miles west	Recreationists	Middleground and background views for recreationists within the Desert Tortoise ACEC, with potential views of solar arrays as well as taller Project infrastructure (transmission towers, anemometer, and 34.5 kV poles). Views are sustained/intermittent.
KOP 3	McCoy Mountains	Superior	0.5 miles north	Recreationists	Foreground/middleground views across the Palo Verde Valley for dispersed recreationists. Views are sustained/intermittent.
KOP 4	Mule Mountains	Superior	1.0 miles south	Recreationists	Foreground/middleground views for recreationists. Views are sustained/intermittent.
KOP 5	Bradshaw Trail	At-grade	4.0 miles south	Recreationists	Foreground/middleground, and background views for recreationists on the trail with potential foreground views of PV Arrays, background views of transmission towers. Views are intermittent.

Table 4.19-2. KOP Locations and Characteristics

ID	Name	Viewer Geometry	View Distance and Direction	Viewer Type	Visual Exposure Description
KOP 6	Nicholls Warm Springs/Mesa Verde	At-grade	1.0 miles north	Residents	Foreground/middleground views for transient and long-term (resident) viewers. Views are sustained.
KOP 7	Community of Ripley	At-grade	6.0 miles southeast	Residents	Background views for long-term (resident) viewers. Views are sustained.
KOP 8	Colorado River	At-grade	12.0 miles southeast	Recreationists	Background views for recreationists along/within the river. Views are sustained.

These KOPs were chosen to represent a mix of user types and viewer experiences. The visual contrast created by the DQSP is rated using simulations from each of these KOPs, and is used to represent the visual change experienced from different locations and viewer types.

4.19.1.3 Visual Simulations

Visual simulations were prepared for a subset of KOPs that represented various viewer positions and related visibility of the Project. Visual simulations were prepared for five KOPs: 1c, 2, 3, 4, and 7. For KOPs 1a, b, d-h, 5, 6, and 8, assumptions were made regarding the level of visual contrast expected rather than using visual simulations to determine effects. Visual simulations were prepared for the operational phase of the Project only; no construction visual simulations were prepared.

The visual simulations were based on a collection of photographs taken using a digital SLR 1:1, 21 megapixel camera to create a panorama that represented the primary vertical and horizontal field of view. Simulations were prepared using a true-to-scale digital 3D model of the Project and spatial data indicating locations of Project features. The Applicant provided Project design-related specifications used in the model. Professional grade survey instruments were used to identify locations of KOPs as well as target objects used for accurate alignment of the 3D model to the photography. Land contour data was used to generate a 3D model of the site, into which proposed solar facilities were accurately placed into the individual photo simulation views. Simulations were produced using Autodesk 3D Studio Max Design and Adobe Photoshop. The resulting photo simulation represents the appearance of the Project within the primary human field of view when viewed from a position located 19.7 inches back from the photo.

4.19.1.4 CEQA Significance Criteria

The significance criteria for aesthetics listed in the CEQA Environmental Checklist, Appendix G of the state CEQA Guidelines, were used to assess the significance of visual impacts resulting from the Project. These thresholds indicate that a project could have potentially significant impacts if it would:

VIS-1) Have a substantial adverse effect on a scenic vista.

VIS-2) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.

VIS-3) Substantially degrade the existing visual character or quality of the site and its surroundings.

VIS-4) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

The County of Riverside's Environmental Assessment Form includes additional significance criteria, which were used in the analysis. The additional criteria indicate that a project could have potentially significant impacts if it would:

VIS-5) Result in the creation of an aesthetically offensive site open to public view.

VIS-6) Interfere with nighttime use of the Mt. Palomar Observatory, as protected through Riverside County Ordinance No. 655.

VIS-7) Expose residential property to unacceptable light levels.

4.19.2 Applicant-Proposed Measures

Lighting

Lighting on the Project site will be limited to areas required for operations or safety, will be directed onsite to avoid backscatter, and will be shielded from public view to the extent practical. Sensors or switches will control lighting that is not required to be on during nighttime hours.

Measures included in the Applicant's Draft Lighting Management Plan are based on the Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands (BLM 2013), and include:

- Provide design and installation guidelines to minimize night-sky impacts during facility construction and operations;
- Limit lighting for facilities to the minimum number of lights and brightness required for safety and security, and avoid causing excessive reflected glare;
- Use of full cut-off luminaires or directional low spectrum LED fixtures to minimize uplighting and reduce light pollution;
- Direct lights downward or toward the area to be illuminated;
- Avoid use of light fixture designs that would allow spill light beyond the Project boundary;
- Provide lighting in highly illuminated areas that are not occupied on a continuous basis with switches, timer switches, or motion detectors so that the lights operate only when the area is occupied;
- Use of vehicle mounted lights for night maintenance activities, where feasible;
- Consistent with safety and security, wherever feasible, keep lighting off when not in use; and

- Definition of a process for promptly addressing and mitigating complaints about potential lighting impacts.

Color and Reflection

The Project design will include the following measures to reduce potential visual impacts from new man-made facilities in the viewshed:

- BLM-acceptable exterior color on Project buildings as appropriate; and
- Fencing constructed of non-reflective materials.

Profile of Facilities

The Project will use low profile PV panel structures that do not extend higher than approximately 13 feet above the ground surface and Project facilities will be set back more than one mile from I-10 and at least four miles from SR-78 to reduce effects of introducing dark PV panels into the landscape.

As discussed in Section 4.1.6, the impact analysis assumes that the APMs have been implemented, and these measures are therefore requirements for approval of the Project. The APMs are to be incorporated into the EICMPP/MMRCP, along with the agency-required mitigation measures.

4.19.3 Direct and Indirect Impacts

4.19.3.1 Alternative 1: Proposed Action

The Proposed Action would convert approximately 3,616 acres of naturally appearing desert plain, and 154 acres of former agricultural land, to an industrial facility characterized by complex geometric forms and lines and industrial surfaces that are dissimilar to the surrounding natural landscape character. Most of the developed area would be covered with solar PV panels. Solar PV employs glass panels that are designed to maximize absorption and minimize reflection to increase electricity production efficiency. To limit reflection, solar PV panels are constructed of dark, light-absorbing materials and covered with an anti-reflective coating. Solar panels reflect as little as 2 percent of the incoming sunlight depending on the angle of the sun and assuming use of anti-reflective coatings (FAA 2010). An example of a solar PV array is shown in Figure 2-3.

The DQSP solar field would occupy most of the disturbed area (2,652 acres, or 74.8 percent of the total disturbed area), whereas electrical substations and transmission facilities, an O&M building, and access roads would take up the rest of the disturbed area. Most of the facility, including the solar field, would be low-profile, and would not exceed 13 feet in height. Some of the ancillary facilities, located primarily on the southeast section of the solar field, would have greater heights. The proposed gen-tie line leading away from the main generation facility would be approximately 135 feet tall, depending on the location and local terrain, with final heights to be determined during detailed design. Approximate dimensions of proposed facilities are provided below:

Solar Field

- Solar field: Linear arrays of PV modules up to 13 feet above grade, at a maximum.
- Security fence: Chain-link or wire fence around the perimeter, 7 feet tall, and upper 1 foot may be barbed wire.
- An estimated nine anemometer towers would be installed around the site perimeter. The anemometer towers would range from approximately 20 to 30 feet high.

Operations and Maintenance Area

- Operations and Maintenance (O&M) Building: The building would rest on a cement foundation, and would be approximately 120 feet by 50 feet in size.
- Lighting: During construction, portable light towers and plants may be used if necessary; otherwise lighting would consist of limited lighting installed around the construction office trailers. During operations, lighting would be placed at the O&M Building, On-Site Substation, and site entrance. Some portable lighting may also be required for maintenance activities that must be performed at night.
- Water Treatment: A septic system and leach field located at the O&M Building would serve as the sanitary waste system for Project operations.
- Water Storage: An above-ground water/firewater tank would be located at the O&M building, and would be used for drinking water and sanitary purposes.

Power Structures

- The On-Site Substation facility would occupy approximately 2.6 acres in the northwest portion of the Project site.
- Hard-wired fiber-optic cable would be installed underground to connect the site to existing communications cables, located approximately one mile to the north.
- Gen-Tie Line: Heights of structures would vary depending on the electrical clearances required, but would be lower than 135 feet in all cases.
- Distribution Line: The overhead lines would be carried on wood or color-treated steel poles with a maximum height of 70 feet.
- Power to support Project construction would be supplied by generators. Power to support operations would be provided by backfeed power through the On-Site Substation, with long-term backup provided by a temporary diesel generator.

Lighting requirements are discussed in detail in Chapter 2. During construction, security lighting would be needed at the construction staging areas, parking area, construction office trailer entries, site access points, and the security guard booth. Limited lighting would be installed around the construction office trailers. If needed for security, small lights with motion sensors may be installed on the outside of construction office trailers and/or portable light plants may be installed in a laydown yard or parking area. In addition, portable light towers may be used if, due to schedule or heat constraints, construction activities were to occur at night. During operation and maintenance, lighting would be placed at the O&M Building, On-Site Substation, and site entrance. Some portable lighting may also be required for maintenance activities that must be performed at night. There would be no lighting along the Project perimeter. Lighting would be kept to a minimum and sensors and switches would be utilized to keep lighting off when not needed. All lights would be shielded and face downwards as much as possible.

The BLM's visual contrast rating system was used to analyze the visual impacts of the Project from eight KOPs. Figures 4.19-1 through 4.19-10 present both the existing and simulated conditions at each of the five KOPs for which simulations were created. The visual contrast ratings are summarized below in Table 4.19-3.

Table 4.19-3. Visual Contrast Rating Summary

ID	Name	Source of Contrast	Scale Dominance	Viewer Geometry	Duration of View	Overall Visual Contrast
KOP 1(a-h)	Interstate 10	Form; color; texture	Apparent	Oblique/ superior	Intermittent	Moderate
KOP 2	Chuckwalla Desert Tortoise ACEC	N/A	Not apparent	Variable	Intermittent	None-Weak[1]
KOP 3	McCoy Mountains	Form; color; texture	Dominant	Superior	Intermittent	Strong
KOP 4	Mule Mountains	Form; color; texture	Dominant	Superior	Intermittent	Strong
KOP 5	Bradshaw Trail	N/A	N/A	Variable	Intermittent	None
KOP 6	Nicholls Warm Springs/Mesa Verde	Form; line	Apparent	At-grade	Sustained	Moderate-Strong
KOP 7	Town of Ripley	Form; line	Not apparent	At-grade	Sustained	Weak
KOP 8	Colorado River	N/A	Not apparent	At-grade/ inferior	Intermittent	None

Source: URS 2016c.
Notes:
1 – Visual contrast may increase to a moderate-to-strong level depending on the vantage point within this resource.

Overall, the proposed solar field would cause the greatest visual contrast in the character element of form. From KOPs 1, 3, and 4, the Project would cause Moderate to Strong contrast in form, color and texture due to the density and movement of construction equipment and activities as well as smooth-textured and distinct tan color of graded areas, which would provide moderate contrast against the natural setting of the Chuckwalla Valley and the Palo Verde Mesa. For KOPs 6 and 7, the main source of contrast would be form and line. At KOP 6, the close proximity (less than one mile) of construction activities would provide moderate contrast, as well as the large scale of the Project and the smooth flat solar panels against the coarser texture of the background. At KOP 7, the collector poles would be visible though they would provide low visual contrast as they would be similar in line and form to other transmission and distribution pole structures in the area.

At KOPs 2, 5, and 8, the Project would result in None to Weak contrast due to low visibility of the Project from these locations due to topographic screening, presence of other transmission line facilities in the area, and distance of these KOPs from the Project.

As shown in the Table 4.19-3, overall visual contrast for KOPs 1, 2, 5, 7, and 8 is Moderate or less, which meets the visual resource management objective for VRM Class III areas. However, for KOPs 3, 4, and 6 the overall visual contrast is moderate-strong or strong, which does not meet the VRM Class III objective of a moderate level of change to the characteristic landscape. The visual contrast at these KOPs (and KOP 1) is due to their elevation above the Project site and/or close proximity to the Project site. A strong visual contrast would be reflective of the VRM Class IV objective.

The visual contrast provided by the Project could also affect scenic quality in the six SQRUs that the Project is located within or adjacent to. The scenic quality factor of “Cultural Modification” could be reduced due to the visual contrast of the Project with the existing landscape. The factor of “Adjacent Scenery” could also be affected if the land use objectives associated with surrounding SQRUs were reliant on the scenic quality of SQRU 021 where the Project site is located.

In SQRU 021 (Chuckwalla Valley), the Project’s solar arrays, the most dominant visual element of the Project, would contrast with the existing natural character of the SQRU, thereby increasing the “Cultural Modification” of the SQRU (via a decreasing score), and therefore reducing the overall scenic quality rating of the SQRU from B to C.

As shown in Table 4.19-4, three of the five adjacent SQRUs would not be expected to undergo a change in scenic quality rating due to the Project. In SQRU 026 (McCoy Mountains), the Project would likely not be visible from the majority of the SQRU and the Project is not expected to detract from existing adjacent scenery in the adjacent National Park or Wilderness area. In SQRU 037 (Palo Verde), the Project could appear as a dominant element in the adjacent scenery and therefore reduce the value of the “Adjacent Scenery” factor, but not to an extent that a change in scenic quality would result. In SQRU 039 (Little Chuckwalla Mountains), though the Project may be visible from a part of the SQRU, the adjacent scenery is dominated by the nearby mountain ranges and would not be dominated by the Project, thus no change in scenic quality would result.

However, as noted in Table 4.19-4, there are two SQRUs that would be expected to decrease in scenic quality due to the Project. In SQRU 036, though the Project would not be visible from most of the SQRU, “Adjacent Scenery” may be reduced due to the modification of the Chuckwalla Valley from the Project’s contrast with the natural characteristics of the valley. A one point reduction in “Adjacent Scenery” would reduce the existing rating from B to C. In SQRU 038, the Project could appear as a dominant element of the “Adjacent Scenery” that would be in contrast to the natural setting of the Chuckwalla Valley, thereby reducing the “Adjacent Scenery” score. A one point reduction in “Adjacent Scenery” would reduce the existing rating of SQRU 038 from B to C.

Table 4.19-4. Scenic Quality Rating Unit Impact Summary

Scenic Quality Rating Unit (SQRU)[1]	SQRU Name[1]	Existing Rating[2]	Expected Post-Project Rating	Rationale[1]
021	Chuckwalla Valley	B	C	Reduction in “Cultural Modification” from 0 to -4.

Table 4.19-4. Scenic Quality Rating Unit Impact Summary

Scenic Quality Rating Unit (SQRU)[1]	SQRU Name[1]	Existing Rating[2]	Expected Post-Project Rating	Rationale[1]
026	McCoy Mountains	C	C	Operation of the Project is not expected to detract from existing values for "Adjacent Scenery."
036	Blythe Valley	B	C	A reduction of one point in the value for "Adjacent Scenery" to account for modification to the Chuckwalla Valley.
037	Palo Verde	C	C	Despite the reduction of 1 point for "Adjacent Scenery" value, no change in overall classification would occur.
038	Mule Mountains	B	C	A reduction of 1 point in the value for "Adjacent Scenery" would decrease the overall scenic quality score from 12.5 to 11.5.
039	Little Chuckwalla Valley	B	B	"Adjacent Scenery" is dominated by the rugged topography of the Mule, McCoy and Little Chuckwalla Mountains; consequently, no change in the inventoried value for "Adjacent Scenery" is expected.

Source: URS 2016c
Notes:
1. Source: BLM 2010
2. Refer to Section 3.19 for a description of the ratings.

In terms of visual sensitivity, the Project is located in SLRU 49 (Bradshaw Trail National Backcountry Byway SLRU). SLRU 49 received a score of high due to the importance of maintaining scenic quality for adjacent land uses, including ACECs and Wilderness areas. Under the Project, the sensitivity score would likely remain high, as recreationists would continue to use the area and would prefer that no further development occur.

Collectively, the strong visual contrast of the Project at several KOPs and reduction in scenic quality of three SQRUs could reduce the overall VRI score for the Project site and surrounding lands from a Class II to Class III or IV. Due to the visual contrast of the solar panels with the natural landscape of the Chuckwalla Valley, the Project would begin to attract attention and begin to dominate the characteristic landscape. Landscape character changes to the elements of form and texture would be primarily perceived from superior (higher elevation to the Project) locations; color and line element changes are expected to be weak.

In an effort to reduce contrast resulting from the Project, Mitigation Measure VIS-1 contains 10 design elements to reduce form, color, line and texture contrast. Design elements include minimizing ground clearing; color treatment of cut slopes; feathering vegetation openings; color-treating panel backs; using low to no reflective materials, coatings or paints; consistency in building colors; use of nonspecular conductors and nonreflective coatings on insulators, color choice options, and preparing a lighting plan.

These design elements would assist in reducing contrast created by the Project, however, Mitigation Measure VIS-1 would not be sufficient to substantially reduce the contrast rating of the KOPs because the color and texture of the Project's solar panels and the large scale of the

Project would continue to create contrast during Project operations. During Project construction, large cleared areas and construction activities would also continue to create visual contrast.

With mitigation, and accounting for viewer specific conditions (such as view duration, viewer expectations, visual contrast, and view exposure), the DQSP would have moderate adverse impacts on visual resources due to moderate to strong visual contrast and impacts experienced within the foreground/middleground zone. Impacts in the foreground/middleground would be experienced by viewers with prolonged views (residences – KOP 6); however, most viewers (likely from higher elevations – KOPs 3 and 4) that would experience impacts would be transient (dispersed recreationists). Visual resource impacts would not be experienced from sensitive viewer locations within the Project's viewshed, including the Chuckwalla Desert Tortoise ACEC, Bradshaw Trail, Town of Ripley, and the Colorado River.

The following analysis discusses the visual effects of the three phases of the DQSP that have not been otherwise addressed above, as well as additional mitigation measures proposed to reduce visual contrasts.

Construction

During the construction period, earth-moving activities and construction materials, equipment, and workers, all could be visible on the site and along the gen-tie line ROW. Construction would occur over 25 to 48 months, during which a number of activities would take place, including large-scale vegetation removal, earthwork, as well as foundation and equipment installation. However, the overall degree of visual impact would be somewhat lessened because the area covered by any one phase of construction would be smaller compared to full build-out of the DQSP, and the visual effects would be temporary.

During construction, visual contrast would occur due to density and movement of construction equipment and workers, as well as construction activities such as site preparation and grading, installation of facilities, and building construction. Graded areas would contrast the natural setting of the Project site due to changes in color and texture resulting from the flat, smooth texture and distinct tan color of areas where natural vegetation was removed. Cleared areas would be shielded by surrounding vegetation for at-grade viewers, though installation of powerline poles would be visible due to the vertical nature of these facilities. Cleared areas would be more noticeable to viewers at higher elevations than the Project site. In general, construction-related activities would appear dominant for KOPs 4 and 6 due to the close proximity of viewers at these KOPs to the Project site.

Although the construction period is estimated to occur for 25 to 48 months, construction would not occur in any one place for the entire period. Further, construction activities would be conducted in a manner that minimizes dust emissions, including visible dust, as described in APMs for air quality. These measures would include watering of unpaved travel surfaces and limiting travel speed on these surfaces to 15 miles per hour. If nighttime construction activities were required, lighting would be provided that meets state and Federal worker safety regulations.

To the extent possible, the nighttime construction lighting would be shielded and directed downward, as described in Chapter 2. Task-specific lighting would be used to the extent practical while complying with worker safety regulations. Construction boundaries would be clearly delineated and surface disturbance minimized under Mitigation Measure VIS-2. Earthwork and vegetation manipulation strategies in Mitigation Measure VIS-1 and VIS-2 would assist in toning down the contrast created in earth-moving and vegetation clearing. Adverse visual effects associated with generation of airborne dust as well as nighttime lighting during construction activities at the Project would be reduced with the implementation of Mitigation Measures AQ-1, AQ-2, VIS-1, and VIS-2.

Operation and Maintenance

The primary feature of the Project that would result in visual contrast is the solar panels. There are other transmission lines in the area, and thus the gen-tie line and distribution lines and poles would be less noticeable.

The Project would have no visual contrast at KOPs 8 and 5. The Project would have weak visual contrast at KOPs 1, 2, and 7 due to low visibility and screening from topography. At KOP 1, there is an estimated 4 mile segment of I-10, where the elevation of I-10 is higher than the Project site, in which the Project would be temporarily visible to east or west-bound travelers. The Project would have intermittent viewer exposure and weak visual contrast due to the low stature of the solar panels and subdominant appearance of the Project compared to the surrounding landscape.

The Project would have strong visual contrast at KOPs 3 and 4 and moderate visual contrast at KOP 6. At all three KOPs, the broad, flat form and dark color of the solar panels would provide form, color and texture contrast with the existing muted-tone landscape. In addition, the large scale of the facility relative to surrounding natural landscape would provide visual contrast such that the Project would dominate the landscape at KOPs 3 and 4. The gen-tie line would have a weak visual contrast at KOPs 3, 4, and 6 due to existing transmission line structures in the area. The collector poles would have a weak-moderate contrast at KOP 4 and weak contrast at KOPs 3 and 6 due to similar facilities in the area.

During the operation of the Project, visual effects would be caused by the visible elements of the DQSP, as described above. The discussion below focuses on the visual effects that are not captured by visual simulations (nighttime lighting and reflected sunlight/glare), or that are unique to the operation and maintenance phase. Mitigation Measure VIS-3 would be required to ensure that visual design measures are maintained properly over time, because some visual design measures can degrade over time and some may require monitoring and maintenance.

Operational Lighting

During operation and maintenance, lighting would be placed at the O&M Building, On-Site Substation, and site entrance. Some portable lighting may also be required for maintenance activities that must be performed at night. There would be no lighting along the Project perimeter.

The Draft Lighting Management Plan prepared by the Applicant describes the lighting to be used during operation of the Project and lighting best practices to be used by the Project. Implementation of the measures included in the Draft Lighting Management Plan would reduce potential nighttime lighting impacts for residents in Nicholls Warm Springs/Mesa Verde, motorists along I-10 and other nearby roads, as well as dispersed recreationists on adjacent BLM lands. While the measures in the Draft Lighting Management Plan would not totally eliminate the light visible by surrounding user groups, facility lighting would be minimized and controlled such that it would not be a nuisance and would not detract from the ability for affected viewers to enjoy their surroundings or view the night sky. Existing light sources described in Section 3.19, *Visual Resources*, such as the motor vehicles traveling on surrounding roadways and from residences in Mesa Verde/Nicholls Warm Springs, would remain the primary sources of light within the Project area.

Glint and Glare

Adverse visual impacts and the potential for air traffic hazards from glint and glare effects is an issue of public concern regarding the installation of solar arrays, including PV modules. Glint (specular reflection) is produced from the reflection of the sun on a reflective surface. Glint is a potential source of viewer distraction from the strong contrasts and intense reflected light from reflective surfaces. Glare is a reflection of the bright sky that is less intense than glint, and is a continuous source of brightness during daylight hours.

Unlike large fields of parabolic mirrors, which have been known to produce fairly intense glint and glare at various times of the day, the use of PV technology is generally regarded as causing minimal glint and glare impacts. Solar PV employs glass panels that are designed to minimize reflection and reflect as little as 2 percent of the incoming sunlight (FAA 2010). Nevertheless, some glare is possible from the surface of the PV panels and other DQSP components (especially metallic components) that reflect light depending on panel orientation, sun angle, viewing angle, viewing distance, and other factors. For example, Sullivan et al. (2010 as cited in DOI 2010) observed glare from a slightly elevated viewpoint at a distance of approximately 2 miles from panels and ancillary components at a partially built PV facility in Nevada. Even though the panels to be used would be a uniform black color, from certain angles and times of day, the panels may appear grey or silvery white due to glare (Sullivan et al., 2010 as cited in DOI 2010). There is very little potential for glint and glare from the proposed PV modules because of the dark color and low reflectivity of the PV panels.

Potentially affected observers of glare from the Project would be travelers on I-10, users of nearby OHV routes, and visitors to the McCoy or Mule Mountains. It is possible that minor glare could be produced from back reflected light or light not absorbed by DQSP facilities. This glare could occur in any one place for several hours (e.g., a sunny afternoon), but is unlikely to be visually distracting or nuisance causing, though the glare produced by the DQSP could be more intense than any other natural or cultural features in an observer's perspective. The color contrast of the dark grey solar panels of the Project and the surrounding desert colors could be increased by glare produced from diffuse reflections of the DQSP, but would not be sufficiently intense or distracting as to alter any of the contrast ratings in Table 4.19-3.

Several measures are available that would reduce the potential for and frequency of glare from the solar fields. Under Mitigation Measure VIS-1, nonspecular conductors and nonreflective coatings on insulators would be required for the gen-tie line and low to no reflective materials, coatings or paints would be used when possible. Further, Mitigation Measure VIS-3 would ensure that painted and color-treated surfaces are maintained during operation and maintenance so as to prevent degradation of paint and colored-treated surfaces. The extent of reflective surfaces within the solar field and gen-tie line would be reduced by these mitigation measures; however, spread reflections off the face of the solar panels would not be prevented. Therefore, the color contrast of the solar panels during certain times of the day when the viewer is positioned in line with the sun would momentarily increase, but not to such an extent as to result in a change in the severity of the contrast rating in Table 4.19-3.

There would be no impact to DoD air navigation associated with Yuma Proving Ground. Appendix E of the DRECP (BLM 2016) states that "photovoltaic systems on or near SUAs [Special Use Airspace] or MTRs [Military Training Routes] present little to no conflict to military operations, testing, or training."

Decommissioning

The decommissioning of the Project would be similar to the construction activities described earlier, though the duration of decommissioning would be shorter than the duration of construction. Decommissioning would include demolition and removal of above-ground and subsurface facilities and site contouring and restoration. After removal of the facilities, a strong color contrast would be evident between graded, disturbed areas devoid of vegetation and undisturbed natural areas in the Project vicinity. Due to difficult growing conditions and the length of time needed for revegetation to mature in the desert, the visual contrast related to land disturbance would remain for quite some time. Implementation of mitigation measures VIS-1 and VIS-4 would aid greatly in reducing the visual effects of decommissioning. VIS-4 would require the Decommissioning and Site Reclamation Plan to include reclamation of the area of disturbed soils used for laydown, Project construction, and siting of the other ancillary operation and support structures. Further, VIS-4 would reduce the amount of disturbed area and blend the disturbed areas into the characteristic landscape. It would require replacement of soil, brush, rocks, and natural debris over disturbed areas. Newly introduce plant species would be of a form, color, and texture that blends with the landscape. These measures would ensure the visual impacts of decommissioning are minor and short-term.

Impacts to Special Designations

Due to the distance between the Project and nearby wilderness areas, it is unlikely that the Project would be visible from the adjacent wilderness areas, and there is no anticipated visual resource impact to these areas. As stated above, visual resource impacts would not be experienced from the Chuckwalla Desert Tortoise ACEC (KOP 2). However, due to discordance between the Project and the natural landscape of the Chuckwalla Valley, the overall scenic quality rating would decrease from B to C for the Chuckwalla Valley SQRU (21), where the Chuckwalla ACEC is located. Impacts to the Mule Mountains ACEC are described above in reference to KOP 4. There would be a strong visual contrast when viewing the Project from KOP 4 during construction and operation of the Project. The Mule Mountains ACEC is located in SQRUs 037 and 038. The scenic quality classification of C would remain for SQRU 037, though the rating for SQRU 038 would be lowered from B to C.

4.19.3.2 Alternative 2: Resource Avoidance Alternative

The direct and indirect impacts of the Resource Avoidance Alternative are similar or the same as the impacts of the Proposed Action, although the size of the facility would be reduced, with no solar panels located in the northwestern corner of the Project site. The degree to which the visible extent of the DQSP under Alternative 2 would be reduced would depend on viewing relationships. A reduction in the disturbance area of Alternative 2, particularly in the northwestern corner of the site, may result in reduction in visibility of the Project from a portion of I-10 (KOP 1a-h) and KOP 6 (Nicholls Warm Springs/Mesa Verde) due to the at-grade view from these KOPs. The reduction in disturbance area of Alternative 2 may also result in a slight reduction in the scale of the Project when viewed from KOP 3 (McCoy Mountains). However, the slight changes in visibility would not change the visual contrast ratings presented in Table 4.19-3 for KOPs 1, 3, or 6.

Because the location of the gen-tie line would not change, all views of the gen-tie line would be identical to those of the Proposed Action. In addition, because the size of the O&M area and the need for security lighting would remain the same under Alternative 2, impacts related to light and glare would be the same or similar compared to the Proposed Action. All mitigation measures identified for the Proposed Action would be applicable to Alternative 2 and would result in a similar degree of reduction in the apparent visual contrast caused by Alternative 2.

Construction

Construction of Alternative 2 would be similar to the Proposed Action and, therefore, visual impacts from Project construction equipment, workers, site grading, vegetation removal, and lighting would be the same as those described for the Proposed Action. Due to the slightly smaller footprint of the Project, the geographic extent of these impacts would be smaller.

Operation and Maintenance

Alternative 2 operation and maintenance impacts would be essentially the same as Alternative 1. No visual simulations were created for Alternative 2. However, the appearance of the solar facilities under Alternative 2 would be similar to the visual simulations for Alternative 1. As discussed above, compared to Alternative 1, Alternative 2 may be less visible from a portion of I-10 (KOP 1a-h) and KOP 6 (Nicholls Warm Springs/Mesa Verde) due to the at-grade view from these KOPs and the absence of solar panels in the northwestern corner of the site. The scale of the Project when viewed from KOP 3 (McCoy Mountains) may also be slightly smaller for Alternative 2. However, the slight changes in visibility would not change the visual contrast ratings presented in Table 4.19-3 for KOPs 1, 3, or 6.

Decommissioning

Visual impacts from decommissioning of Alternative 2 would be the same as those described for the Proposed Action, though due to a slightly smaller footprint, the geographic extent of these impacts would be smaller.

4.19.3.3 Alternative 3: Reduced Project Alternative

The direct and indirect impacts of the Reduced Project Alternative are similar or the same as the impacts of the Proposed Action, although the size of the facility would be reduced with no solar panels located in the northwestern corner of the Project site (similar to Alternative 2) and a reduced number of panels along the eastern side of the site. A reduction in the disturbance area of Alternative 3, in both the northwestern corner and eastern side of the site, may result in an even greater reduction in visibility of the Project from a portion of I-10 (KOP 1a-h) and KOP 6 (Nicholls Warm Springs/Mesa Verde) due to the at-grade view from these KOPs, as compared to Alternative 2. The reduction in disturbance area of Alternative 3 may also result in a greater reduction in the scale of the Project when viewed from KOP 3 (McCoy Mountains) though the solar facilities would still dominate the view from this KOP. In addition, Alternative 3 may be even less visible from KOP 7 (Town of Ripley) due to the absence of panels along the eastern edge of the site, thus increasing the distance between the KOP and the first visible panels for this at-grade view. However, the changes in visibility would not change the visual contrast ratings presented in Table 4.19-3 for KOPs 1, 3, 6, or 7.

Because the location of the gen-tie line would not change, all views of the gen-tie line would be identical to those of the Proposed Action. In addition, because the size of the O&M area and the need for security lighting would remain the same under Alternative 3, impacts related to light and glare would be the same or similar compared to the Proposed Action. All mitigation measures identified for the Proposed Action would apply to Alternative 3 and would result in a similar degree of reduction in the apparent visual contrast caused by Alternative 3.

Construction

Construction of Alternative 3 would be similar to the Proposed Action and, therefore, visual impacts from Project construction equipment, workers, grading, vegetation removal, and lighting would be the same as those described for the Proposed Action. Due to the smaller footprint of the Project and shorter construction schedule, the geographic extent and duration of these impacts would be smaller.

Operation and Maintenance

Alternative 3 operation and maintenance impacts would be essentially the same as Alternative 1. No visual simulations were created for Alternative 3. However, the appearance of the solar facilities under Alternative 3 would be similar to the visual simulations for Alternative 1. As discussed above, compared to Alternative 1, Alternative 3 may be less visible from a portion of I-10 (KOP 1a-h), KOP 6 (Nicholls Warm Springs/Mesa Verde), and KOP 7 (Town of Ripley) due to the at-grade view from these KOPs and the absence of solar panels in the northwestern corner and along the eastern edge of the site, which thus both reduces the width of the Project when viewed from these KOPs and/or increases the viewing distance from the KOP to the first visible panel. The scale of the Project when viewed from KOP 3 (McCoy Mountains) may also be smaller for Alternative 3, though the Project would still dominate the view from this location. However, the changes in visibility would not change the visual contrast ratings presented in Table 4.19-3 for KOPs 1, 3, 6, or 7.

Decommissioning

Visual impacts from decommissioning of Alternative 3 would be the same as those described for the Proposed Action, though due to a smaller footprint, the geographic extent of these impacts would be smaller.

4.19.4 Application of CEQA Significance Thresholds

VIS-1) Would the Project have a substantial adverse effect on a scenic vista?

Alternatives 1, 2, or 3 would not be located in a designated scenic vista. Neither the Riverside County General Plan (Riverside County 2015a) nor the Palo Verde Valley Area Plan (Riverside

County 2015b) designates the Project site as an important visual resource. Therefore, no impacts would occur.

VIS-2) Would the Project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

Though Riverside County has identified I-10 as eligible for designation as a scenic corridor, it is not a state- or County-designated scenic highway. I-10 was included as KOP 1 (a-h) in the visual resources impact assessment. Alternatives 1, 2, or 3 would be consistent with visual policies contained in the Riverside County General Plan (Riverside County 2015a), Palo Verde Valley Area Plan (Riverside County 2015a), and the City of Blythe General Plan 2025 (2007). Policies to protect the scenic quality of views from designated and eligible scenic highways are contained in the County's General Plan and the Palo Verde Valley Area Plan. Distribution lines and the gen-tie line would be placed above-ground and would be within view of I-10, an eligible scenic highway, though the distance of I-10 to the Project and presence of other electrical transmission poles would lessen the visual impact of the Projects transmission lines. However, because the transmission lines for Alternatives 1, 2, or 3 would be above ground and at least partially visible from I-10, the distribution and gen-tie lines would not be consistent with the Riverside County General Plan LU Policy 14.5 requiring new electric distribution lines, which would be visible from designated or eligible state and County Scenic Highways, to be placed underground.

Motorists on I-10 enjoy scenic desert views across the Palo Verde Mesa to the mountains. Due to its low profile, the Project would not block motorists' views of the mountains, which would remain visible in the distance beyond the Project. It is estimated that the Project would be visible for a 4-mile segment of I-10 located north of the Project due to the elevation of I-10 above the Project in this section. Given the adjacent land uses, which include other solar facilities, the other transmission lines in the area and the distance between I-10 and the Project, Alternatives 1, 2, or 3 would be compatible with policies to protect scenic views from I-10. There are no scenic resources such as significant trees, rocks, historic buildings, or prominent topographic features that would be degraded due to Alternatives 1, 2, or 3. Therefore, no substantial adverse effects to scenic resources would occur and impacts would be less than significant.

VIS-3) Would the Project substantially degrade the existing visual character or quality of the site and its surroundings?

Alternatives 1, 2, or 3 would be visible from portions of the nearby mountains (Mule and McCoy Mountains - KOPs 3 and 4), the adjacent housing development (Nicholls Warm Springs/Mesa Verde KOP 6), and along a 4-mile stretch of I-10 (KOP 1a-h) due to an elevation above the Project site and/or close proximity to the Project site. The broad, flat form of the solar panels, along with the dark grey color of the panels would strongly contrast with the desert landscape surrounding the Project and would dominate the landscape from the mountain views due to the large scale of the project and would be apparent from the I-10 and nearby development views. During construction of Alternatives 1, 2, or 3, the density and movement of construction workers and vehicles, as well as the appearance of cleared/graded areas, would contrast with the surrounding desert landscape. Therefore, during both construction and operation, Alternatives 1, 2, or 3 would degrade the existing visual character of the site and surrounding areas, particularly from elevated positions where the Project would be visible.

Alternatives 1, 2, or 3 (both during construction and operation) would be discordant with the existing naturally appearing visual character of the Chuckwalla Valley and would reduce the scenic quality of the Project area due to an increase in man-made development at the site. The overall scenic quality of the site would be reduced from a B to a C. Therefore, Alternatives 1, 2, or 3 would reduce the visual quality of the site, as well as the quality of surrounding areas that include views of the Project, particularly from nearby vantage points in the Mule and McCoy Mountains.

Though the existing visual character of the Project site is already influenced by existing transmission lines and other energy projects, Alternatives 1, 2, or 3 would result in substantial degradation of the existing visual character and visual quality of the Project site when viewed from elevated locations. Mitigation Measures VIS-1, 2, 3 and 4 would reduce visual contrast of Alternatives 1, 2, or 3 during construction, operation and decommissioning; however, these measures would not fully mitigate the significant visual impact of the Project. Therefore, Alternatives 1, 2, or 3 would result in a significant and unavoidable impact.

VIS-4) Would the Project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Solar PV employs glass panels that are designed to minimize reflection and reflect as little as 2 percent of the incoming sunlight (FAA 2010). Nevertheless, some glare is possible from the surface of the PV panels and other DQSP components (especially metallic components) that reflect light depending on panel orientation, sun angle, viewing angle, viewing distance, and other factors. It is possible that minor glare could be produced from back reflected light or light not absorbed by DQSP facilities. This glare could occur in any one place for several hours (e.g., a sunny afternoon), but is unlikely to be visually distracting or nuisance causing, though the glare produced by the DQSP could be more intense than any other natural or cultural features in an observer's perspective. The color contrast of the dark grey solar panels of the Project and the surrounding desert colors could be increased by glare produced from diffuse reflections of the DQSP, but would not create substantial glare that would adversely affect day or nighttime views in the area.

During construction of Alternatives 1, 2, or 3, security lighting would be needed at the construction staging areas, parking area, construction office trailer entries, site access points, and the security guard booth. Limited lighting would be installed around the construction office trailers. If needed for security, small lights with motion sensors may be installed on the outside perimeter of construction office trailers and/or portable light plants may be installed in a laydown yard or parking area. In addition, portable light towers may be used if, due to schedule or heat constraints, construction activities were to occur at night. During operation and maintenance of Alternatives 1, 2, or 3, lighting would be placed at the O&M Building, On-Site Substation, and site entrance. Some portable lighting may also be required for maintenance activities that must be performed at night. There would be no lighting along the Project perimeter. Lighting would be kept to a minimum and sensors and switches would be utilized to keep lighting off when not needed. All lights would be shielded and face downwards as much as possible. Therefore, Alternatives 1, 2, or 3 would not create substantial light that would adversely affect day or nighttime views in the area. Overall, impacts related to light and glare from Alternatives 1, 2, or 3 are anticipated to be less than significant.

VIS-5) Would the Project result in the creation of an aesthetically offensive site open to public view?

The general public would primarily view Alternatives 1, 2, or 3 temporarily from a 4 mile stretch of I-10 where the Project would be visible due to the elevation of the highway above the Project. The Project would also be visible to viewers at elevated positions in the Mule and McCoy Mountains (KOPs 3 and 4), as well as viewers in the nearby development of Nicholls Warm Springs/Mesa Verde. The broad, flat form of the solar panels, along with the dark grey color of the panels would contrast with the desert landscape surrounding the Project and would be apparent or dominate the landscape from these views and would reduce the scenic quality of the Project area due to an increase in man-made development at the otherwise natural appearing site.

However, the experience of viewers at most of the locations where the Project would be visible would be intermittent. The Project area is also being subjected to an increased amount of similar development with additional solar projects and transmission lines anticipated for construction in the near future. Though Alternatives 1, 2, or 3 would change the visual character of the site, the Project area is already influenced by nearby energy projects (Modified BSPP, Blythe Substation, Blythe Energy Center, etc.) and will continue to be modified when new energy projects are built. Therefore, Alternatives 1, 2, or 3 would not alter the site in a manner that would create a substantially aesthetically offensive site open to public view. Thus, impacts would be less than significant.

VIS-6) Would the Project interfere with nighttime use of the Mt. Palomar Observatory, as protected through Riverside County Ordinance No. 655?

Alternatives 1, 2, and 3 are over 100 miles east of the Mt. Palomar Observatory, which greatly exceeds the distance from the Observatory's areas of sensitivity (Zone A at a 15-mile radius and Zone B at a 45-mile radius from the Observatory). Therefore, there would be no impacts to astronomical observation and research at the Mt. Palomar Observatory.

VIS-7) Would the Project expose residential property to unacceptable light levels?

Construction and operation of Alternatives 1, 2, or 3 would utilize minimal lighting. Additionally, the proposed Project facilities would be close to existing sources of light, such as the Blythe Energy Center, Blythe Substation, the NRG Blythe Solar PV Project, and the Blythe Airport. Therefore, residential property would not be exposed to unacceptable light levels, and impacts would be less than significant.

4.19.5 Alternative 4: No Action Alternative

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, the BLM would continue to manage the land under its land use jurisdiction consistent with the site's multiple use classification as described in the CDCA Plan, as it was amended by the Western Solar Plan.

If the site remained undeveloped, the existing environmental setting described in Section 3.19 would be maintained. Existing land uses would continue uninterrupted, and there would be no impact on visual resources.

4.19.6 Cumulative Impacts

Impacts resulting from construction, operation, maintenance, and decommissioning of the DQSP could result in a cumulative effect on visual resources in combination with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for visual resources consists of the viewshed of the I-10 corridor (where visual impacts could be synergistic), and locations from which a viewer could see the Proposed Action along with views of other projects (where visual impacts could be additive). Potential cumulative effects on visual resources could occur during the DQSP's proposed 25 to 48-month construction period (e.g., from cumulative construction disturbances), during the 30-year term of the authorizations and permits for the Proposed Action (e.g., project contrast with the landscape, glint and glare), or result from closure and decommissioning (e.g., until restoration efforts return the landscape to its original condition). Cumulative visual impacts could occur as long as the DQSP contributes to visual changes to the landscape that are visible or perceived by the public, either within the same viewpoints, or as a noticeable element in a cumulative viewing experience (i.e., an OHV travel route, a drive on I-10, or a local road).

Existing conditions within the area of cumulative effects analysis reflect a combination of the natural condition and the effects of past actions, and are described in Chapter 3. Direct and indirect effects of the DQSP are analyzed above. The cumulative analysis provided here considers implementation of the Project in combination with other past, present, and reasonably foreseeable future projects described in Tables 4.1-1 and 4.1-2. Among them, projects such as the Palen, Blythe Airport, Modified Blythe, Desert Harvest, RE Crimson, and BMSP solar power projects, as well as numerous solar projects proposed on lands under County jurisdiction, are expected to result in synergistic visual impacts for travelers along I-10, as well as additive visual impacts to dispersed recreation users on BLM lands on the Palo Verde Mesa and local roads.

Alternative 1 – Proposed Action

Construction, Operations, and Decommissioning

Due to the visual contrast of the solar panels with the natural landscape of the Chuckwalla Valley, the Project would begin to attract attention and begin to dominate the characteristic landscape. Landscape character changes to the elements of form and texture would be primarily perceived from superior (higher elevation to the Project) locations; color and line element changes are expected to be weak. The degree of visual contrast caused by the DQSP solar field, as experienced from the eight KOPs, ranged from "none" to "strong".

The cumulative scenario for visual resource impacts, especially the viewshed impacts of utility-scale solar energy projects, has been evaluated in detail in the Western Solar Plan issued in July 2012 (BLM and DOE 2012). The specific solar technologies and the precise locations of projects were not known, however, the Riverside East Solar Energy Zone (SEZ) provides a useful approximation of the likely cumulative visual impact to be expected should all projects listed in Section 4.1 be developed. The projects in the cumulative scenario located on and adjacent to the Palo Verde Mesa, as well as south of I-10 and west of Blythe, are generally coincident with the SEZs analyzed in the Western Solar Plan.

Because of the large size of the Riverside East SEZ, the area's topography, and the general lack of screening vegetation, the viewshed of the SEZ is enormous. Within 25 miles of the SEZ, utility scale solar energy projects theoretically could be visible within an area of more than

2,100,000 acres (DOI 2010). The viewshed includes large portions of the mountain ranges surrounding the Chuckwalla Valley and some neighboring valleys, including Ward and Rice Valleys, and the Pinto Basin. The affected lands that are common to both the DQSP and the Riverside East SEZ include I-10, but do not include sensitive visual resource areas such as Wilderness areas because the DQSP is not visible from the nearby wilderness areas. The DQSP's viewshed is wholly encompassed by the viewshed of the Riverside East SEZ.

The main conclusion reached in the visual analysis of the SEZ is that visually complex, man-made industrial landscapes would contrast greatly with the surrounding lands, which are generally naturally appearing. Large visual impacts on the SEZ and surrounding lands within the SEZ viewshed would be associated with solar energy development due to major modification of the character of the existing landscape. This conclusion indicates that the cumulative scenario would result in a visual impact that is inconsistent with the Interim VRM objectives that have been established in the DQSP area as described in Section 3.19.1.6 (VRM Class III). The analysis in the Western Solar Plan also indicates that the most effective mitigation measures would be proper facility siting and layout, and that other mitigation measures addressing facility color and/or edge contrasts, due mostly to the size and scale of the foreseeable developments, would have a limited ability to appreciably reduce visual impacts from highly exposed areas.

In summary, the large-scale, closely spaced nature of projects in the cumulative scenario, in addition to the fact that some technologies, such as that proposed for the Rio Mesa Solar Project, would construct solar power towers approximately 760 feet tall, results in a cumulative scenario that would have major adverse impacts on the visual values in the visual resources cumulative geographic scope (BrightSource 2011). Commonly employed visual mitigation measures, such as those proposed in this section, would slightly reduce the cumulative visual impacts, but not to such a degree as to avoid or substantially reduce the impacts to visual values of the region. The cumulative impact would be long-term, adverse and unavoidable. The following sections provide additional details on the type and severity of cumulative visual impacts that would be experienced from each of the KOPs, from I-10, and for dispersed recreation users.

Impacts on KOPs/Visual Contrast Ratings

In general, the addition of the cumulative projects to the views from KOPs 1 through 8 would affect some views more than others, depending on topography and location of the cumulative projects relative to the KOPs. For KOPs 5 (Bradshaw Trail) and 8 (Colorado River), where no contrast was identified for the DQSP, it is unlikely that the addition of the cumulative projects would increase the contrast substantially due to the topography and distance between the cumulative projects and these at-grade KOPs, making it difficult to see the cumulative projects from these KOPs. For KOPs 2 (Chuckwalla Desert Tortoise ACEC) and 7 (Town of Ripley), where weak contrast was identified for the DQSP, the change in contrast would vary. For KOP 7, the addition of the cumulative projects would be unlikely to change the contrast substantially due to the distance between the cumulative projects and the at-grade KOP. However, for KOP 2, contrast may change from weak to strong because the KOP could be adjacent to or within one to two new solar projects, the RE Crimson and Mule Mountain III projects. KOP 1a-h (I-10) is discussed below in the discussion of impacts to the I-10 corridor. The remaining KOPs, 3 (McCoy Mountains), 4 (Mule Mountains), and 6 (Nicholls Warm Springs/Mesa Verde), were found to have moderate-strong or strong contrast with the DQSP. With the addition of the cumulative projects, a strong contrast would likely remain for KOPs 3 and 4, and the contrast for

KOP 6 may increase to strong due to additional solar development adjacent to the DQSP. The estimated visual contrast created by the cumulative scenario from each of the KOPs discussed in Section 4.19.3.1 is shown in Table 4.19-5. In sum, the cumulative scenario would have adverse and unavoidable visual resource impacts for over half of the KOPs that could not be sufficiently mitigated with feasible mitigation measures.

Motorists on I-10

Visual changes as a result of other projects both east and west of the DQSP in the cumulative scenario, including the Blythe Airport, RE Crimson, Mule Mountain III, Blythe Energy Project II, and the BMSP, would be visible to travelers on I-10, who would also experience limited views of the DQSP for a four mile stretch of I-10. The combined effect of large-scale landscape alterations from these solar projects, which would be visible along the length of I-10, would substantially degrade the visual character and the general scenic appeal of the existing desert landscape.

Table 4.19-5. Estimated Visual Contrast of Cumulative Scenario

ID	Name	Visual Contrast of DQSP	Estimated Visual Contrast of the Cumulative Scenario	Contribution of the DQSP to the Cumulative Visual Contrast
1	Interstate 10 (a-h)	Moderate	**Strong**. The number and size of the solar projects along the I-10 corridor would provide strong contrast to the natural desert landscape of the corridor.	**Minor**. The DQSP would only be visible for a short distance on I-10 (4 miles). There would be several other projects, which would, in total, transform the I-10 corridor into an industrial energy production landscape from an open desert landscape.
2	Chuckwalla Desert Tortoise ACEC	None-Weak	**Strong**. The KOP would be located adjacent to or within two large solar developments, Mule Mountain III and RE Crimson.	**Minor**. There would be low visibility of the DQSP from this KOP; if built, the other solar projects would dominate the view from this KOP.
3	McCoy Mountains	Strong	**Strong**. With the addition of the cumulative projects, the view from this elevated KOP would become increasingly developed and discordant with the natural desert landscape.	**Major.** The DQSP would dominate the view from this KOP, though additional projects would increase the scale and width of the view of solar projects.
4	Mule Mountains	Strong	**Strong**. With the addition of the cumulative projects, the view from this elevated KOP would become increasingly developed and discordant with the natural desert landscape.	**Major.** The DQSP would dominate the view from this KOP, though additional projects would increase the scale and width of the view of solar projects.

Table 4.19-5. Estimated Visual Contrast of Cumulative Scenario

ID	Name	Visual Contrast of DQSP	Estimated Visual Contrast of the Cumulative Scenario	Contribution of the DQSP to the Cumulative Visual Contrast
5	Bradshaw Trail	None	**None.** Due to distance to the cumulative projects and intervening topography, the cumulative projects would likely not be visible from this KOP.	**None.**
6	Nicholls Warm Springs/Mesa Verde	Moderate-Strong	**Strong.** Due to additional solar development adjacent to DQSP that would likely be visible from the KOP, the contrast would increase to strong as the view became more dominated by solar development.	**Moderate-Major**. The DQSP would be the largest solar project visible from this KOP, though additional projects would increase the scale and width of the view of solar projects from this KOP.
7	Town of Ripley	Weak	**Weak.** It is unlikely that the cumulative projects would be readily visible from this KOP due to distance from the KOP to the cumulative projects.	**Minor.** Due to its location, the DQSP would be the closest Project to the KOP and therefore the most visible, though the Project is not apparent from the KOP.
8	Colorado River	None	**None.** Due to distance to the cumulative projects, they would not be visible from this KOP.	**N/A**

Numerous existing cultural modifications are visible from the I-10 corridor, including transmission lines, pipelines, 4-wheel drive tracks, and widely scattered facilities and structures; however, the general character is of an unimpaired, isolated desert landscape. The cumulative scenario includes many large-scale solar plants whose scale, potential glare, color, and pervasiveness would adversely impact the continued existence of the general character of the I-10 corridor. Though considered unlikely, if all the cumulative projects included in Section 4.1 were to be implemented, tens of thousands of acres within the I-10 corridor viewshed between Desert Center and Blythe (approximately 50 miles) would be converted from undeveloped desert to a more industrialized appearance, with solar projects blending together into large swaths of developed landscape.

However, in many cases, favorable topography would diminish the apparent scale of the projects from motorists' perspective. The cumulative projects are at the same or similar elevation as the highway, and thus are reduced in prominence due to their distance from the highway and low angle of view, as is the case for the DQSP. In many cases, the other projects in the cumulative scenario would blend in with the horizon line of the valley floor, and the rugged mountains would remain the dominant visual features in the landscape, although this is decreasingly the case further west toward Desert Center where I-10 is elevated relative to the proposed solar energy developments. Because the landscape is currently undeveloped and valued by visitors for its isolated and unspoiled condition, the addition of numerous new large-scale solar projects would substantially degrade the scenic experience for east and westbound travelers along I-10, due to the projects' industrial character and visual contrast.

Mitigation measures are available that partially reduce the color contrast of some structures, or the line contrast of vegetation clearing; however, the mitigation measures only reduce the contrast of certain features of the projects at various distances. Due to the size, extent and geographic dispersal of renewable energy projects in the cumulative scenario along I-10, mitigation measures would be insufficient to substantially reduce the visual impacts of the cumulative scenario. Though considered unlikely, if all of the cumulative projects were constructed, travelers along I-10 between Desert Center and Blythe would have very few views of an undisturbed desert landscape. For these reasons, the cumulative scenario would have a moderate to major (depending on visual sensitivity and visual exposure factors) adverse impact on the I-10 corridor. Thus, the cumulative scenario would present a significant and unavoidable impact for travelers along I-10 that could not be feasibly mitigated.

Dispersed Recreation Users in Surrounding Mountains

The DQSP, in combination with other projects, would make the valleys surrounding the Mule and McCoy Mountains appear increasingly industrialized, and could substantially diminish the remote and isolated character of the landscape. While use levels in the mountains surrounding the DQSP are generally low, the remote and isolated character of the landscape is highly valued by its users.

Available mitigation measures could not feasibly reduce the scale and contrast created by development of the cumulative projects, especially from elevated viewpoints. Even with mitigation, visitors to the higher elevation locations in the region (the McCoy and Mule Mountains) would be exposed to large-scale renewable energy developments on valley floors from multiple locations and in several view directions, causing a substantial adverse impact on solitude and other backcountry values. Thus, the cumulative scenario presents a significant and unavoidable impact for dispersed recreation users in the surrounding, higher-elevation mountains.

Summary

The Project would not contribute to adverse cumulative effects on any scenic vistas (VIS-1) or on scenic resources within a State scenic highway (VIS-2), would not contribute to cumulative creation of an aesthetically offensive site open to public view (VIS-5), and would not contribute to interference with nighttime use of the Mt. Palomar Observatory (VIS-6).

The Project would result in substantial degradation of the existing visual character and visual quality of the Project site when viewed from elevated locations. Even with implementation of Mitigation Measures VIS-1, 2, 3 and 4, the incremental impact of the Project when added to other past, present, and reasonably foreseeable future projects would be cumulatively considerable.

The Project would not contribute to adverse cumulative effects related to substantial light or glare that would adversely affect day or nighttime views in the area (VIS-4) or contribute to unacceptable light levels (VIS-7).

Alternative 2 – Resource Avoidance Alternative

Construction, Operations, and Decommissioning

The cumulative impacts for Alternative 2 would be similar to those for Alternative 1, though the contribution of the DQSP to impacts from KOPs 1, 3 and 6 may be reduced due to the slightly narrower width of the Project and increased distance of the solar panels from these KOPs, thus slightly decreasing the visibility of the Project from these KOPs or reducing the scale of the solar Project when viewed from the KOPs. However, the changes in visibility would not change the visual contrast ratings presented in Table 4.19-5.

Alternative 3 – Reduced Project Alternative

Construction, Operations, and Decommissioning

The cumulative impacts for Alternative 3 would be similar to those for Alternative 1, though the contribution of the DQSP to impacts from KOPs 1, 3 and 6 may be reduced due to the narrower width of the Project and increased distance of the solar panels from these KOPs, thus decreasing the visibility of the Project from these KOPs or reducing the scale of the solar Project when viewed from the KOPs. However, the changes in visibility would not change the visual contrast ratings presented in Table 4.19-5.

Alternative 4 – No Action

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project, and the DQSP would not be implemented. The public lands in the Project area would continue to be managed by BLM in accordance with existing land use designations in the CDCA Plan, which could include a different solar project, or other development. Alternative 4 would not contribute to cumulative visual impacts.

4.19.7 Residual Impacts

The implementation of Mitigation Measures VIS-1 through VIS-4 would reduce, but not eliminate, adverse cumulative impacts to KOPs. These residual impacts of the Project and alternatives would be unavoidable.

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4.20 Water Resources

4.20.1 Methodology for Analysis

This analysis of potential impacts of the Proposed Action and Alternatives on water resources includes an evaluation of groundwater supply and recharge, water quality (both surface water and groundwater), potential for flood damage, stormwater flow, and springs.

4.20.1.1 CEQA Significance Criteria

The criteria listed below were used to determine if the Project would have significant impacts to water resources. These criteria are the same as the significance criteria listed in the CEQA Environmental Checklist, Appendix G of the state CEQA Guidelines. Under CEQA, the proposed Project and alternatives would have a significant impact on water resources and require mitigation if they would:

HYD-1) Violate any water quality standards or waste discharge regulations.

HYD-2) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).

HYD-3) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.

HYD-4) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.

HYD-5) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.

HYD-6) Otherwise substantially degrade water quality.

HYD-7) Place housing within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.

HYD-8) Place within a 100-year flood hazard area structures which would impede or redirect flood flows.

HYD-9) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.

HYD-10) Be at risk of inundation by seiche, tsunami, or mudflow.

The following additional significance criteria from the County of Riverside CEQA Environmental Assessment Form are used in the analysis. A project could have potentially significant impacts if it would:

HYD-11) Include new or retrofitted Stormwater Treatment Control BMPs (e.g., water quality treatment basins, constructed treatment wetlands), the operation of which could result in significant environmental effects (i.e., increased vectors and/or odors).

HYD-12) Cause changes in absorption rates or the rate and amount of surface runoff.

HYD-13) Cause changes in the amount of surface water in any water body.

4.20.2 Applicant-Proposed Measures

Section 4.9.2 describes APMs and management plans intended to address hazardous materials handling and disposal. Those measures would be protective of water quality, and would therefore be applicable to protection of water resources.

The Applicant has developed a preliminary summary of a SWPPP, which would be developed and implemented prior to Project construction. The SWPPP would define Best Management Practices (BMPs) to be used to minimize the potential for the Project to modify onsite stormwater flow and erosion characteristics. The SWPPP will include the following information:

1. Sequence of construction events and identification of potential pollutants on the Project site;
2. Calculation of the potential disturbance area;
3. Identification of streams and wetlands, in vicinity of Project;
4. Description of proposed storm water pollution control measures;
5. Summary of applicable regulatory requirements;
6. Inspection, monitoring, and maintenance procedures;
7. Site restoration measures; and
8. Minimum training and reporting requirements

The SWPPP will also contain site map(s) that show the construction site perimeter; existing and proposed structures and roadways; storm water collection and discharge points; and drainage patterns across the site both before and after construction.

The erosion and sediment control measures discussed in the SWPPP will serve as minimum standards during construction. The SWPPP will describe the physical erosion and sediment control measures that would be implemented, including filter fabric fence, palliatives, geotextiles, and straw bales. The SWPPP will define the locations of these measures, and potential alternatives and limitations for each measure. In general, the measures would address stormwater, sedimentation, and erosion impacts by:

- Minimizing the quantity and duration of soil exposure to stormflow;
- Protecting critical areas during construction by reducing the velocity of and redirecting runoff;
- Installing and maintaining erosion and sediment control measures during construction; and

- Inspecting the work area and maintaining erosion and sediment controls as necessary until final stabilization is achieved.

To achieve this, the following BMPs for initial site stabilization and construction entrance installation would be implemented:

- Project area boundaries (e.g. workspace limits) will be clearly delineated and the contractor will ensure that no stabilization structures are installed outside the Project extent;
- Grading plans would be developed to minimize the amount of vegetation to be removed;
- Filter fabric fence will be installed along Project borders that have the potential to release sediment into receiving waters or other environmentally sensitive areas;
- Storm drain protection barriers will be installed around any storm drain inlet, catch basin or culvert present within the Project area; and
- Stabilized construction entrance/exits to public right-of-ways will be installed.

Where feasible, stemmed vegetation such as brush, shrubs and trees shall be removed at or near the ground level, leaving the root systems intact to stabilize the soil. Preservation of existing vegetation is one of the most effective methods of erosion control and storm water management, and the contractor shall only remove the vegetation required to complete the Project. Temporary erosion control measures (such as sediment barriers) will be installed to contain disturbed soils within the work area during clearing and grading activities that have the potential to release upland soil sediment into adjacent water bodies or environmentally sensitive areas. All temporary soil stockpiles will be placed in upland areas and surrounded by filter-fabric fence.

Because Project water use is almost entirely associated with dust control during construction, the measures associated with the Applicant's Phased Site Preparation Plan would be used to conserve water where feasible. Although grading would be necessary in some parts of the site, the measures used to phase construction, control vehicle speed, cover stockpiles, minimize the amount of disturbed ground, and maintain existing vegetation, where feasible, would also result in minimizing water use. In addition, the use of soil stabilizers would minimize the need to use water to control dust in those areas.

As discussed in Section 4.1.6, the impact analysis assumes that the APMs have been implemented, and these measures are therefore requirements for approval of the Project. The APMs are to be incorporated into the EICMPP/MMRCP, along with the agency-required mitigation measures.

4.20.3 Direct and Indirect Impacts

4.20.3.1 Alternative 1: Proposed Action

Construction

Some impacts related to ground disturbance, such as those relating to surface water and drainage patterns and flood hazard areas, would begin during the construction phase and continue throughout the operation and maintenance phase, and are therefore described below under *Operation and Maintenance*. Where appropriate, a distinction is made between temporary impacts, which would occur during construction only, and long-term impacts, which would occur during both phases.

Groundwater Supply and Recharge

The analysis of impacts to groundwater supply and recharge is based on modeling of the anticipated effect of Project-related groundwater withdrawal on the overall groundwater balance in the Palo Verde Groundwater Basin (PVGB), the effect of groundwater withdrawal on the PVID drains, and the effect of the withdrawal on nearby groundwater wells.

The PVGB is made up of two components: the Palo Verde Mesa Groundwater Basin (PVMGB), and the Palo Verde Valley Groundwater Basin (PVVGB). The PVVGB comprises the floodplain of the Colorado River. Although the solar projects, including the DQSP, are situated on the PVMGB, BLM has typically evaluated the PVGB as a whole, in order to ensure that project effects on the Colorado River are understood. Therefore, the analysis in this Draft PA/EIS/EIR evaluates the entire PVGB.

BLM has previously analyzed the effect of groundwater withdrawal for solar plant construction in the PVGB in their Environmental Impact Statements (EISs) for the BSPP (BLM 2010), the MSEP (BLM 2012b); and the Modified BSPP (BLM 2014). The analyses were based on a numerical groundwater flow model originally developed by the U.S. Geological Survey (USGS; Lieke 2008). The Applicant for the BSPP adapted the USGS model to support BLM's analysis of groundwater withdrawal impacts for that project (AECOM 2010). That analysis concluded that groundwater drawdown of 0.1 feet would be limited to the Palo Verde Mesa Groundwater Basin (PVMGB), and would not extend into the adjacent PVVGB or the Colorado River. The numerical model for the BSPP was then modified in 2011 to support BLM's analysis of the MSEP (AECOM 2011). To support that analysis, the Applicant for the MSEP reviewed and updated the input parameters for the numerical model, and modeled the drawdown associated with the different well locations associated with the MSEP. Again, the analysis concluded that groundwater use for the MSEP would result in drawdown of less than one foot at the nearest water supply wells, the radius of influence would not extend off of the Palo Verde Mesa, and it was unlikely that the MSEP would influence the PVID drains. For the Modified BSPP EIS, BLM used the modeling results from the BSPP, but updated their conclusions, stating that hydraulic connectivity between the PVMGB and PVVGB does not exist.

For the DQSP, the Applicant adapted the MSEP groundwater model, and customized it based on four potential locations of groundwater production wells within the Project boundaries URS 2016d, provided in Appendix X). The model was constructed as a single-layer (two-dimensional) numerical groundwater flow model in MODFLOW2000 (Groundwater Modeling System [GMS] platform). The geographic scope of the model included the entire Palo Verde Valley, including the mesa and floodplain. The base of the model was established at the bottom of the younger and older Colorado River alluvium, as these are the productive aquifers in the valley. A variety of boundary conditions were employed to simulate inflow and outflow of water from the model following the basin water balance. The Colorado River formed the eastern boundary of the model and was simulated using depth profiles provided by the U.S. Bureau of Reclamation (USBR) along selected locations of the river reach through the Palo Verde Valley. The river bottom elevation was linearly interpolated from these data for all river cells along the eastern boundary of the model domain. The model was calibrated to steady-state conditions and average measured water levels from wells on both the mesa and floodplain from 1980 to 2009.

Groundwater withdrawals would occur during construction. A model was completed in order to evaluate the combined effects of pumping associated with construction and operation. Four well locations within the footprint of the Proposed Action were evaluated in the model as the pumping locations, including a well in the northeastern portion of the Project area (BLM North Well), a well on the private land parcel (Private Parcel Well), a well in the east-central portion of the Project area (BLM Central Well), and a well in the southern portion of the Project area (BLM South Well). None of these wells are currently in operation or in a usable condition, and there are no existing authorizations for them. However, they were selected because they represent locations that could feasibly be used for future wells, as they apparently served as water supply wells in the past.

The currently proposed locations of production wells are shown in Figure 2-2 for the Proposed Action, and in Figures 2-9 and 2-10 for the Resource Avoidance and Reduced Project Alternatives, respectively. The Northern Well is approximately in the same location as the production well proposed under the Resource Avoidance and Reduced Project Alternatives. Under the Proposed Action, the proposed production well would be located approximately 1.5 miles west of the Northern Well, and would be located much further from the other potentially affected wells on the mesa.

The groundwater pumping simulations were modeled for both a 25-month and 48-month construction scenarios. The 25-month construction scenario assumes water usage of 700 AFY for a total of 1,400 AF. The 48-month construction scenario assumes water usage of 450 AFY for a total of 1,800 AF.

Results from both construction scenarios indicated that the model-predicted drawdown outside of the solar field boundary would be less than 0.1 foot at the end of construction. Drawdown would primarily be constrained to the mesa area during construction. Additionally, under the 450 AFY construction scenario, the model predicts that the extent of drawdown is less than predicted for the construction scenario with the higher pumping rate (700 AFY) and shorter 25-month duration. Drawdowns less than 0.1 feet are negligible when considering the thickness of the aquifer and typical well installation in the region. Under both construction scenarios, the impacts from water use are negligible to offsite water wells.

In general, the results from the analysis of all four wells suggest that there are no potential well locations within the Project area that would result in unacceptable impacts to offsite wells. The results from the analysis of all four wells are similar to each other, showing approximately the same radius of influence limited to within approximately one mile of the well. Of the four wells, the Northern Well, under the 700 AFY scenario, is the most conservative scenario analyzed in the model because the location is on the Project area boundary, and is closest to other wells on the mesa northeast of the Project area, as identified in the USGS National Water Information System (NWIS) database. This is the only scenario in which drawdown exceeding 0.1 feet would occur outside of the Project area, and would potentially encompass another well location. Any other location within the Project area, including the location in the Proposed Action, potential temporary wells along the southeastern or southwestern Project boundary, would be further removed from the potentially affected wells on the mesa. As discussed in Section 2.3.3.8, further study, including groundwater well pump testing, would be performed to establish the feasibility of obtaining the needed supplies from onsite wells, and the specific locations of onsite production wells. However, the result of the modeling of the four hypothetical well locations indicates that no onsite well location would result in unacceptable offsite impacts.

To ensure that the actual groundwater drawdown does not exceed the predicted drawdown, Mitigation Measure WATER-4 requires that the Applicant develop and implement a Groundwater Monitoring and Mitigation Plan prior to construction.

Surface Water Supplies

As discussed in Section 2.3.3.8, an off-site water supply may be used to supplement, or in place of, water from groundwater wells. This may include a situation where a temporary water source is needed before a water supply well can be installed, or could occur throughout the duration of construction. The source of this water would be the PVID, which obtains water from the Colorado River through Priority 1 and Priority 3 rights pursuant to a 1933 Water Delivery contract with the United States (URS 2016a, provided in Appendix Y).

PVID's Priority 3 water rights are not based on volume, but on the ability to irrigate 16,000 acres on the Palo Verde Mesa. As of 2000, approximately 2,500 acres on the mesa were receiving irrigation water from PVID. The majority of the Project site is located within the PVID service boundaries, and PVID has confirmed that PVID may supply water to areas within these boundaries for beneficial uses, which would include the Project. PVID has provided a letter, included as Appendix C of the WSA, indicating that they are capable and willing to supply the water for Project needs, and that their water supply and other customers would not be negatively impacted.

Water Quality

Construction of the DQSP would require the use of heavy machinery for vegetation grubbing, grading, and installation of roads, pipelines, generation facilities, transmission facilities, administration buildings, the solar field, and other facilities as discussed previously. Construction of these facilities would involve the use of bulldozers, graders, semi-trucks, and various other heavy machinery, and would involve changes to on-site topography. These activities would potentially loosen existing surface soils and sediments, increasing the potential for erosion during storm events. Additionally, the use of construction equipment may involve the accidental release of fuel, oils, brake dust, lubricants, antifreeze, and other potentially hazardous substances at the construction site. These water quality pollutants could become entrained in surface water during storm events, and/or be infiltrated into groundwater and the underlying aquifer, resulting in the degradation of water quality. Existing water quality would not be affected by extraction of groundwater during construction.

The Applicant will implement site design and protective erosion and drainage control design measures during construction to prevent the degradation of water quality. The Project will conform to the California State Water Resource Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges (General Permit) for activities regarding runoff and erosion control, as well as applicable regional, county, and local requirements. This will include preparing a SWPPP and implementing appropriate storm water BMP as described in Section 4.20.2 and required by Mitigation Measure WATER-1. BMPs will consist of control measures such as swales and ditches, stabilized construction entrances, gravel-covered construction staging area, and silt fencing. The industrial SWPPP (if necessary) will include appropriate BMPs (such as secondary containment structures around mineral oil-filled transformers). Implementation of a SWPPP, would reduce the potential water quality degradation of stormwater emanating from the DQSP site.

Flood Hazards

The Project site is located in a desert environment within a large alluvial fan system with several washes that periodically collect runoff water during infrequent rain events. No perennial water bodies are located on the Project site itself. No Federal Emergency Management Agency- (FEMA-) designated flood zones exist within the vicinity of the Project; the Project Site Area and vicinity are classified by FEMA as Zone D, indicating an area where there are possible but undetermined flood hazards (FIRM map 06065C Panel 06065C3200G). In areas designated Zone D, no analysis of flood hazards has been conducted (URS 2011).

The Project site is located in an arid environment and on relatively high ground northeast of the Mule Mountains, which drain into and through portions of the site. Based on a site drainage report, the potential for flooding on the site is considered moderate (URS 2011). Although some surface water collects within the Project area, the Applicant is exploring site preparation methods that will contain water draining onto the site, and fill the primary low areas, if necessary, to avoid flooding hazard in limited portions of the site area. The Project area also contains washes that periodically contain water during infrequent events, and an agricultural ditch surrounding an offsite jojoba farm also periodically contains water.

In the event that a major storm event occurs during construction of the DQSP, unanticipated flooding could occur on site. Potential for damage to facilities due to on-site flooding would be exacerbated during the construction period. This is because a major flood event could occur at any time, including prior to the completion of the proposed stormwater management facilities on site. Therefore, unless construction practices and procedures are carefully managed, flooding during construction could result in damages to onsite facilities, interference with the construction process, and potential exposure of employees to flood conditions.

To minimize potential for construction period flooding to affect site facilities, the Project will conform to the SWRCB NPDES General Permit for Storm Water Discharges, as described in Section 4.20.2. Site design and implementation of protective erosion and drainage control design measures during construction will manage stormwater flow to mitigate downstream erosion and channelization. In addition, the Applicant would be required to implement Mitigation Measure WATER-3, which would ensure that proposed onsite buildings are protected from flooding, and that all onsite buildings and fill areas are placed outside of frequent flood flow areas.

Operation and Maintenance

Groundwater Supply and Recharge

The impact assessment for groundwater was performed based on the results of a numerical groundwater model (Palo Verde Groundwater Model) that was previously developed for the BSPP and MSEP, which are located adjacent to each other, north of the Project across Interstate 10. The model encompasses the entirety of the Palo Verde Valley inclusive of both the PVMGB and the PVVGB; these basins considered together are hereafter referred to as the PVGB. The Palo Verde Groundwater Model was modified to accommodate the location of the proposed

Project and its water supply wells. Model runs and associated documentation were completed by URS (2016d), in order to predict:

1. The effects from DQSP-only pumping during construction and operation, on groundwater supply wells on the Palo Verde Mesa, and how pumping might affect PVGB storage;
2. The cumulative effects of all proposed projects in the Palo Verde Valley on water levels and groundwater basin storage (results from this portion of the evaluation are considered under the subsequent discussion of cumulative impacts); and
3. To what extent the DQSP could cause a change in flux of surface water in PVID drains into underlying groundwater in the floodplain.

The Palo Verde Groundwater Model was constructed as a single-layer (two dimensional) numerical groundwater flow model in MODFLOW2000, with a domain that encompassed the entire Palo Verde Valley, inclusive of the mesa and floodplain. The base of the model was established at the bottom of the younger and older Colorado River alluvium, since these are the productive aquifers in the valley. A variety of boundary conditions were employed to simulate inflow and outflow of water from the model following the basin water balance. The Colorado River formed the eastern boundary of the model and was simulated using depth profiles provided by the USBR along selected locations of the river reach through the Palo Verde Valley. The river bottom elevation was linearly interpolated from these data for all river cells along the eastern boundary of the model domain.

In calibrating the Palo Verde Valley model, the hydraulic conductivity distribution was initially homogeneous and additional hydraulic conductivity zones were added as necessary to match the observed water levels and changes in hydraulic gradient in the floodplain and on the mesa. The model was calibrated to steady-state conditions and average measured water levels from wells on both the mesa and floodplain from 1980 to 2009.

No additional calibration was conducted for the numerical modeling for this Project. Steady-state conditions of calibrating the model to actual observed conditions of groundwater levels was deemed not necessary as few available additional data points of water levels were available in publically available records in the USGS NWIS database, and those few available water levels were measured close to water levels already included in the existing groundwater model.

Additionally, as part of the water balance calibration, the model also used the average measured discharge data from the PVID drains as a measure of model calibration, matching the average discharge data since 1993 reported by the USBR (USBR 2009). The model met calibration targets following generally accepted practices, and generally provided an adequate representation by comparison to the average water levels over the calibration period and flow directions and mixing along the mesa and floodplain boundary. Additional details regarding model design can be found in the Proposed Groundwater Use – Numerical Groundwater Modeling Report (URS 2016d).

Four model simulations were conducted where each of the four wells located on the site were individually modeled at the required pumping rates for providing the necessary rates of groundwater extraction during construction and operation. Groundwater pumping simulations were modeled for both a 25-month and 48-month construction scenarios followed by 30 years of operation. The 25-month construction scenario assumes water usage of 700 AFY during construction for a total of 1,400 AF, and 38 AFY during the operation period of 30 years for a total of 1,140 AF. Total Project water usage of 2,540 AF would be pumped under the 25-month construction and 30 year operational scenario (32 years). Because the 30 year period of the ROW would include the construction, operations, and decommissioning phases, the assumption of a longer extraction period in the model is a conservative analysis of the impacts associated with groundwater withdrawal.

The 48-month construction scenario assumes water usage of 450 AFY during construction for a total of 1,800 AF, and 38 AFY during the operational period of 30 years for a total of 1,140 AF. Total Project water usage of 2,940 AF would be pumped under the 48-month construction and 30 year operational scenario (34 years). Again, this is a conservative analysis, by analyzing a longer duration for groundwater extraction.

The model results show that, regardless of the well configuration or associated pumping rates, the influence from DQSP pumping would be minimal. The model predicted that drawdown outside of the solar plant boundary would be less than 0.1 foot, both at the end of construction and at the end of operational pumping. As would be anticipated, the construction pumping produced a larger drawdown at the pumping well and correspondingly larger radius of influence. In general, the predicted cones of depression were similar among the scenarios.

Drawdown would primarily be constrained to the mesa area during operation. Predicted drawdowns at the end of operation for the Central Well and South Well show 0.01 feet of drawdown extending slightly into the PVVGB under the 700 AFY and 450 AFY scenarios. Additionally, under the 450 AFY construction scenario, the model predicts that the extent of drawdown is less than predicted for the construction scenario with the higher pumping rate (700 AFY) and shorter 25-month duration. Drawdowns less than 0.1 feet are negligible when considering the thickness of the aquifer and typical well installation in the region. Under both construction scenarios, the impacts from water use to off-site water wells are negligible.

The cumulative change in flow through the PVID drains was evaluated for the two varying construction pumping rate scenarios. Both scenarios show that there is a very small change in the PVID drain mass balance between the non-pumping and pumping condition at the end of construction and end of operation. For the 700 AFY construction scenario, there was a total change of about 476 AF at the end of the combined construction and operational period of 32 years. The total change represents 0.0037 percent or the 12.8 million AF of the throughput in the PVID drains over 32 years. For the 450 AFY construction scenario, there was total change of about 520 AF at the end of the combined construction and operational period of 34 years. The total change represents 0.0039 percent of the 13.5 million AF of the throughput in the PVID drains over 34 years.

It is important to note that this small of a change would be unmeasurable, and thus the model prediction cannot be verified. Further, it is also important to note that it is likely that this prediction is a function of the overall simplicity and limitations of the two-dimensional groundwater model and steady-state calibration, rather than a reflection of likely processes, given the very low proposed pumping volume. The change is very small in relationship to the overall PVID drain throughput in the model, and as such should be considered within the error of the model to reliably predict the change in mass flux from the drains. To ensure that the actual groundwater drawdown does not exceed the predicted drawdown, Mitigation Measure WATER-4 requires that the Applicant develop and implement a Groundwater Monitoring and Mitigation Plan prior to construction.

Installation of new impervious surfaces can in some cases result in reductions in ground surface infiltration capacity, potentially causing reductions in net groundwater recharge. As discussed in greater detail below (see subsequent discussion of stormwater flows), the approximate percentage of the Project site that will be covered with impervious surfaces (inverter foundations, etc.), will constitute a fraction of one percent of the total surface area of the Project site. Infiltration of stormwater would be prevented from occurring within these areas. The unmitigated post-Project sediment transport will be less than the pre-Project conditions due to soil compaction during construction. In general, the Project site experiences relatively shallow and slow flows, so the nominal increases in post-Project flow depths and velocities do not overcome the decreased erosion potential due to compaction. Compaction of soils during construction would reduce infiltration slightly; however, the sandy desert soils located on site have generally high infiltration capacity. Additionally, areas surrounding the DQSP site would not be affected, and would remain pervious. Therefore, the potential effects of the proposed impervious surfaces on site would be minimal in comparison to the overall infiltration capacity of the DQSP site and surrounding areas. Within the solar field, the proposed panels are not expected to interfere with stormwater infiltration: rainfall incident on the panels would fall to the ground, which would remain pervious, and be permitted to infiltrate.

The BLM recognizes disagreement among water resource professionals as to whether hydrologic connectivity exists between the Palo Verde Mesa Groundwater Basin (PVMGB), which underlies the Project site, and the Colorado River via the intervening Palo Verde Valley Groundwater Basin (PVVGB) (Godfrey et al. 2013). The PVMGB and PVVGB collectively are referred to as the Palo Verde Groundwater Basin (PVGB). The issue is whether or not Project-related groundwater use could induce flows from the Colorado River into the PVMGB. Any resulting use of Colorado River water without an entitlement could be considered to violate the Law of the River (Colorado River Compact of 1922 and amendments).

After thorough review and consideration of input received during the formal comment period on the MSEP Draft EIS, BLM concluded that the data does not demonstrate that connectivity exists. Agricultural development in the area has caused changes in the groundwater flow patterns in local aquifers (USGS 1988). Irrigation and its associated network of drainage ditches have a significant effect on the saturated thickness of the aquifers and on the direction of groundwater movement through the aquifers (USGS 1988). In the vicinity of the Project site, a boundary between the PVMGB and the PVVGB exists along the toe of the mesa in the form of Palo Verde Valley Irrigation District (PVID) drains. Water from the Colorado River, located over 6 miles east of the mesa, does not flow into the PVMGB due to PVID's drains that intercept all river water (in the form of sub-surface flow within the PVVGB) flowing west toward the PVMGB. Similarly, in the vicinity of the Project, groundwater within the PVMGB either flows east into a PVID drain along the toe of the mesa or into a cone of depression formed by a well. PVID drains prevent underflow from the PVVGB into the PVMGB from occurring and no water flows directly from the Colorado River past the network of PVID drains into the PVMGB. However, the fact that connectivity has not yet been demonstrated does not preclude the possibility that connectivity could be shown in the future.

Separate from the groundwater model, BLM reviewed the Colorado River Accounting Surface methodology proposed by the USGS (USGS 2009). A review of the Figure 6 in the USGS analysis shows that the Accounting Surface elevation in the vicinity of the Project is approximately 237 feet above sea level. From Figure 5 in the Groundwater Modeling Report

(URS 2016d), the groundwater elevation in the Project area is approximately 245 to 250 feet above sea level. Based on the maximum modeled drawdown of approximately one foot, it is unlikely that the Project would withdraw groundwater from below the Accounting Surface. Mitigation Measure WATER-4 provides details related to the required analysis, including development of specific groundwater elevation triggers, and specific actions to be taken if trigger elevations are reached, to reduce the possibility of impacts related to Colorado River water.

Surface Water and Drainage Patterns

The DQSP would be constructed in an area that presently is drained primarily by sheet flow and desert washes. Low-frequency, high-intensity monsoonal storms in the region can result in high volumes of stormwater flow within the vicinity of the DQSP site, which can cause high volumes of surface runoff to occur in the vicinity of the Project area. Although on-site grading would be minimized, and major features of existing onsite drainages would be preserved, the installation of proposed facilities, including roads, fencing, and solar arrays, could interfere with existing drainage patterns onsite. These changes could result in altered hydrology on site or downstream, thereby causing increases in erosion and sedimentation.

In general, surface water drains onto the Project site from the surrounding mountains to the north and west, then towards the Colorado River to the east. There are no perennial streams on the Project site or the Palo Verde Mesa. The Project area consists of two distinct types of topography which affect site drainage. Approximately half of the northwestern portion of the Project site is part of an alluvial fan which slopes in a southeastward direction from the McCoy Mountains, located to the northwest. The southeastern portion of the site is a flat plateau, part of the Palo Verde Mesa. The ground surface in this area is characterized by a series of depressions in which surface water can pool.

The Project would cause minor impacts to the existing drainage shed area. During construction, the Project would alter the soil's hydraulic characteristics within the solar arrays due to vegetation removal and grading. Vegetation would be disked under, mulched or composted and retained onsite to assist in erosion control and limit waste disposal. Grading activities would consist of micrograding within sections of the solar array fields; however, the macro-level topography would remain unchanged.

A drainage study conducted for the Project shows that impacts to onsite drainage systems will be minimized due to the relatively flat terrain and presence of large natural depressions that range from one to five feet deep (TLA 2011). These large depressions store significant volumes of water which would attenuate the increased runoff. After construction, increases in flow depth, velocity and outflow would be mitigated with onsite retention basins sized with at least 20 AF of combined storm water storage capacity. In addition, sediment transport would be less than the pre-Project conditions due to soil compaction during construction.

The unmitigated post-Project impacts during the 100-year storm event are as follows:

- Average Flow Depth increase of 0.03-feet
- Average Flow Velocity increase of 0.04 feet/second
- Total Outflow increase of 20 AF (2.6%)

The maximum potential pier scouring at the solar array pedestal supports is 1.22 feet. The structural design and embedment depth of the solar panel pedestal piers shall account for the maximum potential scour plus a factor of safety. Monitoring after large storm events shall be implemented to detect piers with significant scouring.

Flood Hazards

No FEMA-designated flood zones exist within the vicinity of the Project. The Project site area and vicinity are classified by FEMA as Zone D, indicating an area where there are possible but undetermined flood hazards (FIRM map 06065C Panel 06065C3200G). In areas designated Zone D, no analysis of flood hazards has been conducted (URS 2011). Based on the site drainage report, the potential for flooding on the Project site is considered moderate (URS 2011). Although some surface water collects within the Project area, the Applicant is exploring site preparation methods that will contain water draining onto the site, and would fill the primary low areas, if necessary, to avoid flooding hazards in limited portions of the site area. The Project area also contains washes that periodically contain water during infrequent events, and an agricultural ditch surrounding an offsite jojoba farm also periodically contains water.

In the event that a major storm event occurs during operation of the DQSP, unanticipated flooding could occur onsite. Construction of the Project would involve the disturbance of soil that would slightly alter existing drainage patterns as well as its flow rate and volume. The Project would be designed such that existing drainage patterns would be preserved to the maximum extent practicable. Impacts to onsite drainage systems would be minimized due to the relatively flat terrain and presence of large natural depressions that range from one to five feet deep (TLA 2011). These large depressions fill with water and store significant volumes of water which would attenuate the increased runoff. Although these depressions would result in "flooding" onsite, these are naturally existing conditions that would not be altered as the result of the Project.

In addition, the Applicant would be required to implement Mitigation Measure WATER-3, which would ensure that proposed onsite buildings are protected from flooding, and that all onsite buildings and fill areas are placed outside of frequent flood flow areas.

Water Quality

During operation, the transportation, storage, and use of hazardous materials at the Project could potentially impact water quality at the site. The use of vehicles may involve the accidental release of fuel, oils, brake dust, lubricants, antifreeze, and other potentially hazardous substances at the construction site. These water quality pollutants could become entrained in surface water during storm events, and/or be infiltrated into groundwater and the underlying aquifer, resulting in the degradation of water quality. The Applicant proposes to use engineering and administrative controls as part of the Proposed Action and Alternatives. Engineering controls are the physical or mechanical systems that can prevent the spill of hazardous material from occurring, or that can either limit the amount of a spill or to a confined area. Administrative controls are the rules and procedures that workers at the facility must follow that would help to prevent accidents or to minimize releases if they do occur. These procedures typically are established in worker safety training and emergency response plans. Implementation of both engineering and administrative controls can act as methods of prevention or as methods of response and minimization. Potential spills of hazardous materials would be managed through hazardous materials management measures (see Section 4.9, *Hazards and Hazardous Materials*).

In addition, operation and maintenance of the Project would not result in the discharge of effluent, with the exception of stormwater. The unmitigated post-Project sediment transport will be less than the pre-Project conditions due to soil compaction during construction. In general, the Project site experiences relatively shallow and slow flows, so the nominal increases in post-Project flow depths and velocities do not overcome the decreased erosion potential due to compaction. As such, sediment transport would not increase as a result of the Project. Existing water quality would not be affected by extraction of groundwater during construction.

Springs

According to the NWIS database of Water Resources of the United States that is maintained by the USGS (2013), no springs or other surface water sites are located in the Project boundary or in the area of the larger Palo Verde Mesa Groundwater Basin.

Decommissioning

Groundwater Supply and Recharge

Decommissioning would take approximately one year, and would require approximately the same water use for dust suppression as the construction phase, resulting in additional groundwater pumping of up to 450 to 700 AFY during decommissioning. As described for Project construction, which would use a greater overall volume of groundwater and the same or greater annual pumping rate, model results indicated that drawdown outside of the solar field boundary, as well as potential effects of withdrawals on PVID facilities, would be minimal. Therefore, because decommissioning would result in reduced withdrawals as compared to construction, it would not have an adverse effect on groundwater supply or recharge.

Additionally, operational period pumping would be minimal. Therefore, ceasing of operational period pumping due to decommissioning would be expected to result in a minimal to negligible increase in remaining groundwater supplies within the basin.

To ensure that the actual groundwater drawdown does not exceed the predicted drawdown, Mitigation Measure WATER-4 requires that the Applicant develop and implement a Groundwater Monitoring and Mitigation Plan prior to construction.

Surface Water and Drainage Patterns

Decommissioning of the DQSP would result in a minor reduction in on-site impervious structures, because on-site facilities would be removed. Removal of such facilities would not substantially affect on-site or downstream hydrology, due to the limited extent of such facilities. Similar to DQSP construction, decommissioning could result in alteration of on-site topography, and therefore of on-site drainage patterns. These changes could result in altered erosion and sedimentation patterns, which could affect downstream areas on site or off site. Implementation of Mitigation Measures WATER-1, WATER-2, and WATER-3 would include development and adherence to the recommendations of a Decommissioning Drainage, Stormwater, and Sedimentation Control Plan, would reduce potential impacts from erosion and sedimentation.

Flood Hazards

Decommissioning would remove structures and people from areas that may be subject to flood-related hazards. Effects during decommissioning would be similar to construction. After decommissioning is completed, no further effects would occur.

Water Quality

Decommissioning impacts generally would be similar to those indicated for construction, with respect to potential for release of construction related water quality pollutants. Adherence to Colorado River RWQCB policies and ensure that water quality impacts associated with removal of that facility would be minimized.

4.20.3.2 Alternative 2: Resource Avoidance Alternative

Alternative 2 is located within the same footprint of Alternative 1, but the total ground disturbance would be 2,845 acres instead of 3,831 acres. Approximately 75 percent of the total Project area would be covered or shaded by solar modules under Alternative 2, versus approximately 75 percent coverage under Alternative 1. Water use scenarios for construction and operation would be the same for Alternative 2 as they are for Alternative 1. Construction techniques, general design, and operation of Alternative 2 would the same as for Alternative 1. As such, the hydrology and water quality impacts for Alternative 2 are the same or less as the results of the analysis of hydrology and water quality impacts presented for the Alternative 1.

4.20.3.3 Alternative 3: Reduced Project Alternative

Alternative 3 is located within the same footprint of Alternative 1, but the total ground disturbance would be 2,112 acres instead of 3,831 acres. Approximately 75 percent of the total Project area would be covered or shaded by solar modules under Alternative 3, versus approximately 75 percent coverage under Alternative 1. Water use scenarios for construction and operation would be the same for Alternative 3 as they are for Alternative 1. Construction techniques, general design, and operation of Alternative 3 would the same as for Alternative 1. As such, the hydrology and water quality impacts for Alternative 3 are the same or less as the results of the analysis of hydrology and water quality impacts presented for the Alternative 1.

4.20.4 Application of CEQA Significance Thresholds

HYD-1) Would the Project violate any water quality standards or waste discharge regulations?

Construction of Alternatives 1, 2, or 3 could result in a temporary degradation of water quality. The Project area of Alternatives 2 and 3 would be smaller than that for Alternative 1. Sediment would be the constituent of greatest concern during construction, resulting from potential erosion during excavation, grading, compaction, trenching, and other construction activities. These activities would involve the disturbance of soil which could introduce contaminants to stormwater runoff and affect water quality in surface water and groundwater. Other pollutants that could affect surface and groundwater quality during Project construction include petroleum products (e.g., gasoline, diesel, kerosene, and grease) from operating heavy machinery and equipment, paints and solvents, lubricants, detergents, fertilizers, and pesticides. Existing water quality would not be affected by extraction of groundwater during construction.

Any sanitary waste produced during construction (e.g., from portable toilets) would be disposed of according to applicable laws, rules, and regulations. In addition, implementation of worker environmental awareness training would provide construction personnel with instruction on their individual regulatory compliance responsibilities. With respect to water quality, the training would include worker responsibilities under the CWA, the SWPPP(s), site-specific BMPs, and about the location of Safety Data Sheets. The training also would provide instructions to notify the foreman and regional spill response coordinator in case of a hazardous materials spill or leak. Instruction also would be provided on the importance of maintaining the construction site in regards to trash disposal.

Alternatives 1, 2, or 3 would implement Mitigation Measure WATER-1 (Implementation of SWPPP) and WATER-2 (Comprehensive Drainage, Stormwater, and Sedimentation Control Plan) during construction. This includes implementing appropriate stormwater BMPs, as required in WATER-1. Implementation of the mitigation measures would reduce the potential water quality degradation of stormwater emanating from the DQSP site. With implementation of Mitigation Measures WATER-l and WATER-2, potential impacts to water quality would be minimized during construction. Therefore, construction impacts related to the violation of water quality standards or waste discharge requirements would be less than significant for Alternatives 1, 2, or 3.

During the operation of Alternatives 1, 2, or 3, no water quality standards or waste discharge requirements are anticipated to be violated as routine activities would be conducted per all applicable standards. Very little vehicular traffic will occur at the site, so the potential for runoff contaminated by vehicle pollutants would be low.

Transportation, storage, and use of hazardous materials at the Project could potentially impact water quality at the site. The use of vehicles may involve the accidental release of fuel, oils, brake dust, lubricants, antifreeze, and other potentially hazardous substances at the construction site. These water quality pollutants could become entrained in surface water during storm events, and/or be infiltrated into groundwater and the underlying aquifer, resulting in the degradation of water quality. The Applicant would implement engineering and administrative controls as methods of prevention or as methods of response and minimization. Potential spills of hazardous materials would be managed through hazardous materials management measures (see Section 4.9, *Hazards and Hazardous Materials*).

A septic system and leach field would be located at the O&M building, and would serve the Project's sanitary wastewater treatment needs. Because of the small operational work force for Alternatives 1, 2, or 3, volumes of sanitary waste discharged to the septic system and leach field will be no more than a few hundred gallons per day during operation. Permits for the septic system will be obtained from Riverside County, as needed. Soil percolation tests would be performed in order to demonstrate that an on-site septic system and leach field is feasible at the planned location.

Ongoing O&M of Alternatives 1, 2, or 3 would result in the discharge stormwater. The Project area of Alternatives 2 and 3 would be smaller than that for Alternative 1. The unmitigated post-Project sediment transport will be less than the pre-Project conditions due to soil compaction during construction. In general, the Project site experiences relatively shallow and slow flows, so the nominal increases in post-Project flow depths and velocities do not overcome the decreased erosion potential due to compaction. Mitigation Measure WATER 2 will be implemented to ensure that the retention basins and other design features retain stormwater onsite. As a result, O&M of Alternatives 1, 2, or 3 would not violate any water quality standards or waste discharge requirements. The impact from O&M of Alternatives 1, 2, or 3 would be less than significant.

HYD-2) Would the Project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

Construction and operation of the O&M buildings, On-Site Substation, and equipment pads would create new areas of impermeable surfaces that could potentially interfere with groundwater recharge; however, the new impermeable surfaces would be minimal in comparison to the total solar facility area which would be left in a pervious condition and would not significantly interfere with groundwater recharge.

Water supplies required for construction, operation, and maintenance of Alternatives 1, 2, or 3 would be provided by onsite groundwater wells. An analysis of impacts to groundwater supply and recharge was conducted based on modeling of the anticipated effect of Project-related groundwater withdrawal on the overall groundwater balance in the PVGB. The modeling also assessed potential impacts from the effect of groundwater withdrawal on the PVID drains, and the effect of the withdrawal on nearby groundwater wells.

Four existing well locations within the footprint of the Project were evaluated in the model as the pumping locations. Groundwater pumping simulations were modeled for both a 25-month and 48-month construction scenarios with 30 years of operation. The 25-month construction scenario assumes water usage of 700 AFY during the construction period for a total of 1,400 AF, and water usage of 38 AFY for the operational period of 30 years for a total of 1,140 AF. Total Project water usage of 2,540 AF would be pumped under the 25-month construction and 30 year operational scenario (32 years).

The 48-month construction scenario assumes water usage of 450 AFY during the construction period for a total of 1,800 AF, and water usage of 38 AFY for the operational period of 30 years for a total of 1,140 AF. Total Project water usage of 2,940 AF would be pumped under the 48-month construction and 30 year operational scenario (34 years).

Results from both scenarios indicated that the model-predicted drawdown outside of the solar field boundary would be less than 0.1 foot at the end of construction and at the end of operational pumping. Drawdown would primarily be constrained to the mesa area during construction and operation. Additionally, under the 450 AFY construction scenario, the model predicts that the extent of drawdown is less than predicted for the construction scenario with the higher pumping rate (700 AFY) and shorter 25-month duration. Under both construction scenarios, the impacts from water use are negligible to offsite water wells.

The cumulative change in flow through the PVID drains was evaluated for the two varying construction pumping rate scenarios and both scenarios show that there is a very small change in the PVID drain mass balance between the non-pumping and pumping condition at the end of construction and end of operation. For the 700 AFY construction scenario, there was a total change of about 476 AF at the end of the combined construction and operational period of 32 years. The total change represents 0.0037 percent of the 12.8 million AF of the throughput in the PVID drains over 32 years. For the 450 AFY construction scenario, there was total change of about 520 AF at the end of the combined construction and operational period of 34 years. The total change represents 0.0039 percent of the 13.5 million AF of the modeled throughput in the PVID drains over 34 years.

To ensure that groundwater levels are not impacted by the Project, Mitigation Measure WATER-4 (Groundwater Monitoring and Mitigation Plan) would be implemented. Based on the groundwater modeling conducted for the Project and with the implementation of WATER-4, impacts to groundwater supplies, groundwater recharge and groundwater levels during construction and operation would be less than significant for Alternatives 1, 2, or 3.

HYD-3) Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?

Alternative 1 would cause minor impacts to the existing drainage shed area. During construction, the Project would alter the soil's hydraulic characteristics within the solar arrays due to vegetation removal and grading. Vegetation would be disked under, mulched or composted and retained onsite to assist in erosion control and limit waste disposal. Grading activities would consist of micrograding within sections of the solar array fields; however, the macro-level topography would remain unchanged.

A drainage study conducted for the Project shows that impacts to on-site drainage systems would be minimized due to the relatively flat terrain and presence of large natural depressions that range from one to five feet deep (TLA 2011). These large depressions store significant volumes of water which would attenuate the increased runoff. After construction, increases in flow depth, velocity and outflow would be mitigated with onsite retention basins sized with at least 20 AF of combined storm water storage capacity. In addition, sediment transport would be less than the pre-Project conditions due to soil compaction during construction.

The Project would implement Mitigation Measures WATER-1 (Implementation of SWPPP) and WATER-2 (Comprehensive Drainage, Stormwater, and Sedimentation Control Plan) during construction. This includes implementing appropriate stormwater BMPs, as noted in WATER-1. Implementation of the mitigation measures would reduce the potential water quality degradation of stormwater emanating from the DQSP site.

With implementation Mitigation Measures WATER-l and WATER-2, impacts related to erosion or siltation as a result of an altered drainage patterns would be less than significant under Alternatives 1, 2, or 3.

HYD-4) Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

As described in HYD-3, construction activities associated with Alternatives 1, 2, or 3 would involve the disturbance of soil that would slightly alter existing drainage patterns as well as its flow rate and volume. The Project would be designed such that existing drainage patterns would be preserved to the maximum extent practicable. Impacts to onsite drainage systems would be minimized due to the relatively flat terrain and presence of large natural depressions that range from one to five feet deep (TLA 2011). These large depressions fill with water and store significant volumes of water which would attenuate the increased runoff. Although these depressions would result in “flooding” onsite, these are naturally existing conditions that would not be altered as the result of the Project.

With implementation of Mitigation Measures WATER-1, WATER-2, and WATER-3, construction impacts from Alternatives 1, 2, or 3 related to flooding onsite or offsite due to a change in drainage patterns or an increase in the rate or amount of surface runoff would be less than significant.

The structural components of the Project (solar panels) would not significantly alter the existing drainage patterns, including the rate and amount of surface flow. In addition, creation of impermeable surfaces relative to the Project area would be nominal allowing for infiltration of stormwater at rates close to existing conditions. Overall, the Project would result in slight alterations in the existing drainage pattern of the site or surrounding area (refer to discussion in HYD-3). However, the nominal post-Project increases in flow depth, velocity and outflow would be mitigated with onsite retention basins sized with at least 20 AF of combined storm water storage capacity. With implementation of Mitigation Measures WATER-1, WATER-2, and WATER-3, operational impacts from Alternatives, 2, or 3 related to flooding onsite or offsite due to a change in drainage patterns or an increase in the rate or amount of surface runoff would be less than significant.

HYD-5) Would the Project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

Creation of new access roads (both gravel and compacted earth/native soil) and construction of the On-Site Substation, and O&M facility, along with grading for installation of the solar array, would create additional sources of runoff. During earthwork activities, surface water control would be managed through the implementation of Mitigation Measures WATER-1 and WATER-2. With implementation of Mitigation Measures WATER-1 and WATER-2, Alternatives 1, 2, or 3 would not provide substantial increases in the amount of runoff or additional sources of polluted runoff, and construction impacts related to an exceedance of the capacity of existing drainage systems or a substantially greater contribution of polluted runoff would be less than significant.

During operation, nominal increases in flow depth, velocity and outflow are anticipated and would be mitigated with onsite retention basins sized with at least 20 AF of combined storm water storage capacity. Once the Project is in operation, the Project site conditions would be similar to the existing conditions and additional sources of polluted runoff would be insignificant. With implementation of Mitigation Measure WATER-2, Alternative 1, 2, or 3 operation impacts related to an exceedance of the capacity of existing or planned stormwater drainage systems or a substantially greater contribution of polluted runoff would be less than significant.

HYD-6) Would the Project otherwise substantially degrade water quality?

Ground disturbance related to construction of Alternatives 1, 2, or 3 could potentially degrade water quality through the inadvertent release of hazardous materials. The effects of the Project on water quality are discussed in detail under HYD-1. Please refer to this section for explanations of the impact determination during construction and operation.

To ensure that groundwater levels and quality are not impacted by the Project, Mitigation Measure WATER-4 (Groundwater Monitoring and Mitigation Plan) would be implemented. With implementation of Mitigation Measure WATER-4, impacts related to substantially degrading water quality would be less than significant for Alternatives 1, 2, or 3.

HYD-7) Would the Project place housing within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

Alternatives 1, 2, or 3 would not include the placement of housing within a 100-year flood hazard area as mapped on the FEMA Flood Insurance Rate Map. In addition, Mitigation Measure WATER-3 would be implemented to reduce impacts from flooding. Therefore, no impacts would occur from placing housing within a 100-year flood hazard area under Alternatives 1, 2, or 3.

HYD-8) Would the Project place within a 100-year flood hazard area structures which would impede or redirect flood flows?

The Project site is classified by FEMA as Zone D, indicating that there are possible but undetermined flood hazards (FIRM map 06065C Panel 06065C3200G). A drainage study conducted for the Project shows presence of large natural depressions that range from one to five feet deep (TLA 2011). These large depressions store significant volumes of water which would attenuate the increased runoff. After construction, increases in flow depth, velocity and outflow would be mitigated with on-site retention basins sized with at least 20 AF of combined storm water storage capacity. In addition, sediment transport would be less than the pre-Project conditions due to soil compaction during construction. In addition, Mitigation Measure WATER-3 would be implemented to reduce impacts to structures from flooding. During construction and operation, structures would not be placed within any known 100-year flood hazard area. Therefore, there would be no impacts under Alternatives 1, 2, or 3 related to the placement of structures within a 100-year flood hazard area which would impede or redirect flows.

HYD-9) Would the Project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

Alternatives 1, 2, or 3 would not be located in the vicinity of a levee or dam. Portions of the Project would be located in areas with large depressions that are capable of storing significant volumes of water; however, structures would not be located in these areas. In addition, Mitigation Measure WATER-3 would be implemented to reduce impacts to the Project from flooding. As such, the Project would not expose people or structures to significant risk of loss, injury, or death involving flooding. Impacts related to flooding, including as the result of the failure of a levee or dam would be less than significant.

HYD-10) Would the Project be at risk of inundation by seiche, tsunami, or mudflow?

Alternatives 1, 2, or 3 are not located near a body of water such as a lake or ocean; therefore, there would be no impacts to the Project from a seiche or tsunami.

Mudflows are flows of water that contain large amounts of silt, sand, boulders, organic material, and other debris. Mudflows occur on steep slopes where vegetation is not sufficient to prevent rapid erosion but can occur on gentle slopes if other conditions are met such as large, sudden rainfall events. The Project site and immediate surrounding area is relatively flat and is in an area that is characterized by dry climatic conditions. Annual rainfall in the Project area is approximately 3.5 inches per year, although high intensity storm events may occur. High intensity storms could generate significant runoff from steep mountains in the surrounding Project area. These mountains are composed of metamorphic and granitic rocks and are less prone to mudflows. As such, there would be no impact to the Project from mudflows.

HYD-11) Would the Project include new or retrofitted Stormwater Treatment Control BMPs (e.g., water quality treatment basins, constructed treatment wetlands), the operation of which could result in significant environmental effects (i.e., increased vectors and/or odors)?

Alternatives 1, 2, or 3 would include onsite retention basins located at the upstream and/or downstream edges of the Project. Retention basins would be sized with at least 20 AF of combined stormwater storage capacity. These retention basins would contain water only after large storm events and shortly thereafter. Annual rainfall in the Project area is approximately 3.5 inches per year, therefore; construction and operation of these stormwater features are not expected to result in significant environmental effects. The impacts would be less than significant.

HYD-12) Would the Project cause changes in absorption rates or the rate and amount of surface runoff?

See HYD-3 and HYD-4 above. The Project would cause slight changes in the absorption rates and amount of surface water to onsite or offsite drainages due to compaction. However, the nominal post-Project increases in flow depth, velocity and outflow would be mitigated with on-site retention basins sized with at least 20 AF of combined storm water storage capacity.

The Project will implement Mitigation Measures WATER-1 and WATER-2. Appropriate stormwater BMPs are included in these mitigation measures. Implementation of the mitigation measures would help manage surface runoff. With implementation of WATER-l and WATER-2, potential alteration to drainages would be minimized during construction and operation, and impacts to runoff and absorption rates from Alternatives 1, 2, or 3 would be less than significant.

HYD-13) Would the Project cause changes in the amount of surface water in any water body?

See HYD-2 above. If groundwater is used as the water supply, the Project would reduce the amount of water flows to the PVID drains. For the 700 AFY construction scenario, there was a total change to the PVID drains of about 476 AF at the end of the combined construction and operational period of 32 years. The total change represents 0.0037 percent of the 12.8 million AF of the throughput in the PVID drains over 32 years. For the 450 AFY construction scenario, there was total change of about 520 AF at the end of the combined construction and operational period of 34 years. The total change represents 0.0039 percent of the 13.5 million AF of the throughput in the PVID drains over 34 years. These changes in flow through are so small that they could not be reliably measured in the PVID drains, and would not have an adverse effect on Colorado River water supplies or diversions. If surface water from PVID is used, PVID has confirmed that the Project would not adversely affect their water supplies or other customers. Based on the groundwater modeling conducted, the small changes to surface water (PVID drains and Colorado River), would be less than significant under Alternatives 1, 2, or 3..

4.20.5 Alternative 4: No Action Alternative

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, the BLM would continue to manage the land under its land use jurisdiction consistent with the site's multiple use classification as described in the CDCA Plan, as it was amended by the Western Solar Plan.

If the site remained undeveloped, the existing environmental setting described in Section 3.20 would be maintained. There would be no water use, and no modification of site hydrology. Therefore Alternative 4 would not result in any water resources impacts.

4.20.6 Cumulative Impacts

The geographic scope of the cumulative impacts analysis with respect to water resources includes those areas overlying the PVGB for groundwater-related impacts, and the watershed for water quality and drainage-related impacts. The temporal scope for potential cumulative impacts includes the construction, operation, and maintenance periods of the Project.

Alternative 1 – Proposed Action

Construction, Operations, and Decommissioning

Groundwater

An assessment was conducted to evaluate the collective water supply requirements by multiple proposed renewable and other energy projects within the geographic area of the Palo Verde Mesa/Valley. The cumulative project list was prepared as part of the groundwater modeling report conducted for the Project and in coordination with the BLM (URS 2016d). In addition to the proposed DQSP, six other energy projects were identified on the mesa. Project schedules, operational and construction water supply requirements, and the source of the water supply were evaluated for each project identified. Tables 2A and 2B of the groundwater model for the Project (URS 2016d) provide a summary of the individual water use for each project and provide an assessment of total yearly and cumulative use for the 25-month and 48-month construction scenarios and the operational period of 30 years.

For the 700 AFY construction pumping scenario, the cumulative energy projects combined annual construction and operational water requirements range from an estimated 1,831 AFY to 4,831 AFY at the end of the 25-month construction period. During the first year of construction, the Project represents about 38 percent of the total combined annual water usage from energy projects in the PVGB, and approximately 14 percent during the second year of construction.

Cumulative total water use from these energy projects, through 2018, is estimated to be approximately 7,603 AF. This represents approximately 0.11 percent of the estimated 6.84 million AF of groundwater storage capacity of the PVGB.

Under the 450 AF construction scenario the cumulative energy projects combined annual operational water requirements range from an estimated 1,581 up to 4,581 AFY during the 48-month construction period. During the first year of construction, the Project represents about 28 percent of the total combined annual water usage from energy projects in the PVGB, and approximately 13 percent during the fourth year of construction. Cumulative total water use from these energy projects, through 2020, is estimated to be approximately 15,167 AF. This represents approximately 0.22 percent of the estimated 6.84 million AF of groundwater storage capacity of the PVGB.

Given the saturated thickness of the alluvial deposits of several hundred feet in the area, the estimated 6.84 million AF of groundwater storage capacity of the PVGB, and the small cumulative change in flow through the PVID drains, the Project would not contribute to cumulative impacts to groundwater levels and recharge during construction and operation (impact HYD-2). In addition, pumping of groundwater for the Project on the mesa would not impact the quality of the groundwater during construction and operation. During decommissioning, the cumulative impacts to groundwater would be similar to those during construction because groundwater would be used for decommissioning activities.

Surface Water Supplies

As discussed in Section 2.3.3.8, an off-site water supply may be used to supplement, or in place of, water from groundwater wells. The source of this water would be the PVID, which obtains water from the Colorado River through Priority 1 and Priority 3 rights pursuant to a 1933 Water Delivery contract with the United States (URS 2016a, provided in Appendix Y).

The majority of the Project site is located within the PVID service boundaries, and PVID has confirmed that PVID may supply water to areas within these boundaries for beneficial uses, which would include the Project. PVID has provided a letter, included as Appendix C of the WSA, indicating that they are capable and willing to supply the water for Project needs, and that their water supply and other customers would not be negatively impacted.

Other solar energy Projects in the area, including BMSP and the Palo Verde Mesa Solar Project, use surface water supplied by PVID. BMSP will use 451 AFY during its three year construction period, and a negligible amount during operations. Palo Verde Solar will use 500 AFY during its three year construction period, and 302 AFY during operations. Both sites occupy former agricultural lands, so the amount of water used for solar project construction and operations is much lower than was used for irrigation when those properties were used for agriculture.

Surface Water Hydrology

Cumulative surface water hydrology impacts can occur if the effects of individual projects, including modification of the amount of surface water or sedimentation downgradient from a project site, would overlap with the effects of another project. As discussed in the analysis of impacts HYD-3 through HYD-5, HYD-11, and HYD-12 in Section 4.20.4, a drainage study conducted for the Project shows that impacts to on-site drainage systems would be minimized due to the relatively flat terrain and presence of large natural depressions that range from one to five feet deep (TLA 2011). These large depressions store significant volumes of water which would attenuate the increased runoff. After construction, increases in flow depth, velocity and outflow would be mitigated with onsite retention basins sized with at least 20 AF of combined storm water storage capacity. Because of these features, surface water flow onto the Project site from upgradient is attenuated. In addition, onsite stormwater flow would be managed under several regulatory programs and mitigation measures, including Mitigation Measures WATER-1 (Implementation of SWPPP) and WATER-2 (Comprehensive Drainage, Stormwater, and Sedimentation Control Plan). Similar BMPs and regulations are required of any projects located upgradient of the Project site. Because flow from upgradient projects is mitigated by BMPs and regulatory controls, flow onto the Project site from upgradient is attenuated in onsite features, and flow off of the Project site is mitigated by BMPs and regulatory controls, the contribution of the Project to cumulative surface water hydrology impacts is not cumulatively considerable.

The cumulative change in flow through the PVID drains was evaluated for the two varying construction pumping rate scenarios and both scenarios show that there is a very small change in the PVID drain mass balance between the non-pumping and pumping condition at the end of construction. For the 700 AFY construction scenario, there was a total change of about 0.36 AF at the end of construction. The total change represents 0.000031 percent of the 1.2 million AF of the throughput in the PVID drains over 25 months. For the 450 AFY construction scenario, there was total change of about 7.87 AF at the end of construction. The total change represents 0.00037 percent of the 2.3 million AF of the throughput in the PVID drains over 48 months.

These small changes in flow through could not be reliably measured in the PVID drains and thus the model prediction cannot be verified. As noted, the change is very small in relationship to the overall PVID drain throughput in the model, and as such should be considered within the error of the model to reliably predict the change in mass flux from the drains. Therefore the contribution of the Project to the amount of surface water (impact HYD-13) would not be cumulatively considerable.

The Project would not result in housing or structures in a 100-year flood zone (impacts HYD-7 and HYD-8), and would not be subject to hazards associated with levees or dams (impact HYD-9) or seiche, tsunami, or mudflow (impact HYD-10).

Alternative 2 – Resource Avoidance Alternative

Construction, Operations, and Decommissioning

The cumulative impacts for Alternative 2 would be similar to those of Alternative 1 because even with the reduced ground disturbance footprint, groundwater use would be the same during construction, operation, and decommissioning as for Alternative 1. For Alternative 2, it is assumed that water use for other projects on the mesa would remain the same during the construction and operation as for of Alternative 1. In addition, the construction and operational periods would be the same for Alternative 2 as they are for Alternative 1, therefore, cumulative impacts for Alternative 2 are less than significant.

Alternative 3 – Reduced Project Alternative

Construction, Operations, and Decommissioning

The cumulative impacts for Alternative 3 would be similar to those of Alternative 1 because even with the reduced ground disturbance footprint and reduced output, groundwater use would be the same during construction, operation, and decommissioning as for Alternative 1. For Alternative 3, it is assumed that water use for other projects on the mesa would remain the same during the construction and operation as for of Alternative 1. In addition, the construction and operational periods would be the same for Alternative 3 as they are for Alternative 1, therefore, cumulative impacts for Alternative 3 are less than significant.

4.20.7 Residual Impacts

Even with mitigation measures, the Project would result in minor adverse impacts to water resources. These would include a minor reduction in groundwater levels, and minor changes to stormwater flow characteristics. Although evidence indicates that project wells would not induce flow from the Colorado River, some uncertainty remains. Implementation of the mitigation measures identified above (i.e., WATER-4) would avoid or offset potential impacts, if any, related to Colorado River water. Consequently, no residual impact would occur. Following decommissioning, groundwater use would cease, and site topography would be restored. Therefore, both impacts would cease to occur following decommissioning of the Project. If releases of hazardous materials were to occur and result in groundwater contamination that could not be remediated before the completion of decommissioning, it is possible that residual groundwater contamination would remain after surface-based decommissioning activities are completed. As specified in Mitigation Measure WATER-1, decommissioning would not be considered complete until BLM approved completion of any groundwater remediation activities required of the Applicant.

4.21 Wildland Fire

4.21.1 Methodology for Analysis

This analysis of impacts of the Project on wildland fire ecology assesses the size, location, and environmental setting of the Project; the number and type of vehicles that would access the site for construction, operation, maintenance, and decommissioning activities; and potential fire hazards resulting from operation of the electrical infrastructure.

4.21.1.1 CEQA Significance Criteria

The criteria listed below were used to determine if the DQSP would result in significant impacts under CEQA to wildland fire ecology. These indicators are the same as the significance criteria for wildland fire listed in the CEQA Environmental Checklist, Appendix G of the state CEQA Guidelines. The Proposed Action would result in an adverse impact on wildland fire ecology if it would:

> Fire-1) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

4.21.2 Applicant-Proposed Measures

There are no APMs to address potential effects of wildland fires.

4.21.3 Direct and Indirect Impacts

4.21.3.1 Alternative 1: Proposed Action

Construction

Construction activities would involve the use of vehicles and heavy machinery, which could potentially result in the ignition of a wildfire through contact between heated mufflers and vegetation. Wildfire ignition could also occur as a result of personnel smoking onsite. Even though potential ignition sources such as heavy equipment would be used during construction, the probability of a wildfire to occur as a result of Project construction would be low due to the lack of fuel. One of the first activities to occur as part of construction would be removal of vegetation and site grading, so any potential fuel material would be removed during the initial stages of construction.

If the introduction of invasive, non-native plants is not controlled during construction, over time the Project site could become dominated with non-native plants that tend to increase the frequency and severity of wildfires. As described in Section 3.21, the occurrence of wildfires in the area historically has been low; however, repeated fires are known to decrease the perennial plant cover and to aid some invasive annual plants. In turn, where they gain widespread propagation, these invasive plants would provide fuel to carry flames, potentially resulting in larger fires in the future. Surface disturbing activities and vehicle use that promotes the introduction of invasive plants would increase this likelihood.

The proposed vegetation management measures described in Section 2.3.7.2, including an Integrated Weed Management Plan, would minimize the potential for weed colonization and dominance on site by including implementation of a risk assessment of the invasive weed species currently known within the study area, procedures to control their spread on site, and procedures to help minimize the introduction of new weed species. Implementation of these measures would not completely eliminate the introduction of noxious weeds into the study area, but would minimize their introduction and control their spread on the Project site.

During construction, electrical equipment would only be energized after the necessary inspection and approval, so there is minimal risk of any electrical fire. Workers would monitor fire risks during both construction and operation, to ensure that prompt measures are taken to mitigate identified risks. In addition, transformers located on-site would be equipped with coolant that is non-flammable, biodegradable, and contains no polychlorinated biphenyls or other toxic compounds. The network of access roads would be developed to ensure that there is adequate access for fire control and emergency vehicles to the site.

Because implementation of the Project would remove the land area from other uses, it would preclude current OHV and other casual uses. As a result, implementation of the Project may slightly decrease the potential for wildfire risks associated with recreational and other casual uses.

Impacts of wildland fire that escapes control and spreads beyond the Project could include permanent damage to biological resources and other natural resources, such as air quality and water quality, in addition to the potential for loss of life and destruction of property.

As discussed in Section 2.3.7.3, the Applicant would coordinate with Riverside County to ensure that appropriate measures are implemented to control the risk of fire. Measures may include installation of an aboveground water storage tank adjacent to the O&M Building, which would be sized to meet Riverside County Fire Department requirements, as applicable, to supply sufficient fire suppression water during construction and operations.

The BLM would be first responder for wildland fires and the County for structures. The Project area falls within acceptable Total Response Time policy standards for an ‘outlying’ land use area based on its proximity to the nearest RCFD station (Station 45, Blythe Air Base, 17280 W. Hobson Way, Blythe, CA 92225) and that station’s ability to meet the seventeen minute and 30 second response time standard. Additionally, the Project site is in close proximity to the City of Blythe Volunteer Fire Department.

Mitigation Measure FIRE-1 would require the Applicant to prepare and implement a Fire Safety Plan which incorporates the use of appropriate fire protection equipment, worker training, and consultation with local fire departments to identify appropriate protocols and procedures for fire prevention and early response to minor fire. These measures would minimize the potential for a wildfire ignition to occur as a result of Project-related construction activities and the presence of personnel on site. The plan would comply with applicable Riverside County regulations, and would be coordinated with the Riverside County Fire Department and BLM.

Operations

Wildfire risk associated with the presence of vehicles, equipment, and workers during operations would be reduced from that associated with construction. Once construction is completed, the number of workers, vehicles, and equipment would be a small fraction of that present during construction.

During operation and maintenance of the Project, fire protection systems for the solar plant site would include a fire protection water system for protection of the O&M building and portable fire extinguishers. An aboveground process water/firewater storage tank would be located adjacent to the O&M Building. The size and dimensions of the tank would be determined based on Riverside County Fire Department requirements for firewater storage. Additional fire protection measures would include sprinkler systems in the O&M Building; a FM200 fire suppression system, or equivalent, in the facility control room at the O&M building; and portable carbon dioxide (CO_2) fire extinguishers mounted at the power conversion system units. All Project facilities would be designed, constructed, and operated in accordance with applicable fire protection and other environmental, health and safety requirements. Mitigation Measure FIRE-1 would apply to operations, as well as construction.

Electrical transmission lines can initiate a fire if an object, such as a tree limb or kite, simultaneously contacts the subtransmission line conductors and a second object, such as the ground or a portion of the supporting pole, or if two conductors make contact. Conductor-to-conductor contact can occur when extremely high winds force two conductors on a single pole to oscillate so excessively that they contact one another. This contact can result in arcing (sparks) that can ignite nearby vegetation. Electrical arcing from power is more prevalent for lower voltage distribution lines than for transmission lines such as those proposed gen-tie lines because distribution lines are typically on shorter structures and in much greater proximity to trees and vegetation. Additionally, lightning strikes on power lines could create power surges that could result in a fire. Fire hazards from transmission lines are reduced through the use of taller structures and wider rights-of-way. CPUC General Order No. 95 and PRC §4293 contain rules and regulations for vegetation clearance surrounding electrical transmission lines. In general, the potential for such fires to occur during operations is expected to be minimal, because of the lack of trees and vegetation in the Project area.

Climate change would result in a small but general increase in temperature, and also could result in an increase in the frequency of extreme weather events that could generate wildfires, such as increased frequency of drought and heat waves or wetter seasons that increase fuel loads, during operation and maintenance of the Project. Wind-blown flaming debris from a fire can ignite vegetation in the surrounding area. The Project's vegetation management measures, fire protection systems, and adherence to building codes relevant to fire safety and other applicable laws and regulations would reduce the potential for wildfire ignition and the potential for a wildfire to spread out of control. The Applicant would be required to comply with vegetation clearance requirements around structures at the site. In addition, access roads across the Project site would break the continuity of fuels at the site, which would slow or stop the progression of potential wildfires originating at the site.

Decommissioning

Impacts from decommissioning would be similar to those described for construction.

4.21.3.2 Alternative 2: Resource Avoidance Alternative

The potential for wildland fire impacts under Alternative 2 would be lower than that described for the Proposed Action. The potential risks associated with vehicles and equipment, workers smoking, invasive weeds, and electrical hazards would be the same. However, the alternative would require a smaller number of vehicles and workers, and a reduced acreage, so the chances of ignition and spread of a fire would be reduced. The provisions of Mitigation Measure Fire-1 would apply to Alternative 2, as to the Proposed Action.

4.21.3.3 Alternative 3: Reduced Project Alternative

The potential for wildland fire impacts under Alternative 3 would be lower than that described for Alternatives 1 and 2. The potential risks associated with vehicles and equipment, workers smoking, invasive weeds, and electrical hazards would be the same. However, Alternative 3 would require a smaller number of vehicles and workers, and a reduced acreage, so the chances of ignition and spread of a fire would be reduced from that of Alternatives 1 and 2. The provisions of Mitigation Measure Fire-1 would apply to Alternative 3, as to the Proposed Action.

4.21.4 Application of CEQA Significance Thresholds

Fire-1: Would the Project expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

Alternatives 1, 2, or 3 would not result in persons living or working in areas of greater fire risk. Alternatives 1, 2, and 3 would present a minimal risk of igniting wildland fires that would expose people or structures to a significant risk of loss, injury, or death involving wildland fires. Therefore, no impact would occur under Alternatives 1, 2, or 3.

4.21.5 Alternative 4: No Action Alternative

Under the No Action Alternative, BLM would not authorize a ROW grant for the Project. Because the Project would not be approved, the BLM would continue to manage the land under its land use jurisdiction consistent with the site's multiple use classification as described in the CDCA Plan, as it was amended by the Western Solar Plan.

If the site remained undeveloped, the existing environmental setting described in Section 3.21 would be maintained. The plant alliances at the Project site would not be expected to change noticeably from existing conditions and therefore, Alternative 4 would not result in any impacts to wildland fire ecology.

4.21.6 Cumulative Impacts

The geographic area for cumulative wildland fire impacts includes other projects which could combine with the effects of the Proposed Action to contribute to the risk for wildland fire. For purposes of this analysis, this area is estimated to be within one mile of the site boundary. The past, present, and reasonably foreseeable future projects included within this area include the BMSP, the transmission lines on the northern and southwestern boundaries of the Project area, the CRSS, and the proposed RE Crimson Solar Project. The temporal scope for analysis of wildland fire impacts from the Project is the life of the Project, including construction, operations, maintenance, and decommissioning phases. Following decommissioning, the Project would no longer contribute to potential wildland fire impacts.

Alternative 1 – Proposed Action

Construction, Operations, and Decommissioning

The past, present, and reasonably foreseeable future projects could increase the risk of wildland fire by increasing the number of vehicles, equipment, and persons in the area, and through the introduction of non-native vegetation. More worker and vehicle activity in and around the Project would increase the chance of wildfire ignitions. The installation and operation of transmission lines and the use of equipment (including motor vehicles) that could spark or otherwise provide an ignition source could combine to cause or create a cumulative impact. Additionally, the increased human presence and disturbance caused by the construction, operation and overall development that would occur under the cumulative scenario could advance the rate of invasion by non-native vegetation and, thereby, contribute to fire fuel-loading that would burn with higher flames and hotter temperatures. Impacts of wildland fire could include damage to biological resources and other natural resources, such as air quality and water quality, in addition to the potential for loss of life and destruction of property. Because the plant alliances in the Project area are not fire-adapted, increases in fire frequency or size would be detrimental to the area’s ecology.

Each of the past, present, and future projects would operate under the fire prevention and response requirements of the Riverside County Fire Department and/or BLM-required mitigation measures associated with fire prevention and response. Project features such as vegetation treatment, weed management, and worker safety fire precautions at all of the projects would lower the probability of such ignitions. Therefore, cumulative impacts would be less than significant.

Alternative 2 – Resource Avoidance Alternative

Construction, Operations, and Decommissioning

The incremental impact of Alternative 2 to cumulative wildland fire impacts would be slightly reduced from that of the Proposed Action, because of the lower numbers of workers, vehicles, and equipment.

Alternative 3 – Reduced Project Alternative

Construction, Operations, and Decommissioning

The incremental impact of Alternative 3 to cumulative wildland fire impacts would be slightly reduced from that of Alternatives 1 and 2, because of the lower numbers of workers, vehicles, and equipment.

Alternative 4 – No Action

For the No Action Alternative, wildfire risks would continue to be associated with OHV and other casual uses of the area.

4.21.7 Residual Impacts

Despite the fire and weed control programs that would be incorporated into the Project, the changes in vehicle use accessing the area for construction, operation, maintenance, and decommissioning would increase the likelihood of wildfires in the Project area to a slight, but unknown degree. The existing Fire Hazard Severity Zone (FHSZ) classification for this area would likely remain moderate.

CHAPTER 5
OTHER NEPA AND CEQA CONSIDERATIONS

5.1 Irreversible and Irretrievable Commitments of Resources

State CEQA Guidelines Section 15126.2 and NEPA Regulations (40 Code of Federal Regulations [CFR] Part 1502.16, 1508.8(b)), the Bureau of Land Management (BLM) NEPA Handbook (H-1790-1 Section 9.2.9) require a discussion of irreversible or irretrievable commitments of resources that would be associated with the implementation of any Proposed Action or action alternative.

Resources irreversibly or irretrievably committed to by a Proposed Action are those used or modified on a long-term or permanent basis. An irretrievable commitment of resources includes activities such as the use of non-renewable resources like metal, wood, fuel, paper, and other natural or cultural resources. These resources are considered irretrievable in that they would be used or modified by a Proposed Action, and are no longer available for other potential uses. An irreversible commitment of resources includes activities such as the unavoidable destruction of natural resources that could not, or would not, be restored. Such a commitment could occur if releases of hazardous materials associated with the Project were to result in environmental damages that could not be remediated.

Each of the DQSP action alternatives would irreversibly and irretrievably commit resources over the 30-year life of the Project. Project construction would require use of water, electricity, and fossil fuels for delivery and assembly of components. These would be consumed during construction, and would not be retrievable following Project decommissioning. The Project components would be made of metal and glass, which would not be available for any other uses during the 30 year life of the Project. After 30 years, the Project would be decommissioned. Some of the metal and glass components would be retrieved, and would be used for other purposes. Although the land area would be re-graded and re-vegetated, it is likely to take a long time before the area would be restored to its pre-Project state; open desert lands and sensitive desert habitats can take a long time to recover from disturbances such as development.

The Project is a renewable energy project intended to generate solar energy to reduce reliance on fossil fuels. Over its projected 30-year life, the Project would contribute incrementally to the reduction in demand for fossil fuel use for electricity-generating purposes. By reducing the demand for other fuel sources, the Project would have a long-term, beneficial effect in avoiding irretrievable use of non-renewable fossil fuels by other energy projects.

5.2 Significant Unavoidable Impacts

Environmental impacts of the Project and action alternatives are discussed in Chapter 4 of this Draft PA/EIS/EIR. As required by CEQA, mitigation measures have been proposed to reduce significant environmental impacts to a level of less than significant. As required by NEPA, where potential adverse environmental impacts have been identified, mitigation measures are proposed that, when implemented, would reduce the impact.

Summaries of the impacts and mitigation measures for each resource area are provided in the Executive Summary. Unavoidable, significant environmental impacts include:

- Emissions estimates for Project construction and decommissioning would exceed applicable MDAQMD daily and annual thresholds for NO_x, PM_{10}, and $PM_{2.5}$. The emissions estimates assume that the APMs and Mitigation Measures AQ-1 and AQ-2 would be applied, but these measures would not reduce these emissions to be below MDAQMD thresholds, resulting in a significant and unavoidable impact for construction and decommissioning. This impact would be temporary, occurring only during active construction and decommissioning, and would cease once each of these phases is completed. This impact is furthermore unavoidable, regardless of which alternative is selected.
- Though the existing visual character of the Project site is already influenced by existing transmission lines and other energy projects, the Project would result in substantial degradation of the existing visual character and visual quality of the Project site when viewed from elevated locations. Mitigation Measures VIS-1, 2, 3 and 4 would reduce visual contrast of the Project during construction, operation and decommissioning; however, these measures would not fully mitigate the significant visual impact of the Project. Therefore, the Project would result in a significant and unavoidable impact to visual resources.

5.3 Energy Conservation

Appendix F of the state CEQA Guidelines provides guidance for assessing the significance of energy conservation-related impacts of projects. The appendix identifies the following means to achieving the goal of energy conservation:

- Decreasing overall per capita energy consumption;
- Decreasing reliance on natural gas and oil; and
- Increasing reliance on renewable energy sources.

Based on Appendix F, energy conservation-related environmental impacts would be considered significant if a project would:

a) Result in substantially inefficient or wasteful consumption of energy;
b) Affect local and regional energy supplies to the point that additional capacity of those energy supplies would be required;
c) Adversely affect peak and base period demands for electricity and other forms of energy;
d) Conflict with existing energy standards;
e) Adversely affect existing energy resources; or
f) Result in substantial transportation energy use requirements with no efficient transportation alternatives.

The analysis of the significance of the Proposed Project with respect to these criteria is presented below. This analysis also applies to the other action alternatives, Alternatives 2 and 3, for which energy usage would be similar to that of the Proposed Project.

a) Result in substantially inefficient or wasteful consumption of energy.

Construction of the Project would require both direct and indirect uses of energy. Direct energy use would include the consumption of diesel fuel and gasoline for operation of construction vehicles and equipment, generators, and commuting vehicles for workers. Indirect energy use includes the energy required to make the materials and components used in construction. This includes energy used for extraction of raw materials, manufacturing, and transportation associated with manufacturing.

The consumption of energy as a result of Project construction would be irreversible. However, the highest level of consumption of energy would be temporary during the construction period, and would not continue during operations. Energy consumption required during operation and maintenance would be minimal, limited to consumption of diesel fuel and gasoline for commuting of workers and for maintenance vehicles. Energy consumption would increase again during decommissioning, but would be at a lower level than that for construction, and would also be temporary. Project activities would not result in long-term depletion of non-renewable energy resources, and would not permanently increase reliance on energy resources that are not renewable. Activities would not reduce or interrupt existing electrical or natural gas services due to insufficient supply, and are not expected to have a significant adverse effect on energy resources. Impacts from the Proposed Project on the consumption of energy would be less than significant.

b) Affect local and regional energy supplies to the point that additional capacity of those energy supplies would be required.

The impact of the Proposed Project on regional energy supplies would be beneficial. The purpose of the Project is to provide renewable energy resources to reduce reliance on non-renewable resources, and to contribute to meeting projected local peak demand electricity needs. Consequently, the Proposed Project would have a beneficial impact on local and regional energy supplies because it would ensure that current energy needs are met and that there is capacity to meet projected future energy needs. No adverse impact on local or regional energy supplies or capacity would result.

c) Adversely affect peak and base period demands for electricity and other forms of energy.

The Proposed Project would generate electrical energy which would be provided to the grid during peak and base periods. Therefore, the impact of the Project on peak and base period electrical demand would be beneficial. Because electricity for construction of the Project would be provided by generators, the Project would not be a source of electricity demand during peak periods, and there would be no adverse impact.

d) Conflict with existing energy standards.

Energy standards applicable to the Project are discussed in Sections 1.3.1 and 1.3.2, and include:

- Executive Order 13783 (March 28, 2017) and Secretary's Order 3349 (March 29, 2017) establishes policy to promote clean and safe development of the energy resources within the United States.
- Executive Order 13807 (August 15, 2017) and Secretary's Order 3355 (August 31, 2017) established policy to prioritize infrastructure projects and streamline the environmental review process.

- Section 211 of the Energy Policy Act of 2005 established a goal for the Department of the Interior to approve non-hydropower renewable energy projects on the public lands with at least 10,000 MWs of capacity by 2015. To achieve and exceed this goal, the BLM has now authorized over 17,000 MWs of non-hydropower renewable energy projects. The BLM continues to prioritize renewable energy development on public lands.
- Desert Quartzite is a covered project under Title 41 of Fixing America's Surface Transportation Act (FAST-41). FAST-41 established new coordination and oversight procedures for infrastructure projects being reviewed by Federal agencies. The intent of the act is to improve early coordination between government agencies, increase public transparency, and increase government accountability.
- SB X1-2, which increases the state's Renewable Portfolio Standard (RPS) to 33 percent by 2020, SB 350, which increases the state's RPS to 50 percent by 2030.
- Executive Order S-14-08 expanded this goal, mandating that "all retail sellers of electricity shall serve 33 percent of their load with renewable energy by 2020."

The impact of the Proposed Project would be beneficial, because assisting in meeting these standards is an objective of the Project. Operation of the Project would include ongoing maintenance activities that would require the use of trucks and equipment that use non-renewable fuels, but energy use for these purposes is expected to be minimal, requiring a negligible percentage of the overall energy used in the Project area. There would be no conflict with current energy conservation standards.

e) Adversely affect existing energy resources.

The Proposed Project would provide energy during peak hours, thus increasing the reliability of the local electrical subtransmission grid during peak demand times, and reducing the likelihood of interruptions in electrical distribution due to demand on the system. Consequently, the Proposed Project would not result in adverse impacts on energy resources.

f) Result in substantial transportation energy use requirements with no efficient transportation alternatives.

The Proposed Project construction would consume energy, in the form of diesel fuel and gasoline, during transportation of workers and materials to and from the Project site. This energy use would cease following the construction period. During operation and maintenance, transportation-related energy use would be limited to five round trips for commuting workers each day. The amount of fuel required for construction, operation, and maintenance activities would not be substantial, and energy use impacts would be less than significant.

5.4 Short-Term Uses and Long-Term Productivity

The BLM NEPA Handbook (H-1790-1 Sec. 9.2.9) and the NEPA Guidelines (40 CFR 1502.16) require a discussion of the relationship between short-term uses of the environment resulting from the Proposed Action or alternatives and the maintenance and enhancement of long-term productivity of the environment.

The environmental impacts described for the Proposed Action or alternatives in Chapter 4, *Environmental Consequences*, include short-term uses of the land area and resources during construction and throughout the 30-year life of the Project, and permanent, adverse impacts that would affect long-term productivity of the Project area following Project decommissioning. Temporary adverse impacts to resources such as air quality would cease following construction, and would not impact the long-term productivity of the environment. Other short-term uses, such as the loss of sensitive desert habitats, could adversely affect the long-term productivity of the area, even following decommissioning. Both APMs and agency-required mitigation measures are proposed to avoid, minimize, or mitigate activities that impact long term productivity.

The Proposed Action and other action alternatives would also provide an environmental benefit by generating electric power with a minimal increase in the use of non-renewable resources such as fossil fuels. Such a benefit could influence the long-term productivity of the environment.

5.5 Growth-Inducing Impacts

NEPA Guidelines (40 CFR 1502.16) and state CEQA Guidelines Section 15126.2 require a discussion of growth-inducing impacts that potentially would result from implementation of the Proposed Action or other action alternatives. State CEQA Guidelines Section 15126.2(d) requires a discussion of the ways in which a project could foster economic or population growth, or induce additional housing, either directly or indirectly in the surrounding environment. NEPA regulations also require consideration of the growth-inducing impacts of a project. As stated in 40 C.F.R. § 1508.8(b), “indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.” Typically, a project’s growth-inducing potential would be considered significant if it leads to population increases above what is assumed in local and regional land use plans, or in projections made by regional planning authorities. Significant growth-inducing impacts also could occur if a project provides infrastructure or service capacity that would accommodate growth levels beyond those permitted by local or regional plans and policies.

The Proposed Action or alternatives would not result in permanent increase in the local population, nor would they encourage growth and development through changes in land use designations or by providing utilities and/or access to previously undeveloped areas. No lands would be converted to residential or commercial use by the Project. The transmission lines associated with Project development would connect Project electrical output to the grid, but would not provide service to previously unserved areas. No new roadways would be constructed that would provide access to nearby areas, or that would open areas to residential or commercial development.

The new electrical generating capacity provided by the Project would not be considered to have significant growth-inducing impacts. Federal and California legal mandates to increase the use of renewable energy sources are not necessarily growth-related. In 2006, the California passed the California Global Warming Solutions Act (AB 32), which required the state to reduce emissions of CO_2 and other GHGs to 1990 emission levels (a 25 percent reduction) by 2020. SB 1368 was enacted in 2006, which prohibits California electric utilities from constructing power plants or entering into long-term purchase contracts with facilities that do not meet the GHG emissions standard. The California RPS legislation requires investor-owned utilities (IOUs), publicly-owned utilities, and energy service providers to increase purchases of renewable energy such that at least 33 percent of retail sales are procured from renewable energy resources by December 31, 2020. The California mandates do not apply only to incremental power generation capacity that does not yet exist. The required shift in generation to renewables is not merely to power future growth – it also applies to the generating capacity needed to continue to serve the current level of demand on an ongoing basis. In addition, utility organizations are obligated to be able to meet the current and projected future electrical demand of their customers – having insufficient capacity is not an option. Because electrical demand is projected to increase in the coming years, the utilities need additional capacity to meet the projected demand, as well as to replace aging generating capacity that must be retired. This need for additional capacity is forecasted with or without implementation of the Project.

CHAPTER 6
COORDINATION, CONSULTATION, AND PUBLIC INVOLVEMENT

6.1 Introduction

Consistent with CEQA and NEPA requirements, public participation and agency consultation for this Project have been accomplished through issuance of public notices, public scoping meetings, and formal and informal consultation with agencies, stakeholders, landowners, and Native American Tribes. The consultation and coordination process was used to develop the range of alternatives, data sources, range of issues to be considered, and mitigation measures for the Draft PA/EIS/EIR. The Bureau of Land Management (BLM) is the NEPA Lead Agency, and the County of Riverside is the CEQA Lead Agency.

6.2 Agency Coordination

This section describes the Federal, state, and local agencies that were involved in preparation of the Draft PA/EIS/EIR, and/or were otherwise consulted. Table 6-1 lists specific individuals in the agencies who have been involved or consulted, to date.

Table 6-1. Agency Contact Summary

Affiliation	Name	Role
Bureau of Land Management	Brandon Anderson	Project Manager
Bureau of Land Management	Susie Greenhalgh	Acting Project Manager
Bureau of Land Management	John Dalton	NEPA Coordinator
Bureau of Land Management	Mark Massar	Biological Resources
Bureau of Land Management	Dani Ortiz	Biological Resources
Bureau of Land Management	George Kline	Cultural Resources
Bureau of Land Management	Tiffany Arend	Archaeologist
Bureau of Land Management	James Weigand	Soils, Water, Air, Vegetation
Riverside County	Larry Ross	Principal Planner
Riverside County	Russell Brady	Solar Project Lead
Riverside County Airport Land Use Commission	John J.G. Guerin	Principal Planner
U.S. Fish and Wildlife Service	Jody Fraser	Biological Resources
U.S. Fish and Wildlife Service	Peter Sanzenbacher	Biologist
California Department of Fish and Wildlife	Shankar Sharma	Senior Environmental Specialist
California Department of Fish and Wildlife	Magdalena Rodriguez	Biologist

6.2.1 U.S. Environmental Protection Agency

The BLM and County coordinated with U.S. Environmental Protection Agency (USEPA) during the PA/EIS/EIR scoping process. USEPA submitted comments in response to the March 6, 2015 NOI to prepare the Draft EIS regarding impacts to site hydrology, air quality, and biological resources. USEPA's concerns about site hydrology are addressed in Section 4.20, air resources are addressed in Section 4.2; and impacts to biological resources are addressed in Sections 4.3 and 4.4. The BLM will continue to coordinate with USEPA on the DQSP throughout the environmental review process.

6.2.2 Department of Defense

The BLM works closely with the Department of Defense (DoD) through the DoD Siting Clearinghouse prior to approval of ROWs for renewable energy, utility, and communication facilities to ensure that these facilities would not interfere with military training routes or special use airspace (DoD 2014; DoD 2015). This coordination is separate from input sought and received from local military installations near the Project site regarding potential hazards to air navigation. Although the Clearinghouse has no regulatory authority in permitting energy infrastructure projects, coordination with the Clearinghouse serves the national security interests of the United States by protecting DoD-specific military capabilities such as the capacity to test and evaluate military weapons and sensor systems, monitor the skies for threats, and train personnel (DoD 2016).

6.2.3 U.S. Army Corps of Engineers

On May 8, 2015, the Applicant submitted a request to the Los Angeles District of the U.S. Army Corps of Engineers (USACE) for an approved Department of the Army Jurisdictional Determination (JD) for the Project site. Additional field data in support of the request were submitted to the USACE in October 2015. In a letter dated February 18, 2016, the USACE determined that waters of the United States do not occur on the Project site. The letter is attached to the Federal Jurisdictional Delineation provided in Appendix I.

6.3 Consultation

6.3.1 Endangered Species Act Section 7

Pursuant to Endangered Species Act Section 7 consultation requirements (16 U.S.C. §1531 et seq.), the BLM will initiate consultation by submitting a Biological Assessment (BA) to the USFWS. BLM held a meeting with the USFWS regarding mitigation of impacts to biological resources on March 17, 2015 at the BLM Palm Springs-South Coast Field Office. BLM will continue to consult with the USFWS, which is expected to issue a Biological Opinion (BO) that will specify required measures for protection of Federally-threatened and endangered species.

6.3.2 National Historic Preservation Act Section 106

Pursuant to National Historic Preservation Act Section 106 (54 U.S.C. §100101), the BLM has coordinated and consulted with potentially affected Indian tribes regarding the Project. Reasonable and good faith efforts undertaken by the BLM to consult and coordinate with the tribes for the Project to date have included written correspondence, meetings for the purposes of information and idea exchange, cultural resource-focused site visits, and responses to information requests. On March 18, 2015, the Advisory Council on Historic Properties received BLM's notification on the proposed Desert Quartzite Solar Project undertaking. On September 30, 2014 the BLM received agreement from the State Historic Preservation Officer (SHPO) on the Area of Potential Effect (APE) pursuant to 36 CFR 800.4.

BLM held a field visit with the Colorado River Indian Tribes on June 10, 2015, with three members and one elder in attendance. BLM sent a letter to the potentially affected Indian tribes on April 20, 2016, announcing the availability of the Class III Archaeological Survey Report. This letter also summarized measures that BLM would require of the Applicant to avoid effects to the significant values of any NRHP-eligible archaeological resources. BLM's determinations of eligibility and finding of effect will be forwarded to the California State Historic Preservation Officer (SHPO) seeking concurrence consistent with the agency's responsibilities under Section 106 of the NHPA.

6.3.3 Government-to-Government Tribal Consultation

BLM is participating in tribal consultation on a government-to-government level in accordance with several authorities, including NEPA; the NHPA; the American Indian Religious Freedom Act of 1978 (42 U.S.C. §1996), as amended; Executive Order 13007 (May 24, 1996), concerning Indian Sacred Sites; and Executive Order 13175 (November 6, 2000), concerning Consultation and Coordination with Indian Tribes. The consultation and discussions revealed concerns about the importance and sensitivity of cultural resources on and near the Project site, concerns about cumulative effects to cultural resources, and, further, that tribes attach significance to the broader cultural landscape. As a result of the tribal consultation process, many important cultural resources were identified in the Project area, and the Proposed Action and other action alternatives have been developed to avoid impacts to these resources.

The BLM invited Indian tribes to consult regarding the Project by letter dated August 21, 2014. The invitation was repeated in the April 20, 2016, letter that notified the tribes of the availability of the Class III Archaeological Survey Report. The invited tribes include:

1. Agua Caliente Band of Cahuilla Indians
2. Augustine Band of Cahuilla Indians
3. Cabazon Band of Mission Indians
4. Cahuilla Band of Mission Indians
5. Chemehuevi Indian Tribe
6. Cocopah Indian Tribe
7. Colorado River Indian Tribes
8. Fort Mojave Indian Tribe
9. Fort Yuma Quechan Tribe
10. Morongo Band of Mission Indians
11. Ramona Band of Mission Indians
12. San Manuel Band of Mission Indians
13. Soboba Band of Luiseno Indians
14. Torres-Martinez Desert Cahuilla Indians
15. Twentynine Palms Band of Mission Indians

On August 29, 2016, the Colorado River Indian Tribes responded to BLM's April 20, 2016 letter notifying the BLM of their intent to conduct additional tribal surveys. To determine the NRHP eligibility of three sites within the project, SRI completed a work plan to test for subsurface presence of archaeological data on seven thermal cobble features that were thought to be earth ovens. The plan was sent to consulting tribes on April 4, 2018 with a letter stating the purpose and intent of the work plan. Tribes were invited to participate in the test excavations, which were completed during the week of April 23, 2018. The Colorado River Indian Tribes responded to the additional testing on April 27, 2018 and provided a monitor to assist in the limited testing. On May 10, 2018, the Twentynine Palms Band of Mission Indians requested the BLM provide copies of the Testing Results when complete. On April 24, 2018, the Cahuilla Band of Indians indicated they do not have knowledge of cultural resources or sites within the Project site, but wish to continue government-to-government consultation. On April 10, 2018, the San Manuel Band of Mission Indians indicated they will not be requesting consulting party status or participating in the environmental review of the project.

6.3.4 County Tribal Consultation

Although formal consultation under Assembly Bill 52 (AB 52) is not required, the County did consult with interested Tribes. Notices regarding the Project were mailed to 11 Tribes who had requested notifications regarding projects located within their Traditional Use Areas. No responses were received from the Cabazon Band of Mission Indians, the Cahuilla Band of Indians, Ramona Band, Rincon Band of Luiseno Indians, Colorado River Indian Tribes, Morongo Band or the Torres Martinez Band of Cahuilla Indians. A response was received dated September 12, 2016 from the Pechanga Band of Luiseno Indians deferring to closer tribes. Three Tribes requested consultation.

The Twenty-Nine Palms Band responded in a letter dated November 18, 2016 and expressed their concern for the project being located in a culturally sensitive area. In a letter dated December 7, 2016 the Tribe requested the opportunity to review the EIR. In a letter dated November 6, 2017, the Tribe requested that the sites identified as eligible or possibly eligible for the NRHP and CRHR be avoided or, if avoidance was not possible, that the Tribe be consulted prior to archaeological data recovery or other mitigation treatment. The November 6, 2017 letter also requested additional monitoring during earthmoving activities in the Orita and Rositas soil series, the Native American Monitor(s) from the Twenty-Nine Palms Band of Mission Indians be present during any ground disturbance, and that consultation continue throughout the life of the Project.

The Soboba Band of Luiseno Indians requested consultation in a letter dated October 10, 2016. Meetings were held on October 25, 2016 and December 5, 2016. The conditions of approval for the project were provided to the Tribe on December 2, 2016. A response was received via email on December 5, 2016 concurring with the conditions and formally concluding AB52 consultation.

The Agua Caliente Band of Cahuilla Indians requested consultation in a letter dated September 16, 2016. This project was discussed on December 2, 2016, April 5, 2017 and May 5, 2017. The conditions of approval for the project were provided to the Tribe on December 2, 2016. A formal conclusion letter was received from the Tribe dated June 08, 2017.

6.4 Public Involvement

The BLM and County solicited internal and external input on the issues, impacts, and potential alternatives to be addressed in the Draft PA/EIS/EIR for the Project, as well as the extent to which those issues and impacts would be analyzed in the document. This process is called “scoping” (40 CFR §1501.7). Internal input was provided by the BLM, Riverside County, and cooperating agencies as an interdisciplinary process, to help define issues, alternatives, and data needs. External scoping involved notification and opportunities for feedback from other agencies, organizations, tribes, local governments, and the public. Formal public scoping began following publication of a NOI under NEPA and release of a NOP under CEQA.

The NOI for the Proposed Action was published in the Federal Register on March 6, 2015 (80 FR 12195). The NOP was issued on March 13, 2015. Copies of the NOP were provided to the Office of Planning and Research (State Clearinghouse) for issuance to state agencies. One hundred and ninety copies of the NOP were distributed to Federal, state, and local agencies, responsible and trustee agencies, local governments, private organizations, Native American tribes, and other interested parties.

Both the NOI and the NOP announced the dates, times, and locations of public scoping meetings in Parker, Arizona on March 23, 2015, and in Blythe, California, on March 24, 2015. The purpose of the meetings was to inform the public about the Project; describe the purpose and need of the Project; provide information regarding the environmental review process; and gather public input regarding the scope and content of the Draft PA/EIS/EIR. The BLM, County, and Applicant presented information about the Project, alternatives, environmental review process, and potential impacts. Following the presentations, members of the public were invited to make verbal comments. A total of six individuals made public comments at the meetings. At the conclusion of the public comments, staff members from the agencies and the Applicant were available to answer questions and gather input. In addition to being published in the NOI and NOP, information regarding the public meetings was published in the Parker Pioneer, Desert Sun, and Palo Verde Times on March 18, 2015. The meetings were also were announced on the BLM website for the project, at http://www.blm.gov/ca/st/en/fo/palmsprings/Desert_Quartzite.html. Notice of the meetings was also mailed to 190 recipients, which included agencies, Native American tribes, organizations, and interested individuals.

The comment period for the NOI and NOP began on March 6, 2015, and ended on April 13, 2015. A total of nine written comment letters were submitted to BLM, 13 written comment letters were submitted to the County, and four comments letters were jointly submitted to both agencies. Comments received during the scoping process are provided in Appendix H, *Public Scoping Report*.

6.5 List of Preparers

A list of persons responsible for the preparation of various sections of the Draft PA/EIS/EIR or preparation of significant background materials, or who participated to a significant degree in preparing the Draft PA/EIS/EIR, is presented below.

Bureau of Land Management—NEPA Lead Agency

- Brandon Anderson, Project Manager/Realty Specialist

- Susie Greenhalgh, Project Manager
- John Dalton, NEPA Specialist
- George Kline, Field Office Archaeologist
- Mark Massar, Wildlife Biologist
- Noel Ludwig, Hydrologist
- Kevin Doran, Natural Resources Specialist
- Jeff Johnston, Geologist
- JoAnn Schiffer-Burdett, Outdoor Recreation Planner
- James Weigand, Ecologist

County of Riverside—CEQA Lead Agency

- Larry Ross, Principal Planner
- Russell Brady, Solar Projects Lead

Consultants responsible for the technical analysis and document production are listed in Table 6-2, along with their qualifications.

Table 6-2. List of Consultants

Name	Qualifications	Role
TRC – Project Management Consultant and Technical Reviewer		
Richard Burke, CEP	B.S., M.S., Technology and Human Affairs, 40 years' experience	Project Manager
Chris Moore, AICP	B.A., M.S., Community and Regional Planning, 18 years' experience	Assistant Project Manager, Technical Review – Spill Prevention, Control, and Countermeasures Plan
Cara Snellen	B.S., M.S., Biology, 7 years, experience	Assistant Project Manager, 508 Compliance
Tim Henggeler	B.S., Chemical Engineering, 12 years' experience	Technical Review – Air Quality, Greenhouse Gas
Taylor VanHouten	B.S., Meteorology, 8 years' experience	Technical Review – Noise
Brian Dempsey, PE, PTOE	B.C.E., Civil Engineering, 28 years' experience	Technical Review – Traffic Impact Analysis
Erin Degutis, RLA, AICP, LEED AP	B.S., M.L.A., Landscape Architecture, 15 years' experience	Technical Review – Visual Impact Analysis
Susan Underbrink, RPA	B.A., M.A., Anthropology, 20 years' experience	Technical Review – Worker Environmental Awareness Program, Scoping
David Clark	B.S., M.S., Environmental Biology, 38 years' experience	Technical Review – Environmental Justice, Social and Economic Setting, Visual Resources
Karin Greenacre, PE	B.S., M.S., Chemical Engineering, 25 years' experience	Technical Review – Air Quality, Greenhouse Gas
Marlene Stephens	B.A., English, 11 years' experience	508 Compliance

Table 6-2. List of Consultants

Name	Qualifications	Role
Joshua Taylor	B.S., Environmental Science, 13 years' experience	Technical Review - Utilities and Public Services
AECOM – PA/EIS/EIR Contractor		
Robert Dover, PG, PMP	B.S., M.S., Geology, 30 years' experience	Project Manager, Geology/Soils, Greenhouse Gas, Hazardous Materials, Mineral Resources, Transportation, Utilities, Wildland Fire
Erika Grace	B.S., Biological Sciences, M.S., Environmental Toxicology, 10 years' experience	Project Coordinator
Anne Ferguson	B.S., Natural Resource Recreation and Tourism, M.S., Environmental Sustainability, 14 years' experience	Air Quality, Lands and Realty, Noise, Recreation, Special Designations
Lyndon Quon	B.A., Ecology, 26 years' experience	Vegetation, Wildlife
Mark Roll	B.S., Biology, Masters, Environmental Law and Policy, 10 years' experience	Vegetation, Wildlife
Matt Tennyson, RPA	B.A., Archaeology, M.A., Anthropology, 16 years' experience	Cultural Resources
Shannon Foglia	B.A., Anthropology, M.A., Archaeology, 7 years' experience	Cultural Resources
Lauren Trimble	B.A., M.A., Anthropology, 3 years' experience	Cultural Resources
Stev Weidlich	B.A., M.S., Anthropology, 8 years' experience	Socioeconomics and Environmental Justice
Susan Provenzano	B.A., Earth and Space Sciences, M.S., Environmental Sciences, M.S., Marine Environmental Sciences, 35 years' experience	Environmental Justice
Steve Ensley	B.S., Environmental Conservation, 12 years' experience	Geographic Information Systems
Peter Augello	B.A., Geography, M.S., Cartography/GIS, 11 years' experience	Geographic Information Systems
Jason Paukovits	B.A., Psychology, B.S., Environmental Resource Management, Master of Environmental Management, Master of Public Policy, 14 years' experience	Air Quality
Carmen Caceres-Schnell, PG	B.S., M.S., Geology, 18 years' experience	Water Resources

APPENDIX A

FIGURES

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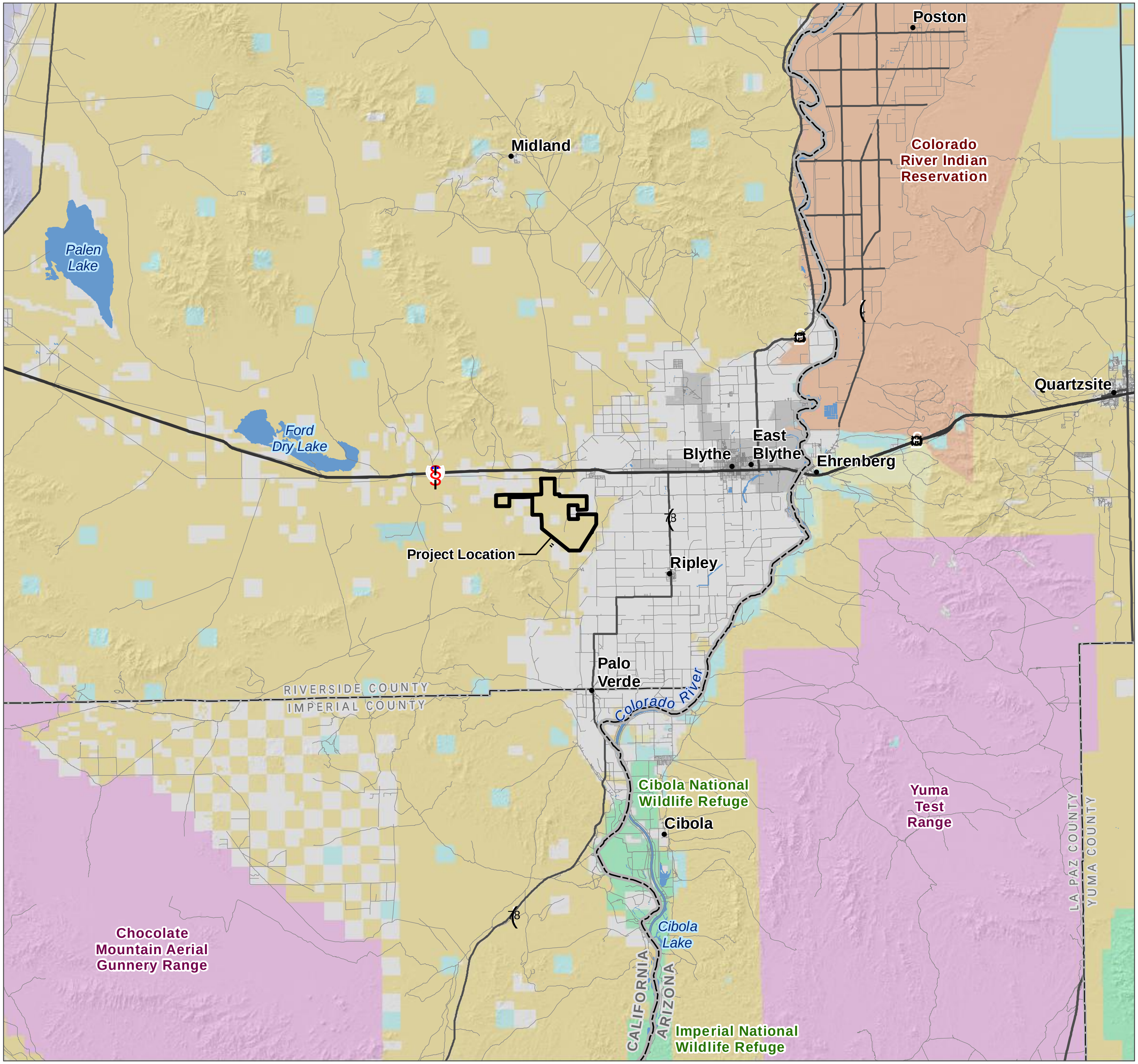
Desert Quartzite Solar Project EIS/EIR



Poston
Midland
Colorado River Indian Reservation
Palen Lake
Ford Dry Lake
Quartzsite
East Blythe
Blythe
Ehrenberg
Project Location
Ripley
Palo Verde
Colorado River
RIVERSIDE COUNTY
IMPERIAL COUNTY
Cibola National Wildlife Refuge
Cibola
Yuma Test Range
LA PAZ COUNTY
YUMA COUNTY
Cibola Lake
CALIFORNIA
ARIZONA
Chocolate Mountain Aerial Gunnery Range
Imperial National Wildlife Refuge
10
95
78

Legend

▭ Right-of-Way Application Boundary

Surface Management

- 🟧 BIA
- 🟨 BLM
- 🟨 BOR
- 🟦 County/Local
- 🟪 DOD
- 🟪 NPS
- 🟦 State
- 🟩 USFWS
- ⬜ Other/Private

Boundaries

- State Boundary
- County Boundary
- Urban Area

Roads

- Interstate
- US Highway
- State Highway
- Other Roads

Figure 1-1 Regional Context

0 5 10 Miles

0 5 10 Kilometers

Date: 12/22/2015

Sources: AECOM, BLM, ESRI, First Solar, US Census, USGS

NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego

Map extent shown in red.

12/22/2015

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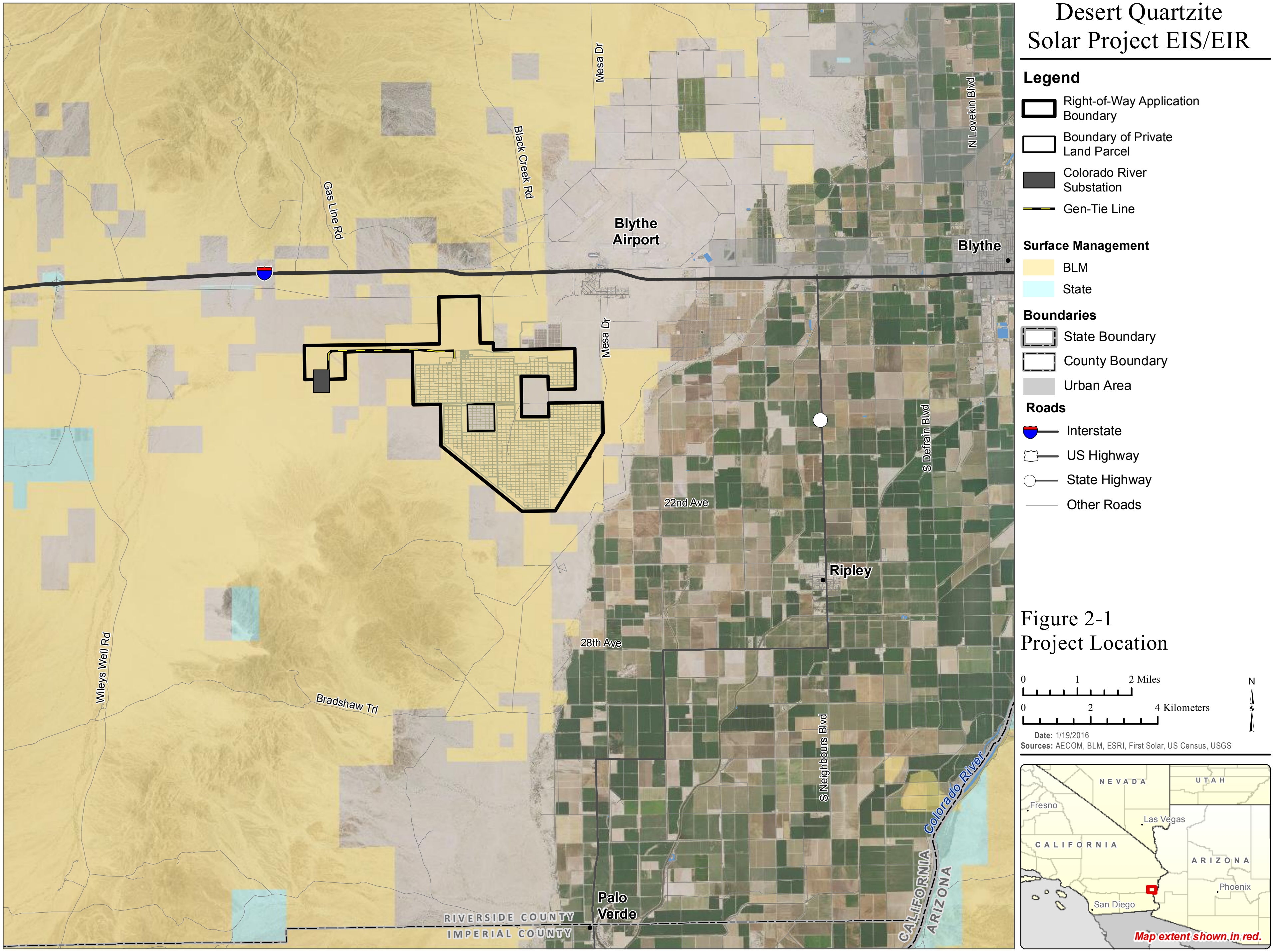
Desert Quartzite Solar Project EIS/EIR


Legend
Right-of-Way Application Boundary
Boundary of Private Land Parcel
Colorado River Substation
Gen-Tie Line
Surface Management
BLM
State
Boundaries
State Boundary
County Boundary
Urban Area
Roads
Interstate
US Highway
State Highway
Other Roads
Mesa Dr
Black Creek Rd
Gas Line Rd
Blythe Airport
Blythe
N Lovekin Blvd
Mesa Dr
S Defrain Blvd
22nd Ave
Ripley
28th Ave
Wileys Well Rd
Bradshaw Trl
S Neighbours Blvd
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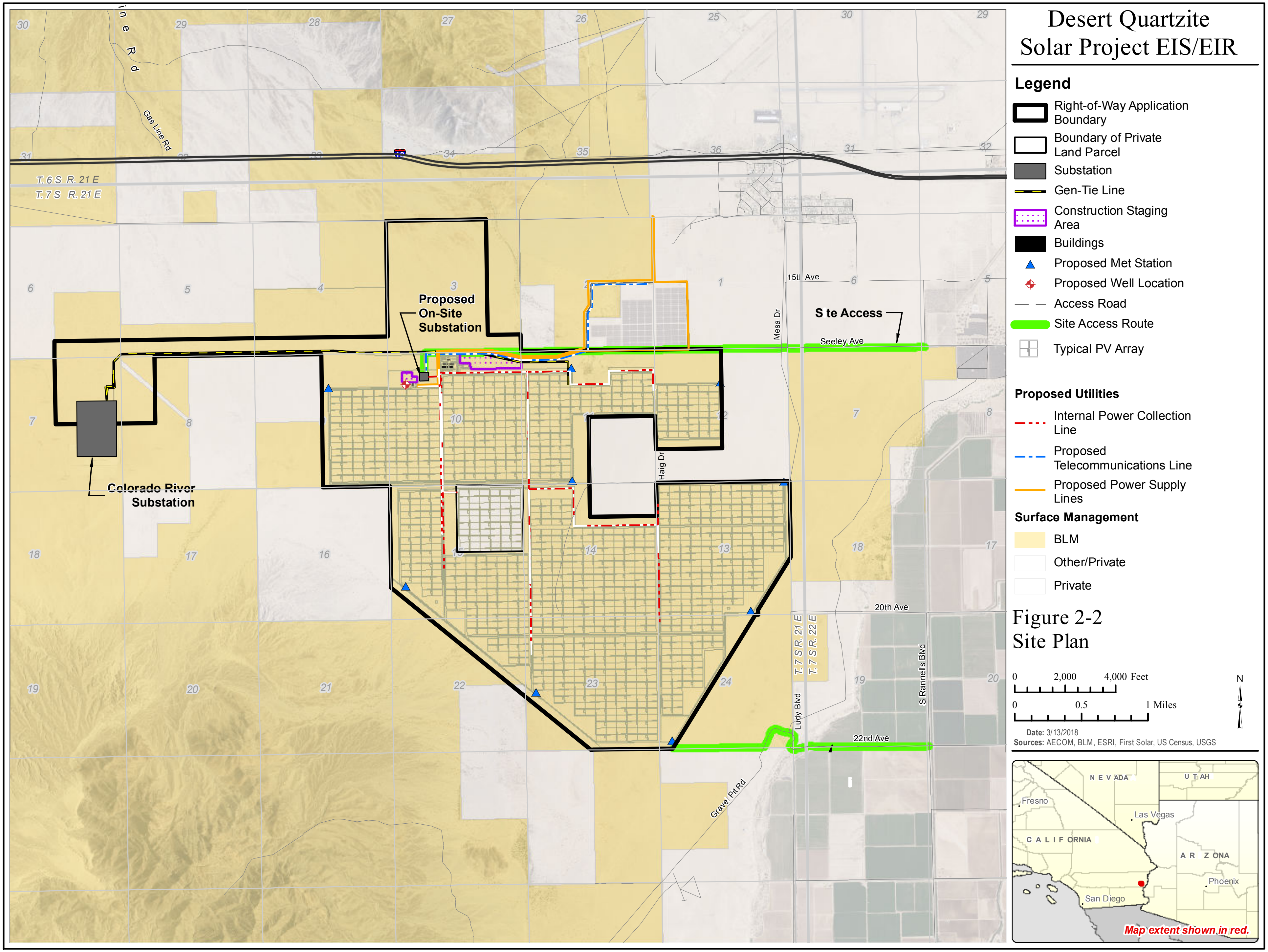
San Diego
Map extent shown in red.

Figure 2-1
Project Location

Date: 1/19/2016
Sources: AECOM, BLM, ESRI, First Solar, US Census, USGS

1/19/2016

Desert Quartzite Solar Project EIS/EIR



Legend
Right-of-Way Application Boundary
Boundary of Private Land Parcel
Substation
Gen-Tie Line
Construction Staging Area
Buildings
Proposed Met Station
Proposed Well Location
Access Road
Site Access Route
Typical PV Array
Proposed Utilities
Internal Power Collection Line
Proposed Telecommunications Line
Proposed Power Supply Lines
Surface Management
BLM
Other/Private
Private
Proposed On-Site Substation
Colorado River Substation
Site Access
Seeley Ave
15th Ave
20th Ave
22nd Ave
Mesa Dr
Haig Dr
Ludy Blvd
S Rannells Blvd
Grave Pit Rd
Gas Line Rd
T. 6 S R. 21 E
T. 7 S R. 21 E
T. 7 S R. 21 E
T. 7 S R. 22 E
10
0 2,000 4,000 Feet
0 0.5 1 Miles
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Fresno
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San Diego
Map extent shown in red.

Figure 2-2
Site Plan

Date: 3/13/2018
Sources: AECOM, BLM, ESRI, First Solar, US Census, USGS

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3/13/2018

Desert Quartzite Solar Project EIS/EIR

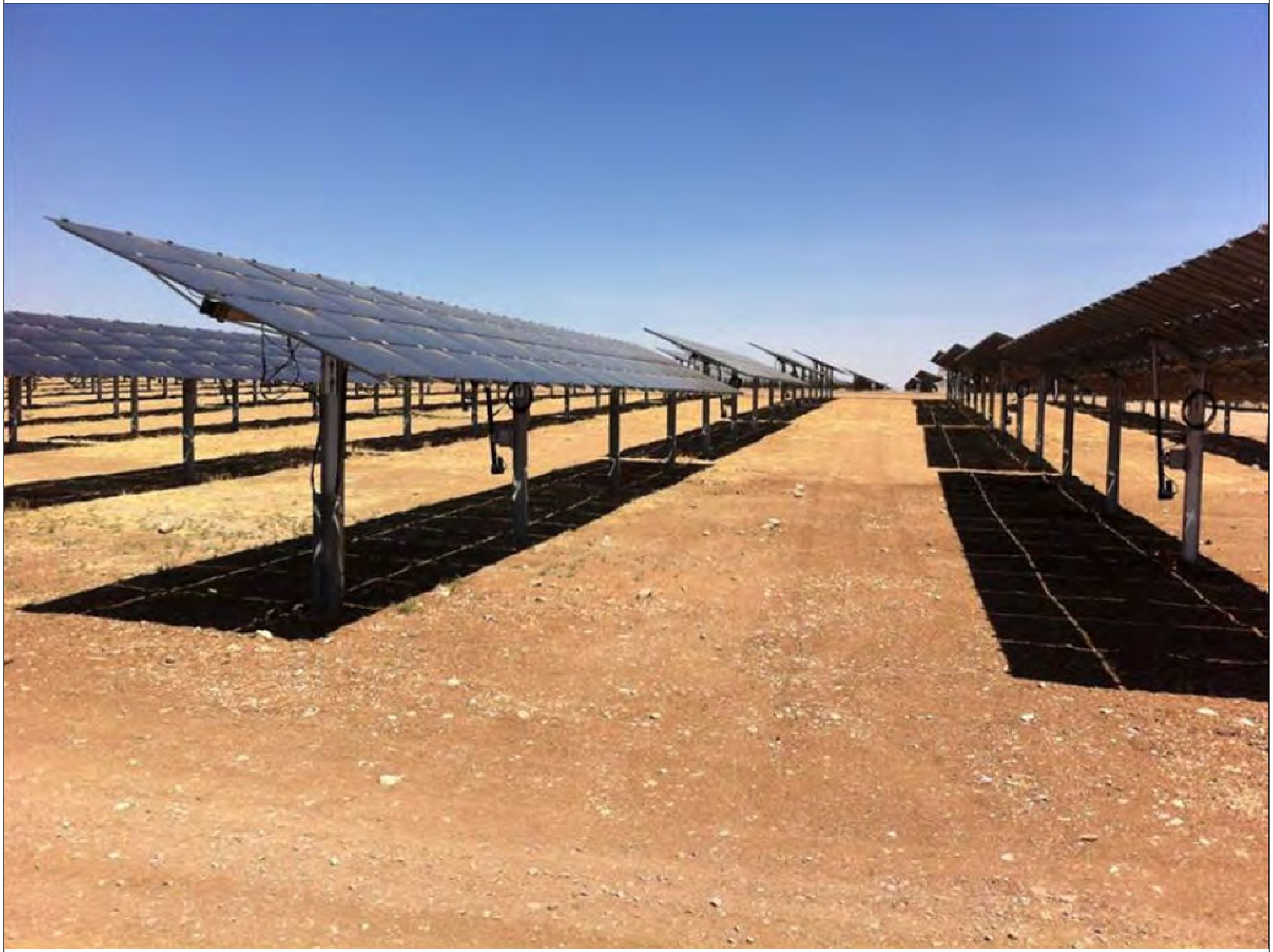
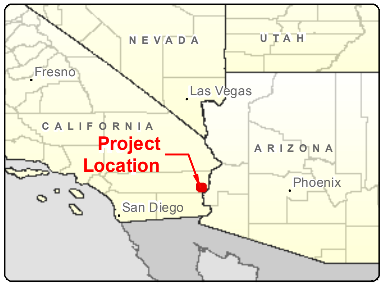


Figure 2-3
Photograph of Typical Solar Array

Date: 3/3/2016
Sources: First Solar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3/3/2016

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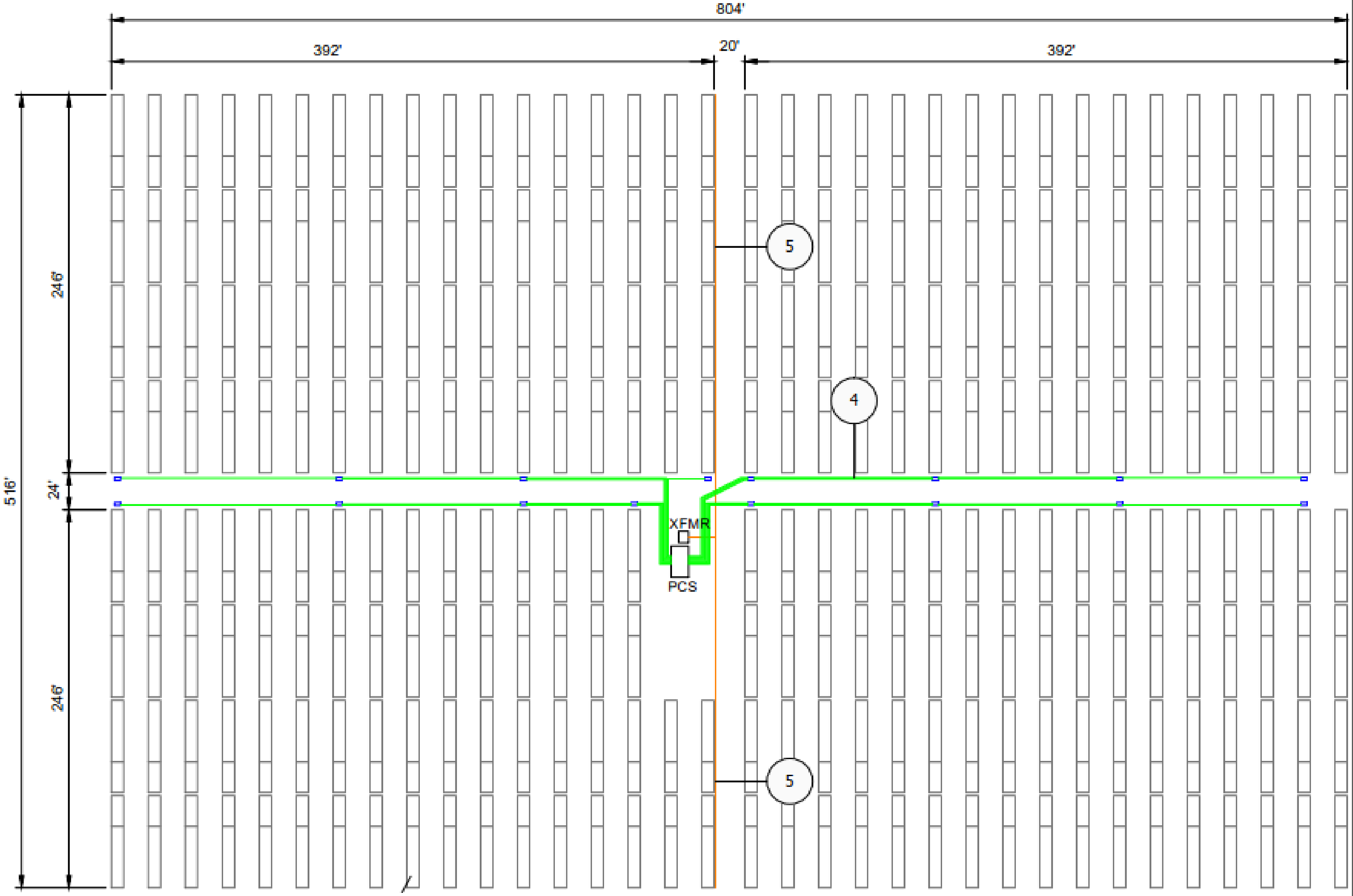
3/3/2016

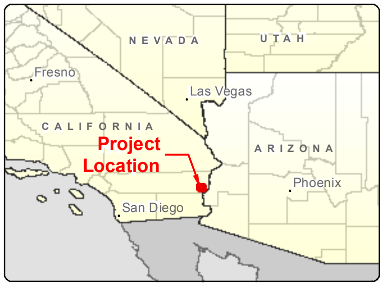
Desert Quartzite Solar Project EIS/EIR



804'
392'
20'
392'
246'
24'
516'
246'
5
4
XFMR
PCS
5

Figure 2-4
Layout of Typical
Solar Array

Date: 3/3/2016
Sources: First Solar



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Project Location
ARIZONA
Phoenix
San Diego

Desert Quartzite Solar Project EIS/EIR

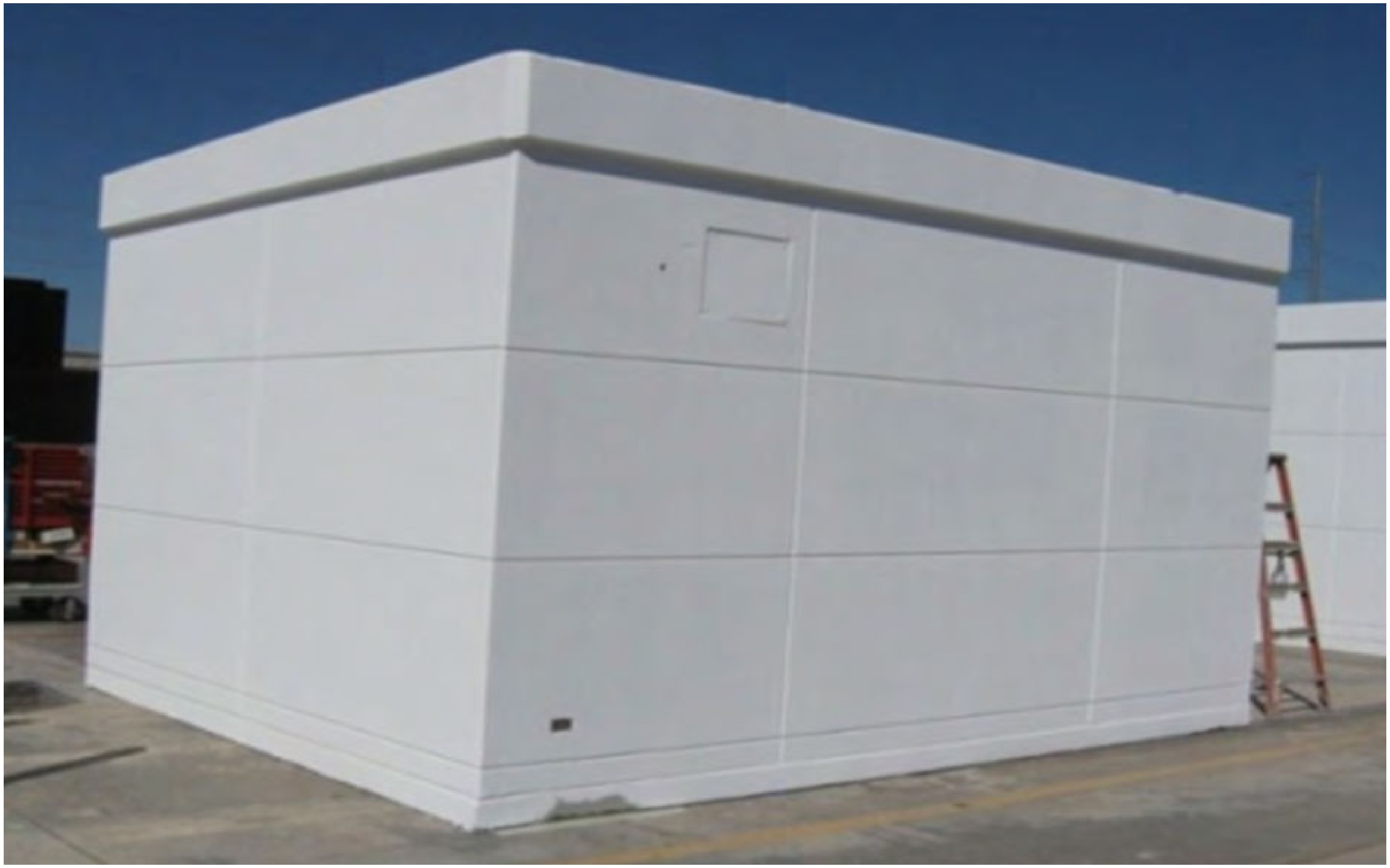
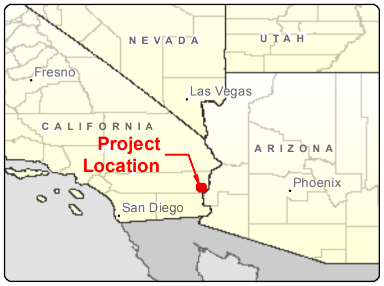


Figure 2-5
Photograph of Typical
Power Conversion Station

Date: 3/3/2016
Sources: First Solar


NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Project Location
Phoenix
San Diego

E:\GIS\Projects\DesertQuartzite\Figures\FIG_02_05_PowerConversionPhoto.mxd

3/3/2016

E:\GIS\Projects\DesertQuartzite\Figures\FIG_02_06_SwitchgearPhoto.mxd

3/3/2016

Desert Quartzite Solar Project EIS/EIR

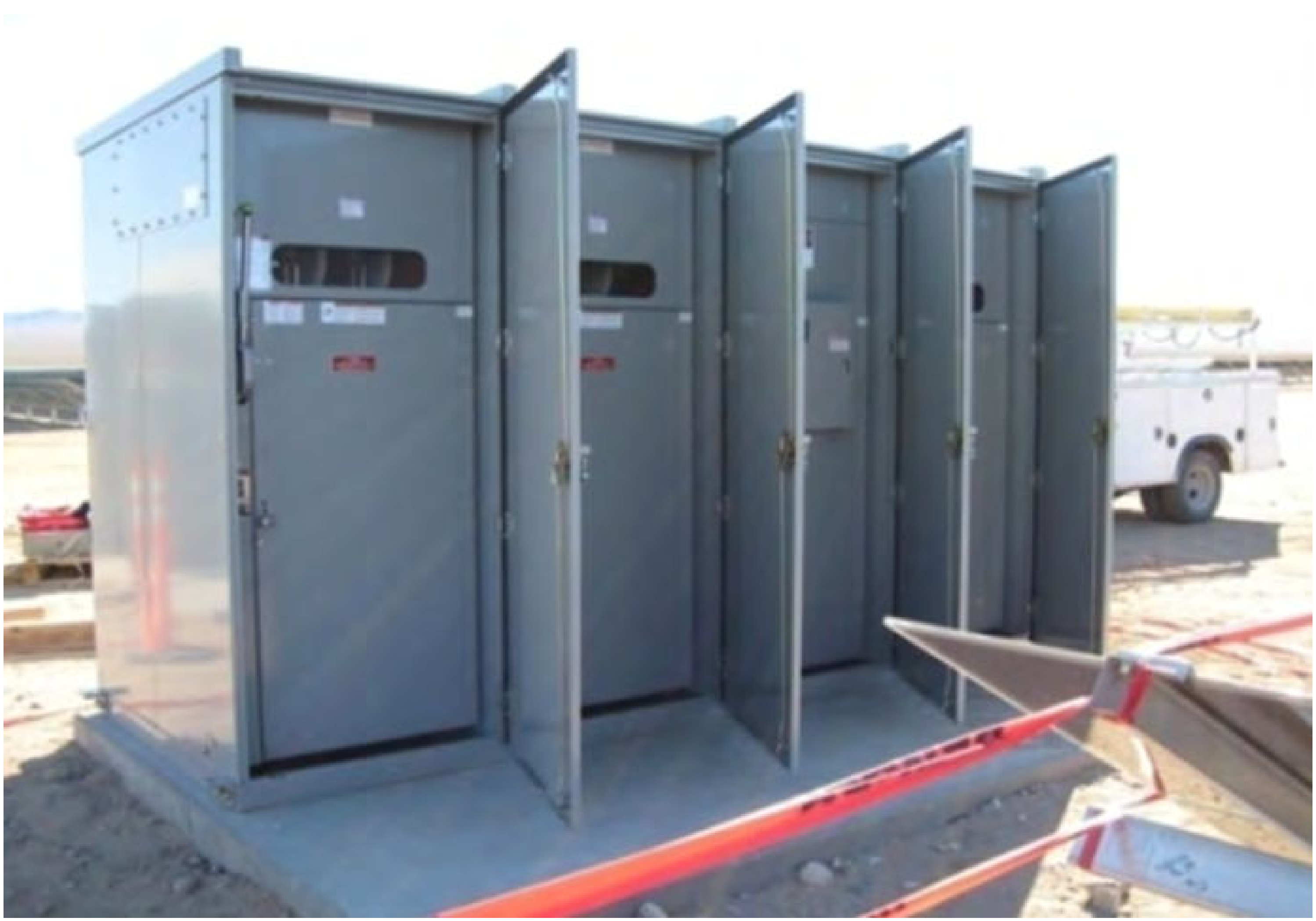
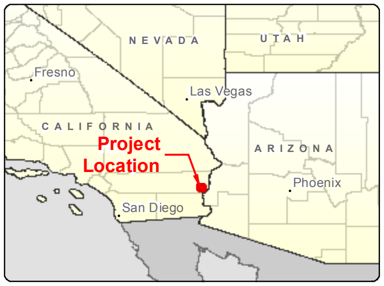


Figure 2-6
Photograph of Typical
PV Combining Switchgear

Date: 3/3/2016
Sources: First Solar


NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Project Location
Phoenix
San Diego

Desert Quartzite Solar Project EIS/EIR

Legend

▭	Right-of-Way Application Boundary
▭	Boundary of Private Land Parcel
■	Substation

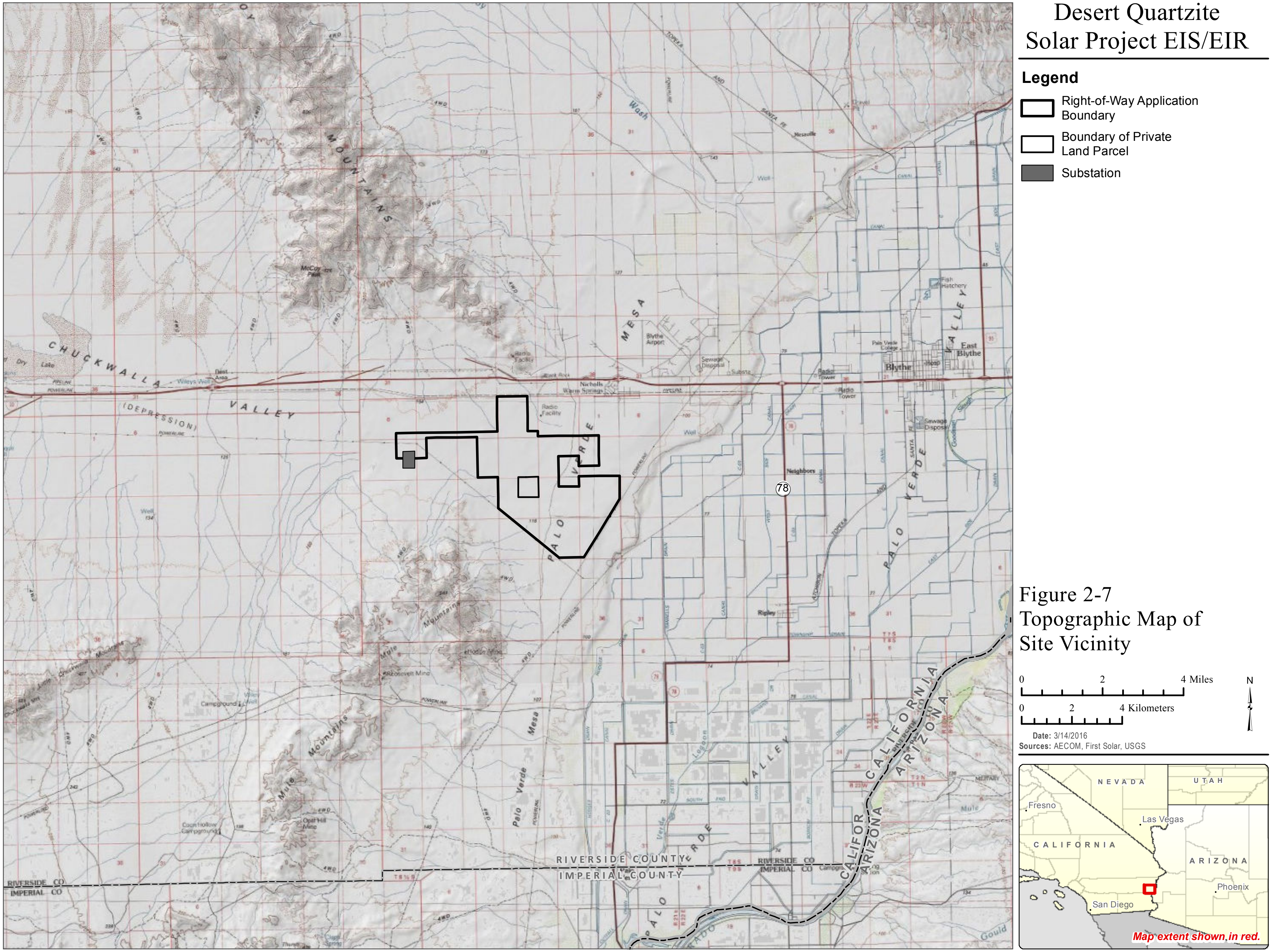

CHUCKWALLA VALLEY
(DEPRESSION)
Dry Lake
Rest Area
Wileys Well
McCOY MOUNTAINS
McCoy Peak
MESA
Blythe Airport
Radio Facility
Nicholls Warm Springs
Sewage Disposal
Substa
Radio Tower
Palo Verde College
Blythe
East Blythe
Fish Hatchery
PALO VERDE
PALO VERDE VALLEY
Neighbors
Ripley
78
Mule Mountains
Roosevelt Mine
Campground
Coon Hollow Campground
Opal Hill Mine
Palo Verde Mesa
RIVERSIDE COUNTY
IMPERIAL COUNTY
RIVERSIDE CO
IMPERIAL CO
CALIFORNIA
ARIZONA
0 2 4 Miles
0 2 4 Kilometers
N
NEVADA
UTAH
CALIFORNIA
ARIZONA
Fresno
Las Vegas
San Diego
Phoenix
Map extent shown in red.

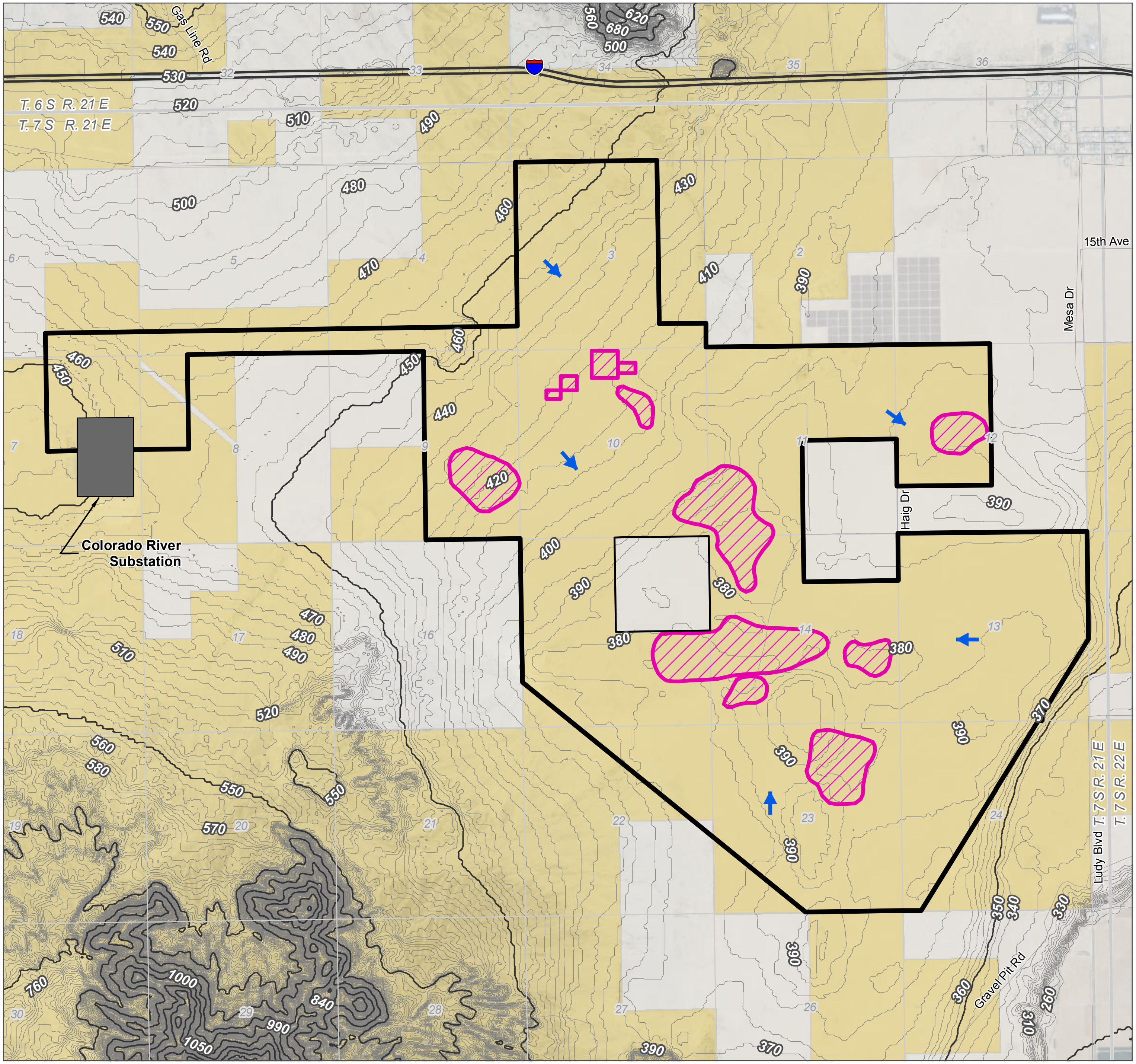
Figure 2-7
Topographic Map of Site Vicinity

Date: 3/14/2016
Sources: AECOM, First Solar, USGS

E:\GIS\Projects\DesertQuartzite\Figures\FIG_02_08_TopoGradingPlan.mxd

2/13/2017

Desert Quartzite Solar Project EIS/EIR



Gas Line Rd
T. 6 S R. 21 E
T. 7 S R. 21 E
15th Ave
Mesa Dr
Haig Dr
Ludy Blvd
T. 7 S R. 21 E
T. 7 S R. 22 E
Gravel Pit Rd
Colorado River Substation
540
550
530
520
510
500
490
480
470
460
450
440
430
420
410
400
390
380
370
360
350
340
330
310
260
560
570
580
620
680
760
840
990
1000
1050
1
2
3
4
5
6
7
8
9
10
11
12
13
14
16
17
18
19
20
21
22
23
24
26
27
28
29
30
32
33
34
35
36

Legend

▭	Right-of-Way Application Boundary
▭	Boundary of Private Land Parcel
▨	Limit of Cut/Fill
■	Substation
→	Drainage Flow Direction

Surface Management

🟨	BLM
☐	Other/Private

Figure 2-8
Project Site Topography and Grading Plan

0 2,000 4,000 Feet

0 0.5 1 Miles

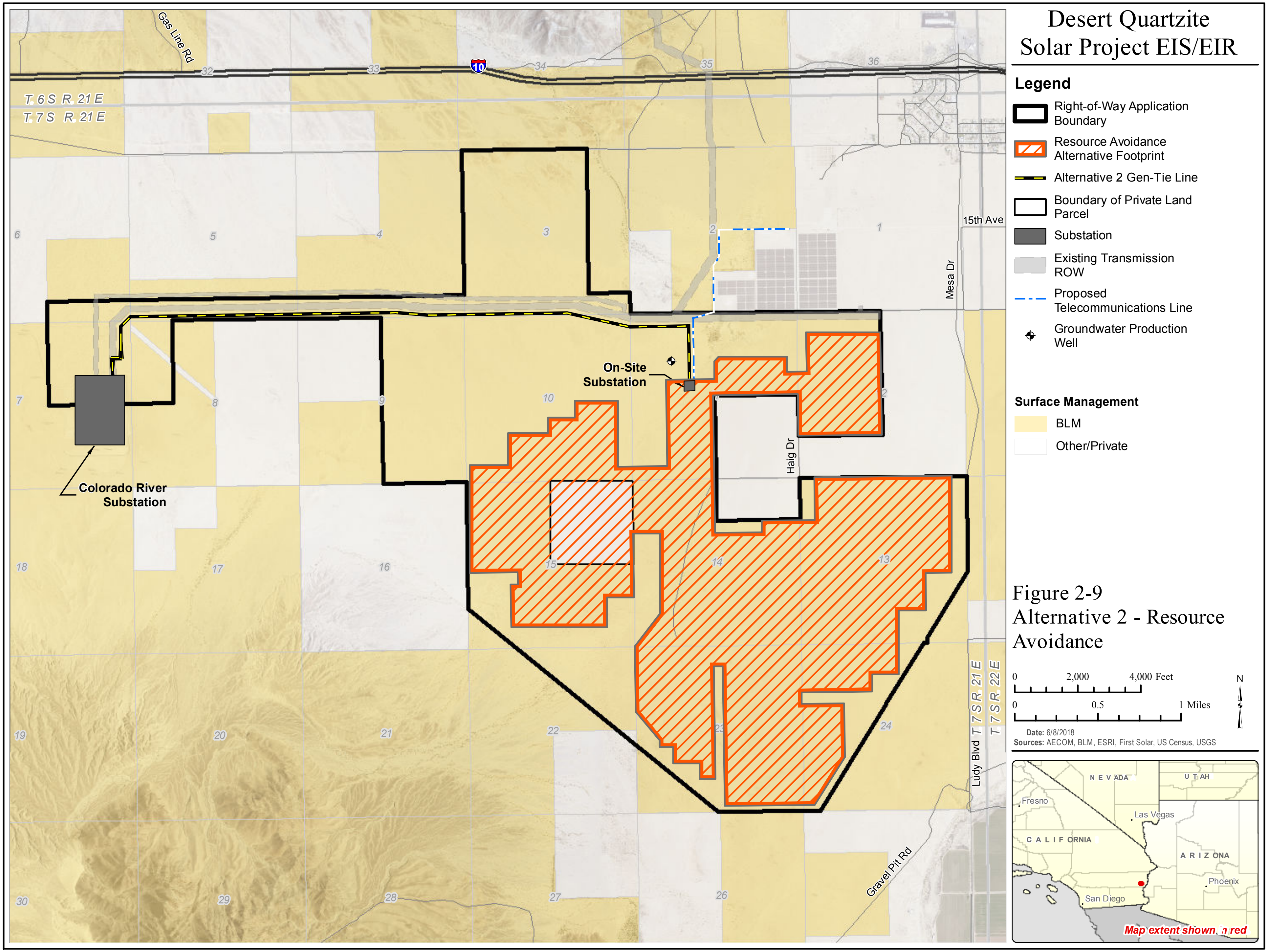
N

Date: 2/13/2017

Sources: AECOM, BLM, ESRI, First Solar, US Census, USGS

NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego

Map extent shown in red.


Gas Line Rd
32
33
10
34
35
36
T 6 S R 21 E
T 7 S R 21 E
6
5
4
3
2
1
15th Ave
Mesa Dr
7
8
9
10
On-Site Substation
12
Haig Dr
Colorado River Substation
18
17
16
15
14
13
19
20
21
22
23
24
Ludy Blvd
T 7 S R 21 E
T 7 S R 22 E
30
29
28
27
26
Gravel Pit Rd
Legend
Right-of-Way Application Boundary
Resource Avoidance Alternative Footprint
Alternative 2 Gen-Tie Line
Boundary of Private Land Parcel
Substation
Existing Transmission ROW
Proposed Telecommunications Line
Groundwater Production Well
Surface Management
BLM
Other/Private
0
2,000
4,000 Feet
0
0.5
1 Miles
N
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red

Desert Quartzite Solar Project EIS/EIR

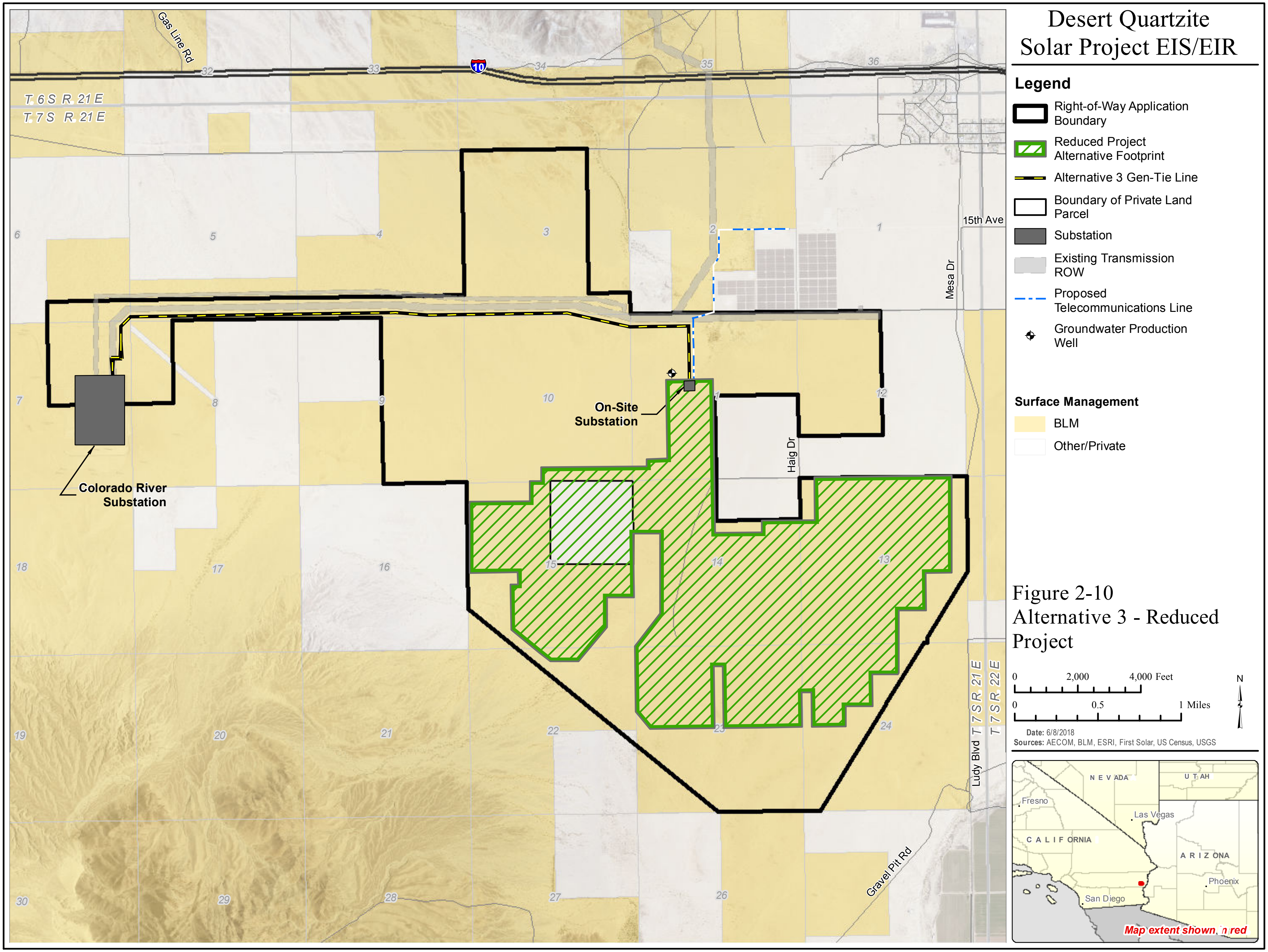
Figure 2-9
Alternative 2 - Resource Avoidance

Date: 6/8/2018
Sources: AECOM, BLM, ESRI, First Solar, US Census, USGS

M:\Denver_GIS\Projects\DesertQuartzite\Figures\FIG_02_09_Alt2_ResourceAvoidance.mxd

6/8/2018

Desert Quartzite Solar Project EIS/EIR



Legend
Right-of-Way Application Boundary
Reduced Project Alternative Footprint
Alternative 3 Gen-Tie Line
Boundary of Private Land Parcel
Substation
Existing Transmission ROW
Proposed Telecommunications Line
Groundwater Production Well
Surface Management
BLM
Other/Private
Gas Line Rd
T 6 S R 21 E
T 7 S R 21 E
T 7 S R 22 E
10
32
33
34
35
36
1
2
3
4
5
6
7
8
9
10
12
13
14
15
16
17
18
19
20
21
22
23
24
26
27
28
29
30
15th Ave
Mesa Dr
Haig Dr
Ludy Blvd
Gravel Pit Rd
On-Site Substation
Colorado River Substation
0
2,000
4,000 Feet
0
0.5
1 Miles
N
NEVADA
UTAH
CALIFORNIA
ARIZONA
Fresno
Las Vegas
Phoenix
San Diego
Map extent shown in red

Figure 2-10
Alternative 3 - Reduced Project

Date: 6/8/2018
Sources: AECOM, BLM, ESRI, First Solar, US Census, USGS

M:\Denver_GIS\Projects\DesertQuartzite\Figures\FIG_02_10_Alt3_ReducedProject.mxd

6/8/2018

M:\Denver_GIS\Projects\DesertQuartzite\Figures\FIG_03_02_01_WindRose.mxd

3/13/2018

Desert Quartzite Solar Project EIS/EIR

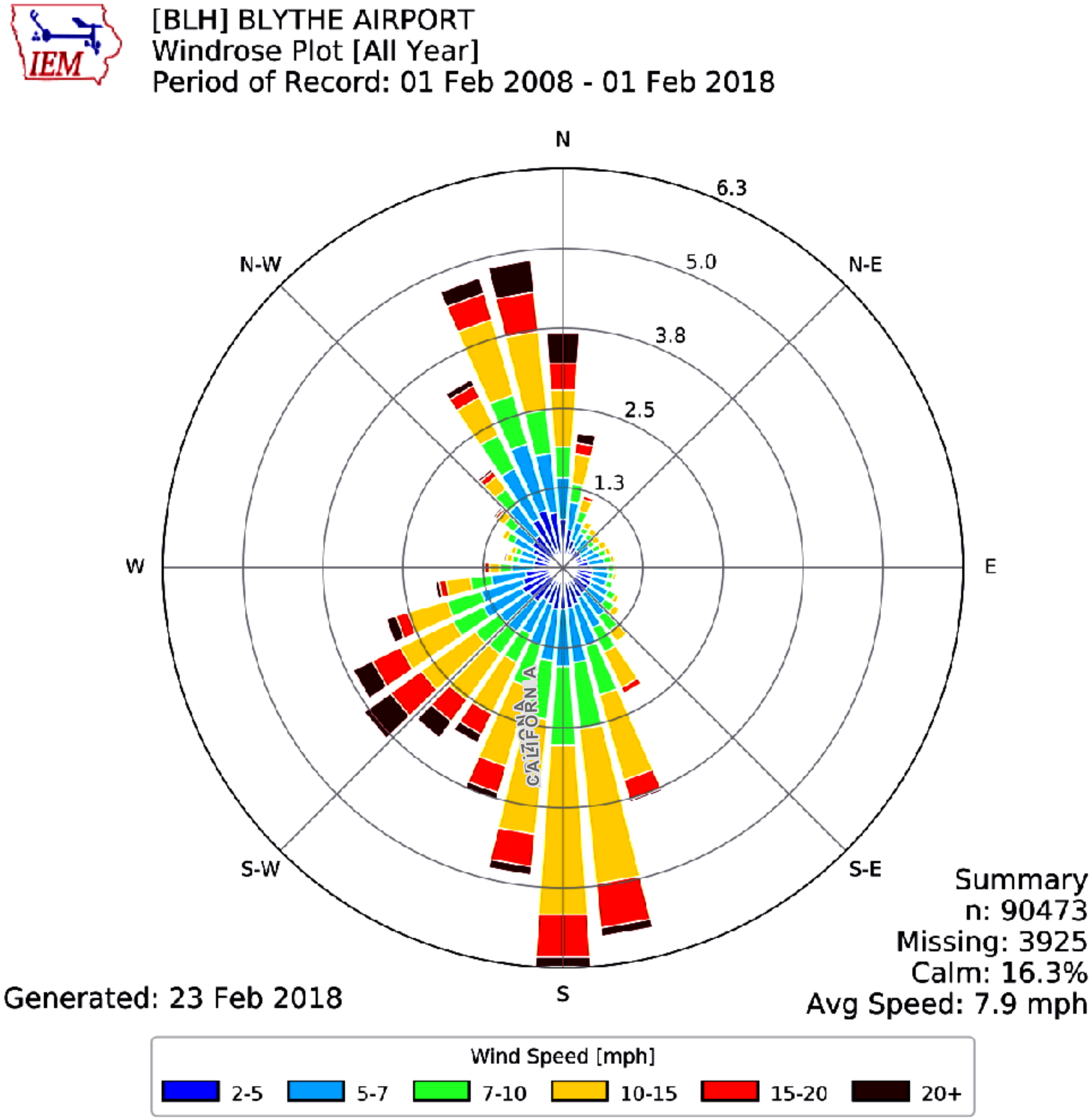
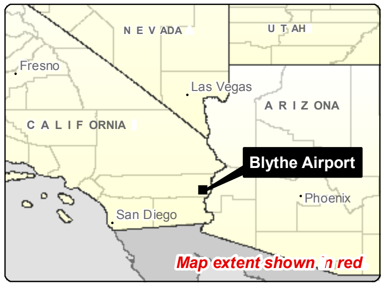


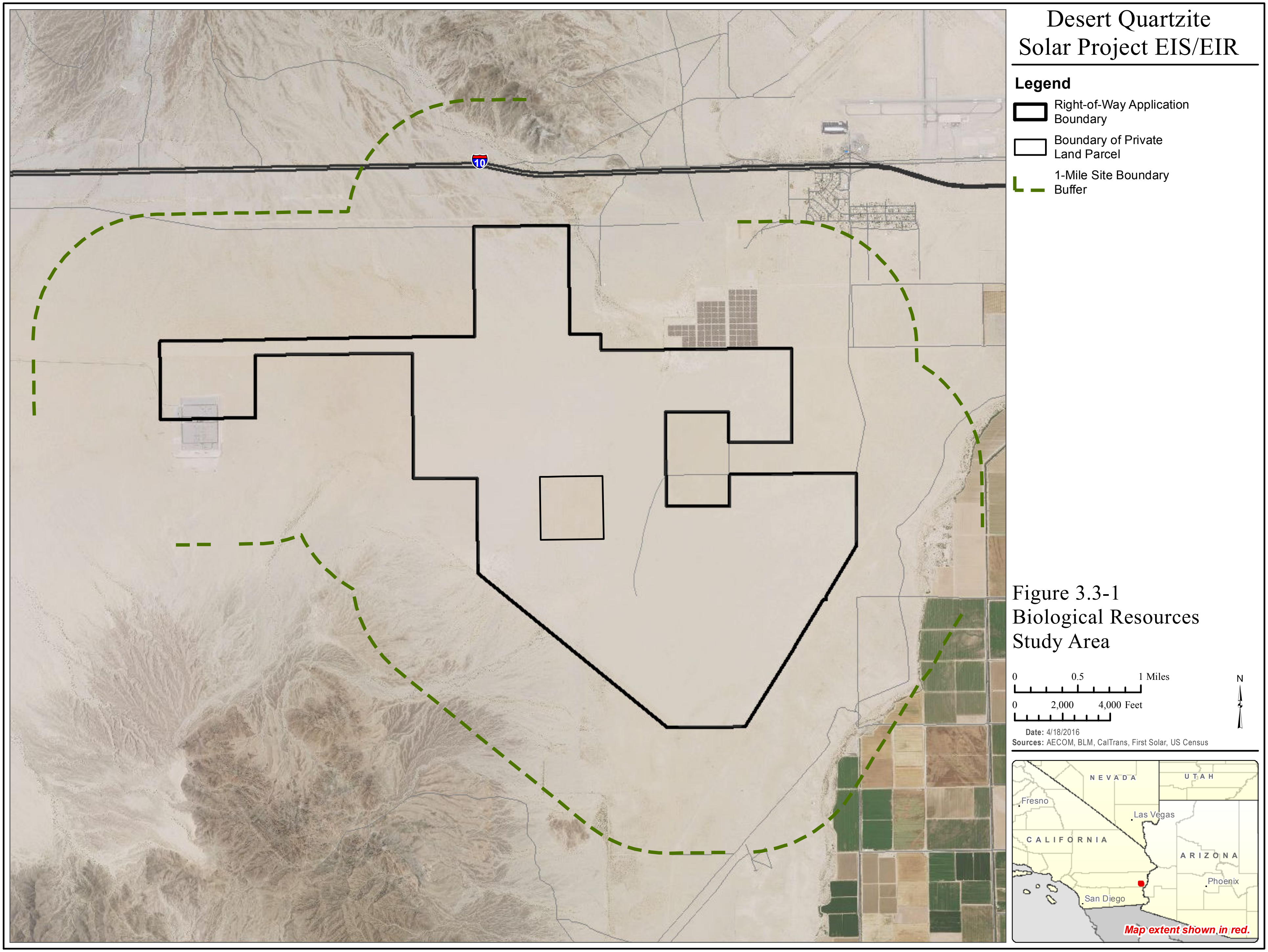
Figure 3.2-1
Blythe Airport
Wind Rose Diagram

Date: 3/13/2018
Sources: AECOM, ESRI, IEM, US Census


NEVADA
UTAH
Fresno
Las Vegas
ARIZONA
CALIFORNIA
Blythe Airport
Phoenix
San Diego
Map extent shown in red

E:\GIS\Projects\DesertQuartzite\Figures\Bio\FIG_03_03_01_BioSurveyArea.mxd

Desert Quartzite Solar Project EIS/EIR


10
0
0.5
1 Miles
0
2,000
4,000 Feet
N
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red.

Legend

▭ Right-of-Way Application Boundary

▭ Boundary of Private Land Parcel

- - 1-Mile Site Boundary Buffer

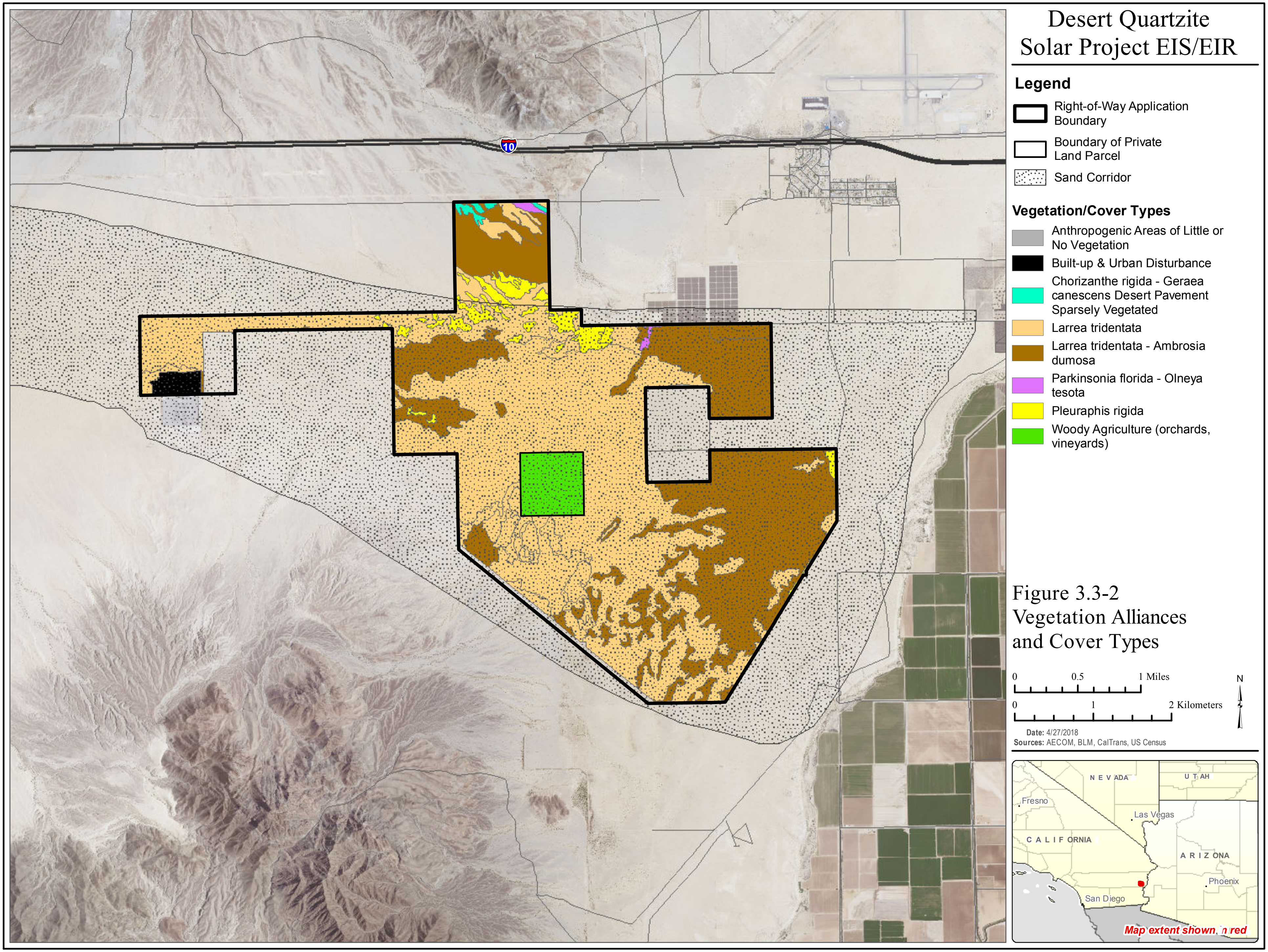
Figure 3.3-1
Biological Resources Study Area

Date: 4/18/2016
Sources: AECOM, BLM, CalTrans, First Solar, US Census

4/18/2016

M:\Denver_GIS\Projects\DesertQuartzite\Figures\Bio\FIG_03_03_02_VegAlliances.mxd

4/27/2018


10
N
0
0.5
1 Miles
0
1
2 Kilometers
N E V ADA
U T AH
Fresno
Las Vegas
C A L I F ORNIA
A R I Z ONA
Phoenix
San Diego
Map extent shown in red

Desert Quartzite Solar Project EIS/EIR

Legend

- ▭ Right-of-Way Application Boundary
- ▭ Boundary of Private Land Parcel
- ▨ Sand Corridor

Vegetation/Cover Types

- ⬜ Anthropogenic Areas of Little or No Vegetation
- ⬛ Built-up & Urban Disturbance
- 🟦 Chorizanthe rigida - Geraea canescens Desert Pavement Sparsely Vegetated
- 🟧 Larrea tridentata
- 🟫 Larrea tridentata - Ambrosia dumosa
- 🟪 Parkinsonia florida - Olneya tesota
- 🟨 Pleuraphis rigida
- 🟩 Woody Agriculture (orchards, vineyards)

Figure 3.3-2
Vegetation Alliances
and Cover Types

Date: 4/27/2018
Sources: AECOM, BLM, CalTrans, US Census

M:\Denver_GIS\Projects\DesertQuartzite\Figures\Bio\FIG_03_03_03_SSPlants.mxd

Desert Quartzite Solar Project EIS/EIR

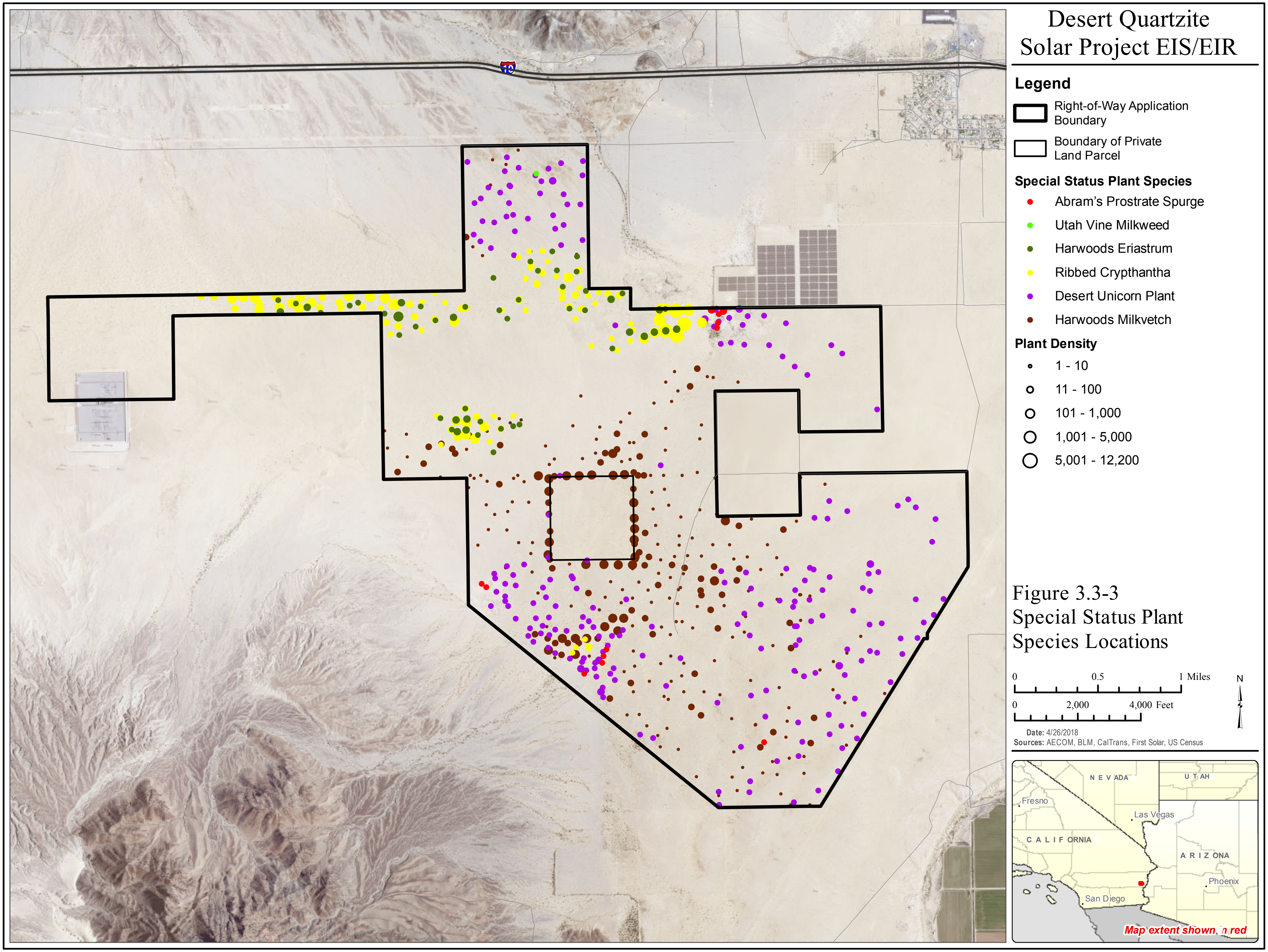
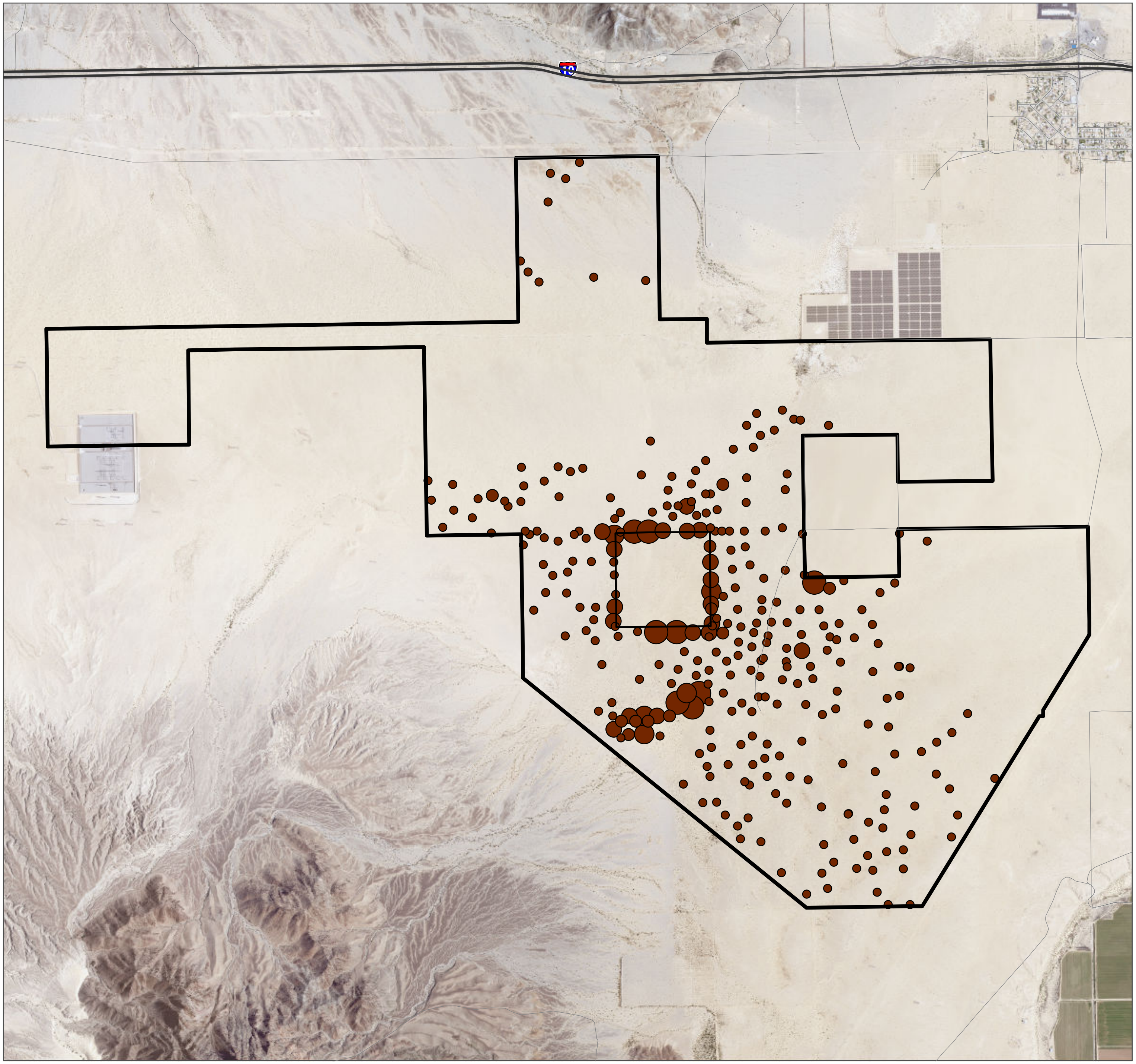

10
Legend
Right-of-Way Application Boundary
Boundary of Private Land Parcel
Special Status Plant Species
Abram's Prostrate Spurge
Utah Vine Milkweed
Harwoods Eriastrum
Ribbed Crypthantha
Desert Unicorn Plant
Harwoods Milkvetch
Plant Density
1 - 10
11 - 100
101 - 1,000
1,001 - 5,000
5,001 - 12,200
0
0.5
1 Miles
0
2,000
4,000 Feet
N
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red

Figure 3.3-3
Special Status Plant Species Locations

Date: 4/26/2018
Sources: AECOM, BLM, CalTrans, First Solar, US Census

4/26/2018



Desert Quartzite Solar Project EIS/EIR

Legend

▭ Right-of-Way Application Boundary

▭ Boundary of Private Land Parcel

Harwoods Milkvetch

Count

● 1 - 50

● 51 - 100

● 101 - 300

● 301 - 500

● 501 - 975

Figure 3.3-4
Harwoods Milkvetch Locations

0 0.5 1 Miles

0 2,000 4,000 Feet

N

Date: 4/27/2018

Sources: AECOM, BLM, CalTrans, First Solar, US Census

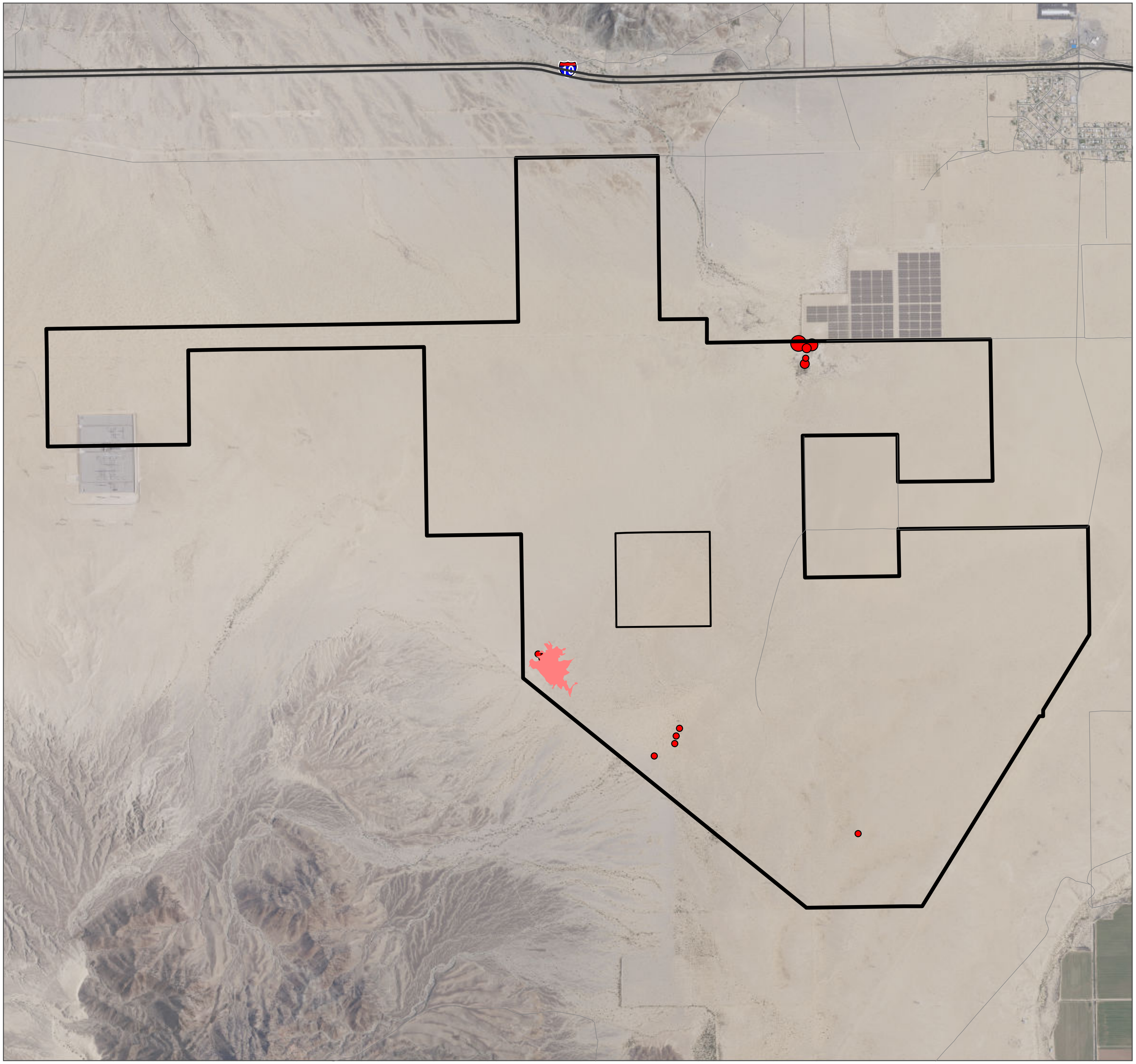
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego

Map extent shown in red

M:\Denver_GIS\Projects\DesertQuartzite\Figures\Bio\FIG_03_03_04_HarwoodsMilkvetch.mxd

4/27/2018

Desert Quartzite Solar Project EIS/EIR


10

Legend

▭ Right-of-Way Application Boundary

▭ Boundary of Private Land Parcel

Abram's Prostrate Spurge

Count

● 1 - 5

● 6 - 10

● 11 - 20

● 21 - 40

🟥 Abram's Spurge Population

Figure 3.3-5 Abram's Spurge Locations

0
0.5
1 Miles
0
2,000
4,000 Feet
N

Date: 4/27/2018

Sources: AECOM, BLM, CalTrans, First Solar, US Census

NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red

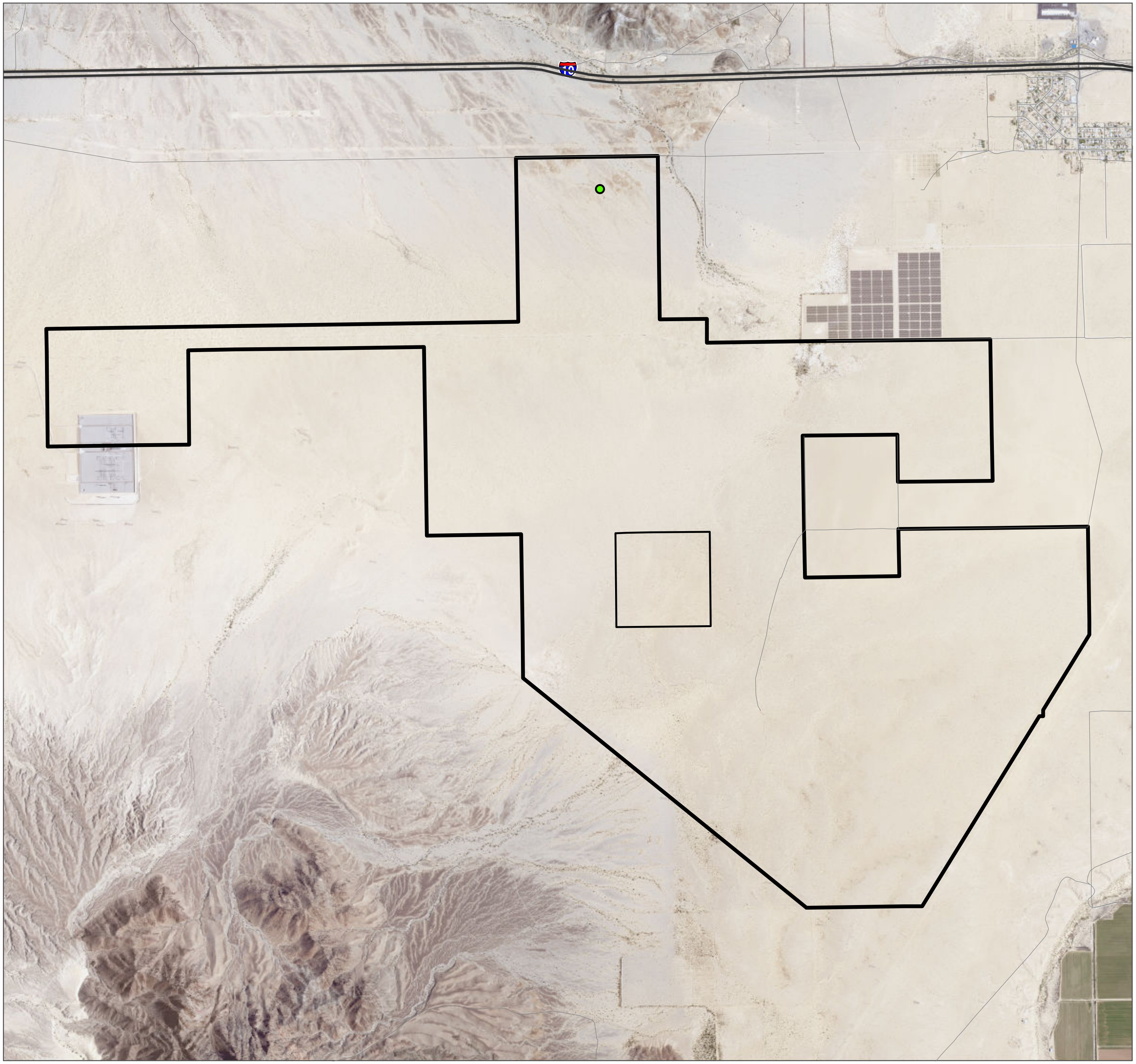
M:\Denver_GIS\Projects\DesertQuartzite\Figures\Bio\FIG_03_03_05_AbramsSpurge.mxd

4/27/2018

M:\Denver_GIS\Projects\DesertQuartzite\Figures\Bio\FIG_03_03_06_UtahVineMilkweed.mxd

4/27/2018

Desert Quartzite Solar Project EIS/EIR



Legend

▭ Right-of-Way Application Boundary

☐ Boundary of Private Land Parcel

Utah Vine Milkweed

Count

● 1

Figure 3.3-6
Utah Vine Milkweed Locations

0 0.5 1 Miles

0 2,000 4,000 Feet

N

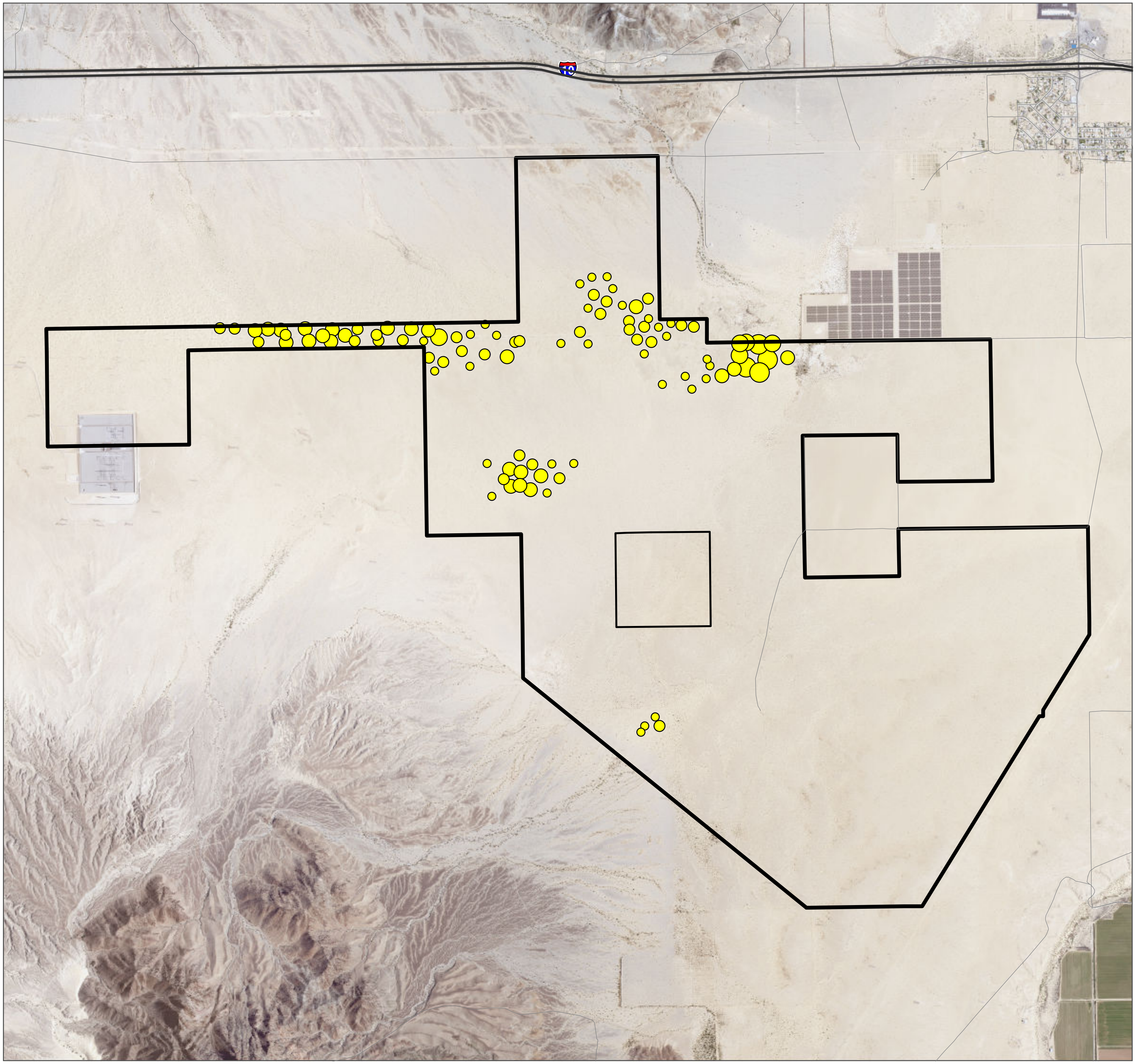
Date: 4/27/2018
Sources: AECOM, BLM, CalTrans, First Solar, US Census

NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red

M:\Denver_GIS\Projects\DesertQuartzite\Figures\Bio\FIG_03_03_07_RibbedCryptantha.mxd

4/27/2018

Desert Quartzite Solar Project EIS/EIR



Legend

▭ Right-of-Way Application Boundary

▭ Boundary of Private Land Parcel

Ribbed Crypthantha

Count

● 1 - 10

● 11 - 100

● 101 - 1,000

● 1,001 - 5,000

● 5,001 - 12,200

Figure 3.3-7
Ribbed Cryptantha
Locations

0 0.5 1 Miles

0 2,000 4,000 Feet

N

Date: 4/27/2018
Sources: AECOM, BLM, CalTrans, First Solar, US Census

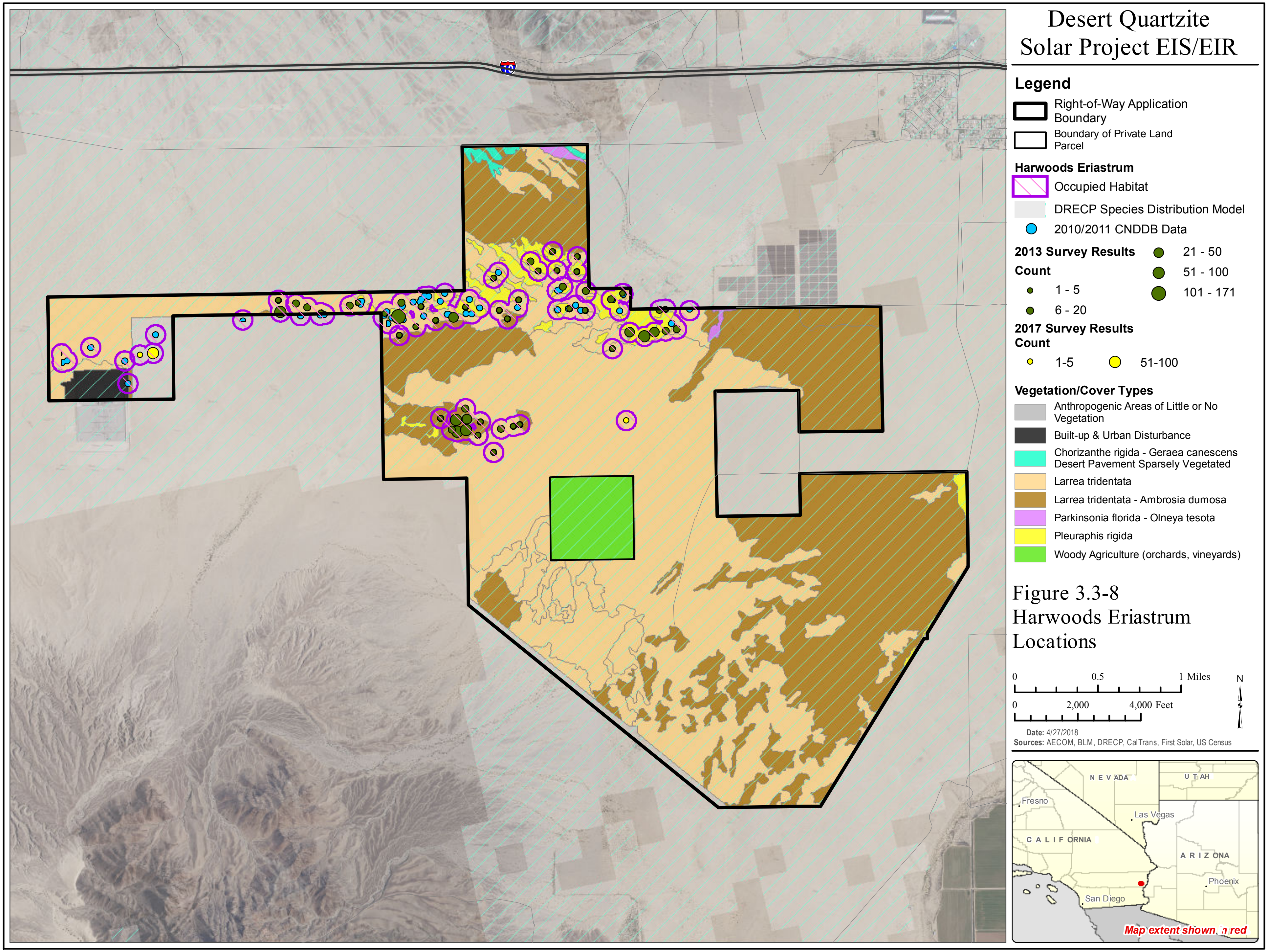
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego

Map extent shown in red

M:\Denver_GIS\Projects\DesertQuartzite\Figures\FIG_03_03_08_HarwoodsEriastrum.mxd

4/27/2018

Desert Quartzite Solar Project EIS/EIR

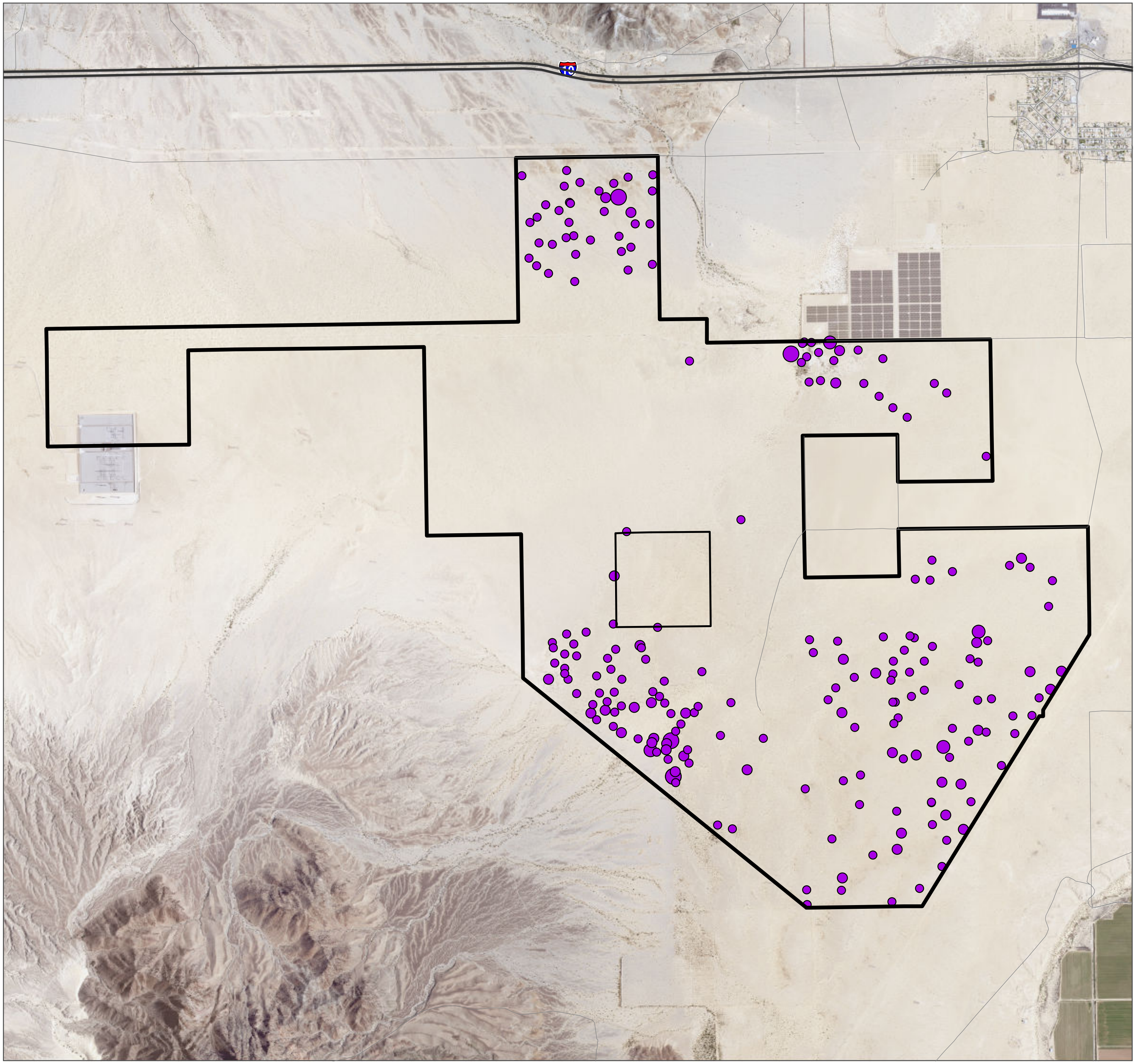


10
Legend
Right-of-Way Application Boundary
Boundary of Private Land Parcel
Harwoods Eriastrum
Occupied Habitat
DRECP Species Distribution Model
2010/2011 CNDDB Data
2013 Survey Results
Count
1 - 5
6 - 20
21 - 50
51 - 100
101 - 171
2017 Survey Results
Count
1-5
51-100
Vegetation/Cover Types
Anthropogenic Areas of Little or No Vegetation
Built-up & Urban Disturbance
Chorizanthe rigida - Geraea canescens Desert Pavement Sparsely Vegetated
Larrea tridentata
Larrea tridentata - Ambrosia dumosa
Parkinsonia florida - Olneya tesota
Pleuraphis rigida
Woody Agriculture (orchards, vineyards)
0
0.5
1 Miles
0
2,000
4,000 Feet
N
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red

Figure 3.3-8
Harwoods Eriastrum Locations

Date: 4/27/2018
Sources: AECOM, BLM, DRECP, CalTrans, First Solar, US Census

Desert Quartzite Solar Project EIS/EIR



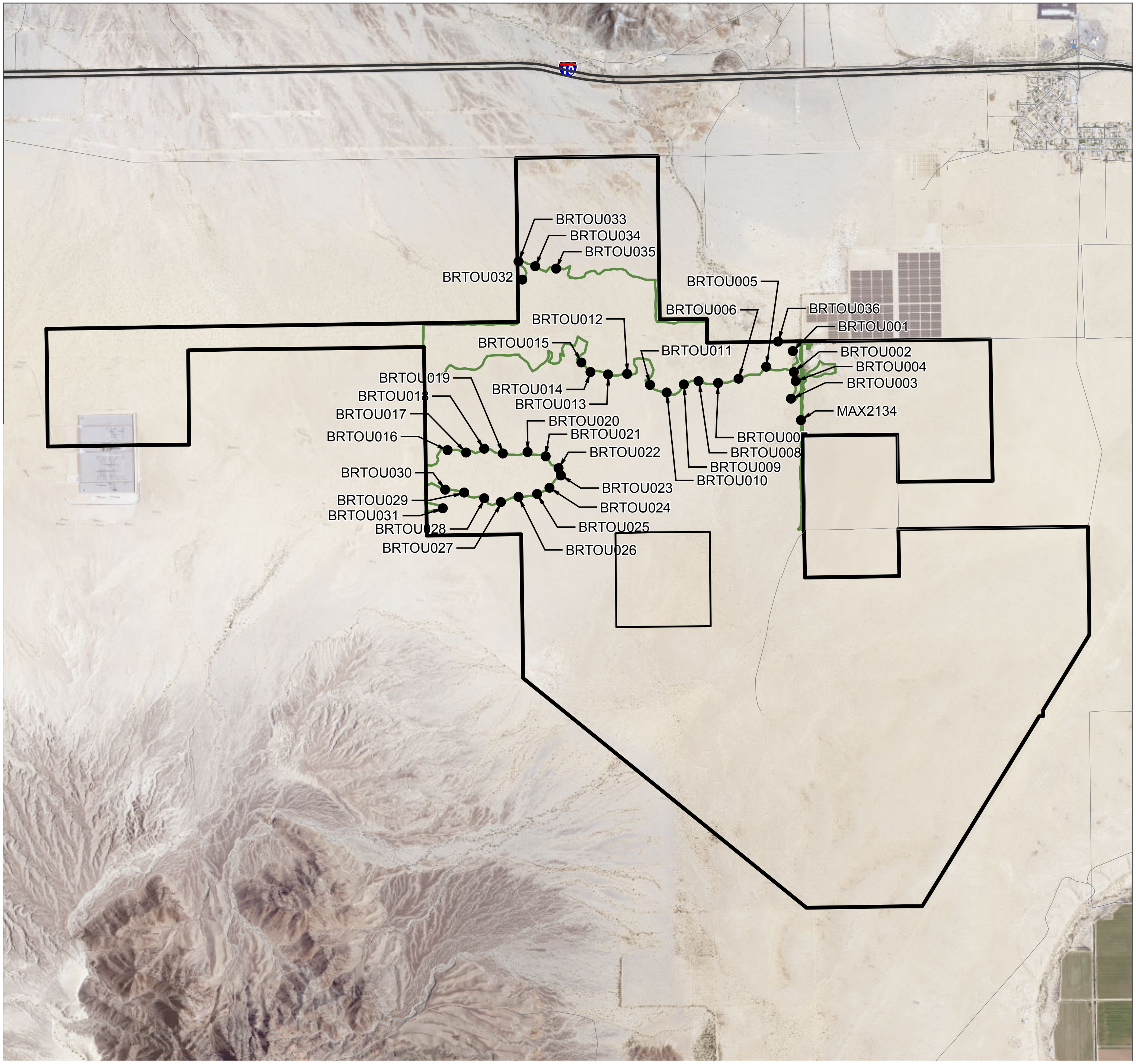
10
Legend
▭ Right-of-Way Application Boundary
▭ Boundary of Private Land Parcel
Desert Unicorn Plant
Count
● 1 - 5
● 6 - 10
● 11 - 15
● 16 - 25
0
0.5
1 Miles
0
2,000
4,000 Feet
N
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red

Figure 3.3-9
Desert Unicorn Plant
Locations

Date: 4/27/2018
Sources: AECOM, BLM, CalTrans, First Solar, US Census

M:\Denver_GIS\Projects\DesertQuartzite\Figures\Bio\FIG_03_03_09_DesertUnicornPlant.mxd

4/27/2018


10
BRTOU033
BRTOU034
BRTOU035
BRTOU032
BRTOU005
BRTOU006
BRTOU036
BRTOU001
BRTOU012
BRTOU015
BRTOU011
BRTOU002
BRTOU004
BRTOU003
BRTOU019
BRTOU014
BRTOU018
BRTOU013
BRTOU017
MAX2134
BRTOU020
BRTOU016
BRTOU021
BRTOU00
BRTOU022
BRTOU008
BRTOU009
BRTOU030
BRTOU010
BRTOU023
BRTOU029
BRTOU024
BRTOU031
BRTOU028
BRTOU025
BRTOU027
BRTOU026

Desert Quartzite Solar Project EIS/EIR

Legend

- ▭ Right-of-Way Application Boundary
- ▭ Boundary of Private Land Parcel
- ● Sahara Mustard
- — Sand Dune

Figure 3.3-10 Sahara Mustard Distribution

0 0.5 1 Miles

0 2,000 4,000 Feet

N

Date: 4/27/2018

Sources: AECOM, BLM, CalTrans, First Solar, US Census

NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red

Desert Quartzite Solar Project EIS/EIR

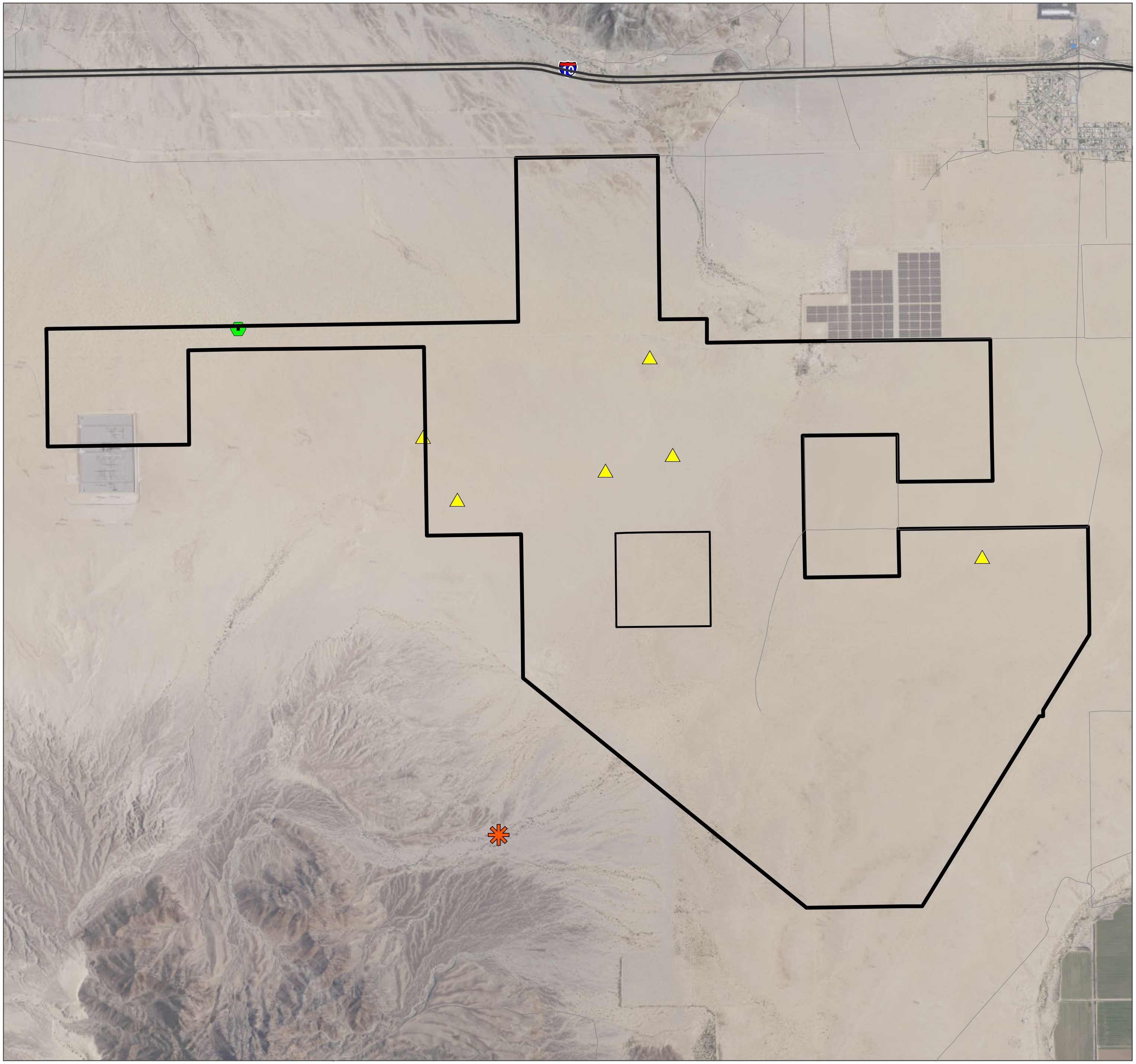

10
Legend
Right-of-Way Application Boundary
Boundary of Private Land Parcel
Desert Tortoise Sign
△ Tortoise Carcass
⬢ Tortoise Tracks
✳ Incidental Live Observation
0
0.5
1 Miles
0
2,000
4,000 Feet
N
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red

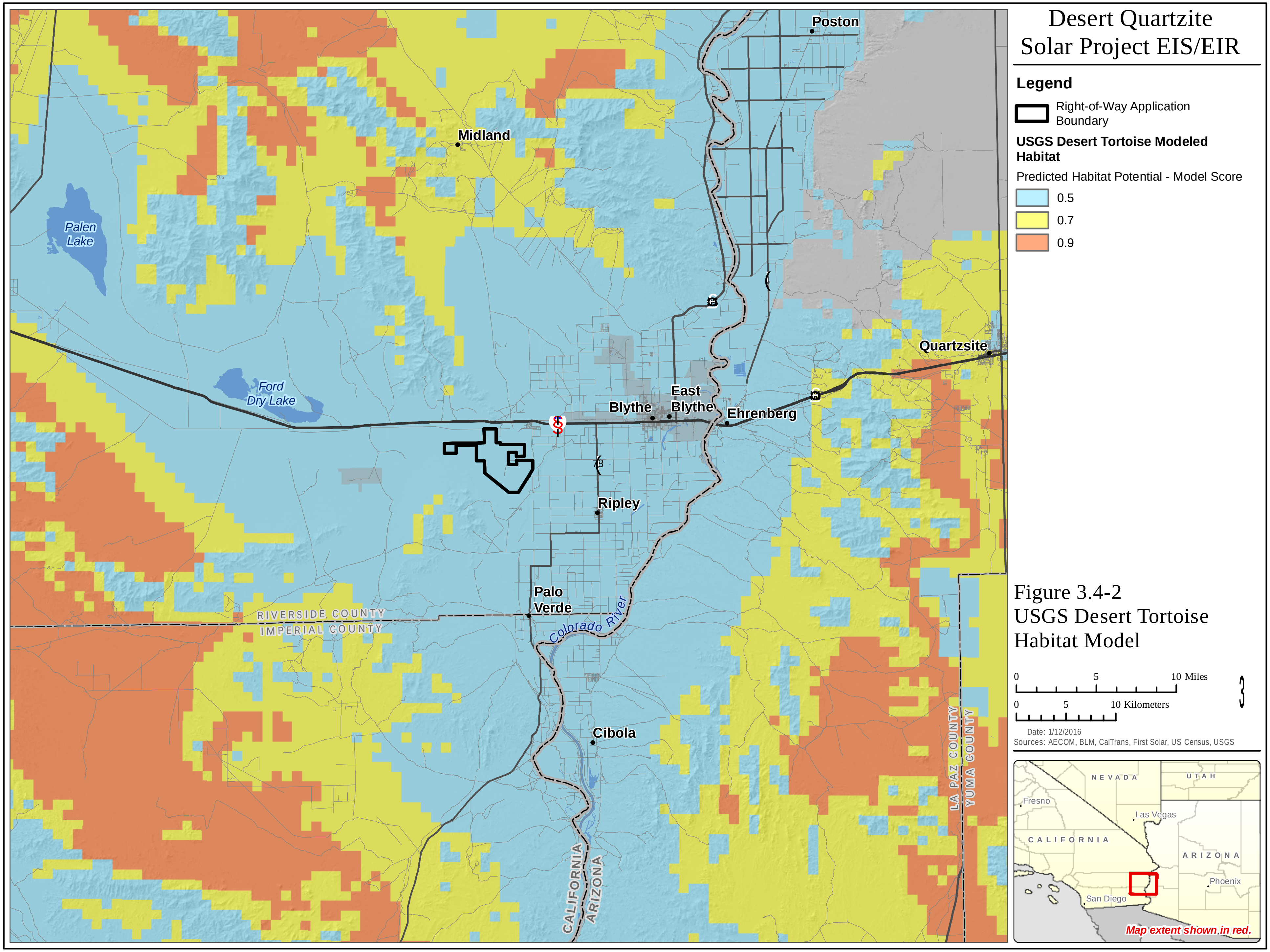
Figure 3.4-1
Desert Tortoise Sign

Date: 4/24/2018
Sources: AECOM, BLM, CalTrans, First Solar, US Census

M:\Denver_GIS\Projects\DesertQuartzite\Figures\Bio\FIG_03_04_01_DesertTortoiseSign.mxd

4/24/2018

Desert Quartzite Solar Project EIS/EIR



Poston
Midland
Palen Lake
Ford Dry Lake
Quartzsite
East Blythe
Blythe
Ehrenberg
Ripley
Palo Verde
RIVERSIDE COUNTY
IMPERIAL COUNTY
Colorado River
Cibola
LA PAZ COUNTY
YUMA COUNTY
CALIFORNIA
ARIZONA
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
0
5
10 Miles
0
5
10 Kilometers

Legend

▭ Right-of-Way Application Boundary

USGS Desert Tortoise Modeled Habitat

Predicted Habitat Potential - Model Score

🟦 0.5

🟨 0.7

🟧 0.9

Figure 3.4-2
USGS Desert Tortoise Habitat Model

Date: 1/12/2016

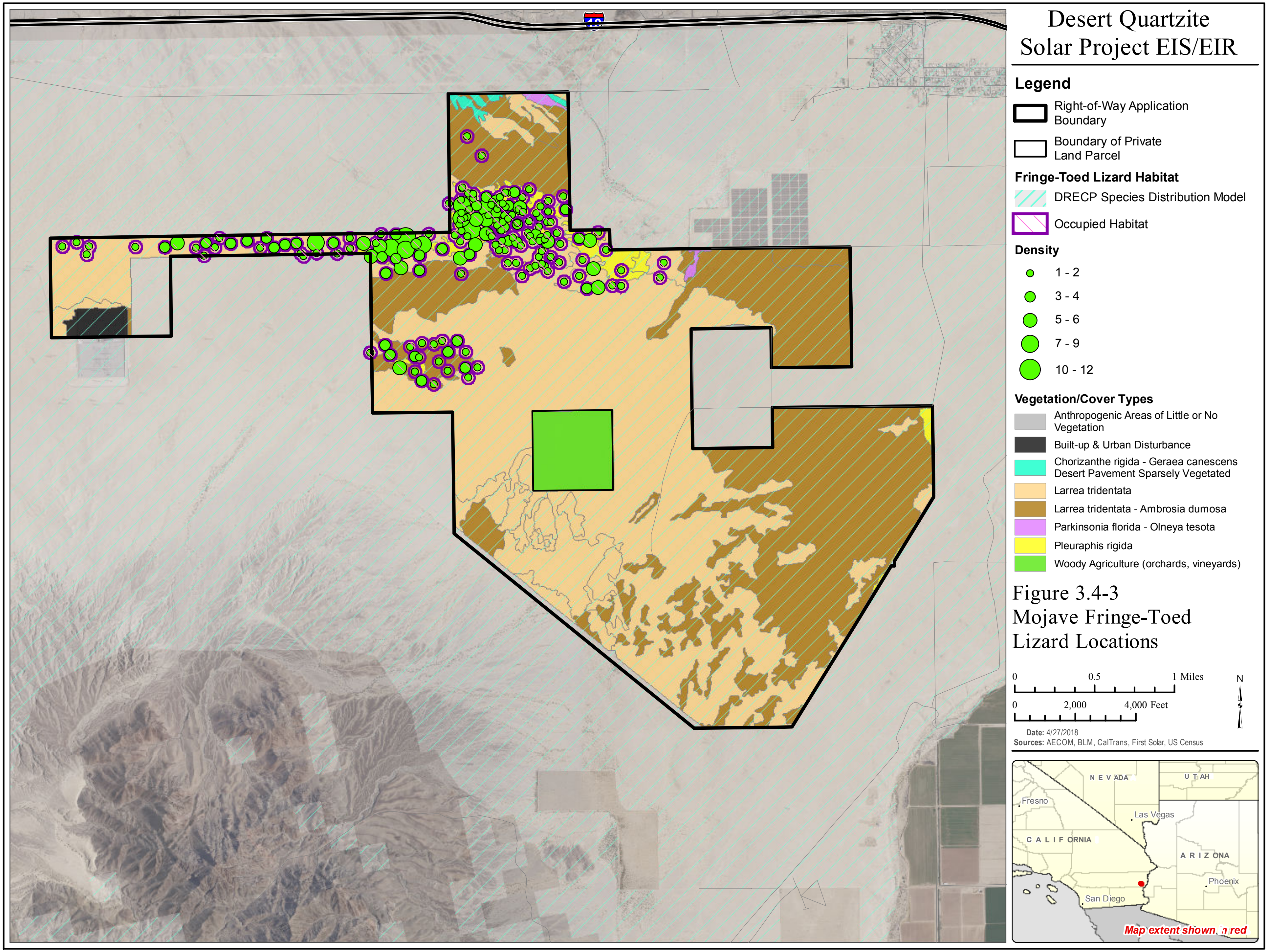
Sources: AECOM, BLM, CalTrans, First Solar, US Census, USGS

Map extent shown in red.

E:\GIS\Projects\DesertQuartzite\Figures\Bio\FIG_03_04_02_USGSDesertTortoiseHabitat.mxd

1/12/2016

Desert Quartzite Solar Project EIS/EIR



Legend
Right-of-Way Application Boundary
Boundary of Private Land Parcel
Fringe-Toed Lizard Habitat
DRECP Species Distribution Model
Occupied Habitat
Density
1 - 2
3 - 4
5 - 6
7 - 9
10 - 12
Vegetation/Cover Types
Anthropogenic Areas of Little or No Vegetation
Built-up & Urban Disturbance
Chorizanthe rigida - Geraea canescens Desert Pavement Sparsely Vegetated
Larrea tridentata
Larrea tridentata - Ambrosia dumosa
Parkinsonia florida - Olneya tesota
Pleuraphis rigida
Woody Agriculture (orchards, vineyards)
0
0.5
1 Miles
0
2,000
4,000 Feet
N
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red

Figure 3.4-3
Mojave Fringe-Toed Lizard Locations

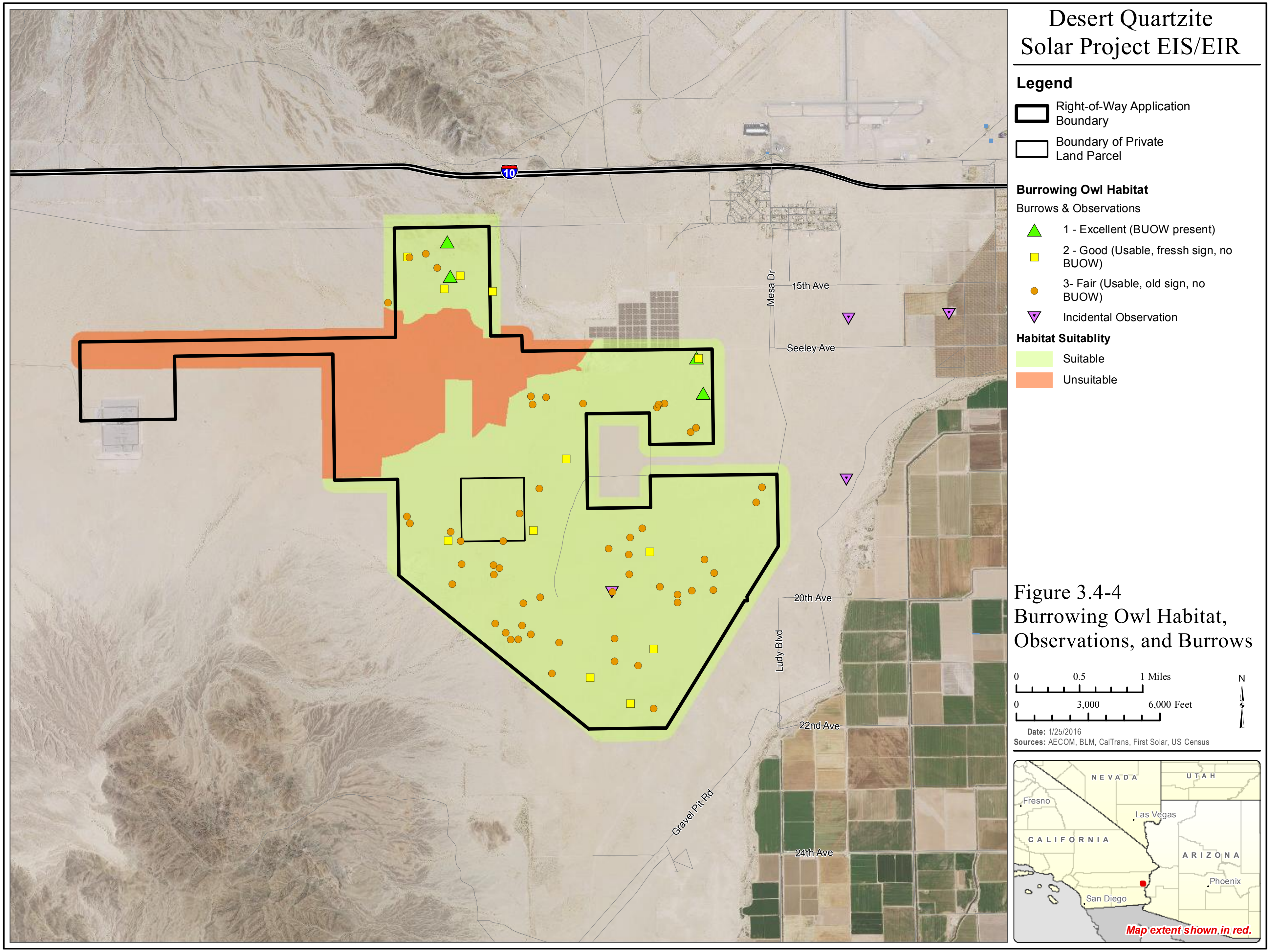
Date: 4/27/2018
Sources: AECOM, BLM, CalTrans, First Solar, US Census

M:\Denver_GIS\Projects\DesertQuartzite\Figures\Bio\FIG_03_04_03_FringeToedLizardHabitat.mxd

4/27/2018

E:\GIS\Projects\DesertQuartzite\Figures\Bio\FIG_03_04_04_BurrowingOwlHabitat.mxd

1/25/2016


10
15th Ave
Mesa Dr
Seeley Ave
20th Ave
Ludy Blvd
22nd Ave
Gravel Pit Rd
24th Ave
0
0.5
1 Miles
0
3,000
6,000 Feet
N
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red.

Desert Quartzite Solar Project EIS/EIR

Legend

▭ Right-of-Way Application Boundary

▭ Boundary of Private Land Parcel

Burrowing Owl Habitat

Burrows & Observations

▲ 1 - Excellent (BUOW present)

■ 2 - Good (Usable, fressh sign, no BUOW)

● 3- Fair (Usable, old sign, no BUOW)

▽ Incidental Observation

Habitat Suitablity

🟩 Suitable

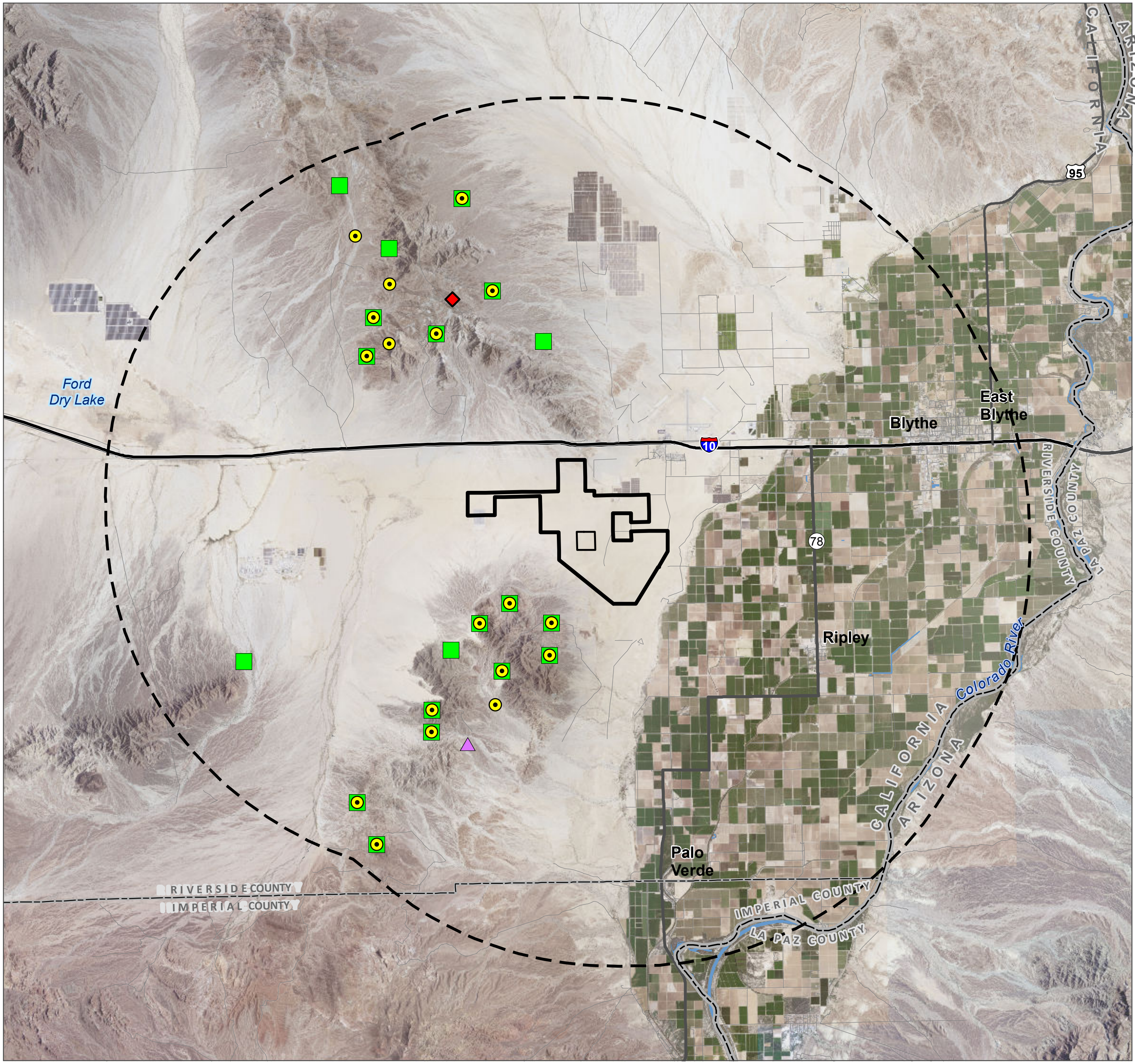
🟧 Unsuitable

Figure 3.4-4
Burrowing Owl Habitat, Observations, and Burrows

Date: 1/25/2016
Sources: AECOM, BLM, CalTrans, First Solar, US Census

M:\Denver_GIS\Projects\DesertQuartzite\Figures\Bio\FIG_03_04_05_GoldenEagleHabitat.mxd

4/27/2018


Ford Dry Lake
95
10
Blythe
East Blythe
78
Ripley
Colorado River
RIVERSIDE COUNTY
LA PAZ COUNTY
CALIFORNIA
ARIZONA
Palo Verde
RIVERSIDE COUNTY
IMPERIAL COUNTY
IMPERIAL COUNTY
LA PAZ COUNTY

Desert Quartzite Solar Project EIS/EIR

Legend

- ▭ Right-of-Way Application Boundary
- ⬚ Right-of-Way Application Boundary 10-Mile Buffer
- ▭ Boundary of Private Land Parcel

Golden Eagle Observation Points & Sightings

- ⊙ Observation Point 2013-2014
- 🟩 Observation Point 2014-2015
- △ Sighting 2014
- ◆ Nest from DRECP Data Basin Website

Figure 3.4-5
Golden Eagle Habitat and Observations

0 2 4 Miles

0 4 8 Kilometers

N

Date: 4/27/2018
Sources: AECOM, BLM, CalTrans, First Solar, US Census

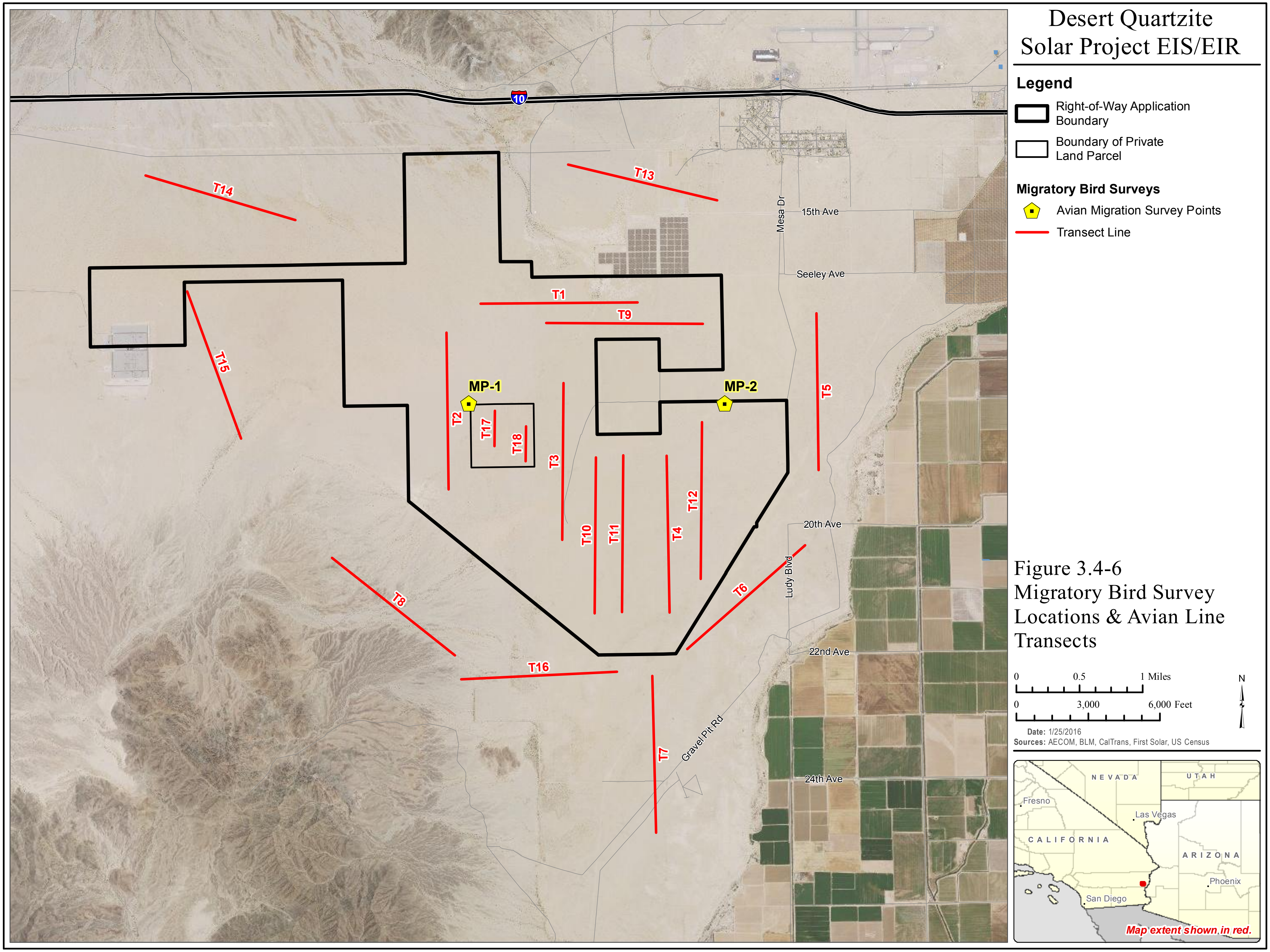
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego

Map extent shown in red.

E:\GIS\Projects\DesertQuartzite\Figures\Bio\FIG_03_04_06_MigratoryBirdSurveys.mxd

1/25/2016

Desert Quartzite Solar Project EIS/EIR

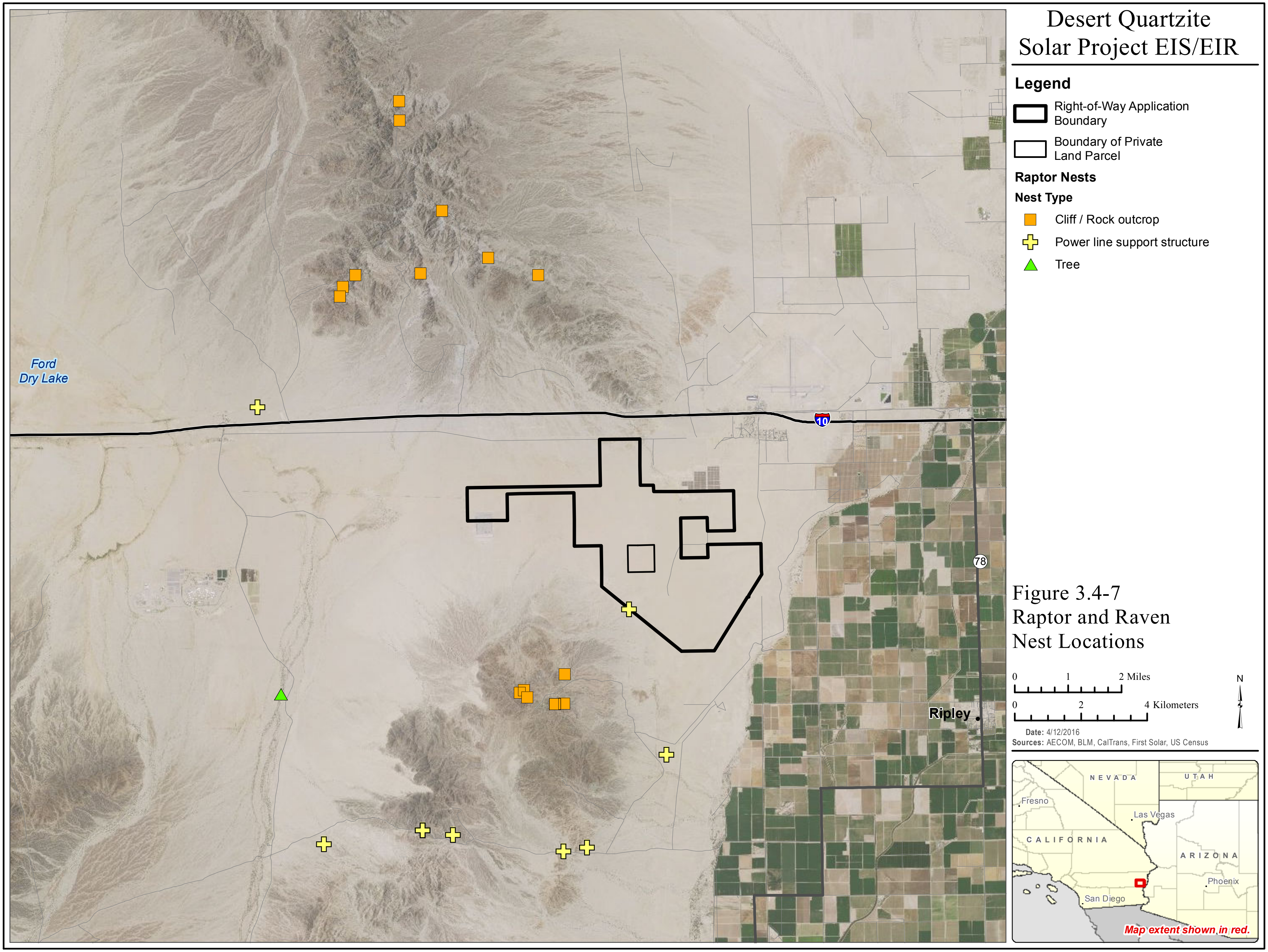


Legend
Right-of-Way Application Boundary
Boundary of Private Land Parcel
Migratory Bird Surveys
Avian Migration Survey Points
Transect Line
10
T1
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T12
T13
T14
T15
T16
T17
T18
MP-1
MP-2
15th Ave
Seeley Ave
Mesa Dr
20th Ave
Ludy Blvd
22nd Ave
Gravel Pit Rd
24th Ave
0
0.5
1 Miles
0
3,000
6,000 Feet
N
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red.

Figure 3.4-6
Migratory Bird Survey Locations & Avian Line Transects

Date: 1/25/2016

Sources: AECOM, BLM, CalTrans, First Solar, US Census



Ford Dry Lake
10
78
Ripley
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
0 1 2 Miles
0 2 4 Kilometers
N

Desert Quartzite Solar Project EIS/EIR

Legend

▭ Right-of-Way Application Boundary

▭ Boundary of Private Land Parcel

Raptor Nests

Nest Type

🟧 Cliff / Rock outcrop

✚ Power line support structure

▲ Tree

Figure 3.4-7
Raptor and Raven Nest Locations

Date: 4/12/2016
Sources: AECOM, BLM, CalTrans, First Solar, US Census

Map extent shown in red.

E:\GIS\Projects\DesertQuartzite\Figures\Bio\FIG_03_04_07_RaptorRavenNests.mxd

1/25/2016

Desert Quartzite Solar Project EIS/EIR

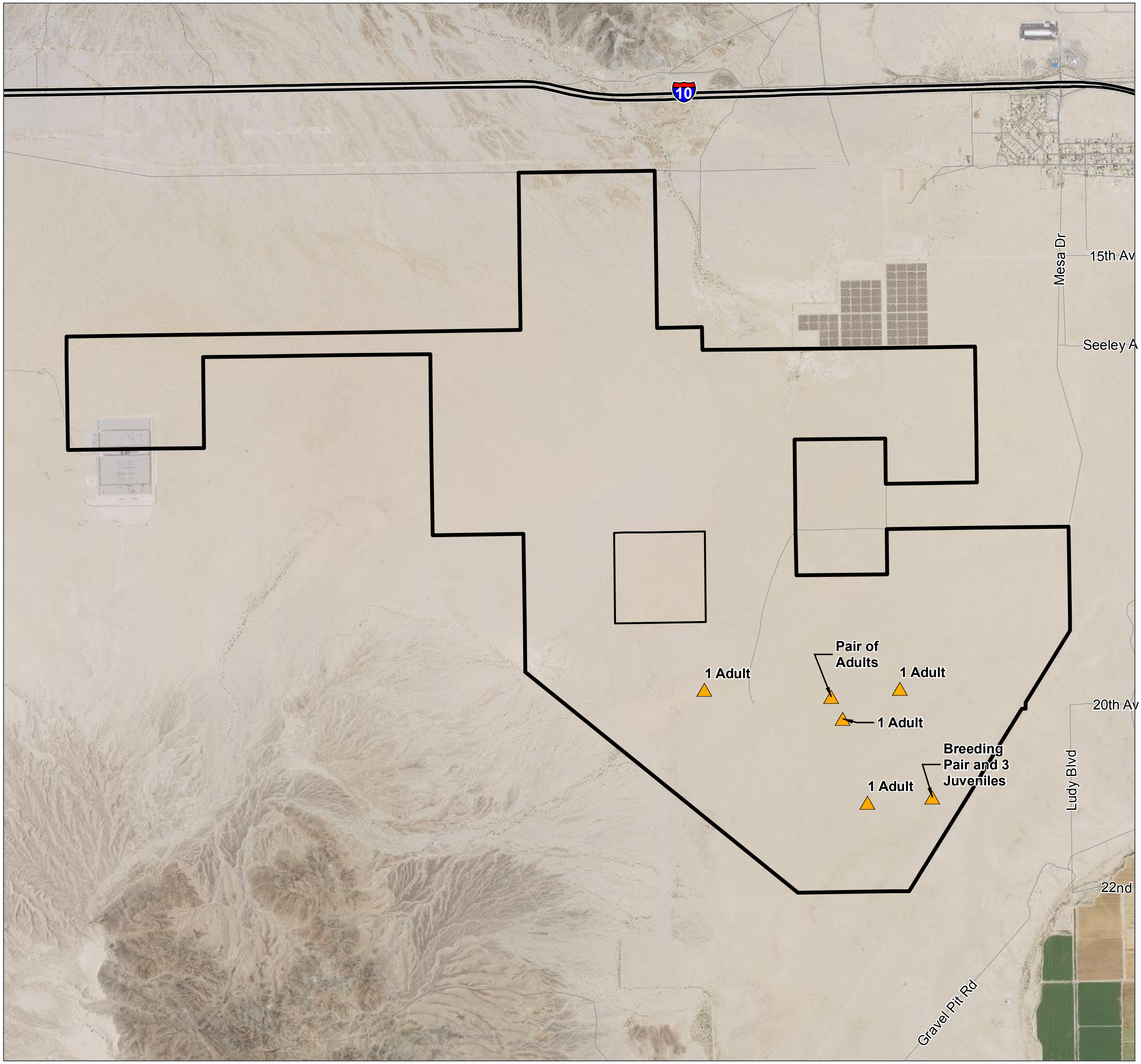

10
15th Av
Mesa Dr
Seeley A
20th Av
Ludy Blvd
22nd
Gravel Pit Rd
Pair of Adults
1 Adult
1 Adult
1 Adult
1 Adult
Breeding Pair and 3 Juveniles
1 Adult
Legend
Right-of-Way Application Boundary
Boundary of Private Land Parcel
Kit Fox Burrow
0
0.5
1 Miles
0
2,000
4,000 Feet
N

Figure 3.4-8
Active Kit Fox Burrows

Date: 1/25/2016
Sources: AECOM, BLM, CalTrans, First Solar, US Census

NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego

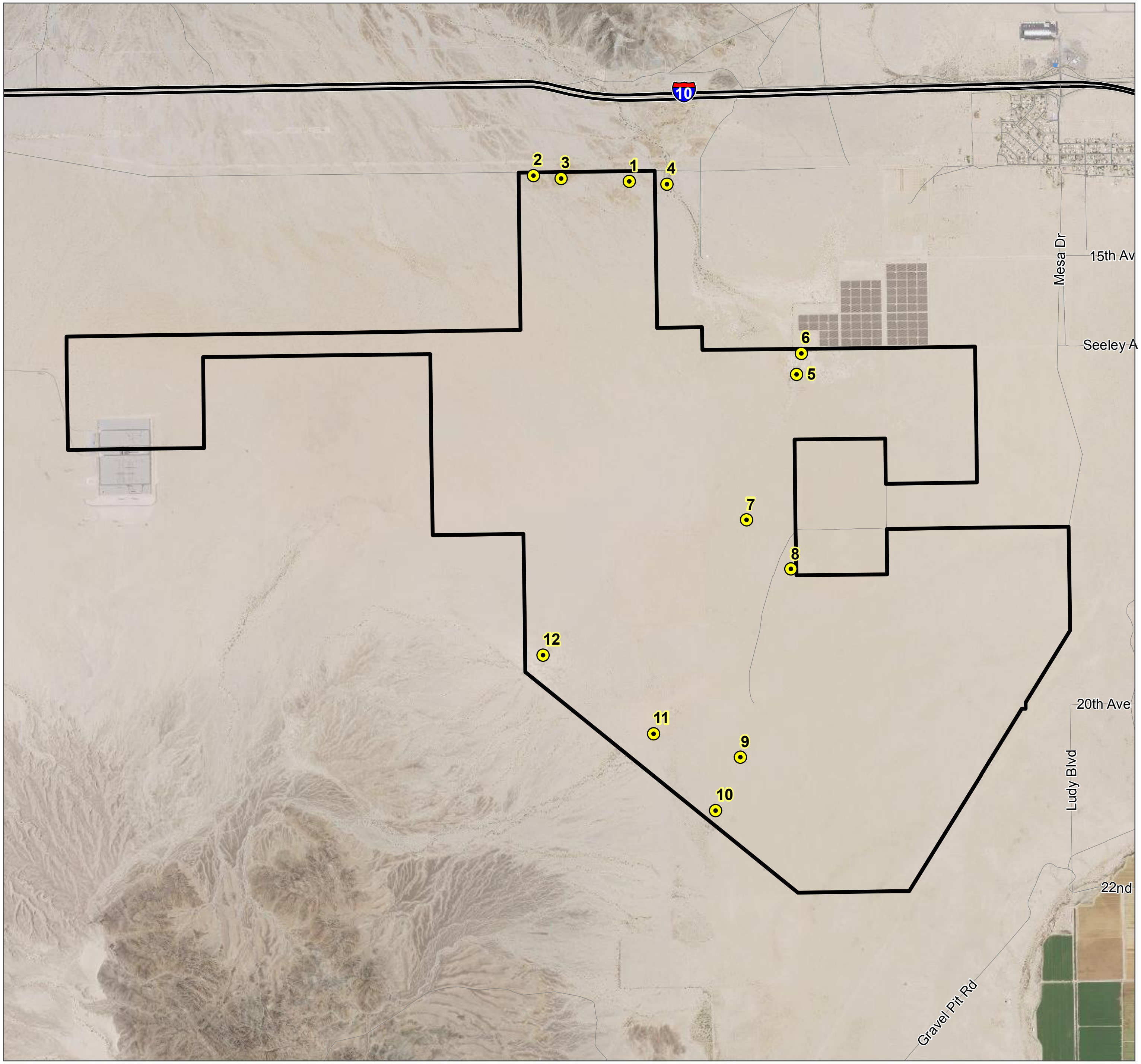
Map extent shown in red.

E:\GIS\Projects\DesertQuartzite\Figures\Bio\FIG_03_04_08_KitFoxBurrows.mxd

1/25/2016

E:\GIS\Projects\DesertQuartzite\Figures\Bio\FIG_03_04_09_BatMonitoringLocations.mxd

Desert Quartzite Solar Project EIS/EIR


10
2
3
1
4
Mesa Dr
15th Av
6
Seeley A
5
7
8
12
20th Ave
11
9
10
Ludy Blvd
22nd
Gravel Pit Rd

Legend

▭ Right-of-Way Application Boundary

● Bat Monitoring Location

Figure 3.4-9
Acoustic Bat Monitoring Locations

0 0.5 1 Miles

0 2,000 4,000 Feet

N

Date: 1/25/2016

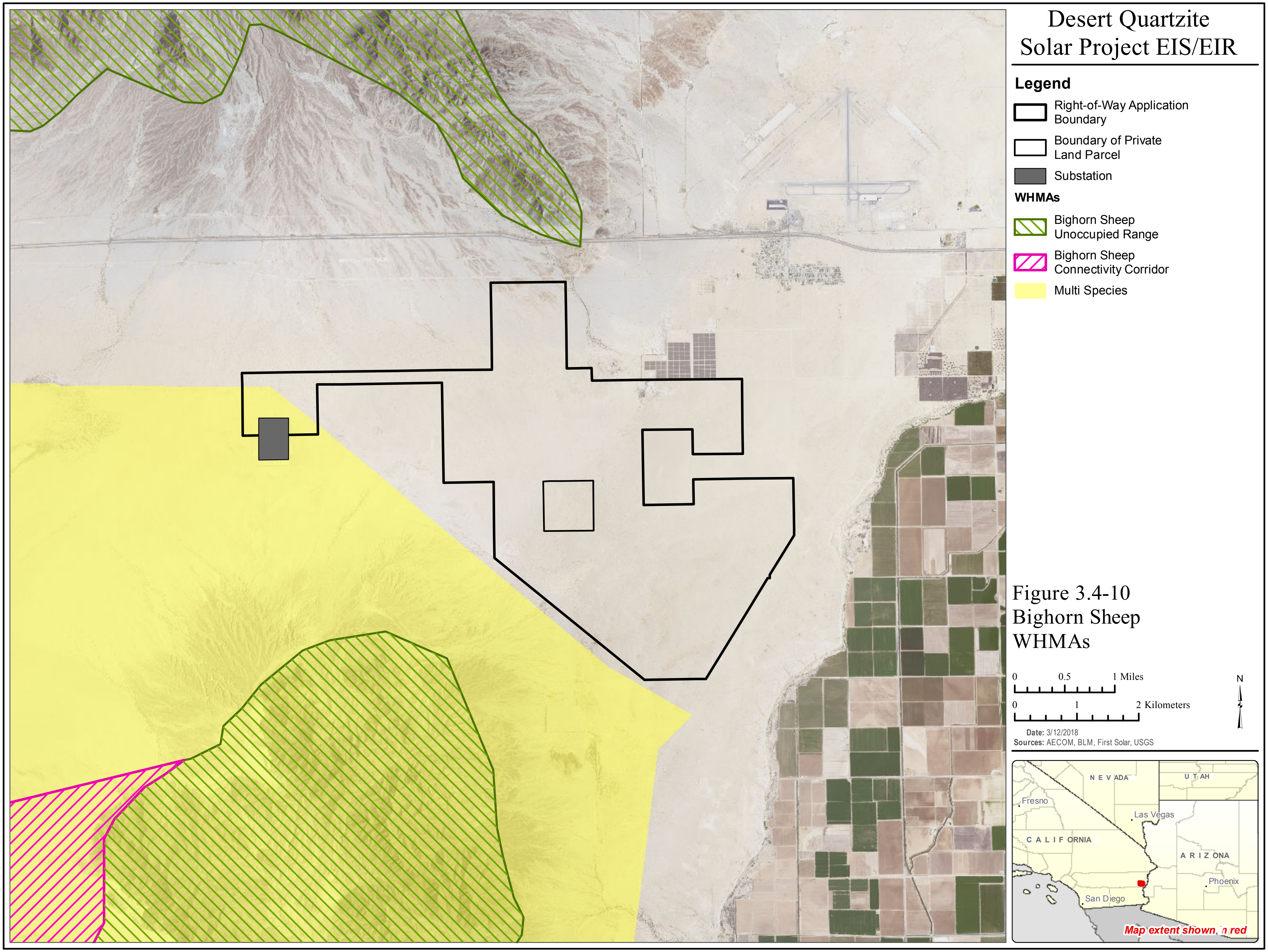
Sources: AECOM, BLM, CalTrans, First Solar, US Census

NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego

Map extent shown in red.

1/25/2016

Desert Quartzite Solar Project EIS/EIR



Legend

▭ Right-of-Way Application Boundary

▭ Boundary of Private Land Parcel

■ Substation

WHMAs

▨ Bighorn Sheep Unoccupied Range

▨ Bighorn Sheep Connectivity Corridor

🟨 Multi Species

Figure 3.4-10
Bighorn Sheep
WHMAs

0
0.5
1 Miles
0
1
2 Kilometers
N
N E V ADA
U T AH
Fresno
Las Vegas
C A L I F ORNIA
A R I Z ONA
Phoenix
San Diego
Map extent shown in red

Date: 3/12/2018
Sources: AECOM, BLM, First Solar, USGS

M:\Denver_GIS\Projects\DesertQuartzite\Figures\Bio\FIG_03_04_10_BighornWHMAs.mxd

3/12/2018

T:\4_Shannon F\GIS\Layout\Current_APE_10_3.mxd

Desert Quartzite Solar Project EIS/EIR

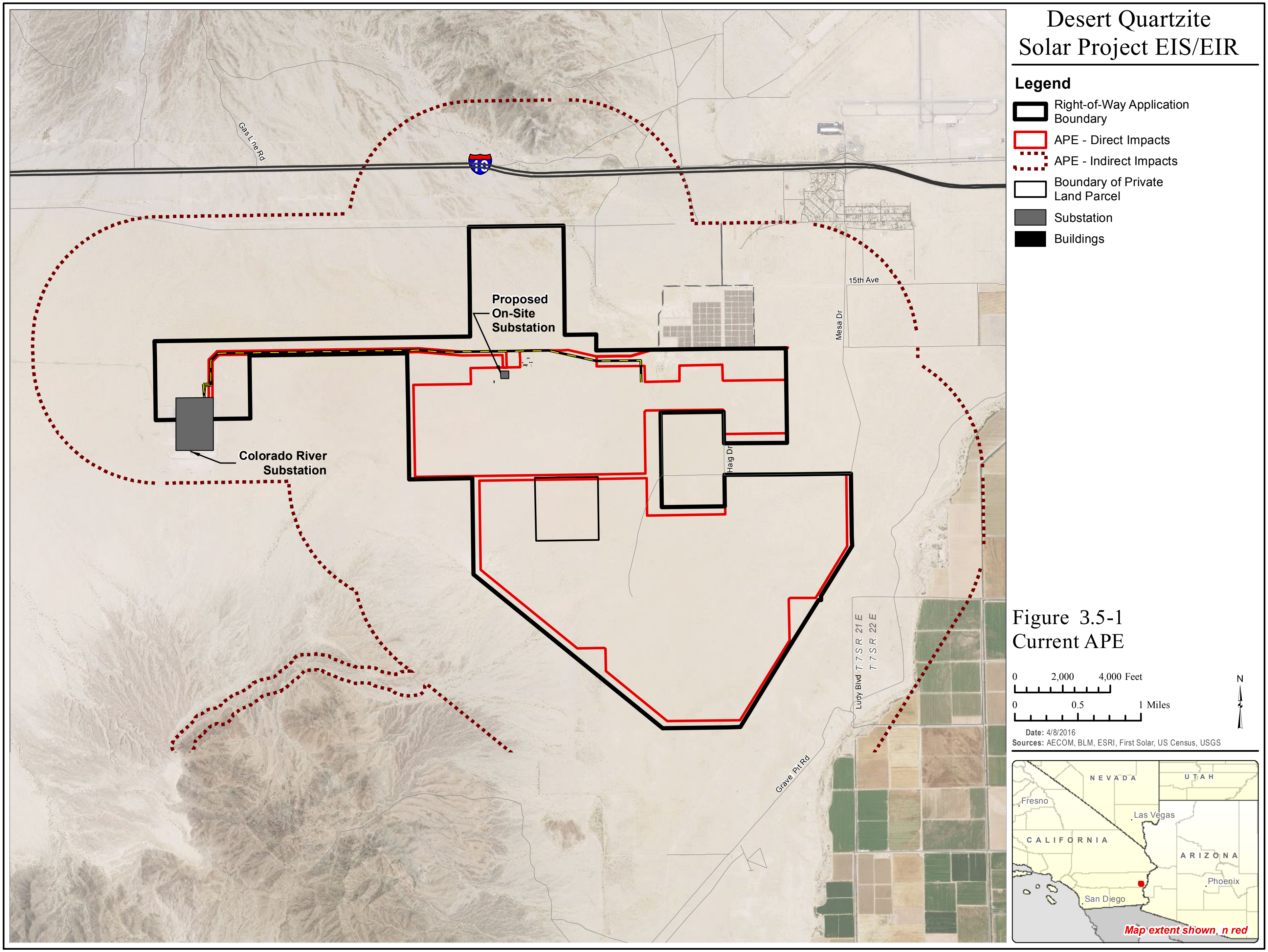

Legend
Right-of-Way Application Boundary
APE - Direct Impacts
APE - Indirect Impacts
Boundary of Private Land Parcel
Substation
Buildings
Gas Line Rd
10
Proposed On-Site Substation
Colorado River Substation
15th Ave
Mesa Dr
Haig Dr
Ludy Blvd
T. 7 S R. 21 E
T. 7 S R. 22 E
Grave Pit Rd
0
2,000
4,000 Feet
0
0.5
1 Miles
N
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red

Figure 3.5-1
Current APE

Date: 4/8/2016
Sources: AECOM, BLM, ESRI, First Solar, US Census, USGS

4/8/2016

E:\GIS\Projects\DesertQuartzite\Figures\FIG_03_06_01_EnvJustice.mxd

Desert Quartzite Solar Project EIS/EIR

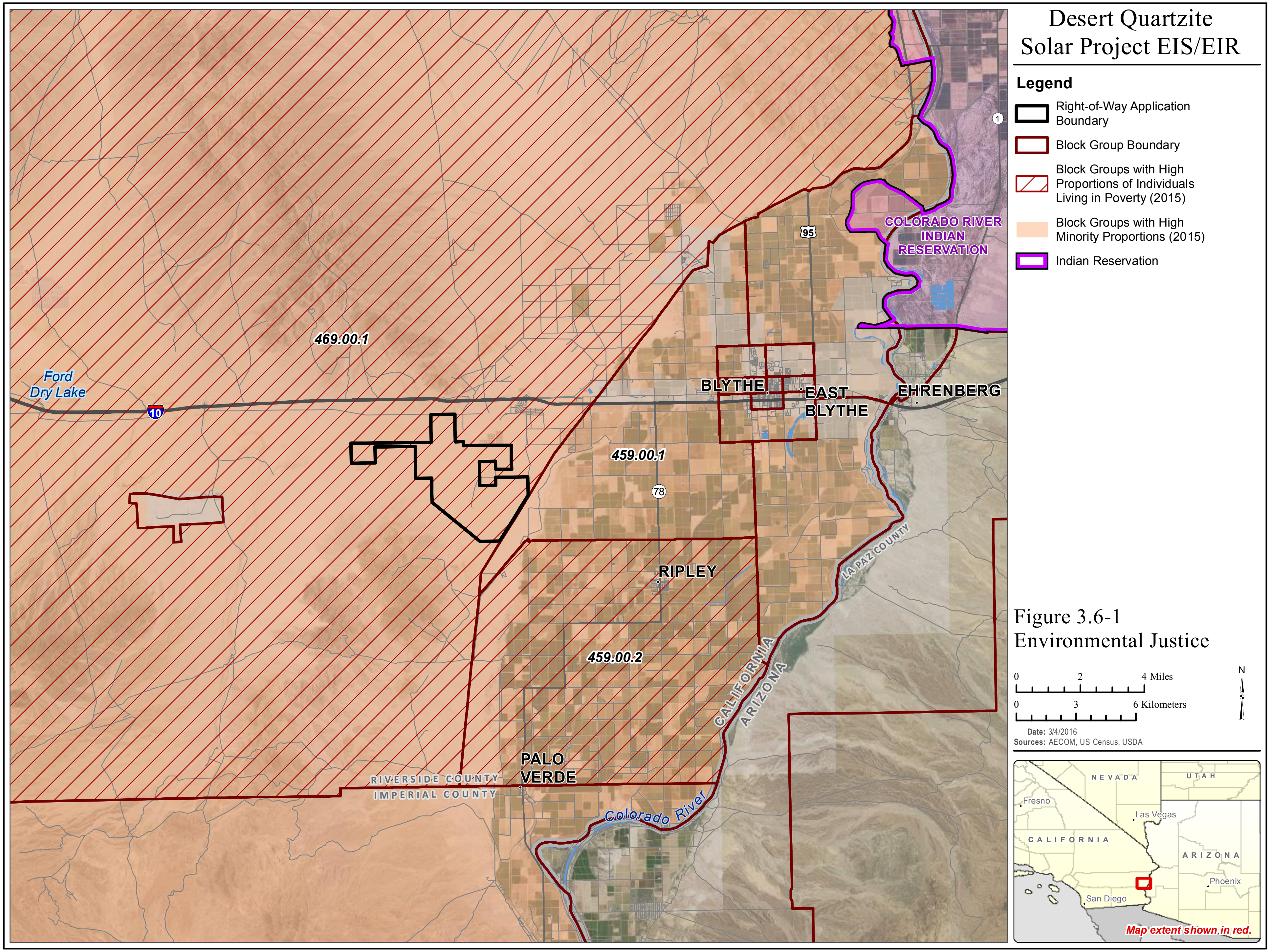

Legend
Right-of-Way Application Boundary
Block Group Boundary
Block Groups with High Proportions of Individuals Living in Poverty (2015)
Block Groups with High Minority Proportions (2015)
Indian Reservation
469.00.1
459.00.1
459.00.2
Ford Dry Lake
10
95
78
1
BLYTHE
EAST BLYTHE
EHRENBERG
COLORADO RIVER INDIAN RESERVATION
RIPLEY
PALO VERDE
LA PAZ COUNTY
CALIFORNIA
ARIZONA
RIVERSIDE COUNTY
IMPERIAL COUNTY
Colorado River
0
2
4 Miles
0
3
6 Kilometers
N
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red.

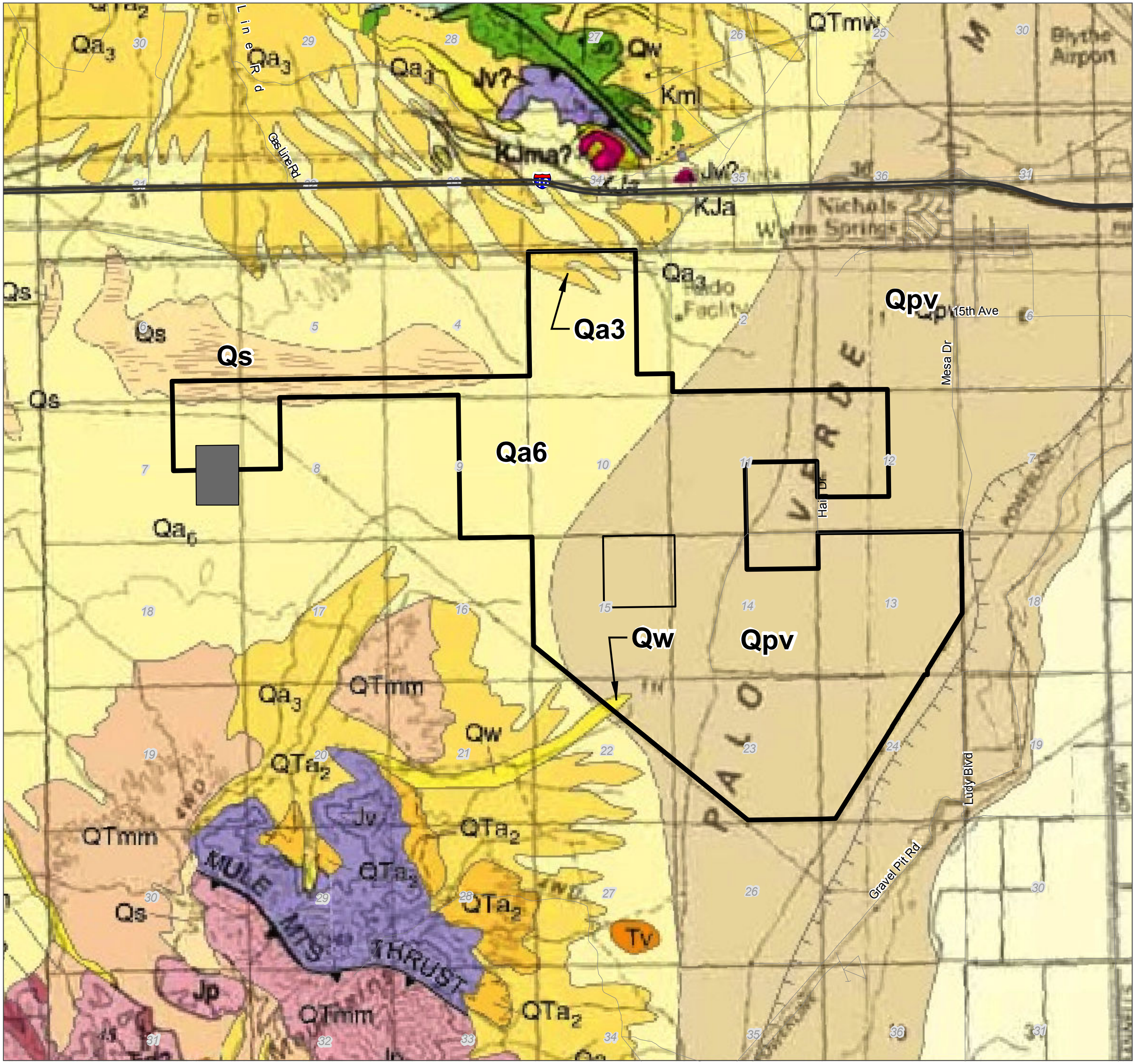
Figure 3.6-1
Environmental Justice

Date: 3/4/2016
Sources: AECOM, US Census, USDA

3/4/2016

E:\GIS\Projects\DesertQuartzite\Figures\FIG_03_07_01_Geology.mxd

3/15/2016


Qa3
Qs
Qa6
Qpv
Qw
Qpv
QTmw
Qw
Kml
Jv?
KJma?
KJa
Jv?
Qa$_3$
Qs
Qa$_6$
QTmm
QTa$_2$
Jv
Jp
Tv
MULE MTS THRUST
PALO VERDE
Nichols Warm Springs
Blythe Airport
Radio Facility
15th Ave
Mesa Dr
Hall Dr
Ludy Blvd
Gravel Pit Rd
Gas Line Rd
Line Rd

Desert Quartzite Solar Project EIS/EIR

Legend

- ▭ Right-of-Way Application Boundary
- ▭ Boundary of Private Land Parcel
- ■ Substation

List of Project Site Map Units

Qw -	Alluvium of modern washes (Holocene)
Qs -	Eolian sand (Holocene)
Qa3 -	Alluvial fan and valley deposits (Unit 3) (Holocene to Pleistocene)
Qa6 -	Alluvial fan and alluvial valley deposits (Unit 6) (Holocene)
Qpv -	Alluvial deposits of Palo Verde Mesa (Pleistocene)

Figure 3.7-1
Geologic Map of
Project Area

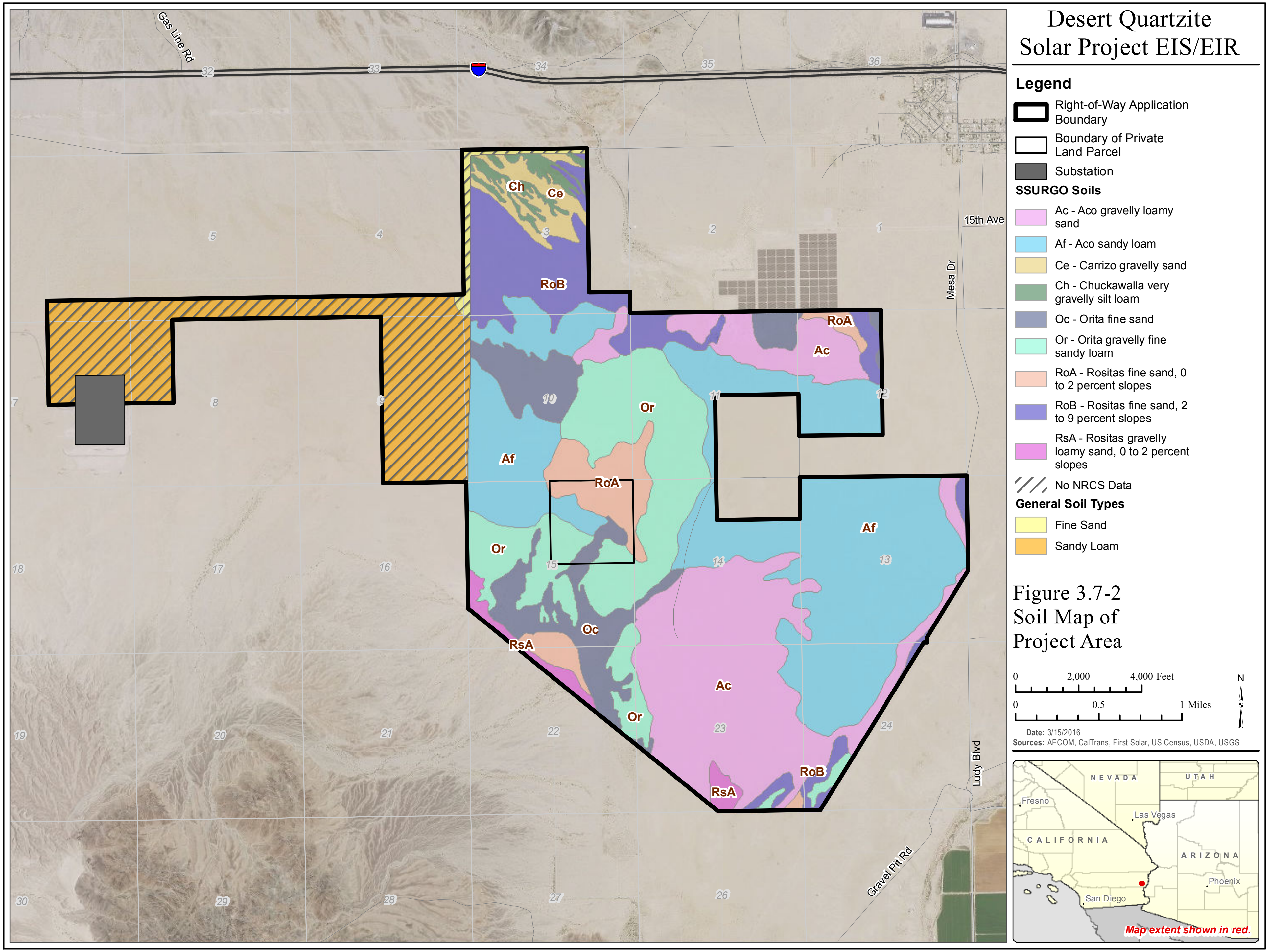
0 2,000 4,000 Feet
0 0.5 1 Miles
N

Date: 3/15/2016
Sources: AECOM, BLM, CalTrans, First Solar, US Census, USGS

NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego

Map extent shown in red.

E:\GIS\Projects\DesertQuartzite\Figures\FIG_03_07_Soils.mxd


Gas Line Rd
32
33
34
35
36
15th Ave
Mesa Dr
Ludy Blvd
Gravel Pit Rd
5
4
3
2
1
7
8
9
10
11
12
18
17
16
15
14
13
19
20
21
22
23
24
30
29
28
27
26
Ch
Ce
RoB
RoA
Ac
Or
Af
RoA
Or
Af
Oc
RsA
Ac
Or
RoB
RsA
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red.
N
0
2,000
4,000 Feet
0
0.5
1 Miles

Desert Quartzite Solar Project EIS/EIR

Legend

▭ Right-of-Way Application Boundary

▭ Boundary of Private Land Parcel

■ Substation

SSURGO Soils

■ Ac - Aco gravelly loamy sand

■ Af - Aco sandy loam

■ Ce - Carrizo gravelly sand

■ Ch - Chuckawalla very gravelly silt loam

■ Oc - Orita fine sand

■ Or - Orita gravelly fine sandy loam

■ RoA - Rositas fine sand, 0 to 2 percent slopes

■ RoB - Rositas fine sand, 2 to 9 percent slopes

■ RsA - Rositas gravelly loamy sand, 0 to 2 percent slopes

▨ No NRCS Data

General Soil Types

■ Fine Sand

■ Sandy Loam

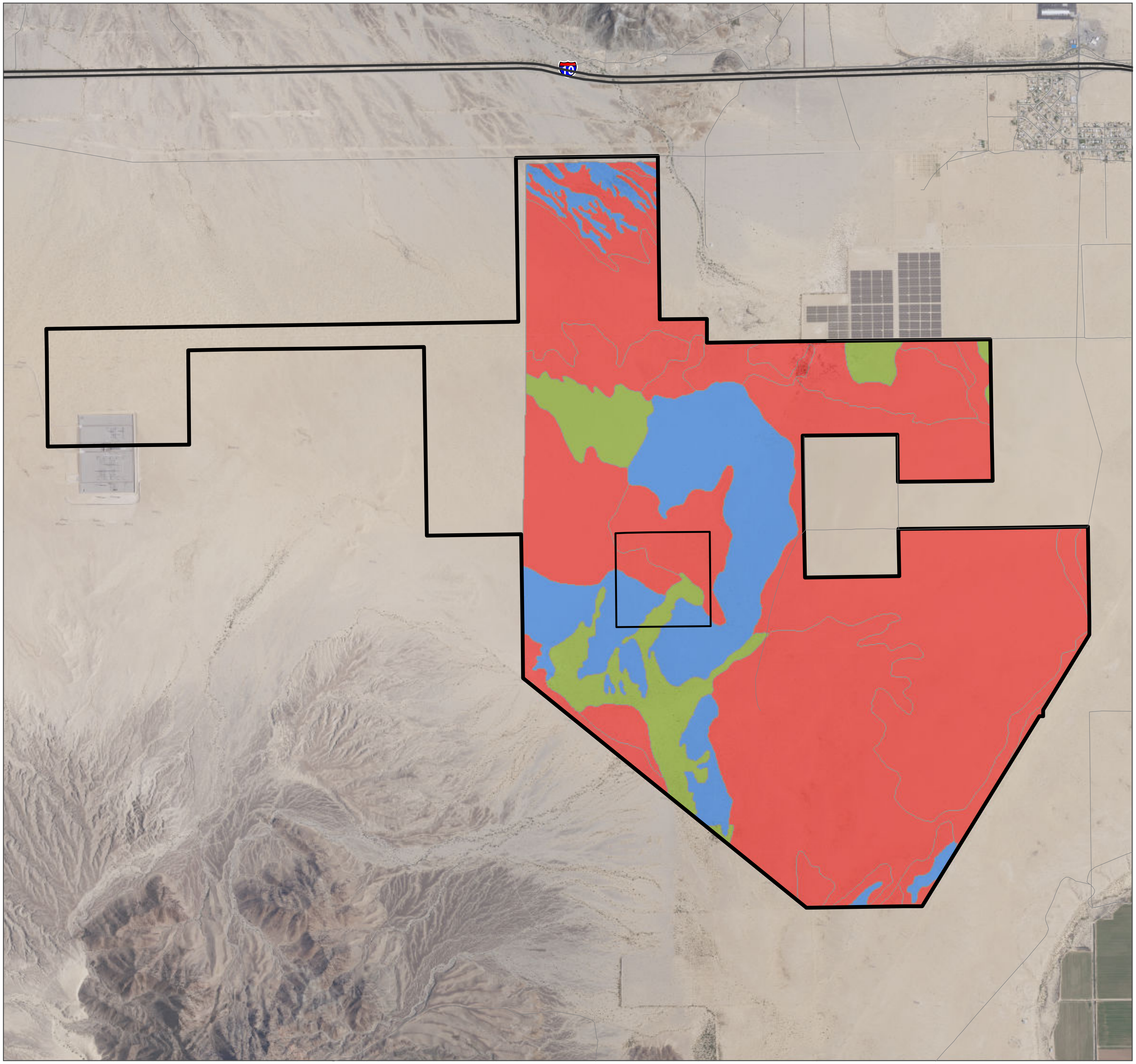
Figure 3.7-2
Soil Map of
Project Area

Date: 3/15/2016
Sources: AECOM, CalTrans, First Solar, US Census, USDA, USGS

3/15/2016

M:\Denver_GIS\Projects\DesertQuartzite\Figures\FIG_03_07_03_HydroGroups.mxd

Desert Quartzite Solar Project EIS/EIR



Legend

▭ Right-of-Way Application Boundary

▭ Boundary of Private Land Parcel

SSURGO Soils

Hydrologic Group

🟥 A - Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

🟦 B - Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission..

🟩 C - Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission..

Figure 3.7-3
SSURGO Soils
Hydrologic Groups

0 0.5 1 Miles

0 2,000 4,000 Feet

N

Date: 4/24/2018
Sources: AECOM, BLM, CalTrans, First Solar, NRCS, US Census

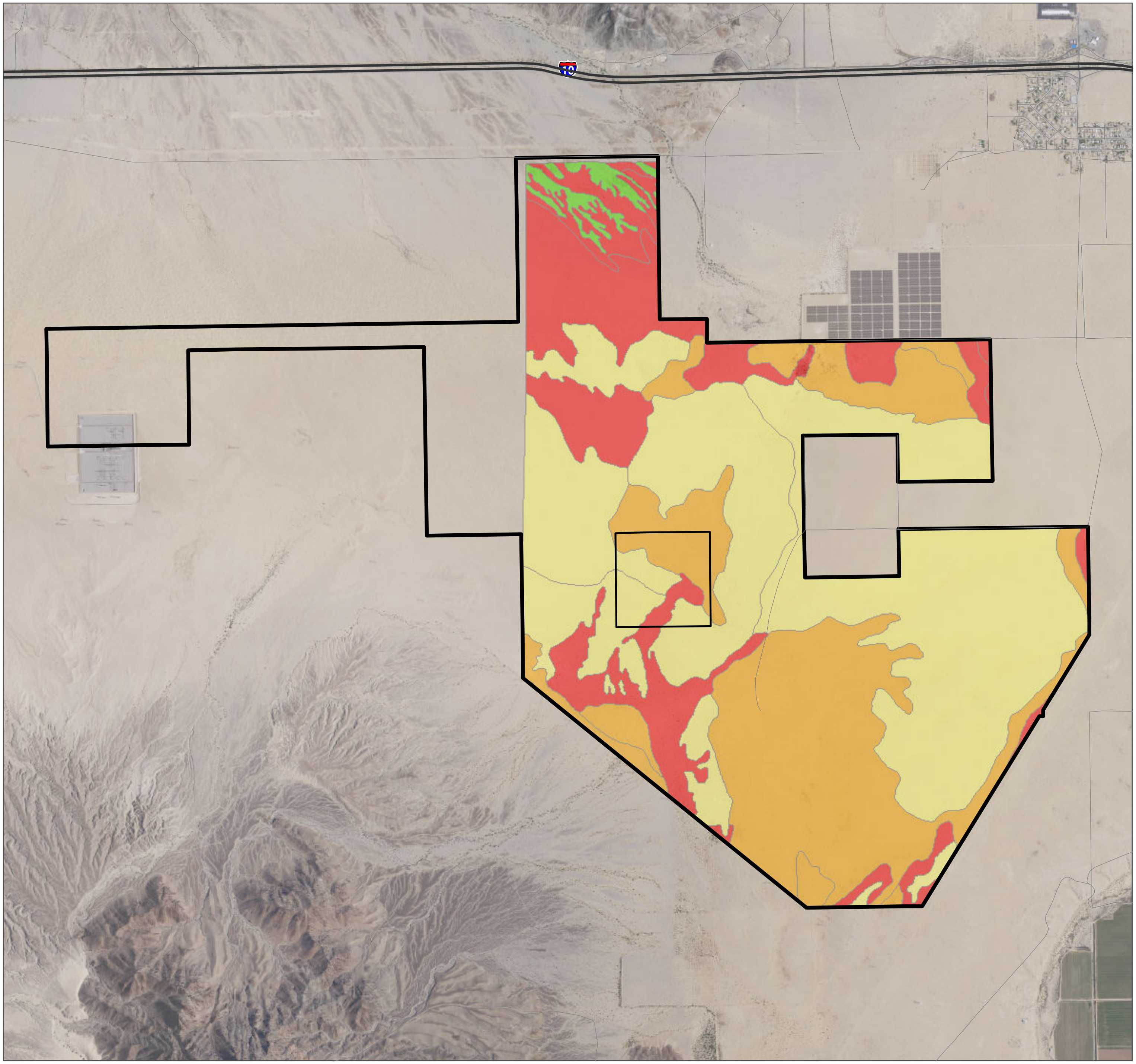
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego

Map extent shown in red

4/24/2018

M:\Denver_GIS\Projects\DesertQuartzite\Figures\FIG_03_07_04_WindErodibility.mxd

3/13/2018


10

Desert Quartzite Solar Project EIS/EIR

Legend

▭ Right-of-Way Application Boundary

▭ Boundary of Private Land Parcel

SSURGO Soils

Wind Erodibility (Tons/Acre/Year)

🟥 310 t/a/y

🟧 134 t/a/y

🟨 86 t/a/y

🟩 38 t/a/y

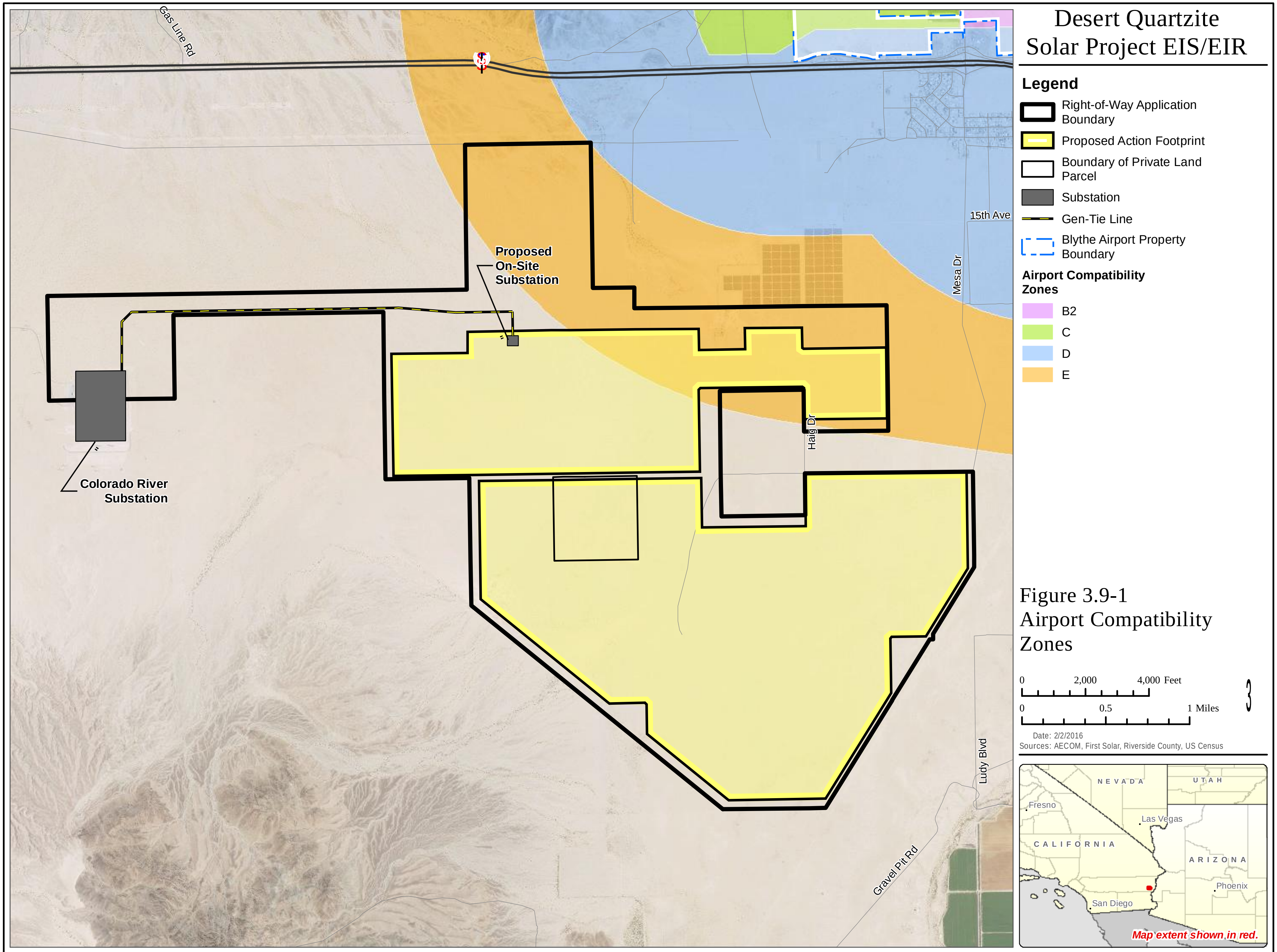
Figure 3.7-4
SSURGO Soils
Wind Erodibilty

0
0.5
1 Miles
0
2,000
4,000 Feet
N

Date: 3/13/2018
Sources: AECOM, BLM, CalTrans, First Solar, NRCS, US Census

NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red

Desert Quartzite Solar Project EIS/EIR



Gas Line Rd
15th Ave
Mesa Dr
Haig Dr
Ludy Blvd
Gravel Pit Rd
Proposed On-Site Substation
Colorado River Substation
Legend
Right-of-Way Application Boundary
Proposed Action Footprint
Boundary of Private Land Parcel
Substation
Gen-Tie Line
Blythe Airport Property Boundary
Airport Compatibility Zones
B2
C
D
E
0
2,000
4,000 Feet
0
0.5
1 Miles
NEVADA
UTAH
CALIFORNIA
ARIZONA
Fresno
Las Vegas
San Diego
Phoenix
Map extent shown in red.

Figure 3.9-1 Airport Compatibility Zones

Date: 2/2/2016

Sources: AECOM, First Solar, Riverside County, US Census

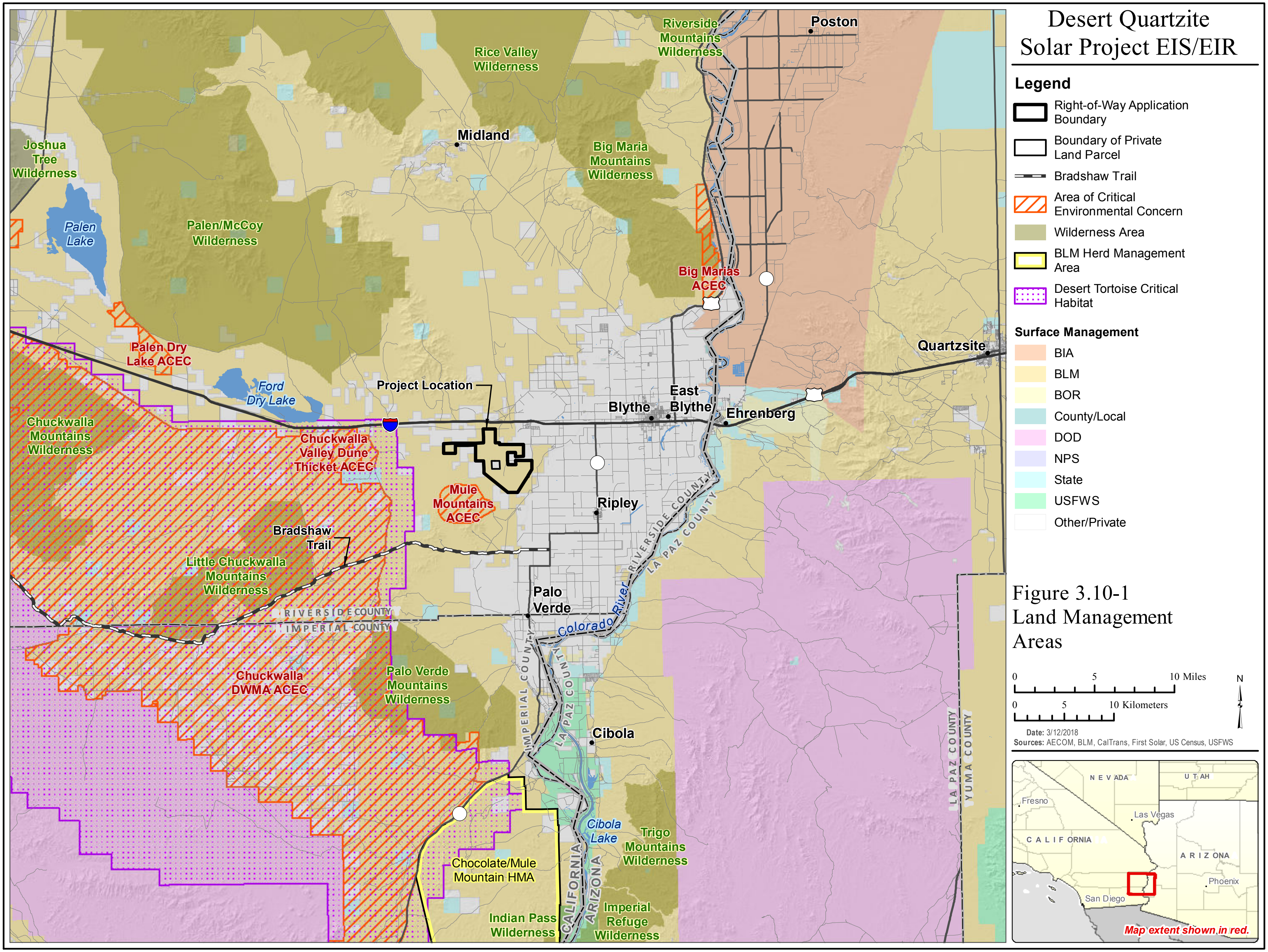
E:\GIS\Projects\DesertQuartzite\Figures\FIG_03_09_01_AirportCompatibilityZones.mxd

2/2/2016

M:\Denver_GIS\Projects\DesertQuartzite\Figures\Bio\FIG_03_10_01_LandManagementAreas.mxd

3/12/2018

Desert Quartzite Solar Project EIS/EIR



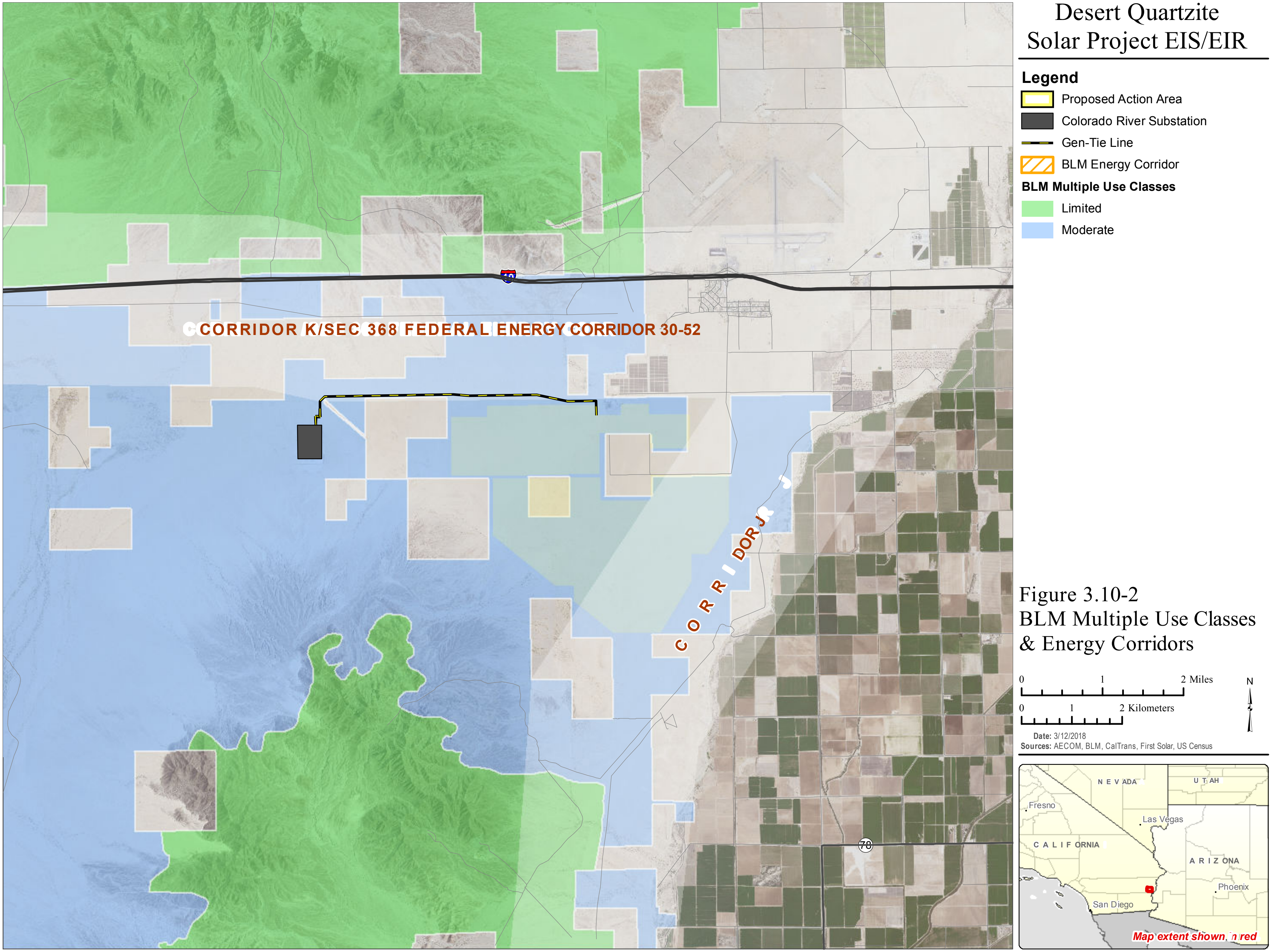
Legend
Right-of-Way Application Boundary
Boundary of Private Land Parcel
Bradshaw Trail
Area of Critical Environmental Concern
Wilderness Area
BLM Herd Management Area
Desert Tortoise Critical Habitat
Surface Management
BIA
BLM
BOR
County/Local
DOD
NPS
State
USFWS
Other/Private
0 5 10 Miles
0 5 10 Kilometers
N
Riverside Mountains Wilderness
Poston
Rice Valley Wilderness
Midland
Joshua Tree Wilderness
Big Maria Mountains Wilderness
Palen Lake
Palen/McCoy Wilderness
Big Marias ACEC
Palen Dry Lake ACEC
Ford Dry Lake
Project Location
Quartzsite
East Blythe
Blythe
Ehrenberg
Chuckwalla Mountains Wilderness
Chuckwalla Valley Dune Thicket ACEC
Mule Mountains ACEC
Ripley
Bradshaw Trail
Little Chuckwalla Mountains Wilderness
RIVERSIDE COUNTY
LA PAZ COUNTY
Palo Verde
Colorado River
RIVERSIDE COUNTY
IMPERIAL COUNTY
Chuckwalla DWMA ACEC
Palo Verde Mountains Wilderness
IMPERIAL COUNTY
LA PAZ COUNTY
Cibola
LA PAZ COUNTY
YUMA COUNTY
Cibola Lake
Trigo Mountains Wilderness
Chocolate/Mule Mountain HMA
CALIFORNIA
ARIZONA
Indian Pass Wilderness
Imperial Refuge Wilderness
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red.

Figure 3.10-1
Land Management Areas

Date: 3/12/2018
Sources: AECOM, BLM, CalTrans, First Solar, US Census, USFWS

M:\Denver_GIS\Projects\DesertQuartzite\Figures\FIG_03_10_02_MUCsEnergyCorridors.mxd

Desert Quartzite Solar Project EIS/EIR



CORRIDOR K/SEC 368 FEDERAL ENERGY CORRIDOR 30-52
CORRIDOR J
10
78
Legend
Proposed Action Area
Colorado River Substation
Gen-Tie Line
BLM Energy Corridor
BLM Multiple Use Classes
Limited
Moderate
0
1
2 Miles
0
1
2 Kilometers
N
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red

Figure 3.10-2
BLM Multiple Use Classes
& Energy Corridors

Date: 3/12/2018
Sources: AECOM, BLM, CalTrans, First Solar, US Census

3/12/2018

Desert Quartzite Solar Project EIS/EIR

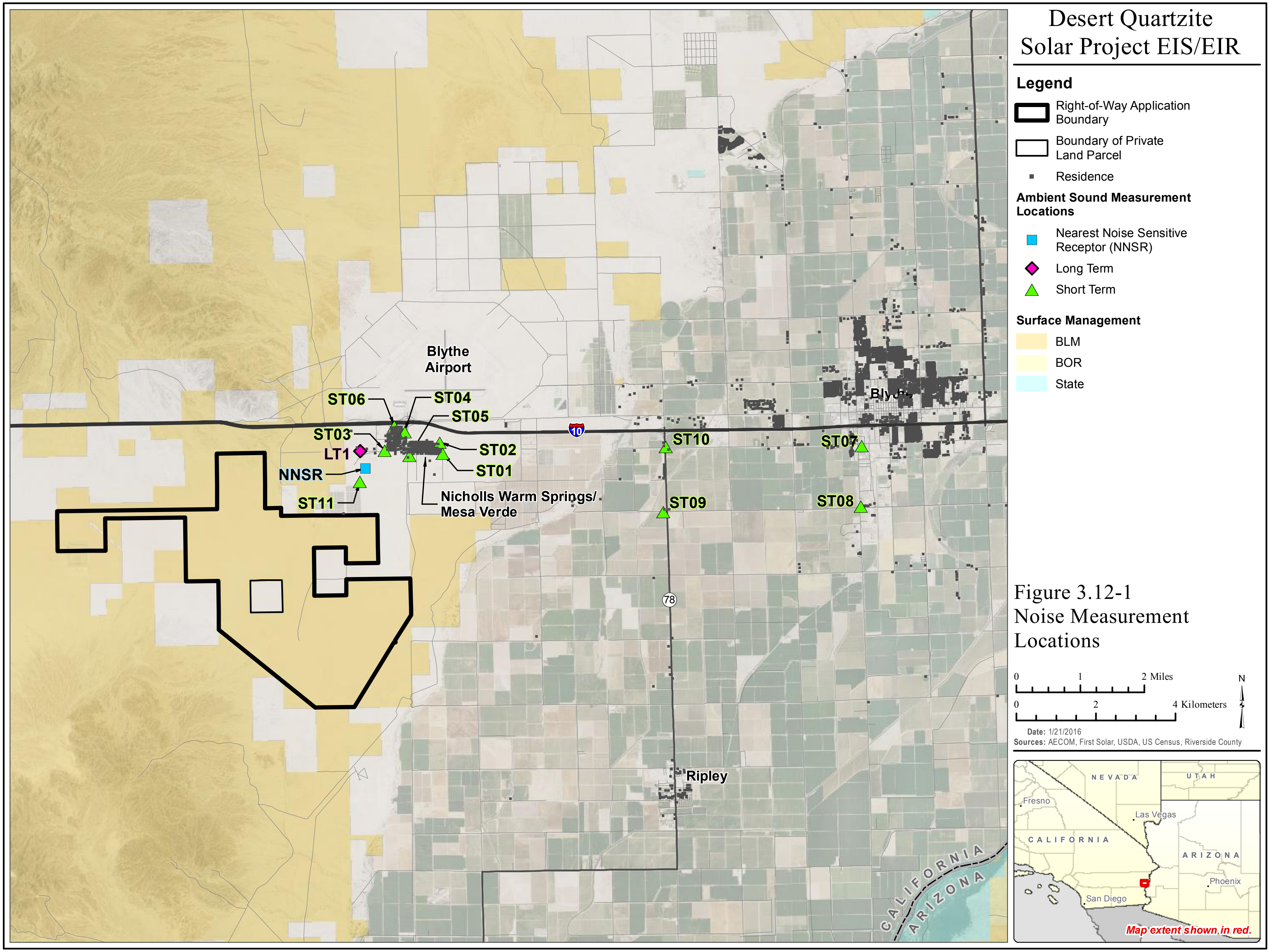
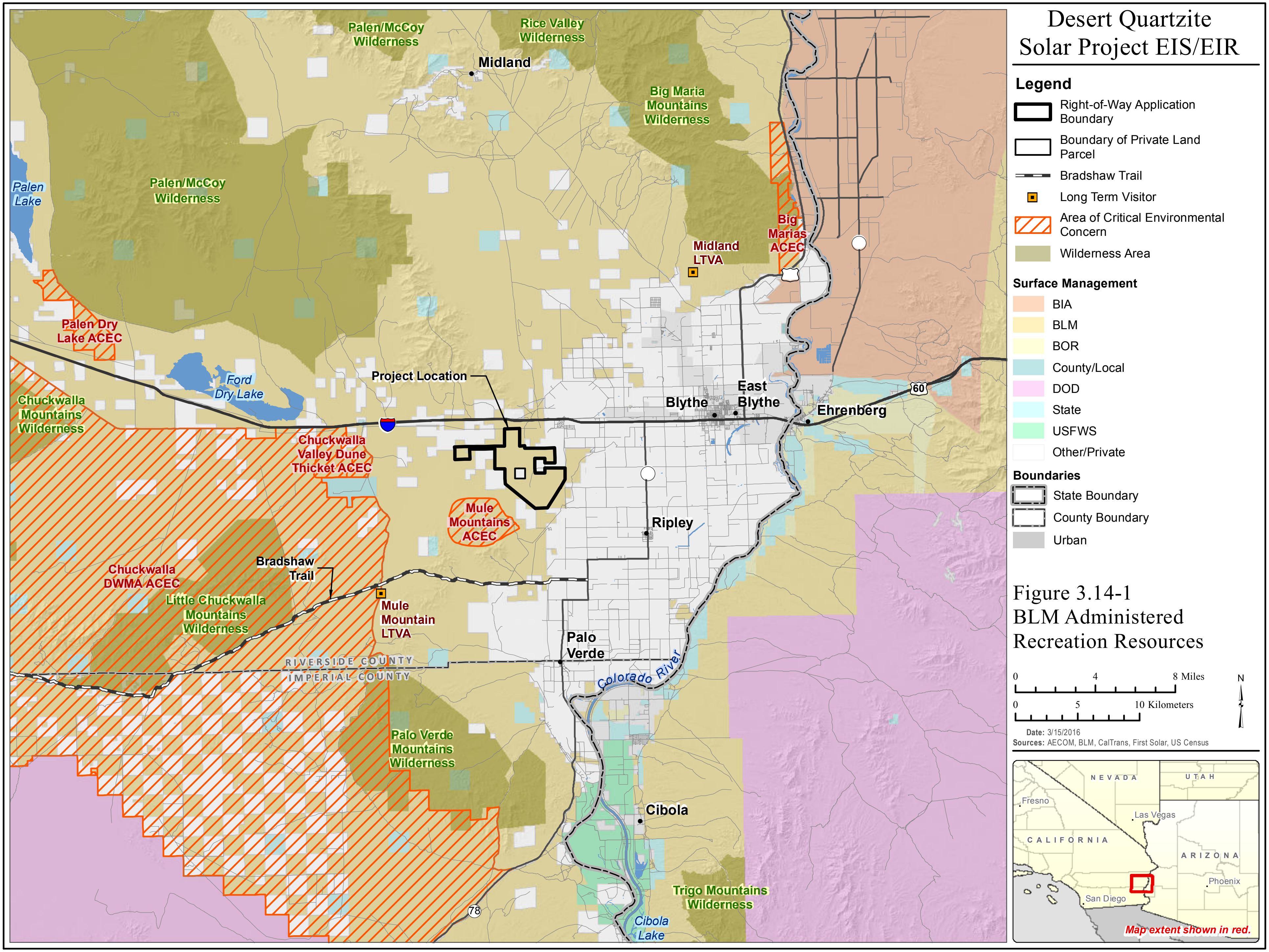

Legend
▭ Right-of-Way Application Boundary
▭ Boundary of Private Land Parcel
▪ Residence
Ambient Sound Measurement Locations
■ Nearest Noise Sensitive Receptor (NNSR)
◆ Long Term
▲ Short Term
Surface Management
▨ BLM
▨ BOR
▨ State
Blythe Airport
ST06
ST04
ST05
ST03
LT1
NNSR
ST02
ST01
ST11
Nicholls Warm Springs/ Mesa Verde
10
ST10
ST07
ST09
ST08
Blythe
78
Ripley
CALIFORNIA
ARIZONA
0
1
2 Miles
0
2
4 Kilometers
N
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red.

Figure 3.12-1
Noise Measurement Locations

Date: 1/21/2016
Sources: AECOM, First Solar, USDA, US Census, Riverside County

E:\GIS\Projects\DesertQuartzite\Figures\FIG_03_12_01_Noise.mxd

1/21/2016


Legend
Right-of-Way Application Boundary
Boundary of Private Land Parcel
Bradshaw Trail
Long Term Visitor
Area of Critical Environmental Concern
Wilderness Area
Surface Management
BIA
BLM
BOR
County/Local
DOD
State
USFWS
Other/Private
Boundaries
State Boundary
County Boundary
Urban
Palen/McCoy Wilderness
Rice Valley Wilderness
Midland
Big Maria Mountains Wilderness
Palen Lake
Palen/McCoy Wilderness
Midland LTVA
Big Marias ACEC
Palen Dry Lake ACEC
Ford Dry Lake
Project Location
East Blythe
Blythe
Ehrenberg
60
Chuckwalla Mountains Wilderness
Chuckwalla Valley Dune Thicket ACEC
Mule Mountains ACEC
Ripley
Bradshaw Trail
Chuckwalla DWMA ACEC
Little Chuckwalla Mountains Wilderness
Mule Mountain LTVA
Palo Verde
RIVERSIDE COUNTY
IMPERIAL COUNTY
Colorado River
Palo Verde Mountains Wilderness
Cibola
Trigo Mountains Wilderness
Cibola Lake
78
0
4
8 Miles
0
5
10 Kilometers
N
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red.

Desert Quartzite Solar Project EIS/EIR

Figure 3.14-1
BLM Administered Recreation Resources

Date: 3/15/2016
Sources: AECOM, BLM, CalTrans, First Solar, US Census

E:\GIS\Projects\DesertQuartzite\Figures\FIG_03_14_01_BLM_RecAreas.mxd

3/15/2016

E:\GIS\Projects\DesertQuartzite\Figures\FIG_03_14_02_Regional_RecAreas.mxd

Desert Quartzite Solar Project EIS/EIR

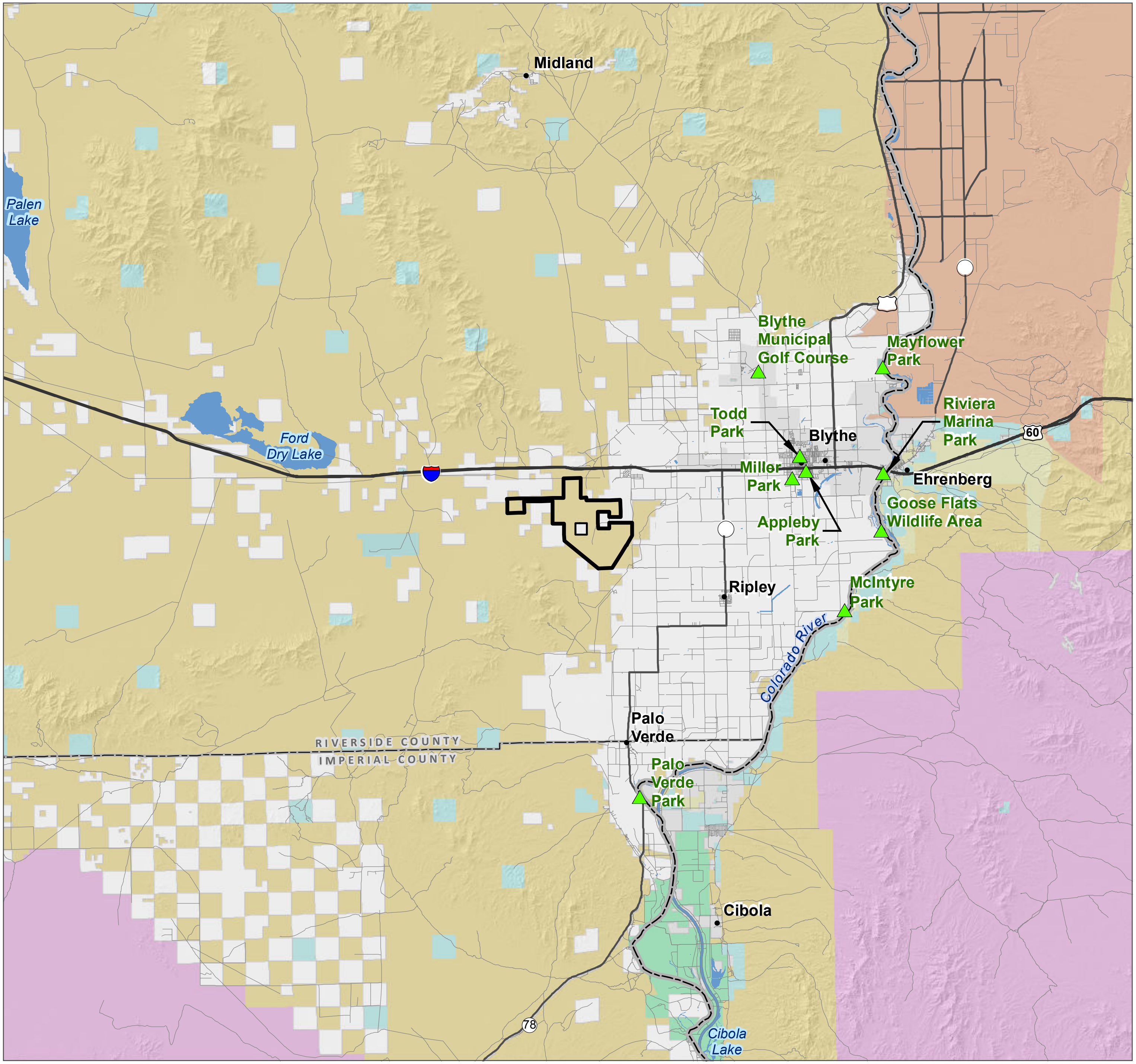

Midland
Palen Lake
Ford Dry Lake
Blythe Municipal Golf Course
Mayflower Park
Todd Park
Blythe
Riviera Marina Park
60
Miller Park
Ehrenberg
Goose Flats Wildlife Area
Appleby Park
Ripley
McIntyre Park
Colorado River
Palo Verde
RIVERSIDE COUNTY
IMPERIAL COUNTY
Palo Verde Park
Cibola
78
Cibola Lake
Legend
Right-of-Way Application Boundary
Boundary of Private Land Parcel
Park/Open Space
Surface Management
BIA
BLM
BOR
County/Local
DOD
NPS
State
USFWS
Other/Private
Boundaries
State Boundary
County Boundary
Urban Area
0
4
8 Miles
0
5
10 Kilometers
N

Figure 3.14-2
Regional Recreation Resources

Date: 3/15/2016
Sources: AECOM, BLM, CalTrans, First Solar, US Census

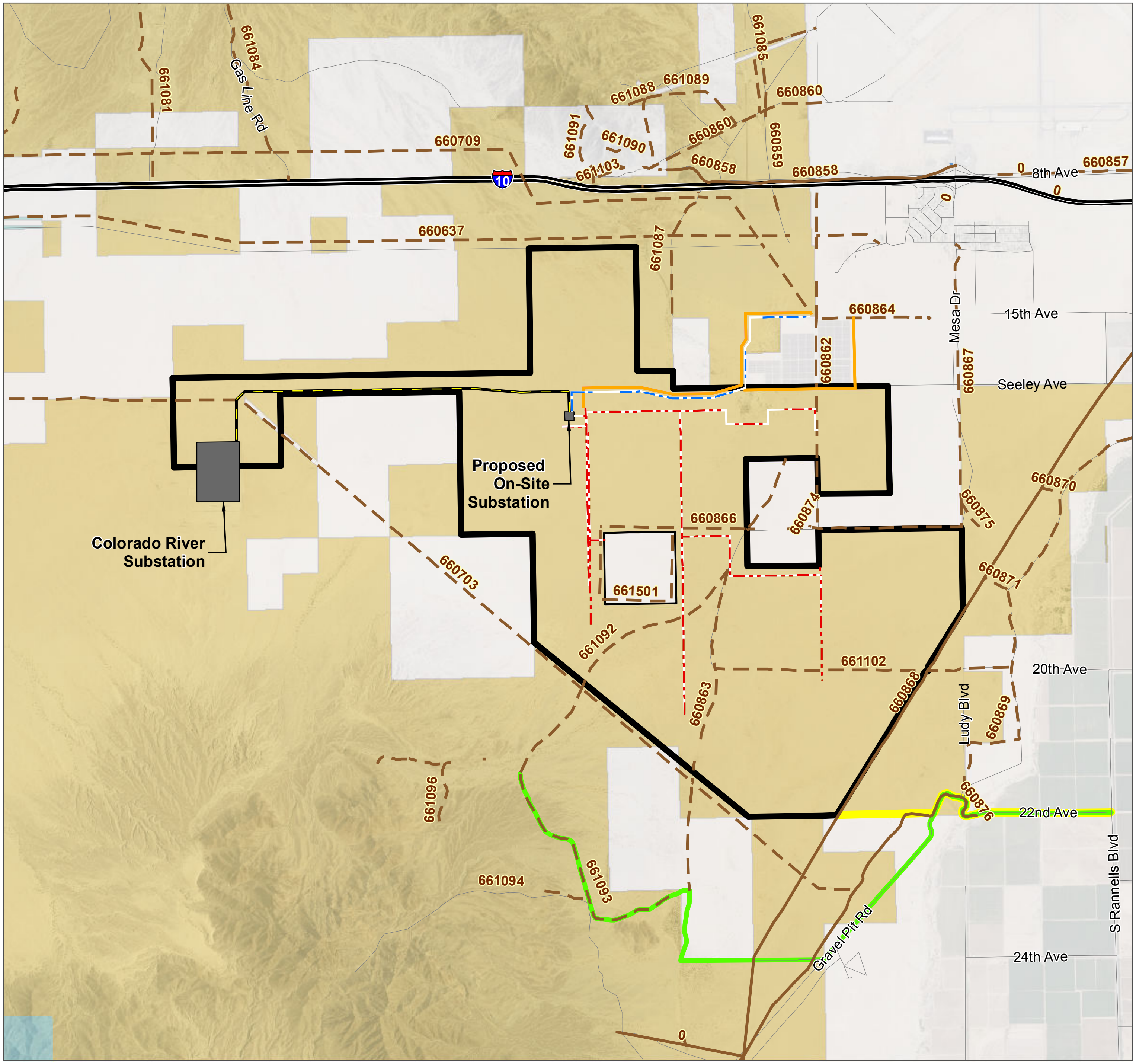
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego

Map extent shown in red.

3/15/2016

M:\Denver_GIS\Projects\DesertQuartzite\Figures\FIG_03_14_03_BLM_Routes_w_Access.mxd

2/17/2018


661084
Gas Line Rd
661081
661085
661088
661089
660860
661091
661090
660860
660709
660859
661103
660858
660858
0
8th Ave
660857
10
0
0
660637
661087
660864
15th Ave
Mesa Dr
660862
660867
Seeley Ave
Proposed On-Site Substation
Colorado River Substation
660870
660875
660874
660866
660703
660871
661501
661092
661102
20th Ave
660868
660863
Ludy Blvd
660869
661096
660876
22nd Ave
661094
661093
S Rannells Blvd
Gravel Pit Rd
24th Ave
0

Desert Quartzite Solar Project EIS/EIR

Legend

▬ Right-of-Way Application Boundary

☐ Boundary of Private Land Parcel

Open Routes

— Maintained Dirt

- - Unmaintained Dirt

Access Routes

— Emergency Access

— Mule Mountains Alternative Access

Utilities

■ Substation

— Gen-Tie Line

Proposed Utilities

-·- Proposed Internal Power Collection Line

— Proposed Power Supply Lines

-·- Proposed Telecommunications Line

Surface Management

▨ BLM ☐ Other/Private

▨ State

Figure 3.14-3
BLM Routes Near Project

0 0.5 1 Miles

0 1 2 Kilometers

N

Date: 2/17/2018

Sources: AECOM, BLM, CalTrans, First Solar, US Census

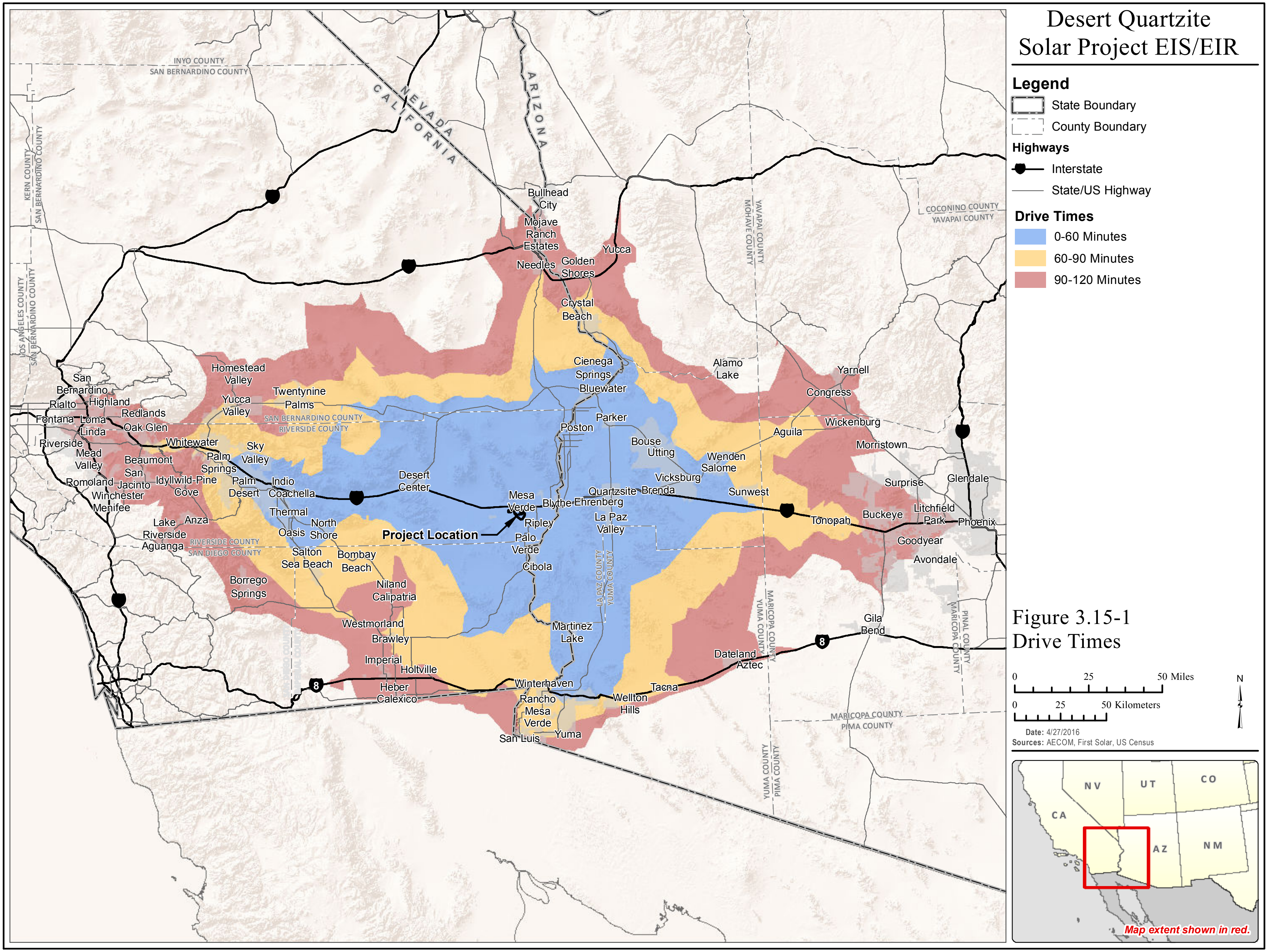
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego

Map extent shown in red.

E:\GIS\Projects\DesertQuartzite\Figures\FIG_03_15_01_DriveTime.mxd

4/27/2016

Desert Quartzite Solar Project EIS/EIR


INYO COUNTY
SAN BERNARDINO COUNTY
KERN COUNTY
SAN BERNARDINO COUNTY
LOS ANGELES COUNTY
SAN BERNARDINO COUNTY
NEVADA
CALIFORNIA
ARIZONA
Bullhead City
Mojave Ranch Estates
Needles
Golden Shores
Yucca
Crystal Beach
Cienega Springs
Bluewater
Parker
Poston
Bouse
Utting
Alamo Lake
Yarnell
Congress
Wickenburg
Aguila
Wenden
Salome
Vicksburg
Morristown
Surprise
Glendale
Sunwest
Quartzsite
Brenda
Ehrenberg
Blythe
Mesa Verde
Ripley
Palo Verde
Cibola
La Paz Valley
Tonopah
Buckeye
Litchfield Park
Phoenix
Goodyear
Avondale
Gila Bend
Dateland
Aztec
Tacna
Wellton
Hills
Martinez Lake
Winterhaven
Rancho Mesa Verde
Yuma
San Luis
Heber
Calexico
Holtville
Imperial
Brawley
Westmorland
Niland
Calipatria
Bombay Beach
Salton Sea Beach
North Shore
Oasis
Thermal
Mecca
Coachella
Indio
Palm Desert
Desert Center
Project Location
Borrego Springs
Twentynine Palms
Yucca Valley
Homestead Valley
SAN BERNARDINO COUNTY
RIVERSIDE COUNTY
RIVERSIDE COUNTY
SAN DIEGO COUNTY
Sky Valley
Palm Springs
Whitewater
San Bernardino
Highland
Rialto
Fontana
Loma Linda
Redlands
Oak Glen
Riverside
Mead Valley
Beaumont
San Jacinto
Idyllwild-Pine Cove
Romoland
Winchester
Menifee
Lake Riverside
Anza
Aguanga
YAVAPAI COUNTY
MOHAVE COUNTY
COCONINO COUNTY
YAVAPAI COUNTY
LA PAZ COUNTY
YUMA COUNTY
MARICOPA COUNTY
YUMA COUNTY
MARICOPA COUNTY
PINAL COUNTY
MARICOPA COUNTY
PIMA COUNTY
YUMA COUNTY
PIMA COUNTY
8
8
8
NV
UT
CO
CA
AZ
NM

Legend

State Boundary

County Boundary

Highways

Interstate

State/US Highway

Drive Times

🟦 0-60 Minutes

🟨 60-90 Minutes

🟥 90-120 Minutes

Figure 3.15-1
Drive Times

0 25 50 Miles

0 25 50 Kilometers

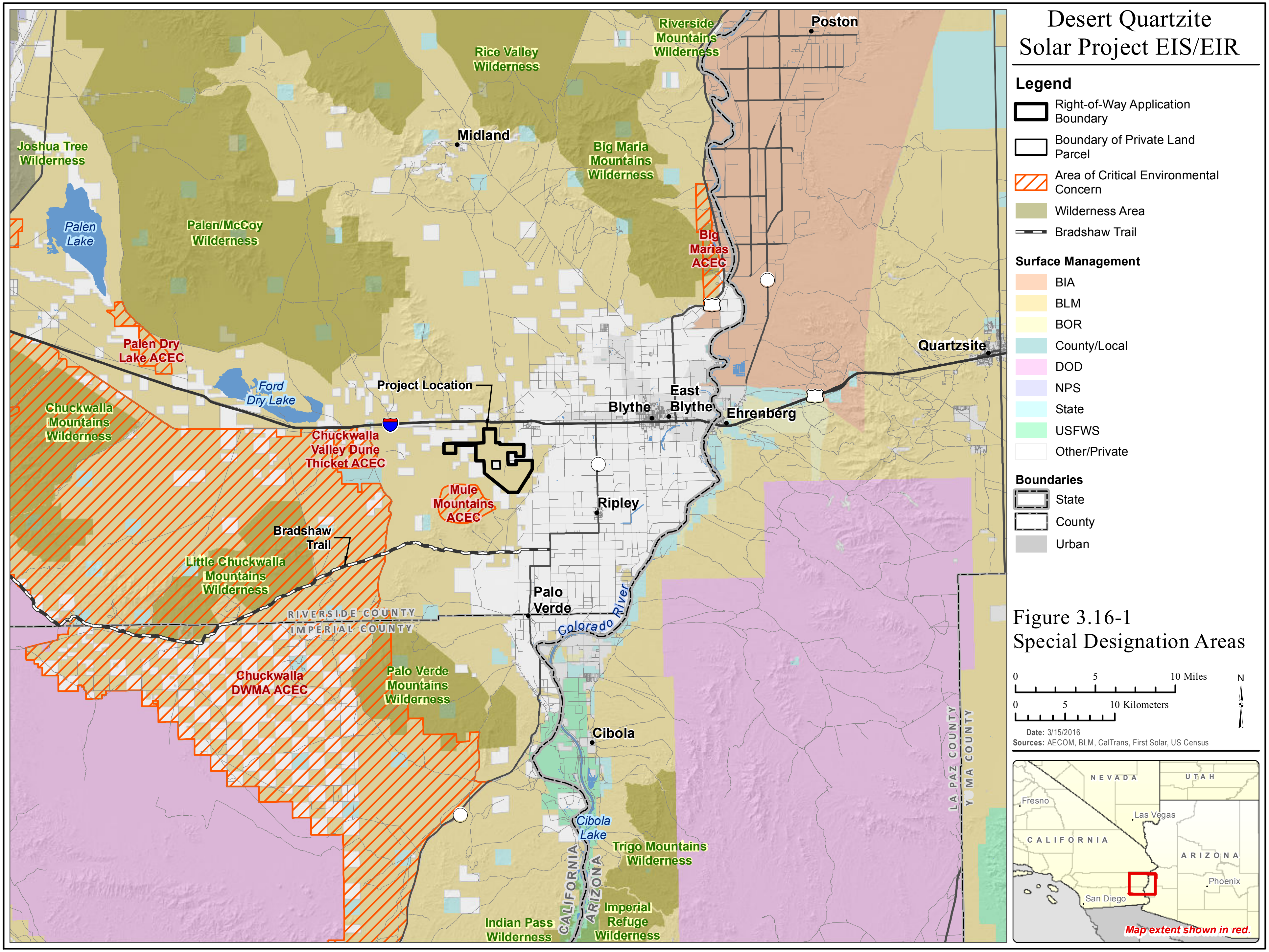
N

Date: 4/27/2016
Sources: AECOM, First Solar, US Census

Map extent shown in red.

E:\GIS\Projects\DesertQuartzite\Figures\FIG_03_16_01_SpecialDesignationAreas.mxd

3/15/2016



Desert Quartzite Solar Project EIS/EIR

Legend

- Right-of-Way Application Boundary
- Boundary of Private Land Parcel
- ▨ Area of Critical Environmental Concern
- Wilderness Area
- Bradshaw Trail

Surface Management

- BIA
- BLM
- BOR
- County/Local
- DOD
- NPS
- State
- USFWS
- Other/Private

Boundaries

- State
- County
- Urban

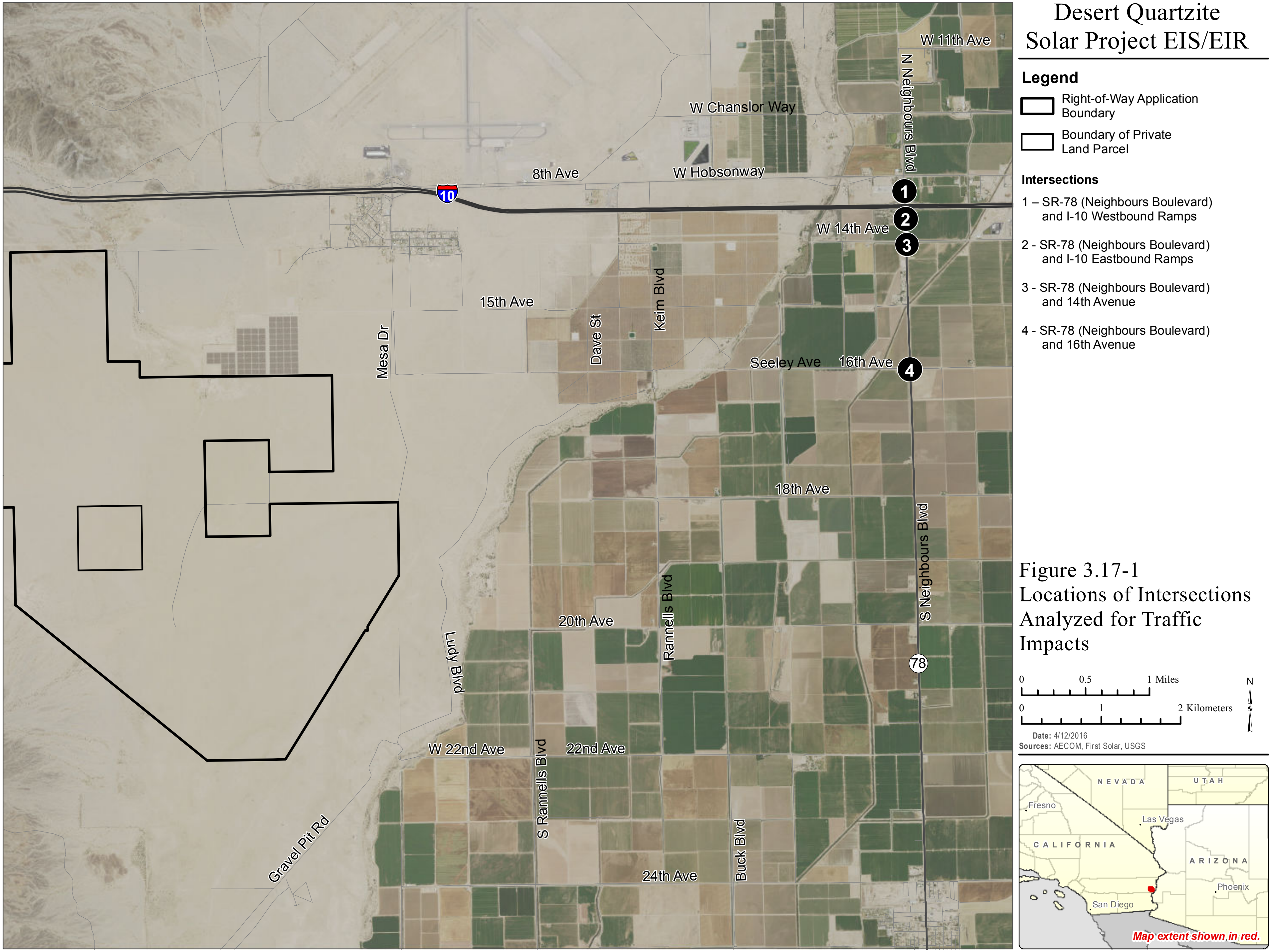
Figure 3.16-1
Special Designation Areas

Date: 3/15/2016
Sources: AECOM, BLM, CalTrans, First Solar, US Census

Map extent shown in red.

Riverside Mountains Wilderness
Poston
Rice Valley Wilderness
Midland
Joshua Tree Wilderness
Big Maria Mountains Wilderness
Palen Lake
Palen/McCoy Wilderness
Big Marias ACEC
Palen Dry Lake ACEC
Quartzsite
Ford Dry Lake
Project Location
East Blythe
Blythe
Ehrenberg
Chuckwalla Mountains Wilderness
Chuckwalla Valley Dune Thicket ACEC
Mule Mountains ACEC
Ripley
Bradshaw Trail
Little Chuckwalla Mountains Wilderness
Palo Verde
Colorado River
RIVERSIDE COUNTY
IMPERIAL COUNTY
Chuckwalla DWMA ACEC
Palo Verde Mountains Wilderness
Cibola
LA PAZ COUNTY
YUMA COUNTY
Cibola Lake
Trigo Mountains Wilderness
CALIFORNIA
ARIZONA
Imperial Refuge Wilderness
Indian Pass Wilderness
0
5
10 Miles
0
5
10 Kilometers
N
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego

Desert Quartzite Solar Project EIS/EIR


W 11th Ave
N Neighbours Blvd
W Chanslor Way
8th Ave
W Hobsonway
10
1
2
3
4
W 14th Ave
15th Ave
Mesa Dr
Dave St
Keim Blvd
Seeley Ave
16th Ave
18th Ave
S Neighbours Blvd
20th Ave
Rannells Blvd
Ludy Blvd
78
W 22nd Ave
22nd Ave
S Rannells Blvd
Gravel Pit Rd
24th Ave
Buck Blvd
0
0.5
1 Miles
0
1
2 Kilometers
N
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego

Legend

- ▭ Right-of-Way Application Boundary
- ▭ Boundary of Private Land Parcel

Intersections

1 – SR-78 (Neighbours Boulevard) and I-10 Westbound Ramps

2 - SR-78 (Neighbours Boulevard) and I-10 Eastbound Ramps

3 - SR-78 (Neighbours Boulevard) and 14th Avenue

4 - SR-78 (Neighbours Boulevard) and 16th Avenue

Figure 3.17-1
Locations of Intersections Analyzed for Traffic Impacts

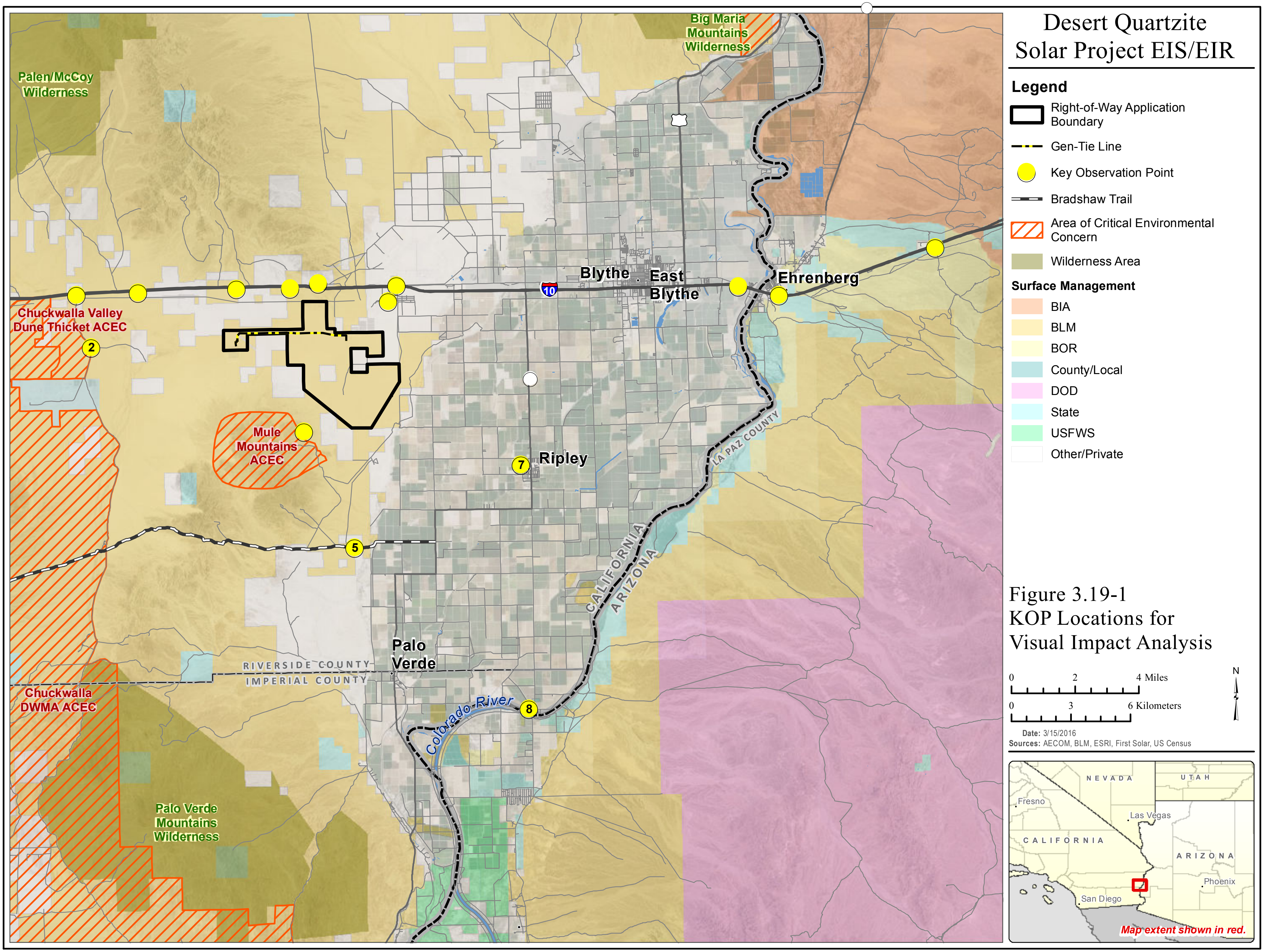
Date: 4/12/2016
Sources: AECOM, First Solar, USGS

Map extent shown in red.

E:\GIS\Projects\DesertQuartzite\Figures\FIG_03_17_01_Intersections.mxd

4/12/2016

Desert Quartzite Solar Project EIS/EIR



Palen/McCoy Wilderness
Big Maria Mountains Wilderness
Chuckwalla Valley Dune Thicket ACEC
2
Mule Mountains ACEC
10
Blythe
East Blythe
Ehrenberg
7
Ripley
LA PAZ COUNTY
5
CALIFORNIA
ARIZONA
Palo Verde
RIVERSIDE COUNTY
IMPERIAL COUNTY
Chuckwalla DWMA ACEC
Colorado River
8
Palo Verde Mountains Wilderness
0 2 4 Miles
0 3 6 Kilometers
N
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red.

Legend

- ▭ Right-of-Way Application Boundary
- Gen-Tie Line
- ● Key Observation Point
- Bradshaw Trail
- ▨ Area of Critical Environmental Concern
- ■ Wilderness Area

Surface Management

- ■ BIA
- ■ BLM
- ■ BOR
- ■ County/Local
- ■ DOD
- ■ State
- ■ USFWS
- □ Other/Private

Figure 3.19-1
KOP Locations for Visual Impact Analysis

Date: 3/15/2016
Sources: AECOM, BLM, ESRI, First Solar, US Census

E:\GIS\Projects\DesertQuartzite\Figures\FIG_03_19_01_KOPs.mxd

3/15/2016

Desert Quartzite Solar Project EIS/EIR

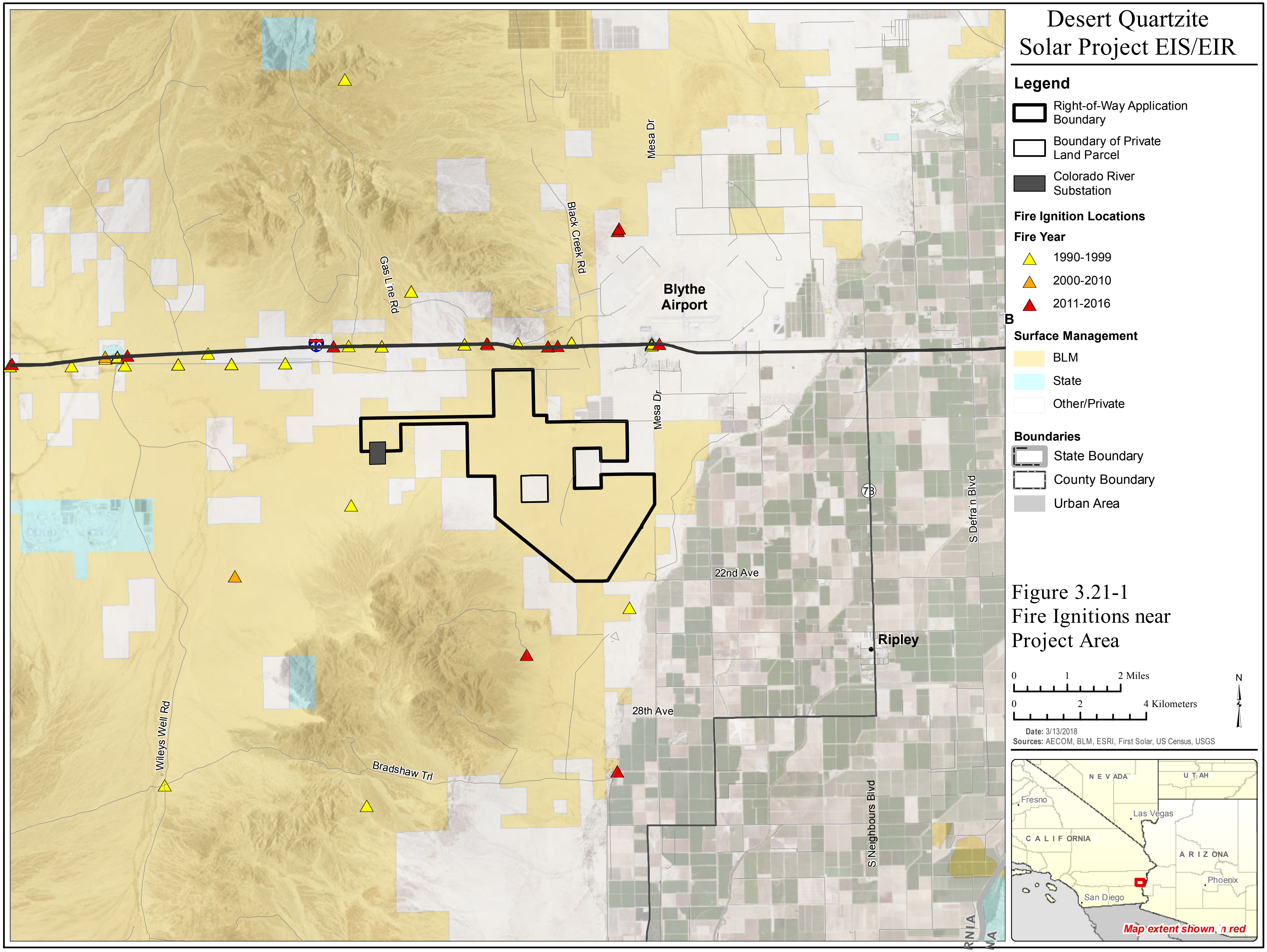

Legend
Right-of-Way Application Boundary
Boundary of Private Land Parcel
Colorado River Substation
Fire Ignition Locations
Fire Year
1990-1999
2000-2010
2011-2016
Surface Management
BLM
State
Other/Private
Boundaries
State Boundary
County Boundary
Urban Area
Mesa Dr
Black Creek Rd
Gas Line Rd
Blythe Airport
B
40
Mesa Dr
78
S Defrain Blvd
22nd Ave
Ripley
28th Ave
Wileys Well Rd
Bradshaw Trl
S Neighbours Blvd
RNIA
NA
0
1
2 Miles
0
2
4 Kilometers
N
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red

Figure 3.21-1
Fire Ignitions near Project Area

Date: 3/13/2018
Sources: AECOM, BLM, ESRI, First Solar, US Census, USGS

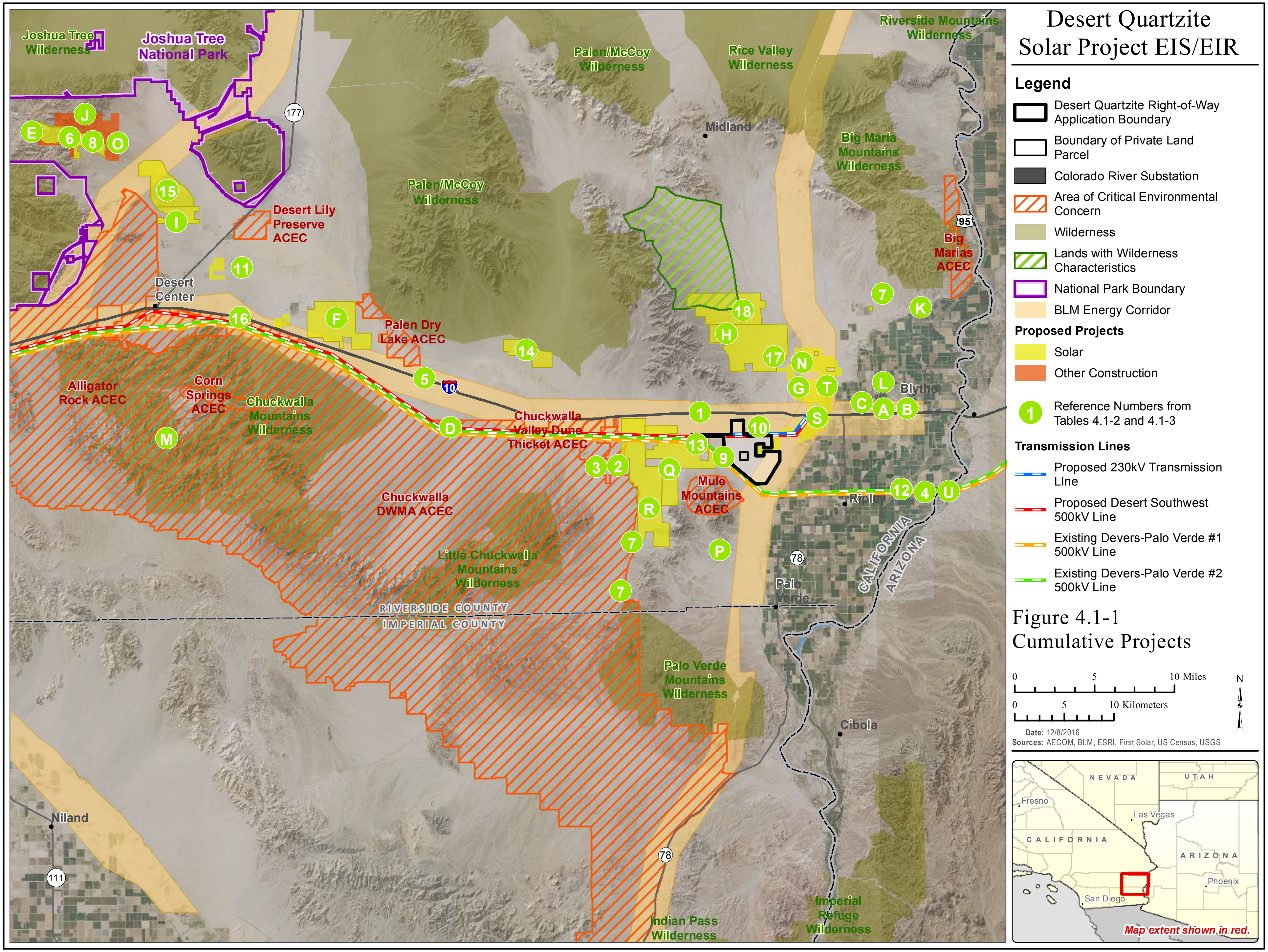
M:\Denver_GIS\Projects\DesertQuartzite\Figures\FIG_03_21_01_FireIgnitions.mxd

3/13/2018

E:\GIS\Projects\DesertQuartzite\Figures\FIG_04_01_01_CumulativeProjects.mxd

12/8/2016

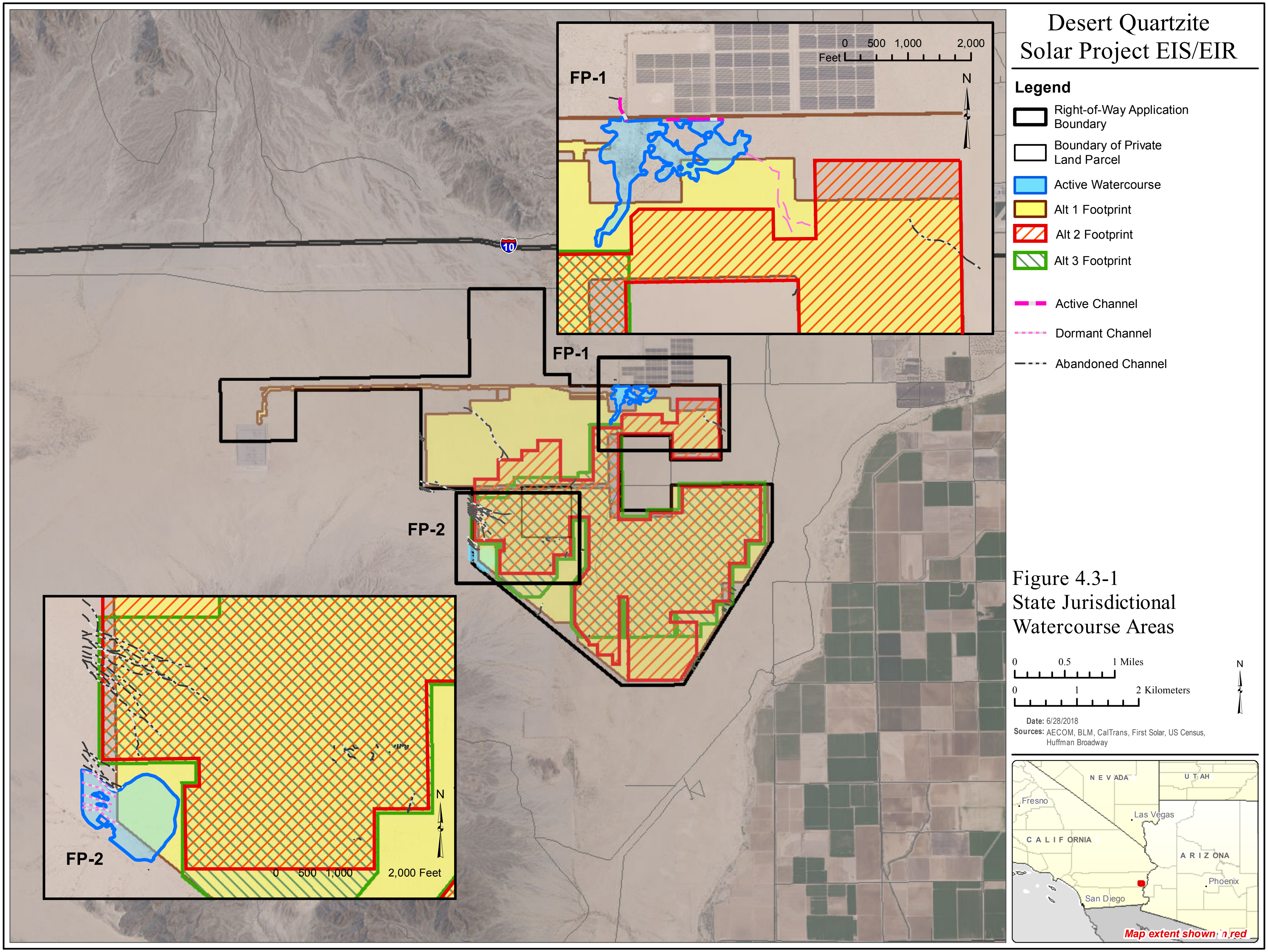
Desert Quartzite Solar Project EIS/EIR



Legend
Desert Quartzite Right-of-Way Application Boundary
Boundary of Private Land Parcel
Colorado River Substation
Area of Critical Environmental Concern
Wilderness
Lands with Wilderness Characteristics
National Park Boundary
BLM Energy Corridor
Proposed Projects
Solar
Other Construction
Reference Numbers from Tables 4.1-2 and 4.1-3
Transmission Lines
Proposed 230kV Transmission LIne
Proposed Desert Southwest 500kV Line
Existing Devers-Palo Verde #1 500kV Line
Existing Devers-Palo Verde #2 500kV Line
0 5 10 Miles
0 5 10 Kilometers
N
Joshua Tree Wilderness
Joshua Tree National Park
Palen/McCoy Wilderness
Rice Valley Wilderness
Riverside Mountains Wilderness
Midland
Big Maria Mountains Wilderness
Big Marias ACEC
Desert Lily Preserve ACEC
Desert Center
Palen Dry Lake ACEC
Alligator Rock ACEC
Corn Springs ACEC
Chuckwalla Mountains Wilderness
Chuckwalla Valley Dune Thicket ACEC
Chuckwalla DWMA ACEC
Little Chuckwalla Mountains Wilderness
Mule Mountains ACEC
Blythe
Ripley
Palo Verde
CALIFORNIA
ARIZONA
RIVERSIDE COUNTY
IMPERIAL COUNTY
Palo Verde Mountains Wilderness
Cibola
Niland
Indian Pass Wilderness
Imperial Refuge Wilderness
177
10
95
78
111
E
J
6
8
O
15
I
11
16
F
14
5
D
M
18
H
17
N
G
T
L
C
A
B
S
1
10
13
9
3
2
Q
R
7
P
7
12
4
U
K
7
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red.

Figure 4.1-1
Cumulative Projects

Date: 12/8/2016
Sources: AECOM, BLM, ESRI, First Solar, US Census, USGS


FP-1
0 500 1,000 2,000
Feet
N
FP-1
FP-2
FP-2
0 500 1,000 2,000 Feet
N
10
Legend
Right-of-Way Application Boundary
Boundary of Private Land Parcel
Active Watercourse
Alt 1 Footprint
Alt 2 Footprint
Alt 3 Footprint
Active Channel
Dormant Channel
Abandoned Channel
0 0.5 1 Miles
0 1 2 Kilometers
N
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red

Desert Quartzite Solar Project EIS/EIR

Figure 4.3-1
State Jurisdictional Watercourse Areas

Date: 6/28/2018
Sources: AECOM, BLM, CalTrans, First Solar, US Census, Huffman Broadway

M:\Denver_GIS\Projects\DesertQuartzite\Figures\FIG_04_03_01_WatercoursesAbandonedChannels.mxd

6/28/2018

E:\GIS\Projects\DesertQuartzite\Figures\FIG_04_12_01_NNSR_2km_Radius.mxd

Desert Quartzite Solar Project EIS/EIR

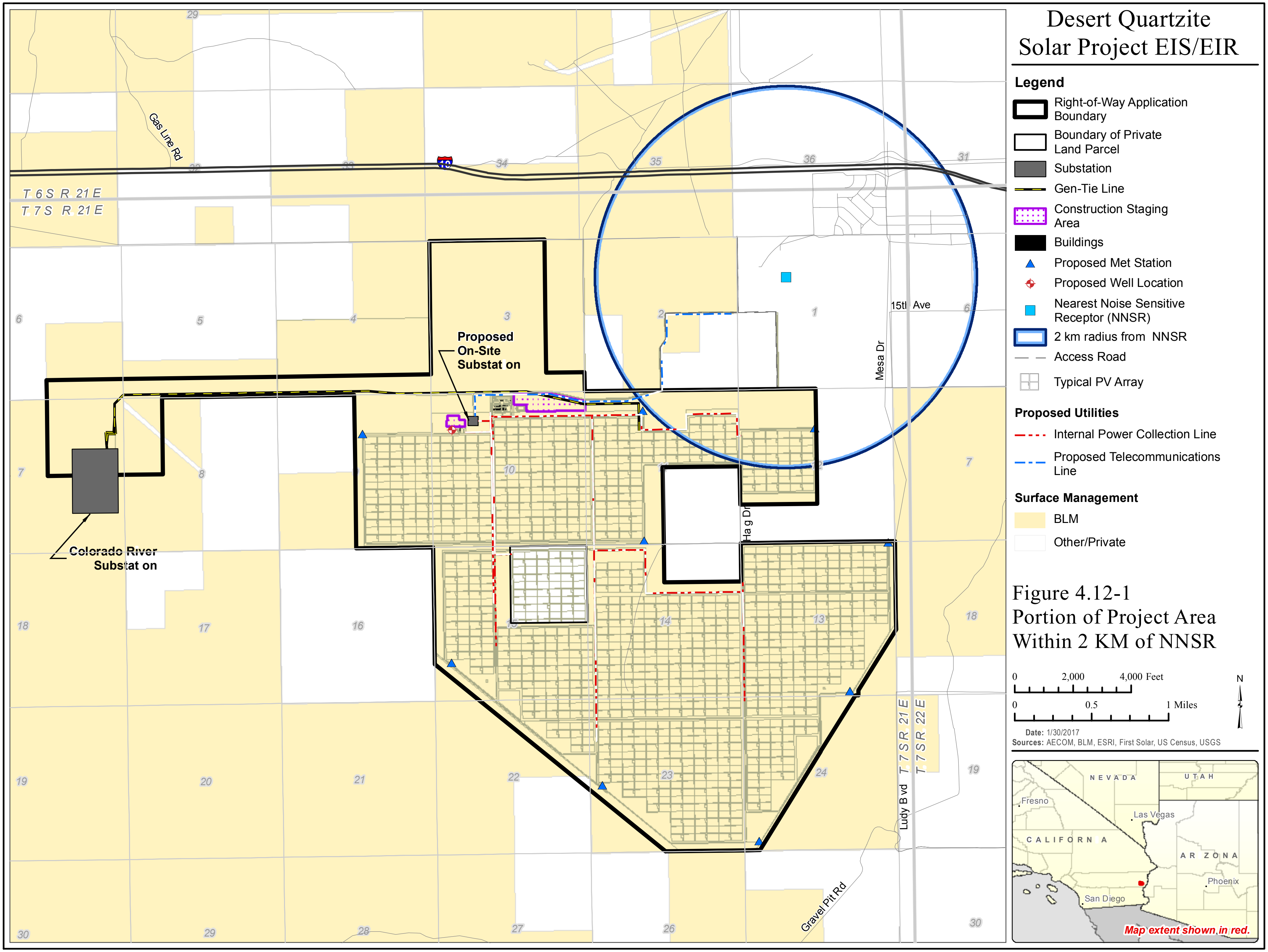

Legend
Right-of-Way Application Boundary
Boundary of Private Land Parcel
Substation
Gen-Tie Line
Construction Staging Area
Buildings
Proposed Met Station
Proposed Well Location
Nearest Noise Sensitive Receptor (NNSR)
2 km radius from NNSR
Access Road
Typical PV Array
Proposed Utilities
Internal Power Collection Line
Proposed Telecommunications Line
Surface Management
BLM
Other/Private
Proposed On-Site Substation
Colorado River Substation
Gas Line Rd
15th Ave
Mesa Dr
Hayfield Rd
Ludy Blvd
Gravel Pit Rd
T 6 S R 21 E
T 7 S R 21 E
T 7 S R 21 E
T 7 S R 22 E
10
29
32
33
34
35
36
31
6
5
4
3
2
1
6
7
8
10
12
7
18
17
16
15
14
13
18
19
20
21
22
23
24
19
30
29
28
27
26
30
0
2,000
4,000 Feet
0
0.5
1 Miles
N
NEVADA
UTAH
Fresno
Las Vegas
CALIFORNIA
ARIZONA
Phoenix
San Diego
Map extent shown in red.

Figure 4.12-1
Portion of Project Area Within 2 KM of NNSR

Date: 1/30/2017
Sources: AECOM, BLM, ESRI, First Solar, US Census, USGS

1/30/2017

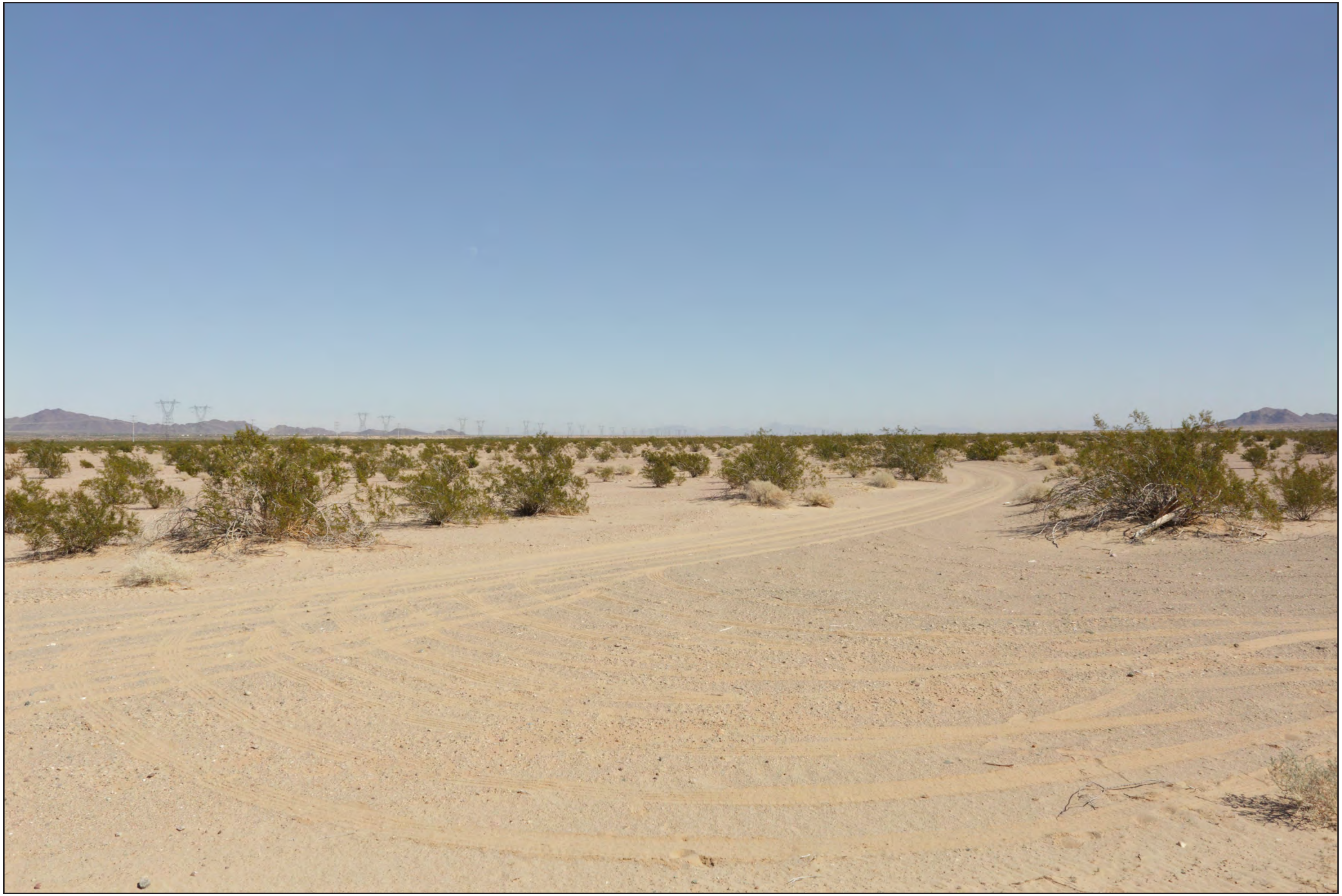


Figure 4.19-1

KOP2 - Chuckwalla DWMA, Looking East - *Existing View*

a. For on-screen display: scale bar to be 4 inches wide, viewing distance is 11.2 inches.
b. When printed on 11x17 paper, viewing distance is 11.2 inches.

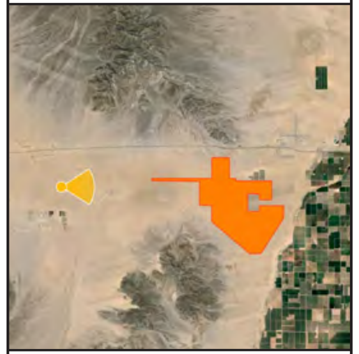
First Solar.

Desert Quartzite Solar Project

KOP2

Chuckwalla DWMA

● Viewpoint Location ● Project Area



Easting Position (UTM Zone 11):	**695432.7**
Northing Position (UTM Zone 11):	**3718027.8**
Elevation of Photopoint Position (NAD83):	**424.5**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**26 February 2015 at 01:40 PM**
Orientation of View:	**E**
Horizontal Field of View:	**65°**
Vertical Field of View:	**46°**

NOTES:

Viewpoint locations have been precision surveyed by:

The Holt Group, Inc.
Blythe, California 92225

No part of this photo simulation shall be altered in any way.

Visual assessments should be made from the full size TrueView™ only.

Photo Simulation Created Using
TrueView™ Technology
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DATE

4 September 2015

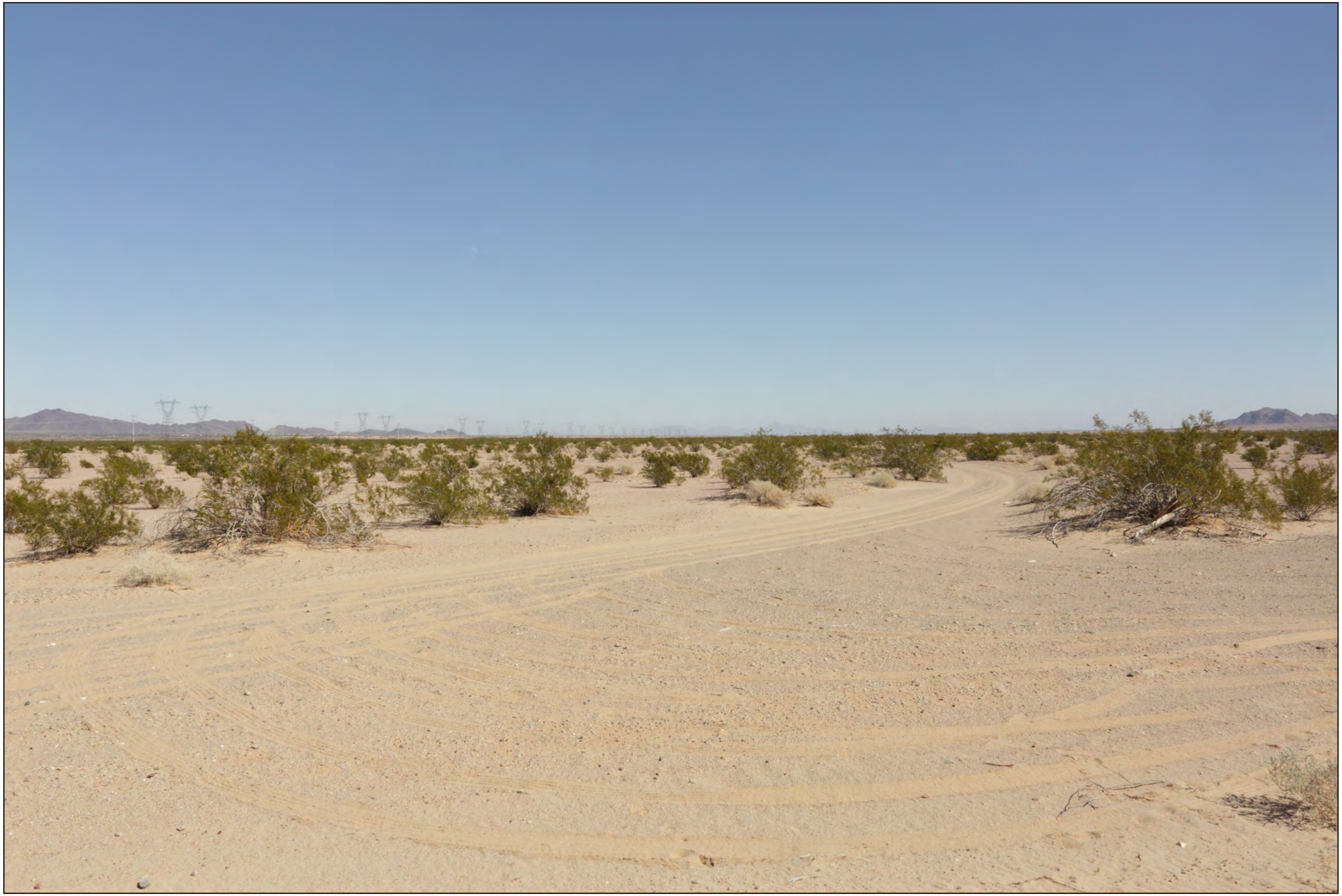


Figure 4.19-2

KOP2 - Chuckwalla DWMA, Looking East - *Proposed View*

a. For on-screen display: scale bar to be 4 inches wide, viewing distance is 11.2 inches.
b. When printed on 11x17 paper, viewing distance is 11.2 inches.

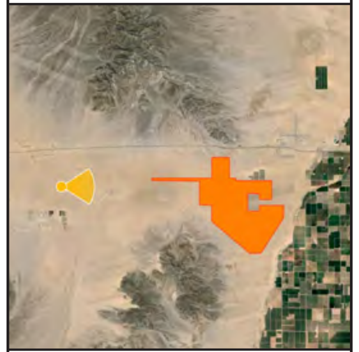
First Solar.

Desert Quartzite Solar Project

KOP2

Chuckwalla DWMA

● Viewpoint Location ● Project Area



Easting Position (UTM Zone 11):	**695432.7**
Northing Position (UTM Zone 11):	**3718027.8**
Elevation of Photopoint Position (NAD83):	**424.5**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**26 February 2015 at 01:40 PM**
Orientation of View:	**E**
Horizontal Field of View:	**65°**
Vertical Field of View:	**46°**

NOTES:

Viewpoint locations have been precision surveyed by:

The Holt Group, Inc.
Blythe, California 92225

No part of this photo simulation shall be altered in any way.

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Photo Simulation Created Using
TrueView™ Technology
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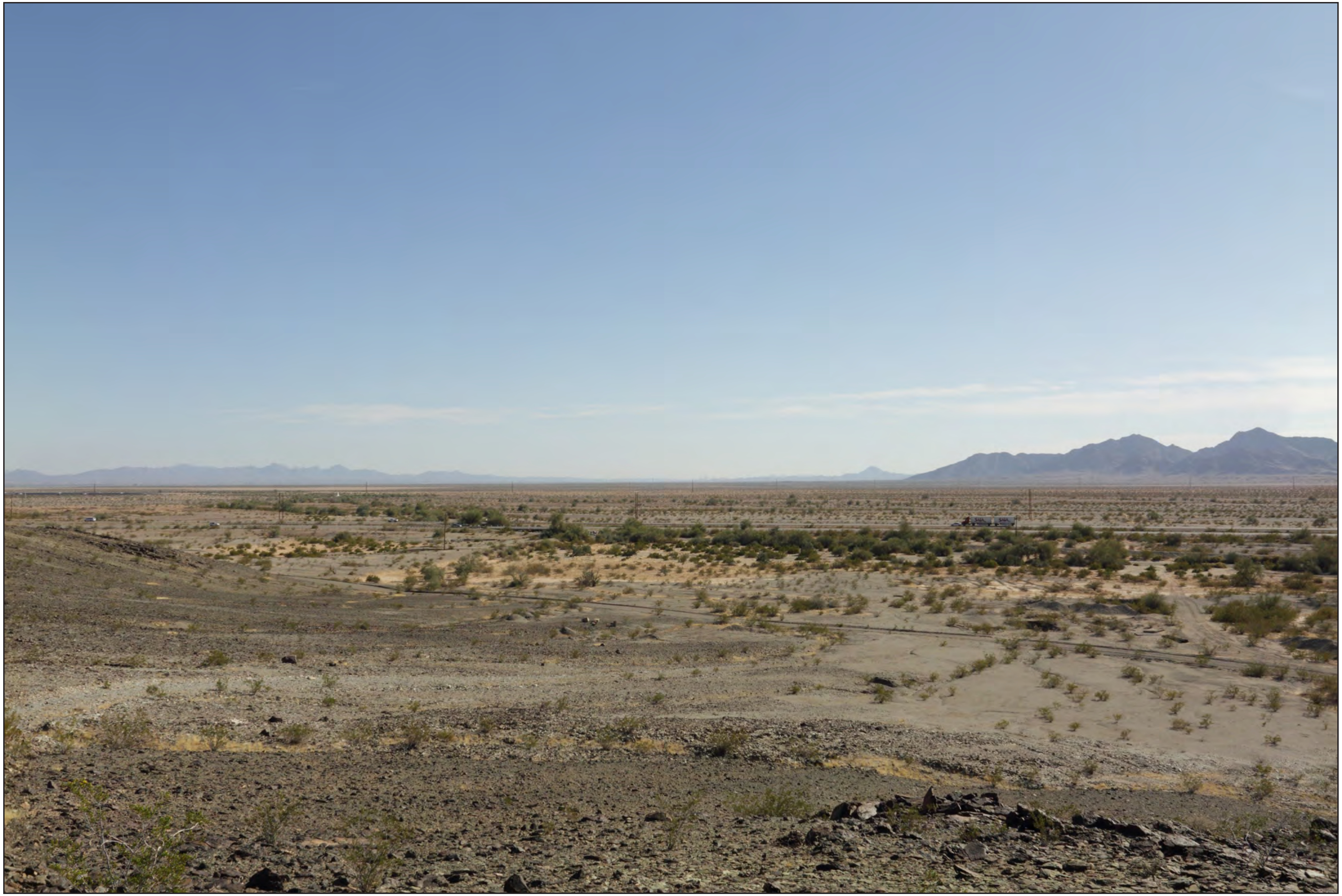


Figure 4.19-3

KOP3 - McCoy Mountains, Looking South - *Existing View*

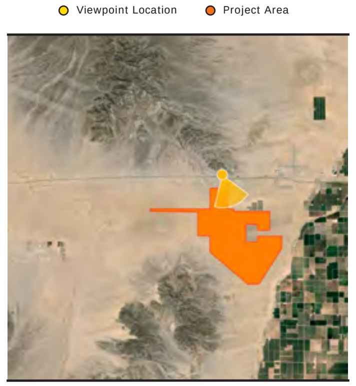
a. For on-screen display: scale bar to be 4 inches wide, viewing distance is 11.2 inches.

First Solar.

Desert Quartzite Solar Project

KOP3

McCoy Mountains



Easting Position (UTM Zone 11):	**706864.0**
Northing Position (UTM Zone 11):	**3721347.7**
Elevation of Photopoint Position (NAD83):	**544.6**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**26 February 2015 at 03:12 PM**
Orientation of View:	**S**
Horizontal Field of View:	**65°**
Vertical Field of View:	**46°**

NOTES:

Viewpoint locations have been precision surveyed by:

The Holt Group, Inc.
Blythe, California 92225

No part of this photo simulation shall be altered in any way.

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TrueView™ Technology
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DATE

4 September 2015

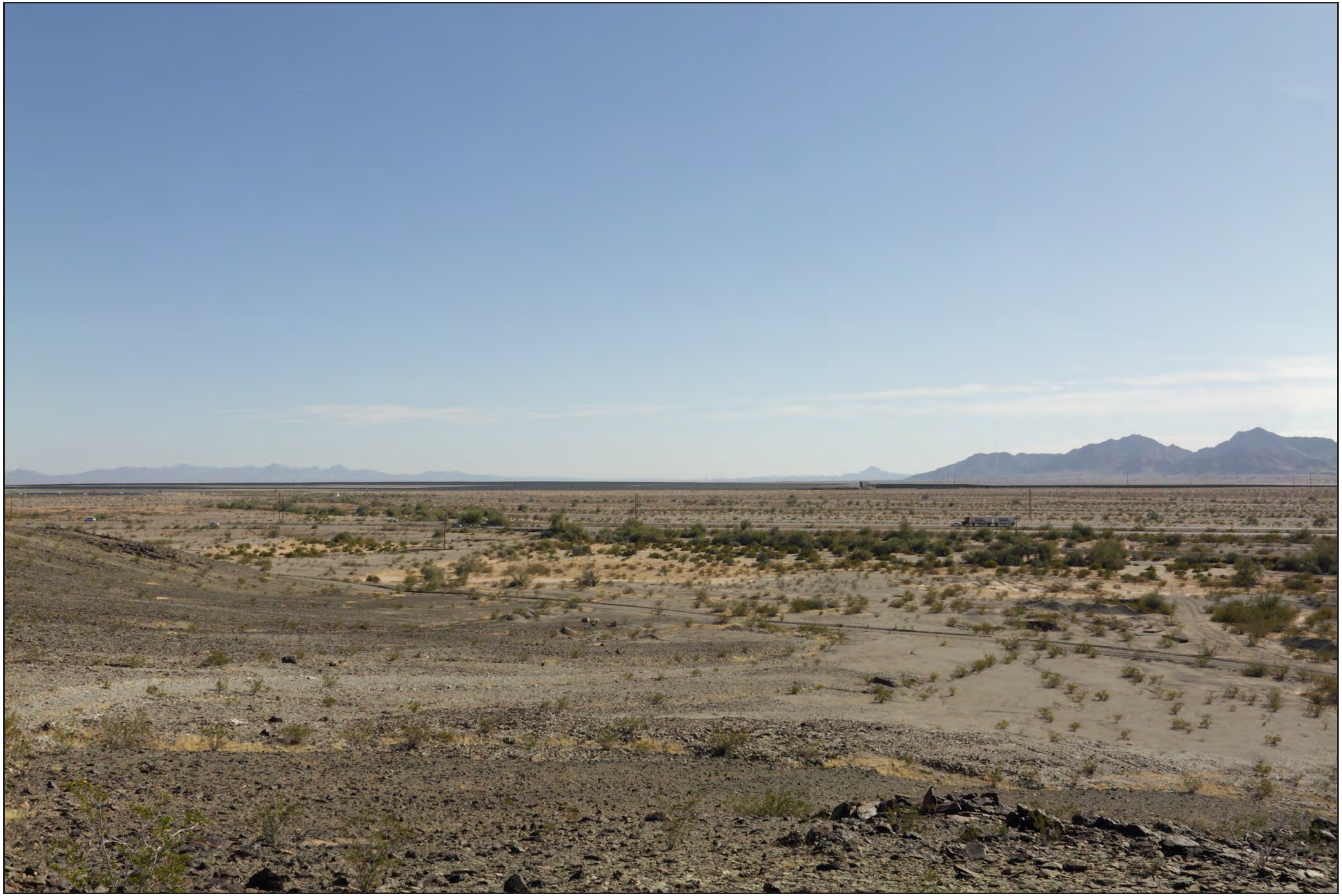


Figure 4.19-4

KOP3 - McCoy Mountains, Looking South - *Proposed View*

a. For on-screen display: scale bar to be 4 inches wide, viewing distance is 11.2 inches.
b. When printed on 11x17 paper, viewing distance is 11.2 inches.

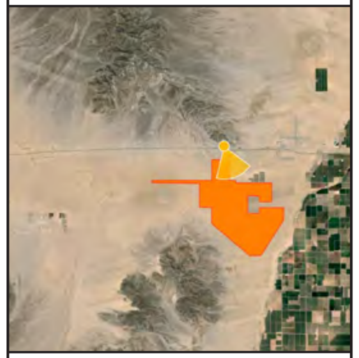
First Solar.

Desert Quartzite Solar Project

KOP3

McCoy Mountains

● Viewpoint Location ● Project Area



Easting Position (UTM Zone 11):	**706864.0**
Northing Position (UTM Zone 11):	**3721347.7**
Elevation of Photopoint Position (NAD83):	**544.6**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**26 February 2015 at 03:12 PM**
Orientation of View:	**S**
Horizontal Field of View:	**65°**
Vertical Field of View:	**46°**

NOTES:

Viewpoint locations have been precision surveyed by:

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Blythe, California 92225

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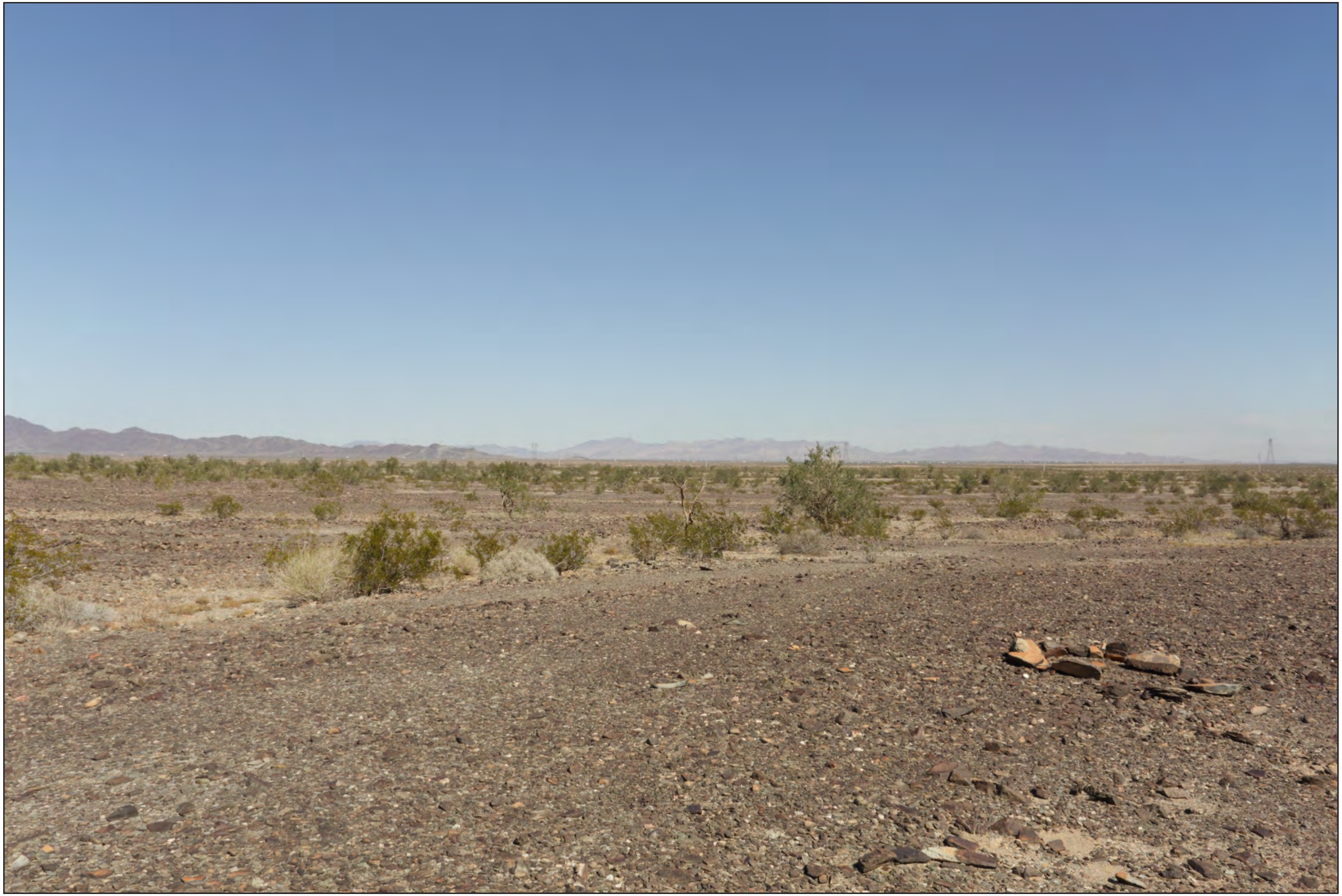


Figure 4.19-5

KOP4 - Mule Mountains, Looking Northeast - *Existing View*

a. For on-screen display: scale bar to be 4 inches wide, viewing distance is 11.2 inches.
b. When printed on 11x17 paper, viewing distance is 11.2 inches.

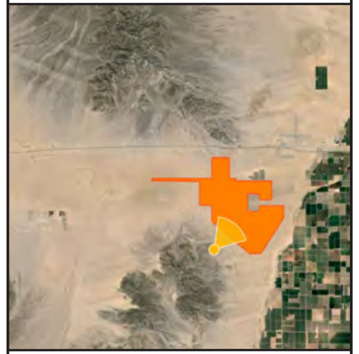
First Solar.

Desert Quartzite Solar Project

KOP4

Mule Mountains

● Viewpoint Location ● Project Area



Easting Position (UTM Zone 11):	**706270.0**
Northing Position (UTM Zone 11):	**3713836.2**
Elevation of Photopoint Position (NAD83):	**435.9**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**26 February 2015 at 12:00 PM**
Orientation of View:	**NE**
Horizontal Field of View:	**65°**
Vertical Field of View:	**46°**

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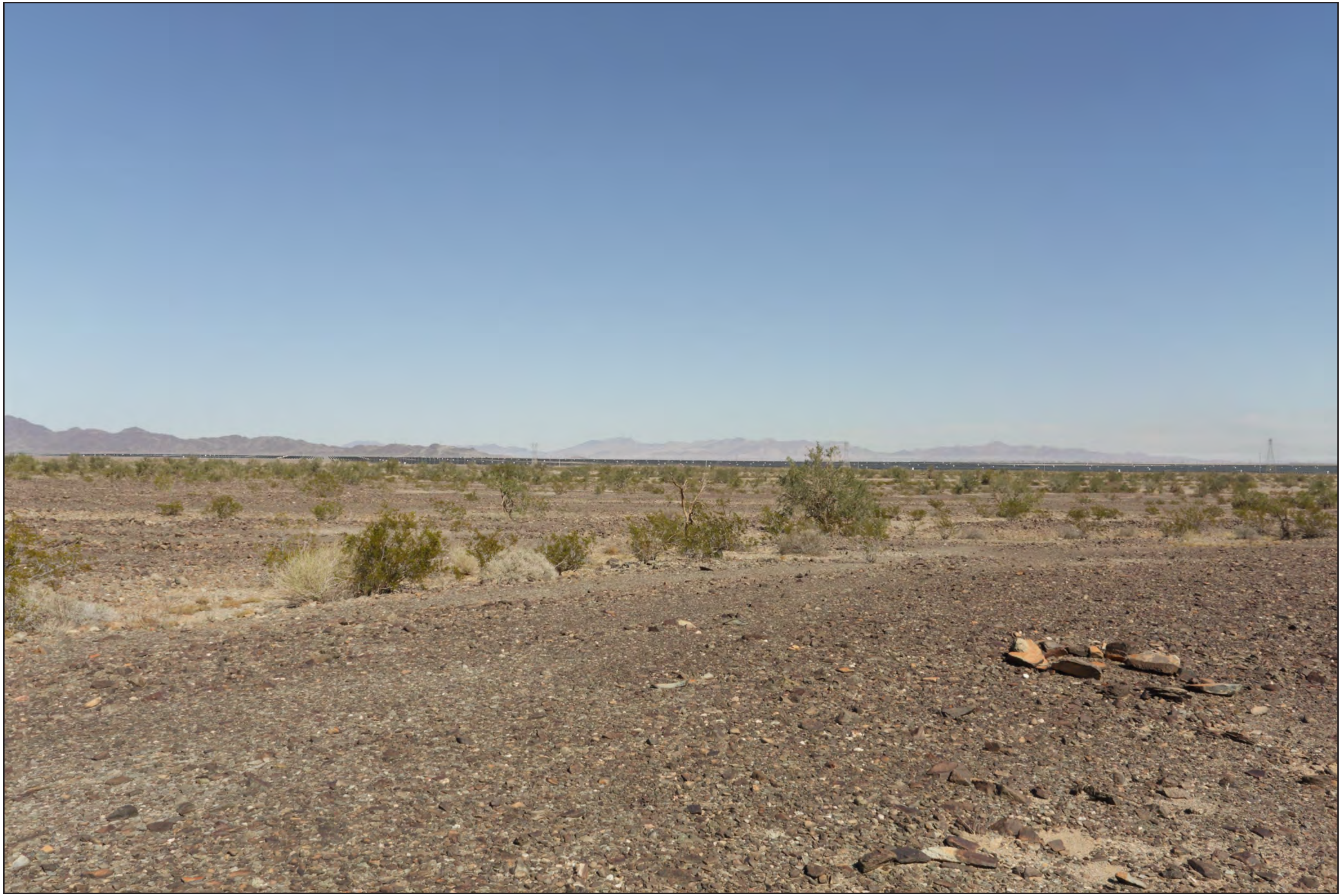


Figure 4.19-6

KOP4 - Mule Mountains, Looking Northeast - *Proposed View*

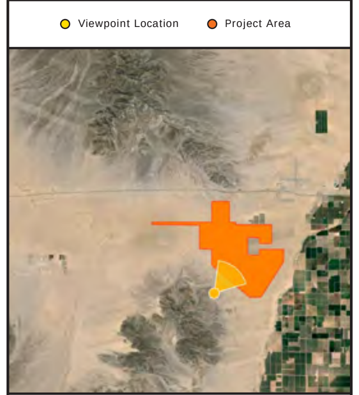
a. For on-screen display: scale bar to be 4 inches wide, viewing distance is 11.2 inches.
b. When printed on 11x17 paper, viewing distance is 11.2 inches.

First Solar.

Desert Quartzite Solar Project

KOP4

Mule Mountains



Easting Position (UTM Zone 11):	**706270.0**
Northing Position (UTM Zone 11):	**3713836.2**
Elevation of Photopoint Position (NAD83):	**435.9**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**26 February 2015 at 12:00 PM**
Orientation of View:	**NE**
Horizontal Field of View:	**65°**
Vertical Field of View:	**46°**

NOTES:

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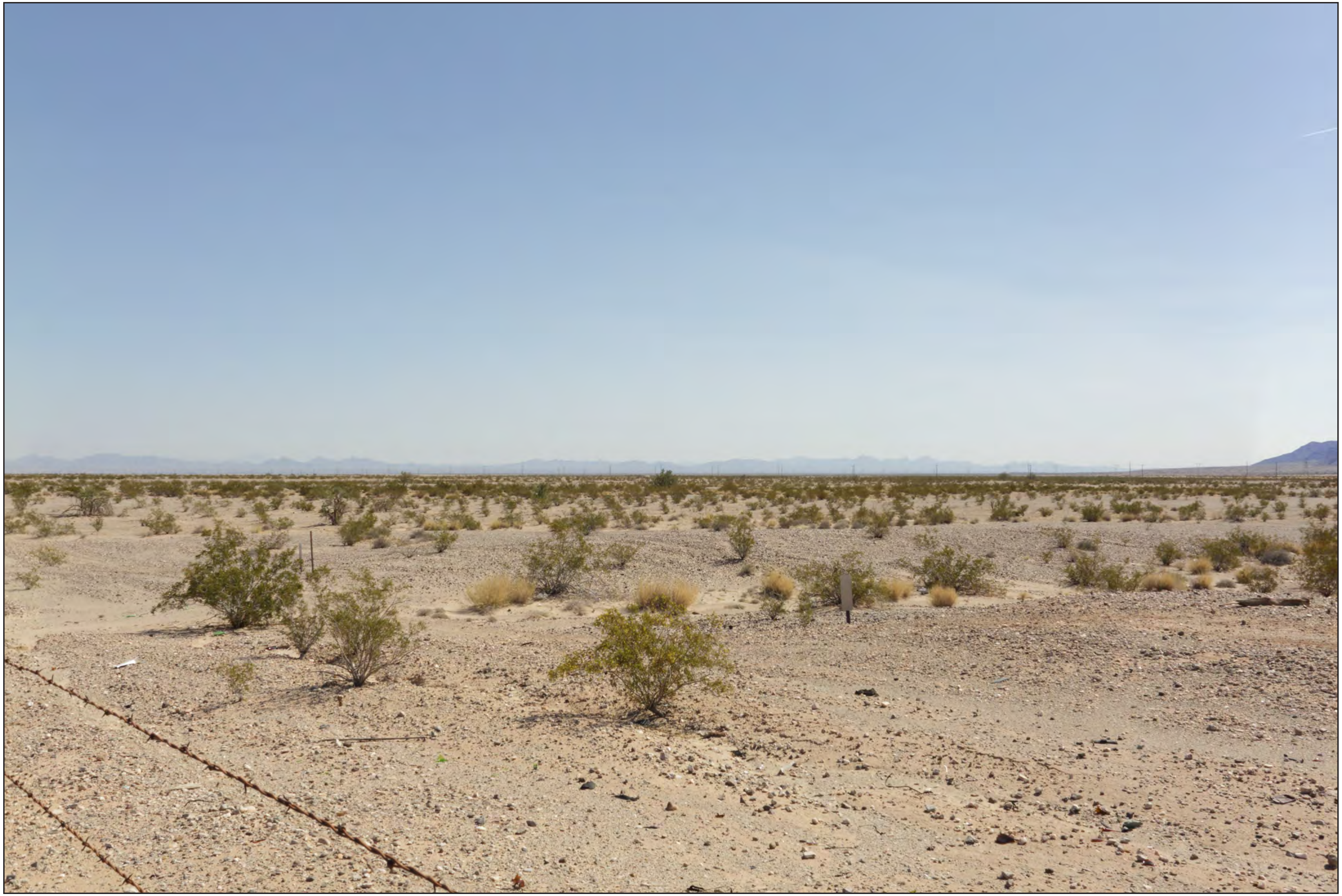
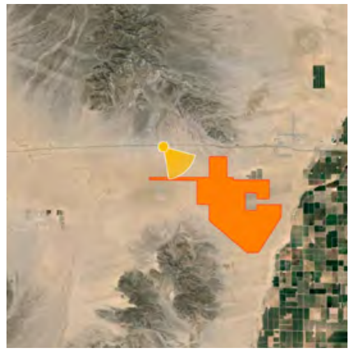


KOP1c

Interstate 10



Easting Position (UTM Zone 11):	**702753.8**
Northing Position (UTM Zone 11):	**3721002.0**
Elevation of Photopoint Position (NAD83):	**539.5**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**27 February 2015 at 01:12 PM**
Orientation of View:	**SE**
Horizontal Field of View:	**65°**
Vertical Field of View:	**46°**

Figure 4.19-7

KOP1c - Interstate 10, Looking Southeast - *Existing View*

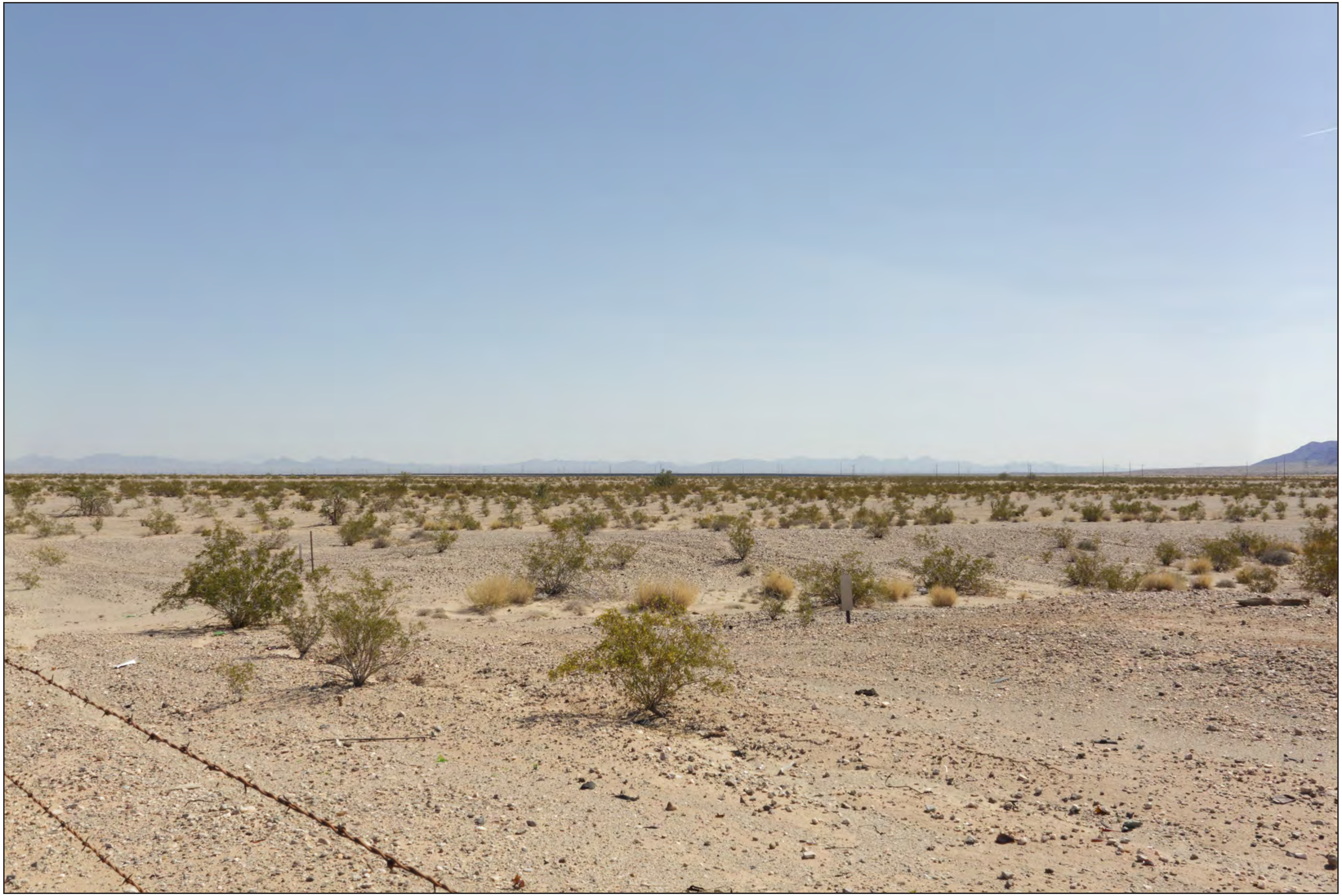


Figure 4.19-8

KOP1c - Interstate 10, Looking Southeast - *Proposed View*

a. For on-screen display: scale bar to be 4 inches wide, viewing distance is 11.2 inches.
b. When printed on 11x17 paper, viewing distance is 11.2 inches.

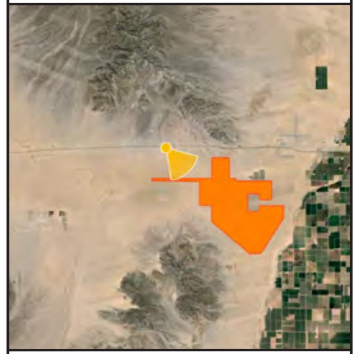
First Solar.

Desert Quartzite Solar Project

KOP1c

Interstate 10

● Viewpoint Location ● Project Area



Easting Position (UTM Zone 11):	**702753.8**
Northing Position (UTM Zone 11):	**3721002.0**
Elevation of Photopoint Position (NAD83):	**539.5**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**27 February 2015 at 01:12 PM**
Orientation of View:	**SE**
Horizontal Field of View:	**65°**
Vertical Field of View:	**46°**

NOTES:

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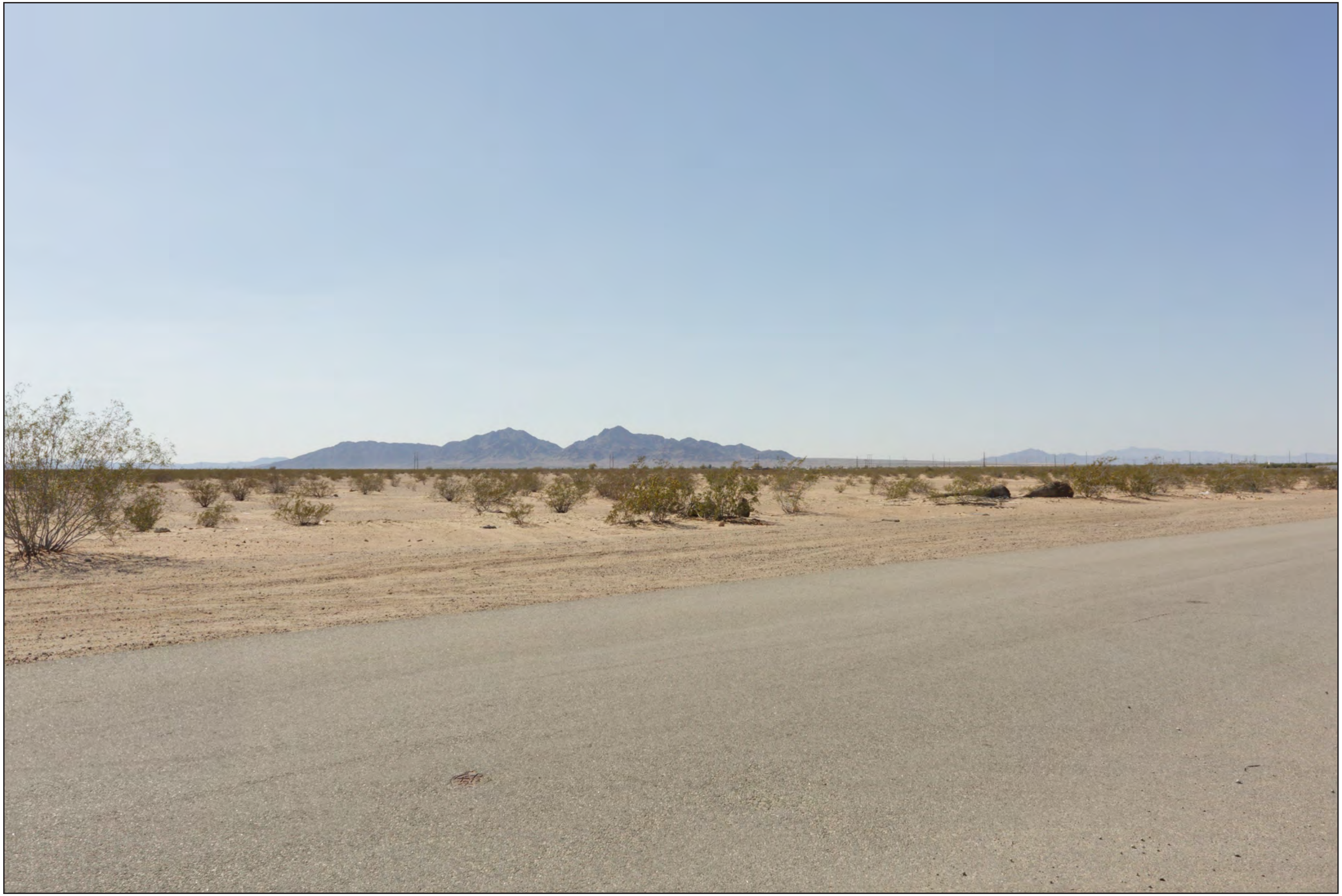
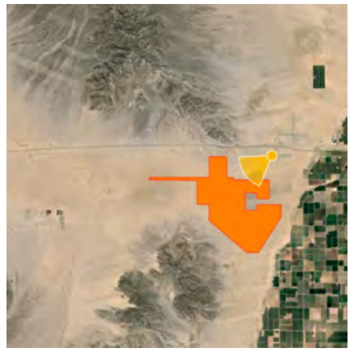


KOP6

Nicholls Warm Springs



Easting Position (UTM Zone 11):	**710409.6**
Northing Position (UTM Zone 11):	**3720442.8**
Elevation of Photopoint Position (NAD83):	**397.2**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**27 February 2015 at 12:33 PM**
Orientation of View:	**SW**
Horizontal Field of View:	**65°**
Vertical Field of View:	**46°**

Figure 4.19-9

KOP6 - Nicholls Warm Springs, Looking Southwest - *Existing View*

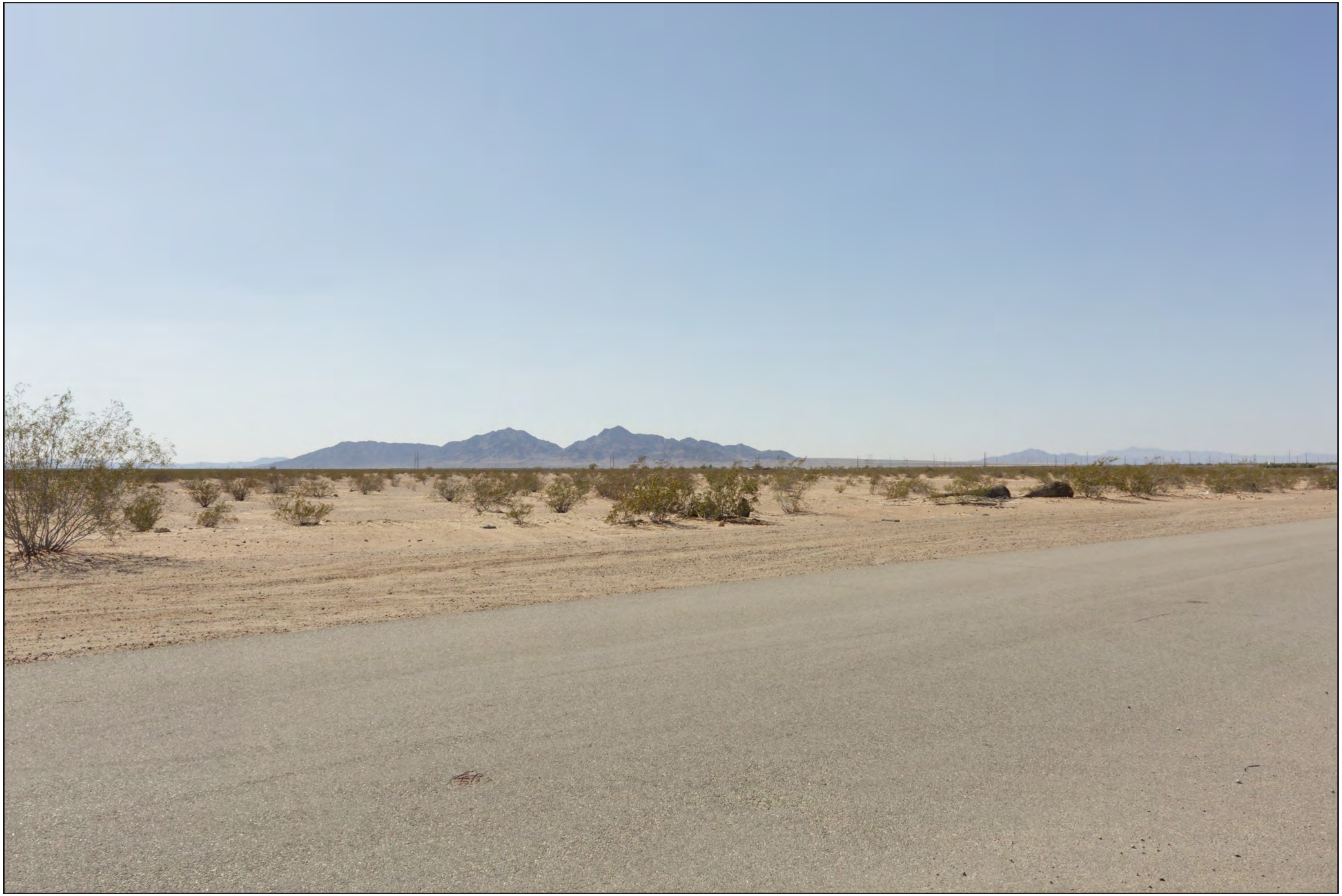


Figure 4.19-10

KOP6 - Nicholls Warm Springs, Looking Southwest - *Proposed View*

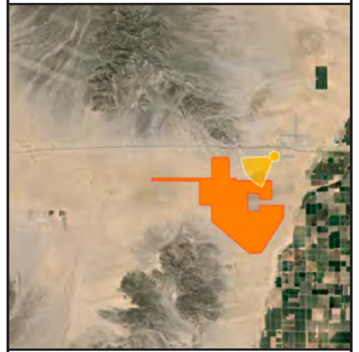
a. For on-screen display: scale bar to be 4 inches wide, viewing distance is 11.2 inches.
b. When printed on 11x17 paper, viewing distance is 11.2 inches.

First Solar.

Desert Quartzite Solar Project

KOP6

Nicholls Warm Springs



Easting Position (UTM Zone 11):	**710409.6**
Northing Position (UTM Zone 11):	**3720442.8**
Elevation of Photopoint Position (NAD83):	**397.2**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**27 February 2015 at 12:33 PM**
Orientation of View:	**SW**
Horizontal Field of View:	**65°**
Vertical Field of View:	**46°**

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APPENDIX B

ACRONYMS AND GLOSSARY

APPENDIX B - ACRONYMNS AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
µg/L	micrograms per Liter
*µg/m*3	micrograms per cubic meter
AADT	Annual Average Daily Traffic
AAQS	ambient air quality standards
AB 32	California Global Warming Solutions Act of 2006
AB	Authorized Biologist
AC	alternating current
ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
ACS	American Community Survey
AF	acre-feet
AFC	Application for Certification
AFY	acre-feet per year
ALUC	Airport Land Use Commission
ALUCP	Airport Land Use Compatibility Plan
amsl	Above Mean Sea Level
APE	Area of Potential Effects
APLIC	Avian Power Line Interaction Committee
APM	Applicant-Proposed Measures
APN	Assessor’s Parcel Number
ARPA	Archaeological Resources Protection Act of 1979
ASTM	American Society for Testing Materials Standards
BA	Biological Assessment
BBCS	Bird and Bat Conservation Strategy
BCC	Birds of Conservation Concern
BEA	United States Bureau of Economic Analysis
BGEPA	Bald and Golden Eagle Protection Act
bgs	below ground surface
BLM	United States Department of Interior, Bureau of Land Management
BMPs	best management practices
BMSP	Blythe Mesa Solar Project
BO	Biological Opinion
BRMIMP	Biological Resources Mitigation, Implementation, and Monitoring Plan
BSPP	Blythe Solar Power Project
BTU/kWh	British thermal units per kilowatt hour
BUOW	Western burrowing owl
CAA	Clean Air Act
CAAQS	California ambient air quality standards
CAL FIRE	California Department of Forestry and Fire Protection
CAISO	California Independent System Operator

CalEPA	California Environmental Protection Agency
Cal-IPC	California Invasive Plant Council
Cal-OSHA	California - Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CARIDAP	California Archaeological Resources Identification and Data Acquisition Program
CBC	California Building Code
CBOC	California Burrowing Owl Consortium
CCD	Census County Division
CCH	Consortium of California Herbaria
CCR	California Code of Regulations
CDC	Centers for Disease Control
CDCA	California Desert Conservation Area
CDCA Plan	California Desert Conservation Area Plan of 1980, as amended
CDFW	California Department of Fish and Wildlife
CDMG	California Division of Mines and Geology
CDP	Census Designated Place
CDPA	California Desert Protection Act of 1994
CDPH	California Department of Public Health
CDOC	California Department of Conservation
CdTe	cadmium telluride
CDV	canine distemper virus
CEC	California Energy Commission
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERS	California Environmental Reporting System
CESA	California Endangered Species Act
CFC	chlorofluorocarbons
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGS	California Geological Survey
CH_4	methane
CHRIS	California Historical Resources Information System
CHWMP	Riverside County Hazardous Waste Management Plan
CIWMP	Countywide Integrated Waste Management Plan
CMA	Congestion Management Agency
CMA	Conservation and Management Action
CMP	Congestion Management Program
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide

CO_2e	carbon dioxide equivalents
CPM	Compliance Project Manager
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CRMMP	Cultural Resources Monitoring and Mitigation Plan
CRR	Cultural Resources Report
CRS	Cultural Resources Specialist
CRSS	Colorado River Substation
cSi	Crystalline Silicon
CT	census tract
CUP	Conditional Use Permit
CUPA	Certified Unified Program Authority
CVGB	Chuckwalla Valley Groundwater Basin
CWA	Clean Water Act
cy	cubic yards
DAS	data acquisition system
dB	decibel
dBA	A-weighted decibel
DC	direct current
DESCP	Drainage Erosion and Sedimentation Control Plan
DFA	Development Focus Area
DHS	United States Department of Homeland Security
DoD	United States Department of Defense
DOE	United States Department of Energy
DOF	California Department of Finance
DOI	United States Department of Interior
DPM	diesel particulate matter
DPR	California Department of Parks and Recreation
DPV1	Devers-Palo Verde Transmission Line Number 1
DPV2	Devers-Palo Verde Transmission Line Number 2
DQSP	Desert Quartzite Solar Project
DRECP	California Desert Renewable Energy Conservation Plan
DTC/C-AMA	Desert Training Center California-Arizona Maneuver Area
DTSC	Department of Toxic Substances Control
DWMA	Desert Wildlife Management Area
DWR	Department of Water Resources
EAP	Emergency Action Plan
EICMPP	Environmental Inspection and Compliance Monitoring Program and Plan
EDD	California Employment Development Department
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMF	Electric and Magnetic Field
EPAct	Energy Policy Act of 2005
EPCRA	Emergency Planning and Community Right-To-Know Act of 1986
EPRI	Electric Power Research Institute

EPS	Emission Performance Standard
FAA	Federal Aviation Administration
FAST	Fixing America's Surface Transportation Act
FE	Federally listed as endangered
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FESA	Federal Endangered Species Act
FHWA	Federal Highway Administration
FHSZ	Fire Hazard Severity Zone
FIRM	Flood Insurance Rate Map
FLPMA	Federal Land Policy and Management Act
FR	Federal Register
ft	foot
FT	Federally listed as threatened
FTA	Federal Transit Administration
gal	gallon
g/m2yr	grams per square meter per year
GDP	gross domestic product
gen-tie	generation transmission
GHG	greenhouse gas
GIS	geographic information system
gpd	gallons per day
gpd/ft	gallons per day per foot
gpd/ft2	gallons per day per square foot
gpm	gallons per minute
GPS	global positioning system
GWP	global warming potential
H_2S	hydrogen sulfide
HMBP	Hazardous Materials Business Plan
HCP	habitat conservation plan
HMA	Herd Management Area
HPTP	Historic Properties Treatment Plan
HRA	health risk assessment
HVAC	Heating, ventilation, and air conditioning
I-10	Interstate 10
IBC	International Building Code
IM	Instructional Memorandum
IOP	Interagency Operating Procedures
IPCC	International Panel on Climate Change
kg	kilogram
KOP	key observation point
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hour

L90	The A-weighted noise level that is exceeded 90 percent of the time during the measurement period.
lbs	pounds
Ldn	day-night average noise level equivalent continuous sound level
Leq	equivalent continuous sound level
LORS	laws, ordinances, regulations, and standards
LOS	level of service
LR2000	Land & Mineral Legacy Rehost 2000 System
LRA	Local Responsibility Area
LTVAs	Long Term Visitor Areas
m	meter
MBTA	Migratory Bird Treaty Act
MCA	Medieval Climatic Anomaly
MDAB	Mojave Desert Air Basin
MDAQMD	Mojave Desert Air Quality Management District
MDP	Monitoring and Discovery Plan
mg/L	milligrams per liter
mg/m3	milligrams per cubic meter
mi	mile
ml	milliliter
mm	millimeter
MM	Modified Mercalli
MOA	Memorandum of Agreement
Modified BSPP	Modified Blythe Solar Power Project
MPH	miles per hour
MRDS	Mineral Resources Data System
MRZ	Mineral Resource Zone
m/s	meters per second
MSEP	McCoy Solar Energy Project
MT	metric ton
MTR	Military Training Route
MUC	Multiple-Use Class
MW	megawatt
MWh	megawatt-hour
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NECO	Northern and Eastern Colorado Desert Coordinated Management Plan
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NFWF	National Fish and Wildlife Foundation
NGI	Norwegian Geotechnical Institute
NHPA	National Historic Preservation Act
NLCS	National Landscape Conservation System

NNSR	Nearest Noise Sensitive Receptor
NO_2	nitrogen dioxide
NOA	Notice of Availability
NOI	Notice of Intent
NOP	Notice of Preparation
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act
NRCS	Natural Resources Conservation Service
NREL	National Renewable Energy Laboratory
NRHP	National Register of Historic Places
NSPS	New Source Performance Standard
NSR	New Source Review
NTP	Notice to Proceed
NWIS	National Water Information System
O2	oxygen
O3	ozone
O&M	operation and maintenance
OEHHA	Office of Environmental Health Hazard Assessment
OHV	off-highway vehicle
OSHA	United States Occupational Safety and Health Administration
PA	Programmatic Agreement (when used in context of cultural resources)
PA	Plan Amendment (when used in context of CDCA Plan)
PA/EIS/EIR	Proposed Plan Amendment/Environmental Impact Statement/Environmental Impact Report
PAR	Property Analysis Record
PCE	Passenger Car Equivalents
PCS	power conversion station
PEIS	Programmatic Environmental Impact Statement
PFYC	Potential Fossil Yield Classification
PGA	peak ground acceleration
PHA	Project Historical Archaeologist
PL	Public Law
PM	particulate matter
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
POD	Plan of Development
PPA	Power Purchase Agreement
ppm	parts per million
PPV	Peak Particle Velocity
PRMMP	Paleontologic Resources Monitoring and Mitigation Plan
PRPA	Paleontologic Resources Preservation Act
PSD	Prevention of Significant Deterioration
PTNCL	Prehistoric Trails Network Cultural Landscape
PUP	Public Use Permit

PV	photovoltaic
PVCS	Photovoltaic Combining Switchgear
PVGB	Palo Verde Groundwater Basin
PVID	Palo Verde Irrigation District
PVMGB	Palo Verde Mesa Groundwater Basin
PVVAP	Palo Verde Valley Area Plan
PVVGB	Palo Verde Valley Groundwater Basin
PVVTA	Palo Verde Valley Transit Agency
R	State characterized as rare
RCFD	Riverside County Fire Department
RCGP	Riverside County General Plan
RCRA	Resource Conservation and Recovery Act of 1976
RCTC	Riverside County Transportation Commission
ROD	Record of Decision
ROG	reactive organic gas
ROW	right-of-way
RMP	Resource Management Plan
RMS	Root Mean Square
RPS	Renewables Portfolio Standard
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act of 1986
SCE	Southern California Edison
SDWA	Safe Drinking Water Act
SE	State listed as endangered
SEZ	Solar Energy Zone
SF	Standard form
SF_6	sulfur hexafluoride
SHPO	State Historic Preservation Officer
SLRU	Sensitivity Level Rating Units
SMARA	Surface Mining and Reclamation Act
SMZ	Sand Migration Zone
SO_2	sulfur dioxide
SO_X	sulfur oxides
SPCC	Spill Prevention Control and Countermeasures
SQRU	Scenic Quality Rating Units
SR	State Route
SRA	State Responsibility Area
SSC	Species of Special Concern
ST	State listed as threatened
SUA	Special Use Airspace
SVP	Society of Vertebrate Paleontology
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminant
TCR	Tribal Cultural Resource

TDS	Total Dissolved Solids
TSCA	Toxic Substances Control Act of 1976
UL	Underwriters Laboratory
U.S.	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	underground storage tank
UXO	unexploded ordnance
UV	ultraviolet
V	volts
VMT	vehicle miles traveled
VOC	volatile organic compound
VRI	Visual Resource Inventory
VRM	Visual Resource Management
VRMP	Vegetation Resources Management Plan
VSOI	visual sphere of influence
W	watts
WAPA	Western Area Power Administration
WDR	Waste Discharge Requirement
WEPS	Wind Erosion Prediction System
WEAP	Worker Environmental Awareness Program
WHMA	Wildlife Habitat Management Area
WIU	Wilderness Inventory Unit
WL	Watch List
WRCC	Western Regional Climate Center
WSA	Wilderness Study Area
WSA	Water Supply Assessment
W/m2	watts per square meter
yr	year

GLOSSARY

A

Air Basin: A regional area defined for state air quality management purposes based on considerations that include topographic features that influence meteorology and pollutant transport patterns, and political jurisdiction boundaries that influence the design and implementation of air quality management programs.

Alluvium: a fine-grained fertile soil consisting of mud, silt, and sand deposited by flowing water on flood plains, in river beds, and in estuaries.

Alluvial Fan: Fan shaped material of water deposited material.

Ambient Air Quality Standards (AAQS): A combination of air pollutant concentrations, exposure durations, and exposure frequencies that are established as thresholds above which adverse impacts to public health and welfare may be expected. Ambient air quality standards are set on a national level by the U.S. Environmental Protection Agency. Ambient air quality standards are set on a state level by public health or environmental protection agencies as authorized by state law.

Ambient Air: Outdoor air in locations accessible to the general public.

Area of Critical Environmental Concern (ACEC): A designated area on public lands where special management attention is required: (1) to protect and prevent irreparable damage to fish and wildlife; (2) to protect important historic, cultural, or scenic values, or other natural systems or processes; or (3) to protect life and safety from natural hazards.

Area of Potential Effects (APE): The geographic area or areas within which an action may directly or indirectly cause changes in the character or use of historic properties, if such properties exist.

Attainment Area: An area that has air quality as good as or better than a national or state ambient air quality standard. A single geographic area may be an attainment area for one pollutant and a non-attainment area for others.

B

Best Management Practices (BMPs): A practice or combination of practices that are determined to provide the most effective, environmentally sound, and economically feasible means of managing an activity and mitigating its impacts.

C

Cancer: A class of diseases characterized by uncontrolled growth of somatic cells. Cancers are typically caused by one of three mechanisms: chemically induced mutations or other changes to introduce new DNA into cells.

Carbon Monoxide (CO): A colorless, odorless gas that is toxic because it reduces the oxygen-carrying capacity of the blood.

Characteristic: A distinguishing trait, feature, or quality.

Characteristic Landscape: The established landscape within an area being viewed. This does not necessarily mean a naturalistic character. It could refer to an agricultural setting, an urban landscape, a primarily natural environment, or a combination of these types.

Climate: A statistical description of daily, seasonal, or annual weather conditions based on recent or long-term weather data. Climate descriptions typically emphasize average, maximum, and minimum conditions for temperature, precipitation, humidity, wind, cloud cover, and sunlight intensity patterns; statistics on the frequency and intensity of tornado, hurricane, or other severe storm events may also be included.

Contrast: Opposition or unlikeness of different forms, lines, colors, or textures in a landscape.

Contrast Rating: A method of analyzing the potential visual impacts of proposed management activities.

Corrosive Soils: Potential soil-induced electrochemical or chemical action that could corrode or deteriorate concrete, reinforcing steel in concrete structures, and bare-metal structures.

Criteria Pollutant: An air pollutant for which there is a national ambient air quality standard (carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, inhalable particulate matter, fine particulate matter, or airborne lead particles).

Critical Habitat: Habitat designated by the U.S. Fish and Wildlife Service under Section 4 of the Federal Endangered Species Act and under the following criteria: 1) specific areas within the geographical area occupied by the species at the time it is listed, on which are found those physical or biological features essential to the conservation of the species and that may require special management of protection; or 2) specific areas outside the geographical area by the species at the time it is listed but that are considered essential to the conservation of the species.

Cultural Landscape: A geographic area, including both natural and cultural resources, associated with a historic event, activity, group, or person; or, a geographic area that has been assigned cultural or social meaning by associated cultural groups.

Cultural Modification: Any man-caused change in the land form, water form, vegetation, or the addition of a structure which creates a visual contrast in the basic elements (form, line, color, texture) of the naturalistic character of a landscape.

Cultural Resource: A location of human activity, occupation, or use identifiable through field inventory, historical documentation, or oral evidence. Cultural resources include archaeological and historical sites, structures, buildings, objects, artifacts, works of art, architecture, and natural features that were important in past human events. They may consist of physical remains or areas where significant human events occurred, even though evidence of the events no longer remains. And they may include definite locations of traditional, cultural, or religious importance to specified social or cultural groups.

D

Day/Night Average Sound Level (Ldn): A 24-hour average noise level rating with a 10 dB penalty factor applied to nighttime noise levels. The Ldn value is very similar to the CNEL value, but does not include any weighting factor for noise during evening hours.

Decibel (dB): A generic term for measurement units based on the logarithm of the ratio between a measured value and a reference value. Decibel scales are most commonly associated with acoustics (using air pressure fluctuation data); but decibel scales sometimes are used for ground-borne vibrations or various electronic signal measurements.

Desert Pavement: A surface covering of closely packed rock fragments of pebble or cobble size found on desert soils.

Desert Wildlife Management Area (DWMA): areas established in the NECO Plan Amendment to the CDCA Plan to address the recovery of the desert tortoise. They are intended to be areas where viable desert tortoise populations can be maintained (Category I habitat). These were eliminated in DRECP, and replaced by Desert Tortoise ACECs.

Distance Zones: A subdivision of the landscape as viewed from an observer position. The subdivision (zones) includes foreground-middleground, background, and seldom seen.

E

Equivalent Average Sound Pressure Level (Leq): The decibel level of a constant noise source that would have the same total acoustical energy over the same time interval as the actual time-varying noise condition being measured or estimated. Leq values must be associated with an explicit or implicit averaging time in order to have practical meaning.

Erosion: A natural process whereby soil and highly weathered rock materials are worn away and transported to another area, most commonly by wind or water.

Ethnographic Resources: Resources representing the heritage of a particular ethnic or cultural group, such as Native Americans or African, European, Latino, or Asian immigrants. They may include traditional resource-collecting areas, ceremonial sites, value-imbued landscape features, cemeteries, shrines, or ethnic neighborhoods and structures.

Excavation: The scientific examination of an archaeological site through layer-by-layer removal and study of the contents within prescribed surface units, e.g. square meters.

Expansive Soils: A soil which significantly changes its volume in horizontal and vertical planes with changes in moisture content.

F

Fault (active): A fault that has had surface displacement during Holocene time (last 11,000 years).

Fault (potentially active): A Quaternary-age (last 1.8 million years) fault that lacks evidence of Holocene-age displacement.

Fluvial: Of, relating to, or occurring in a river.

Form: The mass or shape of an object or objects which appear unified, such as a vegetative opening in a forest, a cliff formation, or a water tank.

G

Glare: The sensation produced by luminance within the visual field that is sufficiently greater than the luminance to which the eyes are adapted, which causes annoyance, discomfort, or loss in visual performance and visibility. See Glint.

Glint: A momentary flash of light resulting from a spatially localized reflection of sunlight.

Greenhouse Gas (GHG): A gaseous compound that absorbs infrared radiation and re-radiates a portion of hat back toward the earth’s surface, thus trapping heat and warming the earth’s atmosphere.

H

Habitat: A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.

Hertz (Hz): A standard unit for describing acoustical frequencies measured as the number of air pressure fluctuation cycles per second. For most people, the audible range of acoustical frequencies is from 20 Hz to 20,000 Hz.

Historical Site: A location that was used or occupied after the arrival of Europeans in North America (ca. A.D. 1492). Such sites may consist of physical remains at archaeological sites or areas where significant human events occurred, even though evidence of the events no longer remains. They may have been used by people of either European or Native American descent.

Holocene: Of, denoting, or formed in the second and most recent epoch of the Quaternary period, which began 10,000 years ago at the end of the Pleistocene.

Hydrocarbons: Any organic compound containing only carbon and hydrogen, such as the alkanes, alkenes, alkynes, terpenes, and arenes.

I

Indian Tribe: Any American Indian group in the United States that the Secretary of the Interior recognizes as possessing tribal status (listed periodically in the Federal Register).

Invasive Species: An exotic species whose introduction does or is likely to cause economic or environmental harm or harm to human health (Executive Order 13122, 2/3/99).

Isolate: Non-linear, isolated archaeological features without associated artifacts.

K

Key Observation Point (KOP): One or a series of points on a travel route or at a use area or a potential use area, where the view of a management activity would be most revealing.

L

Landscape Character: The arrangement of a particular landscape as formed by the variety and intensity of the landscape features and the four basic elements of form, line, color, and texture.

These factors give the area a distinctive quality which distinguishes it from its immediate surroundings.

Landscape Features: The land and water form, vegetation, and structures which compose the characteristic landscape.

Landslide: A slope failure that involves downslope displacement and movement of material, either triggered by static (i.e., gravity) or dynamic (i.e., earthquake) forces.

Leasable Minerals: Minerals whose extraction from Federally managed land requires a lease and the payment of royalties. Leasable minerals include coal, oil and gas, oil shale and tar sands, potash, phosphate, sodium, and geothermal steam.

Line: The path, real or imagined, that the eye follows when perceiving abrupt differences in form, color, or texture. Within landscapes, lines may be found as ridges, skylines, structures, changes in vegetative types, or individual trees and branches.

Liquefaction: A condition in which a saturated cohesionless soil may lose shear strength because of a sudden increase in pore water pressure caused by an earthquake.

Locatable Minerals: Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872, as amended. This includes deposits of gold, silver, and other uncommon minerals not subject to lease or sale.

M

Maintenance Area: An area that currently meets Federal ambient air quality standards but which was previously designated as a nonattainment area. Federal agency actions occurring in a maintenance area are still subject to Clean Air Act conformity review requirements.

Mining Claim: A mining claim is a selected parcel of Federal Land, valuable for a specific mineral deposit or deposits, for which a right of possession has been asserted under the General Mining Law. This right is restricted to the development and extraction of a mineral deposit. The rights granted by a mining claim protect against a challenge by the United States and other claimants only after the discovery of a valuable mineral deposit. The two types of mining claims are lode and placer. In addition, mill sites and tunnel sites may be located to provide support facilities for lode and placer mining.

Mitigation: Mitigation includes: (a) Avoiding the impacts altogether by not taking an action or parts of an action, (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation, (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment, (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action, (e) Compensating for the impact by replacing or providing substitute resources or environments (40 CFR §1508.20).

N

National Pollutant Discharge Elimination System (NPDES): The NPDES permit program has been delegated in California to the State Water Resources Control Board. These sections of the CWA require that an applicant for a Federal license or permit that allows activities resulting in a discharge to waters of the United States must obtain a state certification that the discharge complies with other provisions of the Clean Water Act.

National Register of Historic Places: The official list, established by the National Historic Preservation Act, of the Nation's cultural resources worthy of preservation. The National Register lists archeological, historic, and architectural properties (i.e. districts, sites, buildings, structures, and objects) nominated for their local, state, or national significance by state and Federal agencies and approved by the National Register Staff. The National Park Service maintains the National Register.

Native American: Indigenous peoples of the western hemisphere.

Nitric Oxide (NO): A colorless toxic gas formed primarily by combustion processes that oxidize atmospheric nitrogen gas or nitrogen compounds found in the fuel. A precursor of ozone, nitrogen dioxide, numerous types of photochemically generated nitrate particles (including PAN), and atmospheric nitrous and nitric acids. Most nitric oxide formed by combustion processes is converted into nitrogen dioxide by subsequent oxidation in the atmosphere over a period that may range from several hours to a few days.

Nitrogen Dioxide: A toxic, reddish gas formed by the oxidation of nitric oxide. Nitrogen dioxide is a strong respiratory and eye irritant. Most nitric oxide formed by combustion processes is converted into nitrogen dioxide by subsequent oxidation in the atmosphere. Nitrogen dioxide is a criteria pollutant in its own right, and is a precursor of ozone, numerous types of photochemically generated nitrate particles (including PAN), and atmospheric nitrous and nitric acids.

Non-native Species: See Invasive Species.

Noxious Weed: According to the Federal Noxious Weed Act (PL 93-629), a weed that causes disease or has other adverse effects on man or his environment and therefore is detrimental to the agricultural and commerce of the United States and to the public health.

Nonattainment Area: An area that does not meet a Federal or state ambient air quality standard. Federal agency actions occurring in a Federal nonattainment area are subject to Clean Air Act conformity review requirements.

O

Off-Highway Vehicle (OHV): Any vehicle capable of or designed for travel on or immediately over land, water, or other natural terrain, deriving motive power from any source other than muscle. OHVs exclude: 1) any non-amphibious registered motorboat; 2), any fire, emergency, or law enforcement vehicle while being used for official or emergency purposes; 3) any vehicle whose use is expressly authorized by a permit, lease, license, agreement, or contract issued by an authorized officer or otherwise approved; 4) vehicles in official use; and 5) any combat or combat support vehicle when used in times of national defense emergencies.

Organic Compounds: Compounds of carbon containing hydrogen and possibly other elements (such as oxygen, sulfur, or nitrogen). Major subgroups of organic compounds include hydrocarbons, alcohols, aldehydes, carboxylic acids, esters, ethers, and ketones. Organic compounds do not include crystalline or amorphous forms of elemental carbon (graphite, diamond, carbon black, etc.), the simple oxides of carbon (carbon monoxide and carbon dioxide), metallic carbides, or metallic carbonates.

Overdraft condition: A condition in which the total volume of water being extracted from the groundwater basin would be greater than the total recharge provided to the basin.

Ozone (O3): A compound consisting of three oxygen atoms. Ozone is a major constituent of photochemical smog that is formed primarily through chemical reactions in the atmosphere involving reactive organic compounds, nitrogen oxides, and ultraviolet light. Ozone is a toxic chemical that damages various types of plant and animal tissues and which causes chemical oxidation damage to various materials. Ozone is a respiratory irritant, and appears to increase susceptibility to respiratory infections. A natural layer of ozone in the upper atmosphere absorbs high energy ultraviolet radiation, reducing the intensity and spectrum of ultraviolet light that reaches the earth's surface.

P

Paleontological Resources (Fossils): The physical remains of plants and animals preserved in soils and sedimentary rock formations. Paleontological resources are for understanding past environments, environmental change, and the evolution of life.

Paleontology: A science dealing with the life forms of past geological periods as known from fossil remains.

Paleozoic Era: An era of geologic time (600 million to 280 million years ago) between the Late Precambrian and the Mesozoic eras and comprising the Cambrian, Ordovician, Silurian, Devonian, Mississippian, Pennsylvanian, and Permian periods.

Particulate Matter: Solid or liquid material having size, shape, and density characteristics that allow the material to remain suspended in the atmosphere for more than a few minutes. Particulate matter can be characterized by chemical characteristics, physical form, or aerodynamic properties. Categories based on aerodynamic properties are commonly described as being size categories, although physical size is not used to define the categories. Many components of suspended particulate matter are respiratory irritants. Some components (such as crystalline or fibrous minerals) are primarily physical irritants. Other components are chemical irritants (such as sulfates, nitrates, and various organic chemicals). Suspended particulate matter also can contain compounds (such as heavy metals and various organic compounds) that are systemic toxins or necrotic agents. Suspended particulate matter or compounds adsorbed on the surface of particles can also be carcinogenic or mutagenic chemicals. See PM_{10} and $PM_{2.5}$.

Peak Ground Acceleration (PGA): A common measure of ground motion during an earthquake. The PGA for a given component of motion is the largest value of horizontal acceleration obtained from a seismograph. PGA is expressed as the percentage of the acceleration due to gravity (g), which is approximately 980 centimeters per second squared. Unlike measures of magnitude, which provide a single measure of earthquake energy, PGA varies from place to place, and is dependent on the distance from the epicenter and the character of the underlying geology (e.g. hard bedrock, soft sediments, or artificial fills).

Petroglyph: Pictures, symbols, or other art work pecked, carved, or incised on natural rock surfaces.

pH: a measure of the acidity or basicity of a water-based solution. Pure water is considered neutral with a pH of 7, while solutions with a pH less than 7 are said to be acidic and solutions with a pH greater than 7 are basic or alkaline.

Physiographic Province: An extensive portion of the landscape normally encompassing many hundreds of square miles, which portrays similar qualities of soil, rock, slope, and vegetation of the same geomorphic origin.

Pleistocene (Ice Age): An epoch in the Quaternary period of geologic history lasting from 1.8 million to 10,000 years ago. The Pleistocene was an epoch of multiple glaciation, during which continental glaciers covered nearly one fifth of the earth's land.

Pliocene: The Pliocene Epoch is the period in the geologic timescale that extends from 5.332 million to 2.588 million years before present.

PM_{10} (inhalable particulate matter): A fractional sampling of suspended particulate matter that approximates the extent to which suspended particles with aerodynamic equivalent diameters smaller than 50 microns penetrate to the lower respiratory tract (tracheo-bronchial airways and alveoli in the lungs). In a regulatory context, PM_{10} is any suspended particulate matter collected by a certified sampling device having a 50 percent collection efficiency for particles with aerodynamic equivalent diameters of 9.5 to 10.5 microns and an maximum aerodynamic diameter collection limit less than 50 microns. Collection efficiencies are greater than 50 percent for particles with aerodynamic diameters smaller than 10 microns and less than 50 percent for particles with aerodynamic diameters larger than 10 microns.

$PM_{2.5}$ (fine particulate matter): A fractional sampling of suspended particulate matter that approximates the extent to which suspended particles with aerodynamic equivalent diameters smaller than 6 microns penetrate into the alveoli in the lungs. In a regulatory context, $PM_{2.5}$ is any suspended particulate matter collected by a certified sampling device having a 50 percent collection efficiency for particles with aerodynamic equivalent diameters of 2.0 to 2.5 microns and an maximum aerodynamic diameter collection limit less than 6 microns. Collection efficiencies are greater than 50 percent for particles with aerodynamic diameters smaller than 2.5 microns and less than 50 percent for particles with aerodynamic diameters larger than 2.5 microns.

Power Purchase Agreement (PPA): A contract between two parties, one who generates and intends to sell electricity, and one who is looking to purchase electricity, defining the commercial terms for the sale of electricity between the two parties.

Precursor: A compound or category of pollutant that undergoes chemical reactions in the atmosphere to produce or catalyze the production of another type of air pollutant.

Prehistoric: Refers to the period wherein American Indian cultural activities took place before written records and not yet influenced by contact with nonnative culture(s).

Q

Quaternary Age: The most recent of the three periods of the Cenozoic Era. In the geologic time scale of the International Commission on Stratigraphy, it follows the Tertiary Period, spanning time from approximately 2.6 ± 0.005 million years ago to the present. The Quaternary includes two geologic epochs: the Pleistocene and the Holocene.

R

Record of Decision (ROD): A formal decision document issued by a Federal agency to record the decision for the public.

Rehabilitation: A management alternative and/or practice which restores landscapes to a desired scenic quality.

Riparian: Situated on or pertaining to the bank of a river, stream, or other body of water. Normally describes plants of all types that grow rooted in the water table or sub-irrigation zone of streams, ponds, and springs.

Road: A linear route declared a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use.

Route: “Routes” represents a group or set of roads, trails, and primitive roads that represents less than 100 percent of the BLM transportation system. Generically, components of the transportation system are described as routes.

S

Saleable Minerals: Common variety minerals on the public lands, such as sand and gravel, which are used mainly for construction and are disposed by sales or special permits to local governments. See also Mineral Material Disposal.

Scale: The proportionate size relationship between an object and the surroundings in which the object is placed.

Scenery: The aggregate of features that give character to a landscape.

Scenic Area: An area whose landscape character exhibits a high degree of variety and harmony among the basic elements which results in a pleasant landscape to view.

Scenic Quality: The relative worth of a landscape from a visual perception point of view.

Scenic Quality Ratings: The relative scenic quality (A, B, or C) assigned a landscape by applying the scenic quality evaluation key factors; scenic quality A being the highest rating, B a moderate rating, and C the lowest rating.

Scenic Values: See Scenic Quality and Scenic Quality Ratings.

Secretary of the Interior: The U.S. Department of the Interior is in charge of the nation’s internal affairs. The Secretary serves on the President’s cabinet and appoints citizens to the National Park Foundation board.

Sedimentary Rocks: Rocks, such as sandstone, limestone, and shale, that are formed from sediments or transported fragments deposited in water.

Sensitivity Levels: Measures (e.g., high, medium, and low) of public concern for scenic quality.

Settlement: A process by which soils decrease in volume. Earthquake induced settlement results when relatively unconsolidated granular materials experience vibration associated with seismic events. Local settlement can occur when areas containing compressible soils are subject to foundation or fill loads.

Special-Status Species: Federal- or state-listed species, candidate or proposed species for listing, or species otherwise considered sensitive or threatened by state and Federal agencies.

State Historic Preservation Office (SHPO): The official within and authorized by each state at the request of the Secretary of the Interior to act as liaison for the National Historic Preservation Act.

State Implementation Plan (SIP): Legally enforceable plans adopted by states and submitted to USEPA for approval, which identify the actions and programs to be undertaken by the state and its subdivisions to achieve and maintain national ambient air quality standards in a time frame mandated by the Clean Air Act.

State Water Resources Control Board (SWRCB): Created in 1967, joint authority of water allocation and water quality protection enables the SWRCB to provide comprehensive protection for California's waters. The mission of the nine Regional Water Quality Control Boards is to develop and enforce water quality objectives and implementation plans that will best protect the state's waters, recognizing local differences in climate, topography, geology, and hydrology.

Stratigraphy: The order and relative position of strata (a layer of rock in the ground) and their relationship to the geological time scale.

Subsurface: Of or pertaining to rock or mineral deposits which generally are found below the ground surface.

Sulfur Dioxide (SO_2): A pungent, colorless, and toxic oxide of sulfur formed primarily by the combustion of fossil fuels. It is a respiratory irritant, especially for asthmatics. A criteria pollutant in its own right, and a precursor of sulfate particles and atmospheric sulfuric acid.

T

Tertiary: The Tertiary Period marks the beginning of the Cenozoic Era. It began 65 million years ago and lasted more than 63 million years, until 1.8 million years ago. The Tertiary is made up of 5 epochs: the Paleocene Epoch, the Eocene Epoch, the Oligocene Epoch, the Miocene Epoch, and the Pliocene Epoch.

Texture: The visual manifestations of the interplay of light and shadow created by the variations in the surface of an object or landscape.

Total Dissolved Solids: A measure of the combined content of all *inorganic* and *organic* substances contained in a liquid that are smaller than two micrometers in diameter (e.g., sodium).

Toxic: Poisonous; exerting an adverse physiological effect on the normal functioning of an organism's tissues or organs through chemical or biochemical mechanisms following physical contact or absorption.

Traditional Cultural Properties: Areas associated with the cultural practices or beliefs of a living community. These sites are rooted in the community's history and are important in maintaining cultural identity.

Trail: A linear route managed for human-powered, stock, or off-highway vehicle forms of transportation or for historical or heritage values. Trails are not generally managed for use by four-wheel drive or high-clearance vehicles.

Tribal Cultural Resource: Sites, features, places, cultural landscapes, and sacred places or objects that have cultural value or significance to a Tribe.

V

Vandalism (Cultural Resource): Malicious damage or the unauthorized collecting, excavating, or defacing of cultural resources. Section 6 of the Archaeological Resources Protection Act states that "no person may excavate, remove, damage, or otherwise alter or deface any archaeological resource located on public lands or Indian lands…unless such activity is pursuant to a permit issued under section 4 of this Act."

Variables: Factors influencing visual perception including distance, angle of observation, time, size or scale, season of the year, light, and atmospheric conditions.

Variety: The state or quality of being varied and having the absence of monotony or sameness.

Viewshed: The landscape that can be directly seen under favorable atmospheric conditions, from a viewpoint or along a transportation corridor. Protection, rehabilitation, or enhancement is desirable and possible.

Visual Contrast: See Contrast.

Visual Quality: See Scenic Quality.

Visual Resources: The visible physical features on a landscape (e.g., land, water, vegetation, animals, structures, and other features).

Visual Resource Management Classes: Categories assigned to public lands based on scenic quality, sensitivity level, and distance zones. There are four classes. Each class has an objective which prescribes the amount of change allowed in the characteristic landscape.

Visual Resource Management (VRM): The inventory and planning actions taken to identify visual values and to establish objectives for managing those values; and the management actions taken to achieve the visual management objectives.

Visual Values: See Scenic Quality.

W

Wetlands: Permanently wet or intermittently water-covered areas, such as swamps, marshes, bogs, potholes, swales, and glades.

Wilderness Area: An area formally designated by Congress as part of the National Wilderness Preservation System as defined in the Wilderness Act of 1964 (78 Stat. 891), Section 2(c).

Wilderness Study Area: A roadless area or island that has been inventoried and found to have wilderness characteristics as described in Section 603 of FLPMA and Section 2(c) of the Wilderness Act of 1964 (78 Stat. 891). The source for both of these is BLM's IMP and Guidelines for Lands Under Wilderness Review (December 1979).

APPENDIX C

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APPENDIX C - REFERENCES

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APPENDIX D

APPLICABLE STATUTES, REGULATIONS, PLANS, AND STANDARDS

APPENDIX D - APPLICABLE STATUTES, REGULATIONS, PLANS, AND STANDARDS

D.1 INTRODUCTION

This appendix describes the Federal, state, and local statutes, regulations, plans, and standards that are applicable to each of the resources evaluated in Chapters 3 and 4 of the Desert Quartzite Solar Project (DQSP) California Desert Conservation Area (CDCA) Plan/Environmental Impact Statement/Environmental Impact Report (Draft PA/EIS/EIR).

D.2 AIR RESOURCES

Air quality in the Project area's air basin is regulated by Federal, state, and local regulatory agencies with the responsibility for maintaining ambient air quality within Federal and state standards. The Environmental Protection Agency (EPA) is the Federal agency responsible for establishing air quality regulations on a Federal level. The Federal Clean Air Act (CAA) and its subsequent amendments establish air quality regulations and the National Ambient Air Quality Standards (NAAQS), and delegate the enforcement of these standards to the states. In California, the California Air Resources Board (CARB) is responsible for enforcing air pollution regulations. The CARB has in turn delegated the responsibility of regulating stationary emission sources to regional air agencies. In the Project area's air basin, which is located in eastern Riverside County, the Mojave Desert Air Quality Management District (MDAQMD) has this responsibility.

The following sections summarize the air quality rules and regulations that apply to the Project.

D.2.1 Federal

The Federal CAA applies to all air emission sources and to all areas within the United States. Regulations adopted under the CAA that would apply to the Project would include the NAAQS as well as other requirements that have been adopted as part of the MDAQMD's Federally approved plans and programs.

Federal Emission Standards. The EPA has also adopted on-road and off-road engine emission reduction requirements, including Federal Exhaust and Evaporative Emission Standards for Light-Duty Vehicles and Light-Duty Trucks, Federal Emission Standards for Heavy-Duty and Non-road Engines, and other emission control programs that affect the Project's potential impacts to air quality through the phase-in of clean fuel and engine requirements.

General Conformity Rule. The General Conformity Rule (40 Code of Federal Regulations [CFR] Part 93) requires that Federal agencies demonstrate that Federal actions conform with the applicable State Implementation Plan (SIP) in order to ensure that Federal activities do not hamper local efforts to control air pollution. The EPA general conformity rule applies to Federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The *de minimis* emission thresholds are based on the attainment status of each air basin. Since the Project is located in an air basin that is designated attainment for all Federal criteria pollutants, it is not subject to the General Conformity emissions thresholds.

D.2.2 State

California Clean Air Act

The CCAA was signed into law in 1988 and, for the first time, clearly spelled out in statute California's air quality goals, planning mechanisms, regulatory strategies, and standards of progress. The CCAA provides the state with a comprehensive framework for air quality planning regulation. Prior to passage of the CCAA, Federal law contained the only comprehensive planning framework. As part of its authority within the state of California, and as allowed under the Federal CAA, CARB has established the California Ambient Air Quality Standards (CAAQS). The CAAQS are at least as stringent as the NAAQS. Both the NAAQS and CAAQS are shown in Table 3.2-3.

The CARB has oversight over air quality in the state of California. The CARB is responsible for the development of the SIP, which provides a framework for attaining and maintaining the NAAQS within the state of California. In turn, development of individual inputs to the SIP is the responsibility of local air pollution control agencies. Regulation of individual stationary sources has been delegated to local air pollution control agencies.

The CARB is responsible for developing programs designed to reduce emissions from non-stationary sources, including motor vehicles and off-road equipment, including heavy equipment for construction. Section 2449 specifies diesel fuel standards and diesel-powered vehicle idling times.

The CARB and the California Office of Environmental Health Hazard Assessment (OEHHA) are also responsible for developing regulations governing TACs. TACs include air pollutants that can cause serious illnesses or increased mortality, even in low concentrations. The CARB and OEHHA identify specific air pollutants as toxic air contaminants (TACs), develop health thresholds for exposure to TACs, and develop guidelines for conducting health risk assessments for sources of TAC emissions.

D.2.3 Local

Mojave Desert Air Quality Management District (MDAQMD)

As discussed above, the Project would be located in the jurisdiction of the MDAQMD. The MDAQMD is responsible for regulating stationary sources of air emissions in the Project area's air basin. Stationary sources that have the potential to emit air pollutants into the ambient air are subject to the Rules and Regulations adopted by the MDAQMD. The following MDAQMD rules are applicable to the Project (MDAQMD 2015).

Rule 401 – Visible Emissions. Rule 401 states that a person shall not discharge into the atmosphere, from any single source of emissions whatsoever, any air contaminant for a period or periods aggregating more than three minutes in any one hour which is:

- As dark or darker in shade as that designated as No. 1 on the Ringelmann Chart, as published by the U.S. Bureau of Mines, or
- Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in Subsection A [of the Rules].

Rule 402 - Nuisance. Rule 402 prohibits a person from discharging from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

Rule 403 – Fugitive Dust. Rule 403 requires control of fugitive dust emissions during activities such as construction that have the potential to generate dust. The provisions of Rule 403 include the following:

1) A person shall not cause or allow the emissions of fugitive dust from any transport, handling, construction or storage activity so that the presence of such dust remains visible in the atmosphere beyond the property line of the emission source. (Does not apply to emissions emanating from unpaved roadways open to public travel or farm roads. This exclusion shall not apply to industrial or commercial facilities).
2) A person shall take every reasonable precaution to minimize fugitive dust emissions from wrecking, excavation, grading, clearing of land and solid waste disposal operations.
3) A person shall not cause or allow particulate matter to exceed 100 micrograms per cubic meter ($\mu g/m^3$) when determined as the difference between upwind and downwind samples collected on high volume samplers at the property line for a minimum of five hours.
4) A person shall take every reasonable precaution to prevent visible particulate matter from being deposited upon public roadways as a direct result of their operations. Reasonable precautions shall include, but are not limited to, the removal of particulate matter from equipment prior to movement on paved streets or the prompt removal of any material from paved streets onto which such material has been deposited.
5) Subsections (a) and (c) shall not be applicable when the wind speed instantaneously exceeds 40 kilometers (25 miles) per hour, or when the average wind speed is greater than 24 kilometers (15 miles) per hour. The average wind speed determination shall be on a 15 minute average at the nearest official air-monitoring station or by wind instrument located at the site being checked.
6) The provisions of this rule shall not apply to agricultural operations.

Rule 403.2 – Fugitive Dust. Rule 403.2 applies to construction sites, including those on BLM land, and requires the owner or operator of any Construction/Demolition source to:

1) Use periodic watering for short-term stabilization of Disturbed Surface Area to minimize visible fugitive dust emissions. For purposes of this Rule, use of a water truck to maintain moist disturbed surfaces and actively spread water during visible dusting episodes shall be considered sufficient to maintain compliance;
2) Take actions sufficient to prevent project-related Trackout onto paved surfaces;
3) Cover loaded haul vehicles while operating on Publicly Maintained paved surfaces;
4) Stabilize graded site surfaces upon completion of grading when subsequent development is delayed or expected to be delayed more than thirty days, except when such a delay is due to precipitation that dampens the disturbed surface sufficiently to eliminate Visible Fugitive Dust emissions;

5) Cleanup project-related Trackout or spills on Publicly Maintained paved surfaces within twenty-four hours; and
6) Reduce non-essential Earth-Moving Activity under High Wind conditions. For purposes of this Rule, a reduction in Earth-Moving Activity when visible dusting occurs from moist and dry surfaces due to wind erosion shall be considered sufficient to maintain compliance.

Rule 403.2 also requires that the owner/operator of a Construction/Demolition source disturbing 100 or more acres shall, in addition to the provisions of subsection (2):

7) Prepare and submit to the MDAQMD, prior to commencing Earth-Moving Activity, a dust control plan that describes all applicable dust control measures that will be implemented at the project;
8) Provide stabilized access route(s) to the project site as soon as is feasible. For purposes of this Rule, as soon as is feasible shall mean prior to the completion of Construction/Demolition activity;
9) Maintain natural topography to the extent possible;
10) Construct parking lots and paved roads first, where feasible; and
11) Construct upwind portions of project first, where feasible.

Rule 404 – Particulate Matter Concentration. Rule 404 restricts emissions of particulate matter from any source based on the concentrations specified in Table 404(a) of this rule.

Rule 405 – Solid Particulate Matter Weight. Rule 405 restricts emissions of particulate matter from any source based on the concentrations specified in Table 405(a) of this rule.

Rule 406 – Specific Contaminants. Rule 406 restricts emissions of sulfur compounds to 500 ppm or less, and restricts emissions of halogens, which are not generally emitted from construction projects.

Rule 407 – Liquid and Gaseous Air Contaminants. Rule 407 restricts emissions of carbon monoxide to 2,000 ppm or less, on a dry-weight basis, over any period of 15 consecutive minutes.

Rule 408 – Circumvention. Rule 408 restricts the building, erection, installation or use of any equipment, the use of which, without resulting in a reduction in the total release of air contaminants to the atmosphere, reduces or conceals an emission which would otherwise constitute a violation of Chapter 3 (commencing with Section 41700) of Part 4, of Division 26 of the Health and Safety Code or of the MDAQMD Rules.

Rule 409 – Combustion Contaminants. Rule 409 restricts discharge into the atmosphere from the burning of fuel, combustion contaminants exceeding 0.23 gram per cubic meter (0.1 grain per cubic foot) of gas calculated to 12 percent of carbon dioxide (CO_2) at standard conditions averaged over a minimum of 25 consecutive minutes.

Rule 431 – Sulfur Content of Fuels. Rule 431 restricts the use of any gaseous fuel containing sulfur compounds in excess of 800 ppm calculated as hydrogen sulfide at standard conditions, or any liquid or solid fuel having a sulfur content in excess of 0.5 percent by weight.

Rule 442 – Usage of Solvents. Rule 442 restricts the emission of volatile organic compounds (VOCs) from any solvent material to 1,190 pounds per month, and requires proper storage and handling of VOC-containing solvents.

Riverside County General Plan

The Riverside County General Plan Air Quality Element (AQ) includes policies that limit emissions within the County boundaries. The goal is to support efforts to decrease region-wide pollution emissions, as surrounding jurisdictions significantly impact Riverside County's air quality. Policies were designed to establish a regional basis for improving air quality. The Riverside County General Plan's Air Quality Element (AQ) discusses the following applicable policies regarding air quality within Riverside County (Riverside County 2015a). Relevant countywide policies that address air quality within the County boundaries are also located in the Land Use Element (LU) of the County General Plan are also described below (Riverside County 2015a).

Air Quality Element

Policy AQ 2.1. The County land use planning efforts shall assure that sensitive receptors are separated and protected from polluting point sources to the greatest extent possible.

Policy AQ 2.2. Require site plan designs to protect people and land uses sensitive to air pollution through the use of barriers and/or distance from emissions sources when possible.

Policy AQ 4.7. To the greatest extent possible, require every project to mitigate any of its anticipated emissions which exceed allowable emissions as established by the SCAQMD, MDAQMD, SOCAB [South Coast Air Basin], the Environmental Protection Agency and the California Air Resources Board.

Policy AQ 4.10. Coordinate with the SCAQMD and MDAQMD to create a communications plan to alert those conducting grading operations in the County of first, second, and third stage smog alerts, and when wind speeds exceed 25 miles per hour. During these instances all grading operations should be suspended.

Land Use Element

Policy LU 7.4. Retain and enhance the integrity of existing residential, employment, agricultural, and open space areas by protecting them from encroachment of land uses that would result in impacts from noise, noxious fumes, glare, shadowing, and traffic.

Policy LU 11.2. Ensure adequate separation between pollution producing activities and sensitive emission receptors, such as hospitals, residences, child care centers and schools.

D.3 BIOLOGICAL RESOURCES – VEGETATION

This section provides a discussion of Federal, state, and local environmental statutes, regulations, plans, and standards applicable to the Project for vegetation resources and Federal and state jurisdictional areas.

D.3.1 Federal

National Environmental Policy Act

NEPA (42 USC §4321 et seq.) declares a continuing Federal policy that directs “a systematic, interdisciplinary approach” to planning and decision-making and requires environmental statements for “major Federal actions significantly affecting the quality of the human environment.” Implementing regulations by the CEQ (40 CFR Parts 1500-1508) requires Federal agencies to identify and assess reasonable alternatives to proposed actions that will restore and enhance the quality of the human environment and avoid or minimize adverse environmental impacts. Federal agencies are further directed to emphasize significant environmental issues in project planning and to integrate impact studies required by other environmental laws and Executive Orders into the NEPA process. The NEPA process should therefore be seen as an overall framework for the environmental evaluation of Federal actions. The BLM is the Lead Agency under NEPA for the Project.

Executive Order 13112 – Invasive Species

Executive Order 13112 was signed in February 1999 and established the National Invasive Species Council. This Order requires agencies to identify actions that may affect the status of invasive species. It also directs Federal agencies not to authorize, fund, or carry out actions that they believe are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that the agency has prescribed, it has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions.

Plant Protection Act of 2000

The Plant Protection Act of 2000 (7 USC Ch. 104) established a Federal program to control the spread of noxious weeds. The Secretary of Agriculture is authorized to publish a list of plants designated as noxious weeds (7 USC §7712(f)). The movement of all such weeds in interstate or foreign commerce is prohibited except under permit.

Lacey Act, as amended

The Lacey Act (16 USC §§3371-3378) protects plants and wildlife by creating civil and criminal penalties for a wide variety of violations including illegal take, possession, transport or sale of protected species.

Federal Endangered Species Act

The FESA (16 USC §1531 et seq.) designates threatened and endangered species, both animal and plant species, and provides measures for their protection and recovery. “Take” of listed wildlife, and of listed plant species located on Federal land, is prohibited without obtaining a Federal permit. Take is defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct.” Harm includes any act that actually kills or injures fish or wildlife, including significant habitat modification or degradation that significantly impairs essential behavioral patterns of fish or wildlife. Activities that damage the habitat of (i.e., harm) listed wildlife species require approval from the USFWS for terrestrial species. The FESA also generally requires determination of critical habitat for listed species. If critical habitat has been designated, impacts to areas that contain the primary constituent elements identified for the species, whether or not it is currently present, is also prohibited. FESA §7 and §10 provide two pathways for obtaining authority to take listed species.

For projects proposed on Federal lands, Federal agencies, such as the BLM are required by the FESA to ensure that any action they authorize, implement, or fund, including energy developments, will not jeopardize the continued existence of any Federally threatened or endangered species or destroy or adversely modify designated critical habitat. In a §7 consultation, the lead agency (e.g., BLM) prepares a BA that analyzes whether the project is likely to adversely affect listed wildlife or plant species or their critical habitat, and proposes suitable avoidance, minimization, or compensatory mitigation measures. If the action may adversely affect the species, the USFWS then has 135 days to respond to the BA by issuing its BO determining whether the project is likely to jeopardize the species or result in adverse modification of critical habitat.

If a “nonjeopardy” or “no adverse modification” opinion is provided by the USFWS, the action agency may proceed with the action as proposed. If a jeopardy or adverse modification opinion is provided, the USFWS may prepare a BO with reasonable and prudent measures to minimize take and associated, mandatory terms and conditions that describe the methods for accomplishing the reasonable and prudent measures. In a BO that results in a jeopardy or adverse modification conclusion, the USFWS may develop mandatory reasonable and prudent alternatives to the proposed action.

BLM Sensitive Species

BLM Sensitive Species are species designated by the State Director that are not already Federally listed, proposed, or candidate species, or state listed because of potential endangerment. BLM’s policy is to “ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as threatened or endangered.” Various offices of the BLM maintain a list of special-status plant and wildlife species that are to be considered as part of the management activities carried out by the BLM on the lands that they administer.

California Desert Conservation Area Plan, 1980 as Amended

The CDCA Plan guides the management of all BLM-administered lands in the Mojave, Sonoran, and a small portion of the Great Basin Deserts. In total, the CDCA Plan includes an area of approximately 25 million acres, 12 million of which are public lands. The primary goal of the CDCA Plan is to provide guidance for the overall maintenance of the land while simultaneously planning for multiple uses and balancing the human needs with the need to protect the natural environment.

The CDCA Plan includes 12 elements: Cultural Resources; Native American; Wildlife; Vegetation; Wilderness; Wild Horse and Burro; Livestock Grazing; Recreation; Motorized Vehicle Access; Geology, Energy and Mineral Resources; Energy Production and Utility Corridors; and Land-Tenure Adjustment. Each of the elements contains goals and specific actions for the management, use, development, and protection of the resources and public lands within the CDCA, and is based on the concepts of multiple use, sustained yield, and maintenance of environmental quality. In addition, each element provides both a desert-wide perspective of the planning decisions for one major resource or issue of public concern as well as more specific interpretation of multiple-use class guidelines for a given resource and its associated activities.

Northern and Eastern Colorado Desert Coordinated Management Plan

The Northern and Eastern Colorado (NECO) Desert Coordinated Management Plan (BLM 2002), an amendment to the CDCA Plan, is a landscape-scale, multi-agency planning effort that protects and conserves the natural resources of the California portion of the Sonoran Desert while also managing its use for humans. This plan was prepared under the same regulations that implement the FLPMA of 1976. The NECO planning area of the CDCA spans 5.5 million acres in the southeastern California Desert, and covers the Project area. The NECO Plan Amendment to the CDCA Plan, which was adopted in December 2002, provides management direction for a variety of sensitive species and habitats on BLM and National Park Service land, as well as the U.S. Marine Corps Chocolate Mountain Aerial Gunnery Range.

The NECO Plan Amendment to the CDCA Plan primarily addresses recovery of the desert tortoise (*Gopherus agassizii*), conservation of a variety of other species, and modification of management of wild burro herds in the planning area, and updates policies regarding OHV use and public lands access and use. As part of its focus on desert tortoise recovery and sensitive species protection, the NECO Plan Amendment to the CDCA Plan has established several Desert Wildlife Management Areas, which cover much of the designated critical habitat for the desert tortoise. Specifically, these Wildlife Management Areas consist of a system of integrated ecosystem management for special-status species and natural communities on Federal lands, and regional standards and guidelines for public land health on BLM lands. The NECO Plan Amendment to the CDCA Plan also establishes several Wildlife Habitat Management Areas, which include habitat for desert bighorn sheep and other sensitive species in the planning area (BLM 2002).

California Desert Renewable Energy Conservation Plan

BLM issued the DRECP in October, 2016. The DRECP amends the CDCA Plan, specifically with respect to natural resource conservation and renewable energy development. The DRECP establishes Ecological and Cultural Conservation and Recreation Designations, and Renewable Energy Activities, Policies, and Allocations.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 USC §§661-666) applies to any Federal project where the waters of any stream or other body of water are impounded, diverted, deepened, or otherwise modified. Project proponents are required to consult with the USFWS and the appropriate state wildlife agency. These agencies prepare reports and recommendations that document project effects on wildlife and identify measures that may be adopted to prevent loss or damage to wildlife resources. The term “wildlife” includes both animals and plants. Provisions of the Act are implemented through the NEPA process and §404 permit process.

Clean Water Act (33 U.S.C. § 1251 et seq.)

The Clean Water Act (CWA) is the principal Federal statute protecting navigable waters and adjoining shorelines from pollution. The Clean Water Act is administered by the EPA and the United States Army Corps of Engineers (USACE). The USACE is responsible for regulating the discharge of fill material into waters of the United States. Waters of the United States include lakes, rivers, streams and their tributaries, as well as wetlands. Since its enactment, the CWA prohibits the discharge of pollutants into waters of the United States without a permit. Section 404 of the CWA provides that whenever any person discharges dredged or clean fill material into Waters of the United States including, without limitation, wetlands, streams, and bays (e.g., while undertaking road construction, bridge construction, or streambed alteration), a permit is required from the USACE. Through field reconnaissance surveys and analyses of National Wetlands Inventory (NWI) and watershed data, it is unlikely that there are any jurisdictional waters of the United States.

D.3.2 State

California Endangered Species Act

The CESA includes provisions for the protection and management of species listed by the state as endangered or threatened, or designated as candidates for such listings. CESA includes a requirement for consultation "to ensure that any action authorized by a state lead agency is not likely to jeopardize the continued existence of any endangered or threatened species… or result in the destruction or adverse modification of habitat essential to the continued existence of the species" (§ 2090). Plants of California declared to be endangered, threatened, or rare are listed at 14 California Code of Regulations (CCR) § 670.2. Animals of California declared to be endangered, threatened, or rare are listed at 14 CCR § 670.5. The administering agency for the above authority is the CDFW.

California Fish and Game Code Section 3503, 3511, 4700, 5050, and 5515

These California Fish and Game Code (FGC) sections list bird (primarily raptor), mammal, amphibian, and reptile species that are classified as fully protected in California. Fully protected species are prohibited from being taken or possessed except under specific permit requirements. These Codes also prohibit the take, possession, or needless destruction of the nests or eggs of any bird, including birds of prey or their nests or eggs, except as otherwise provided by the code or any regulation made pursuant thereto.

California Native Plant Protection Act

The California Native Plant Protection Act prohibits importation of rare and endangered plants into California, "take" of rare and endangered plants, and sale of rare and endangered plants. CESA defers to the California Native Plant Protection Act, which ensures that state-listed plant species are protected when state agencies are involved in projects subject to CEQA. In this case, plants listed as rare under the California Native Plant Protection Act are not protected under CESA but rather under CEQA.

California Desert Native Plants Act

The California Desert Native Plants Act protects certain species of California desert native plants from unlawful harvesting on both public and privately owned lands. The law applies in the counties of Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego. Within these counties, the CDNPA prohibits the cutting, removal, sale, or possession of specific native desert plants unless a person has a valid permit or wood receipt, and the required tags and seals. The appropriate permits, tags and seals must be obtained from the sheriff or commissioner of the county where collecting will occur, and the county will charge a fee.

The following plant species inventoried in the Project area fall under the jurisdiction of this law: desert lily (*Hesperocallis undulata*), silver cholla (*Cylindropuntia echinocarpa*), California barrel cactus (*Ferocactus cylindraceus*); common fishhook cactus (*Mammillaria tetrancistra*), microphyll woodland trees; ironwood (*Olneya tesota*), blue palo verde (*Parkinsonia florida*), honey mesquite (*Prosopis glandulosa*).

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act provides state coordination with the CWA, which is described above. It provides a mechanism by which the Regional Water Quality Control Boards certify that Federal actions that result in a discharge to waters, including Federally issued CWA permits to ensure the compatibility of Federal and state water quality guidelines, are in compliance with Section 401 of the CWA, which requires such Federal actions to comply with state water quality standards. The act provides for the development and periodic review of water quality control plans (basin plans) that designate beneficial uses of California’s major rivers and groundwater basins and establish narrative and numerical water quality objectives for those waters. Basin plans are primarily implemented by using the National Pollution Discharge Elimination System permitting system to regulate waste discharges to ensure that water quality objectives are met. Waste discharges may include fill, any material resulting from human activity, or any other “discharge” that may directly or indirectly impact Waters of the State relative to the implementation of Section 401 of the CWA. Waters regulated under Porter-Cologne include isolated waters that are no longer regulated by USACE. Developments which impact jurisdictional waters must demonstrate compliance with the goals of the Act by developing SWPPPs, Standard Urban Storm Water Mitigation Plans, and other measures in order to obtain a CWA §401 certification.

California Fish and Game Code Sections 1600-1616 – Streambed Alteration Agreement

This Code requires that any person, state or local government agency, or public utility notify the CDFW and obtain a streambed alteration agreement before they begin any construction project that will divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake, use materials from a streambed, or result in the disposal or disposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake. In general, CDFW jurisdiction extends to the top of the stream or bank, or to the outer edge of riparian vegetation, whichever is wider.

D.3.3 Local

Riverside County General Plan

The Riverside County General Plan (Riverside County 2015a) includes policies that address biological resources within the County boundaries. Countywide policies that seek to preserve biological resources are located in the Land Use Element and Open Space Element of the County General Plan, and include:

Land Use Element (LU)

Policy LU 9.2. Require that development protect environmental resources by compliance with the Multipurpose Open Space Element of the General Plan and Federal and state regulations such as CEQA, NEPA, the Clean Air Act, and the Clean Water Act.

D.4 BIOLOGICAL RESOURCES – WILDLIFE

The Project must comply with various Federal, state, and local laws. While some laws and policies provide constraints, others provide intent and direction for certain actions to occur. The following is a general overview of such guidance, which gives intent or direction for the proposed Project relevant to wildlife resources.

D.4.1 Federal

National Environmental Policy Act

NEPA (42 USC 4321 et seq.) declares a continuing Federal policy that directs "a systematic, interdisciplinary approach" to planning and decision-making and requires environmental statements for "major Federal actions significantly affecting the quality of the human environment." Implementing regulations by the CEQ (40 CFR Parts 1500-1508) requires Federal agencies to identify and assess reasonable alternatives to proposed actions that will restore and enhance the quality of the human environmental and avoid or minimize adverse environmental impacts. Federal agencies are further directed to emphasize significant environmental issues in project planning and to integrate impact studies required by other environmental laws and Executive Orders into the NEPA process. The NEPA process should therefore be seen as an overall framework for the environmental evaluation of Federal actions. The BLM is the Lead Agency under NEPA for the Project.

Federal Endangered Species Act

The ESA includes provisions for protection and management of species that are Federally listed as threatened or endangered or proposed for such listing and of designated critical habitat for these species. The administering agency for the above authority for non-marine species is the USFWS.

BLM Sensitive Species

BLM Sensitive Species are species designated by the State Director that are not already Federally listed, proposed, or candidate species, or state-listed because of potential endangerment. BLM's policy is to "ensure that actions authorized, funded, or carried out do not contribute to the need to list any of these species as threatened or endangered." Various offices of the BLM maintain a list of special-status plant and wildlife species that are to be considered as part of the management activities carried out by the BLM on the lands that they administer.

California Desert Conservation Area Plan, 1980 as Amended

The CDCA Plan guides the management of all BLM-administered lands in the Mojave, Sonoran, and a small portion of the Great Basin Deserts. In total, the CDCA Plan includes an area of approximately 25 million acres, 12 million of which are public lands. The primary goal of the CDCA Plan is to provide guidance for the overall maintenance of the land while simultaneously planning for multiple uses and balancing the human needs with the need to protect the natural environment.

The CDCA Plan includes 12 elements: Cultural Resources; Native American; Wildlife; Vegetation; Wilderness; Wild Horse and Burro; Livestock Grazing; Recreation; Motorized Vehicle Access; Geology, Energy and Mineral Resources; Energy Production and Utility Corridors; and Land-Tenure Adjustment. Each of the elements contains goals and specific actions for the management, use, development, and protection of the resources and public lands within the CDCA, and is based on the concepts of multiple use, sustained yield, and maintenance of environmental quality. In addition, each element provides both a desert-wide perspective of the planning decisions for one major resource or issue of public concern as well as more specific interpretation of multiple-use class guidelines for a given resource and its associated activities.

Northern and Eastern Colorado Desert Coordinated Management Plan

The NECO Plan Amendment to the CDCA Plan (BLM 2002) is a landscape-scale, multi-agency planning effort that protects and conserves the natural resources of the California portion of the Sonoran Desert while also managing its use for humans. This plan was prepared under the same regulations that implement the FLPMA of 1976. The NECO planning area of the CDCA spans 5.5 million acres in the southeastern California Desert, and covers the Project area. The NECO Plan Amendment to the CDCA Plan, which was adopted in December 2002, provides management direction for a variety of sensitive species and habitats on BLM and National Park Service land, as well as the U.S. Marine Corps Chocolate Mountain Aerial Gunnery Range.

The NECO Plan Amendment to the CDCA Plan primarily addresses recovery of the Mojave desert tortoise (*Gopherus agassizii*), conservation of a variety of other species, and modification of management of wild burro herds in the planning area, and updates policies regarding OHV use and public lands access and use. As part of its focus on Mojave desert tortoise recovery and sensitive species protection, the NECO Plan Amendment to the CDCA Plan has established several Desert Wildlife Management Areas, which cover much of the designated critical habitat for the Mojave desert tortoise. Specifically, these Wildlife Management Areas consist of a system of integrated ecosystem management for special-status species and natural communities on Federal lands, and regional standards and guidelines for public land health on BLM lands. The NECO Plan Amendment to the CDCA Plan also establishes several Wildlife Habitat Management Areas, which include habitat for desert bighorn sheep and other sensitive species in the planning area (BLM 2002; Figure 3.4-10).

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) includes provisions for protection of migratory birds, including basic prohibitions against any taking not authorized by Federal regulation. The administering agency for the above authority is the USFWS. The law contains no requirement to prove intent to violate any of its provisions. Wording in the MBTA makes it clear that most actions that result in "taking" or possession (permanent or temporary) of a protected species can be a violation of the act. The word "take" is defined as "pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect (including nests, eggs, and feathers)."

Lacey Act

The Lacey Act, as amended (16 USC 3371-3378) protects plants and wildlife by creating civil and criminal penalties for a wide variety of violations including illegal take, possession, transport, or sale of protected species.

The Bald and Golden Eagle Protection Act

Bald eagle protection began in 1940 with the passage of the Eagle Protection Act, which was later amended to include golden eagle and was renamed. The Bald and Golden Eagle Protection Act makes it unlawful to import, export, take, sell, purchase, or barter any bald eagle or golden eagle, their parts, products, nests, or eggs. Take includes pursuing, shooting, poisoning, wounding, killing, capturing, trapping, collecting, molesting, or disturbing. Exceptions may be granted by USFWS for scientific or exhibition use, or for traditional and cultural use by Native Americans. However, no permits may be issued for import, export, or commercial activities involving eagles.

Wild Horse and Burro Act of 1971, as amended

Herd Areas are those geographic areas where wild horses and/or burros were found at the time of the passage of the Wild Horse and Burro Act in 1971. Herd Management Areas are those areas within Herd Areas where the decision has been made, through Land Use Plans, to manage for populations of wild horses and/or burros. Herd Areas boundaries may only be changed when it is determined that areas once listed as Herd Areas are later found to be used only by privately owned horses or burros, or the Herd Area boundary does not correctly portray where wild horses and burros were found in 1971.

California Desert Renewable Energy Conservation Plan

BLM issued the DRECP in October, 2016. The DRECP amends the CDCA Plan, specifically with respect to natural resource conservation and renewable energy development. The DRECP establishes Ecological and Cultural Conservation and Recreation Designations, and Renewable Energy Activities, Policies, and Allocations.

D.4.2 State

California Endangered Species Act

The CESA includes provisions for the protection and management of species listed by the state as endangered or threatened, or designated as candidates for such listings. CESA includes a requirement for consultation "to ensure that any action authorized by a state lead agency is not likely to jeopardize the continued existence of any endangered or threatened species… or result in the destruction or adverse modification of habitat essential to the continued existence of the species" (§ 2090). Plants of California declared to be endangered, threatened, or rare are listed at 14 California Code of Regulations (CCR) § 670.2. Animals of California declared to be endangered, threatened, or rare are listed at 14 CCR § 670.5. The administering agency for the above authority is the CDFW.

Other Provisions of the California Fish and Game Code

These California Fish and Game Codes (CFGC) list bird (primarily raptor), mammal, amphibian, and reptile species that are classified as fully protected in California. Fully protected species are prohibited from being taken or possessed except under specific permit requirements. These Codes also prohibit the take, possession, or needless destruction of the nests or eggs of any bird, including birds of prey or their nests or eggs, except as otherwise provided by the code or any regulation made pursuant thereto.

D.4.3 Local

Riverside County General Plan

The Riverside County General Plan (Riverside County 2015a) includes policies that address biological resources within the County boundaries. Countywide policies that seek to preserve biological resources are located in the Land Use Element and Open Space Element of the County General Plan, and include:

Land Use Element (LU)

Policy LU 9.2. Require that development protect environmental resources by compliance with the Multipurpose Open Space Element of the General Plan and Federal and state regulations such as CEQA, NEPA, the Clean Air Act, and the Clean Water Act.

D.5 CULTURAL RESOURCES

D.5.1 Federal

There are numerous Federal regulations, executive orders, and policies that direct management of cultural resources on Federal lands and by Federal agencies. These include NEPA, the NHPA, the Archaeological Resources Protection Act (ARPA), the NAGPRA, the American Indian Religious Freedom Act (AIRFA), Executive Order 13007, and the Antiquities Act. The following is a discussion of the most pertinent laws affecting the proposed Project.

National Environmental Policy Act

NEPA (42 U.S.C. §§ 4321-4346) establishes national policy for the protection and enhancement of the environment. Part of the function of the Federal government in protecting the environment is to “preserve important historic, cultural, and natural aspects of our national heritage.” The act is implemented by the Council on Environmental Quality (CEQ) regulations at 40 CFR Parts 1500-1508. Refer to Sections 1.3 and 1.4 for more information regarding NEPA as it relates to this Project.

National Historic Preservation Act

The National Historic Preservation Act (NHPA), as amended (54 U.S.C. § 100101 et seq.), is the principal Federal law in the United States protecting cultural resources. Section 106 of the NHPA directs all Federal agencies to take into account the effects of their undertakings (i.e., actions, financial support, and authorizations) on properties included in or eligible for inclusion in the NRHP and to allow the ACHP an opportunity to comment. ACHP regulations at 36 CFR Part 800 implement Section 106 of the NHPA. These regulations establish the NRHP as a planning tool to help Federal agencies evaluate cultural resources in consultation with the SHPO, Native American tribes, and other interested parties. The criteria for determining whether cultural resources are eligible for listing in the NRHP are provided in 36 CFR Part 60.4. These criteria are:

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:

A) Are associated with events that have made a significant contribution to the broad patterns of our history;

B) Are associated with the lives of persons significant in our past;

C) Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; possess high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction; or

D) Have yielded, or may be likely to yield, information important in prehistory or history.

A cultural resource that is eligible for the NRHP is called a historic property regardless of the time period to which it dates. To be listed in, or determined eligible for, the NRHP a cultural resource must meet one or more of the above criteria and possess integrity. Integrity is defined as the authenticity of a resource’s historic identity as evidenced by the survival of physical characteristics that existed during the prehistoric or historic period of use. The NRHP recognizes seven aspects, which in various combinations define integrity: location, design, setting, materials, workmanship, feeling, and association. Integrity of location means that the resource has not been moved from its historic location. Integrity of design, materials, and workmanship mean that the resource’s original building materials, plan, shape, and design elements remain intact. Integrity of setting means that the surrounding landscape has changed very little since the period of importance for the resource. Integrity of feeling and association means the resource retains a link to an earlier time and place and is able to evoke that era. Historic properties must generally be at least 50 years old; however, a younger resource may be considered eligible if it is of exceptional importance.

An undertaking results in adverse effects, or impacts, to a historic property (i.e., a cultural resource eligible to or listed in the NRHP) when it alters the resource's characteristics, including relevant features of its environment or use that qualify it for inclusion in the NRHP. Potential effects could include (36 CFR Part 800.5(a) (2)):

- Physical destruction, damage, or alteration of all or part of the property;
- Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR Part 68);
- Removal of the property from its historic location;
- Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
- Introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- Neglect of a property resulting in its deterioration or destruction; and
- Transfer, lease, or sale of the property.

Compliance with NHPA Section 106 is required whenever a project has a Federal nexus, meaning that the project is on Federal land, uses Federal funds, or is permitted by a Federal agency. The BLM is reviewing an application for and will make a decision on issuing a new ROW grant for the proposed solar facility and gen-tie line. This activity constitutes an undertaking as defined in 36 CFR Part 800.16(y) and requires compliance with Section 106.

Antiquities Act

The Antiquities Act of 1906 (16 U.S.C. § 431-433) was the first law to protect and preserve cultural resources on Federal lands. It makes it illegal to remove cultural resources from Federal lands without a permit and establishes penalties for illegal excavation and looting. The Archaeological Resources Protection Act (see below) reinforces and replaces portions of the Antiquities Act as the authority for special use permits regarding archaeological investigations.

Federal Land Policy and Management Act, 1976 as Amended

The FLPMA (43 U.S.C. § 1701) requires the BLM to manage its lands on the basis of multiple use in a manner that will "protect the quality of…historical…resources and archaeological values." FLPMA is a comprehensive law that provides for the periodic inventory of public lands and resources, for long-range, comprehensive land use planning, for permits to regulate the use of public lands, and for the enforcement of public land laws and regulations. FLPMA compels agencies to manage all cultural resources on public lands through the land management planning process.

Archaeological Resources Protection Act

The Archaeological Resources Protection Act (ARPA) of 1979 (16 U.S.C. § 470 aa-mm) establishes civil and criminal penalties for the unauthorized excavation, removal, damage, alteration, or defacement of archaeological resources; prohibits trafficking in resources from public lands; and directs Federal agencies to establish educational programs on the importance of archaeology. The act also establishes permit requirements for removal or excavation of archaeological resources from Federal lands. The law applies to archaeological resources more than 100 years old found on public lands. No distinction is made regarding NRHP eligibility.

American Indian Religious Freedom Act

The American Indian Religious Freedom Act of 1978 requires Federal agencies to consult Native American groups when a proposed land use might conflict with traditional Indian religious beliefs or practices; to avoid interference with these beliefs to the extent possible; and to maintain access to religious or sacred areas whenever feasible.

Executive Order 11593, Protection and Enhancement of the Cultural Environment

Issued in 1971, Executive Order 11593 directs land-holding Federal agencies to identify and nominate historic properties to the NRHP and requires that these agencies avoid damaging historic properties that might be eligible to the NRHP. It also directs agencies to treat resources eligible for listing in the NRHP as if they were already listed.

Executive Order 13007, Indian Sacred Sites

Executive Order 13007, issued in 1996, directs Federal agencies responsible for managing Federal lands to accommodate access to, and ceremonial use of, Indian sacred sites by Indian religious practitioners; avoid adversely affecting the physical integrity of such sacred sites; and maintain the confidentiality of sacred sites.

Executive Order 13175, Consultation and Coordination with Indian Tribal Governments

Executive Order 13175, issued in 2000, directs Federal agencies to establish regular and meaningful consultation and collaboration with Tribal officials in the development of Federal policies that have Tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes.

Executive Order 13287, Preserve America

This Executive Order, issued in 2003, encourages the Federal government to take a leadership role in the protection, enhancement, and contemporary use of historic properties and establishes new accountability for agencies with regard to inventories and stewardship.

Memorandum for the Heads of Executive Departments and Agencies Regarding Government-to-Government Relations with Native American Tribal Governments

The Presidential memorandum, issued in 2009, directs each Federal agency to operate within a government-to-government relationship with Federally recognized Tribal governments; consult with Tribal governments; assess the impact of plans, projects, programs, and activities on Tribal trust resources; and ensure that Tribal rights are taken into account during consideration of such plans, projects, and activities.

Native American Graves Protection and Repatriation Act

The Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) (25 U.S.C. § 3001) provides a process for Federal agencies to return certain Native American cultural items—human remains, funerary objects, sacred objects, or objects of cultural patrimony—to lineal descendants and culturally affiliated Indian tribes. NAGPRA includes provisions for unclaimed and culturally unidentifiable Native American cultural items, intentional excavation and unanticipated discovery of Native American cultural items on Federal lands, and penalties for noncompliance and illegal trafficking. Permits for the excavation or removal of cultural items protected by the act require Tribal consultation, as do discoveries of cultural items made during activities on Federal lands. The Secretary of the Interior's implementing regulations are at 43 CFR Part 10.

D.5.2 State

CEQA

The principal state law relevant to the protection of cultural resources within the 160 acres of privately owned land is CEQA, with particular reference to California PRC 21083.2 to 21084.1, which addresses historical resources, unique archaeological resources, and Native American human remains.

Section 5097.5 of the PRC specifies that any unauthorized disturbance or removal of archaeological and historical resources located on public lands is a misdemeanor. This Section also prohibits the knowing destruction of objects of antiquity without a permit (expressed permission) on public lands, and provides for criminal sanctions. In addition, Section 30244 of the PRC requires reasonable mitigation for adverse impacts on archaeological resources as identified by the SHPO. Further, California Penal Code, Section 622.5, provides misdemeanor penalties for willfully injuring or destroying objects of historic or archaeological interest located on public or private lands, but specifically excludes the landowner.

Historical Resources

Lead agencies are required to identify historical resources that may be affected by any undertaking involving state or county lands, funds, or permitting. Also, the significance of such resources that may be affected by the undertaking must be evaluated using the criteria for listing in the CRHR (PRC §5024.1, Title 14 CCR, Section 4852). Under CEQA, a resource is considered historically significant if the resource satisfies any of the following criteria:

1. A resource listed in, or determined to be eligible by the State Historical Resources Commission for listing in, the CRHR (PRC §5024.1, Title 14 CCR, Section 4850 et seq.).
2. A resource included in a local register of historical resources, as defined in Section 5020.1(k) of the PRC or identified as significant in an historical resource survey meeting the requirements section 5024.1(g) of the PRC, shall be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless

the preponderance of evidence demonstrates that it is not historically or culturally significant.

3. Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the CRHR (PRC §5024.1, Title 14 CCR, Section 4852) including the following:
   - A) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
   - B) Is associated with the lives of persons important in our past;
   - C) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
   - D) Has yielded, or may be likely to yield, information important in prehistory or history.
4. The fact that a resource is not listed in, or determined to be eligible for listing in, the CRHR, not included in a local register of historical resources (pursuant to section 5020.1(k) of the PRC), or identified in an historical resources survey (meeting the criteria in Section 5024.1(g) of the PRC) does not preclude a lead agency from determining that the resource may be an historical resource as defined in PRC Sections 5020.1(j) or 5024.1.

Resources already listed or determined eligible for the NRHP and CHL (No. 770 and above) are by definition eligible for the CRHR. Historical resources included in resource inventories prepared according to California State Office of Historic Preservation (OHP) guidelines or designated under county or city historic landmark ordinances may be eligible.

For a resource to be eligible for the CRHR, it must satisfy each of the following three standards:

1. A property must be significant at the local, state or national level, under one or more of the following criteria:
   - a. It is associated with events or patterns of events that have made a significant contribution to the broad patterns of the history and cultural heritage of California and the United States.
   - b. It is associated with the lives of persons important to the nation or California's past.
   - c. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
   - d. It has yielded, or may be likely to yield, information important to the prehistory or history of the state or the nation:

2. A resource must retain enough of its historic character or appearance to be recognizable as a historic property, and to convey the reasons for its significance; and
3. It must be fifty years old or older (except for rare cases of structures of exceptional significance).

Integrity is defined as the authenticity of a historical resource's physical identity, evidenced by the survival of characteristics that existed during the resource's period of significance. CRHR regulations specify that integrity is a quality that applies to historical resources in seven ways: location, design, setting, materials, workmanship, feeling, and association.

Unique Archaeological Resources

Lead agencies must also determine whether a proposed project will have a significant effect on unique archaeological resources. PRC 21083.2(g) states:

"…a 'unique archaeological resource' means an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and that there is demonstrable public interest in that information.
- Has a special and particular quality such as being the oldest of its type or the best available example of its type.
- Is directly associated with a scientifically recognized important prehistoric or historic event or person."

A non-unique archaeological resource does not meet these criteria and does not need to be given further consideration other than simple recording, unless it happens to qualify as a historical resource.

Native American Human Remains

The state CEQA Guidelines (Section 15064.5 (d)) provide that when an initial study identifies the existence of, or probable likelihood of, Native American human remains within the Project, a lead agency will work with the appropriate Native Americans as identified by the NAHC.

Native American Consultation

Pursuant to Senate Bill (SB) 18 (California Government Code §65352.3), local governments are required to consult with California Native American tribes identified by the NAHC for the purpose of protecting and/or mitigating impacts to cultural places. SB 18 requires formal consultation with Native American tribes as part of a project that enacts or amends a general plan or specific plan. The proposed Project would not require a general plan or specific plan amendment; therefore, SB 18 does not apply to the proposed Project. However, as described above, Native American Coordination has been initiated with Native American groups with historic ties to, and interest in, the proposed Project area.

Assembly Bill (AB) 52 (PRC Section 5097.94, 21073, 21074, 21080.3.2, 21082.3, 21083.09, and 21084.3) requires the lead agency of a project to consult with interested California Native

American tribes that have a traditional or cultural affiliation with the project area for projects with a NOP after July 1, 2015. Tribes must notify the lead agency in writing that they are interested in consulting on projects within a particular geographic area. Lead agencies must then notify the interested California Native American tribes about the proposed Project prior to determining whether a negative declaration, mitigated negative declaration, or environmental impact report will be prepared. AB 52 also provides recognition of tribal cultural resources in the CEQA process. This category of resources includes sites, features, places, landscapes, and objects that are essential to traditional cultural values, heritages, and identities of California Native Americans. Some of the preferred mitigation measures included in AB 52 are preservation in place, a conservation easement, or to incorporate the resource within a park or open space. AB 52 specifies that it is applicable to projects that have a NOP or a notice of negative declaration filed or mitigated negative declaration on or after July 1, 2015. Because the date of the NOP for the DQSP was March 12, 2015, AB 52 is not applicable to the Project.

D.5.3 Local

Riverside County General Plan- Multipurpose Open Space Element

The Multipurpose Open Space Element of the Riverside County General Plan (Riverside County 2015a) outlines policies intended to promote the preservation of cultural resources in the County of Riverside, as follows:

OS 19.3 - Review proposed development for the possibility of cultural resources and for compliance with the cultural resources program.

OS 19.5 - Exercise sensitivity and respect for human remains form both prehistoric and historic time periods and comply with all applicable laws concerning such remains.

D.6 ENVIRONMENTAL JUSTICE

D.6.1 Federal

Title VI of the Civil Rights Act of 1964

Title VI of the Civil Rights Act of 1964 (Public Law 88-352, 78 Stat.241) prohibits discrimination on the basis of race, color, or national origin in all programs or activities receiving Federal financial assistance.

Executive Order 12898

Executive Order 12898, “Federal Actions to address environmental justice in Minority Populations and Low-Income Populations,” focuses Federal attention on the environment and human health conditions of minority communities and calls on agencies to achieve environmental justice as part of this mission (59 FR 7629). The order requires the USEPA and all other Federal agencies (as well as state agencies receiving Federal funds) to develop strategies to address this issue. The agencies are required to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

Council on Environmental Quality

The CEQ has oversight responsibility for the Federal Government's compliance with Executive Order 12898 and NEPA. The CEQ, in consultation with the USEPA and other agencies, has developed guidance to assist Federal agencies with their NEPA procedures so that environmental justice concerns are effectively identified and addressed. According to the CEQ's *Environmental Justice Guidance Under the National Environmental Policy Act* (CEQ 1997), agencies should consider the composition of the affected area to determine whether minority populations or low-income populations are present in the area affected by the proposed action, and if so whether there may be disproportionately high and adverse environmental effects.

Environmental Protection Agency (EPA) Final Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analyses

The EPA's Final Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analyses defines how the EPA will ensure that disproportionately high and adverse human health or environmental effects on minority communities and low-income communities are identified and addressed. It establishes agency-wide goals for engaging American Indian, Alaska Native, Native Hawaiian, and other indigenous peoples. It also establishes agency-wide goals for environmental protection and lists actions the EPA would take to incorporate environmental justice into its mission (EPA 1998).

Environmental Protection Agency Plan Environmental Justice 2014

The EPA's Plan Environmental Justice (EJ) 2014 is a strategy to help the agency integrate environmental justice into its programs, policies, and activities. Plan EJ 2014 identifies Cross-Agency Focus Areas, Tools Development, and Program Initiatives as the three essential elements that will advance environmental justice across the EPA and other agencies of the Federal government.

BLM Land Use Planning Handbook (H-1601-1)

BLM Land Use Planning Handbook, H-1601-1, Appendix D, Section IV (Environmental Justice Requirements) provides guidance for assessing potential impacts on population, housing, and employment as they relate to environmental justice. It also describes variables such as lifestyles, beliefs and attitudes, and social organizations with respect to environmental justice. These variables were not evaluated in this analysis, as they are cannot be readily quantified for the purposes of impact assessment and do not provide any additional analytical value in terms of evaluating potential environmental justice impacts.

D.6.2 State

No state statutes, regulations, plans, or standards related to environmental justice would be applicable to the DQSP.

D.7 GEOLOGY AND SOIL RESOURCES

D.7.1 Federal

International Building Code

The International Building Code (IBC) is published by the International Code Council (ICC) and is the national model building code. The 2018 IBC, published in August, 2017, is the most recent edition of the International Building Code, and applies to all structures currently being constructed in California (ICC 2017). The national model codes are incorporated by reference into the building codes of local municipalities, such as the California Building Code (CBC) and County of Riverside Building Code as discussed below.

D.7.2 State

California Building Code

The CBC is promulgated under the CCR, Title 24, Parts 1 through 12 (also known as the California Building Standards Code), and is administered by the California Building Standards Commission. The Project is subject to the applicable sections of the CBC updated most recently in January, 2017. The Riverside County Building Department is responsible for implementing the CBC for the Project. The Project would comply with applicable seismic design and construction criteria of the most recent CBC and American Society of Civil Engineers (ASCE) Minimum Design Loads for Buildings and Other Structures (ASCE 7-05).

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act (formerly the Alquist-Priolo Special Studies Zone Act) signed into law in December of 1972, requires the delineation of zones along active faults in California. The purpose of the Alquist-Priolo Fault Zoning Act is to regulate development on or near active fault traces to reduce the hazard of potential fault rupture and to prohibit the location of structures for human occupancy across these traces. Cities and counties must regulate certain development projects within the zones, which includes withholding permits until geologic investigations demonstrate that development sites are not threatened by future surface displacement (Hart and Bryant 2007). The Project is not subject to this act because it is not within an earthquake fault zone. Nevertheless, this act is included in the regulatory framework because it requires the State of California to identify and disseminate information about the location of earthquake fault zones, which is considered relevant to the environmental setting.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act was developed to protect the public from the effects of strong ground shaking, liquefaction, landslides, or other ground failure, and from other hazards caused by earthquakes. This act requires the State Geologist to delineate “zones of required investigation” (i.e., seismic hazard zones) where site investigations are required to determine the need for mitigation of potential liquefaction and/or earthquake-induced landslide ground displacements. The act requires cities, counties, and other local permitting agencies to regulate certain development projects by implementing the provisions of the act through various local building codes, permits, and ordinances. Before a development permit is granted for a site within a seismic hazard zone, a geotechnical investigation of the site must be conducted and appropriate mitigation measures incorporated into the project design, consistent with CGS Special Publication 117, *Guidelines for Evaluating and Mitigating Seismic Hazards in California*. Because the CGS has not established seismic hazard zones for the Project area, the Applicant is not required to comply with the evaluation and mitigation guidelines. Nevertheless, this act is included in the regulatory framework because it requires the State of California to identify and disseminate information about seismic hazards, which is considered relevant to the environmental setting.

D.7.3 Local

Riverside County General Plan – Palo Verde Valley Area Plan

Portions of the Palo Verde Valley planning area may be subject to seismic hazards. Threats from seismic events include ground shaking, fault rupture, liquefaction, and landslides. In the Palo Verde Valley planning area, liquefaction poses the most significant threat from a seismic event. Generally, the use of building techniques and practical avoidance measures help mitigate potentially dangerous seismic events. The Palo Verde Valley Area Plan (PVVAP) provides the policy related to seismic hazards below.

PVVAP 15.1. Protect life and property from seismic related incidents through adherence to the Seismic Hazards section of the General Plan Safety Element.

D.8 GREENHOUSE GAS EMISSIONS AND GLOBAL CLIMATE CHANGE

On a national scale, Federal agencies are addressing emissions of GHGs by reductions mandated in Federal laws and Executive Orders. Several states have promulgated laws as a means to reduce statewide levels of GHG emissions. In particular, the California Global Warming Solutions Act of 2006 directs the State of California to reduce statewide GHG emissions to 1990 levels by the year 2020.

D.8.1 Federal

National Fish, Wildlife, and Plants Climate Adaptation Strategy

The National Fish, Wildlife, and Plants Climate Adaptation Strategy outline the first joint effort of three levels of government (Federal, state, and tribal) with primary authority and responsibility for the living resources within the United States. The intent of the strategy is to identify how these resources can become more resilient, adapt to, and survive a warming climate.

Environmental Protection Agency Endangerment Finding

Recent actions by the EPA have allowed for the regulation of GHGs. On April 17, 2009, the EPA issued its proposed endangerment finding for GHG emissions. On December 7, 2009, the EPA Administrator signed and finalized two distinct findings regarding greenhouse gases under Section 202(a) of the Clean Air Act:

Endangerment Finding: The Administrator finds that the current and projected concentrations of the six key well-mixed greenhouse gases—carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)—in the atmosphere threaten the public health and welfare of current and future generations.

Cause or Contribute Finding: The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution that threatens public health and welfare.

These findings do not themselves impose any requirements on industry or other entities. However, this action was a prerequisite to finalizing the EPA's proposed GHG emission standards for light-duty vehicles, which were jointly proposed by the EPA and the Department of Transportation's National Highway Safety Administration on September 15, 2009 and adopted on April 1, 2010. As finalized in April 2010, the emissions standards rule for vehicles will improve average fuel economy standards to 35.5 miles per gallon by 2016. In addition, the rule will require model year 2016 vehicles to meet an estimated combined average emission level of 250 grams of CO_2 per mile.

On March 10, 2009, in response to the FY2008 Consolidated Appropriations Act (H.R. 2764; Public Law 110–161), the EPA proposed a rule that requires mandatory reporting of GHG emissions from large sources in the United States. On September 22, 2009, the Final Mandatory Reporting of Greenhouse Gases Rule was signed, and it was published in the Federal Register on October 30, 2009. The rule became effective on December 29, 2009. The rule will collect accurate and comprehensive emissions data to inform future policy decisions.

The EPA is requiring suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions to submit annual reports to the EPA. The gases covered by the proposed rule are CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, and other fluorinated gases, including nitrogen trifluoride (NF_3) and hydrofluorinated ethers (HFE).

D.8.2 State

The State of California enacted some of the first legislation in the United States to regulate GHGs. The following subsections describe regulations and standards that have been adopted by the State of California to address GHG emissions.

Western Climate Initiative

California is part of the Western Climate Initiative (WCI), an effort of the western states and Canadian provinces to establish a cap and trade market to reduce GHG emissions in the Western United States with offsets in Canada and other countries. WCI adopted a goal of an aggregate reduction of 15 percent below 2005 GHG levels by 2020. It has voluntarily prepared a GHG inventory based on calendar year 2004, as well as a set of rules for Climate Change (Regulation XXVII), including the Southern California Climate Solutions Exchange (Rule 2701), and the Greenhouse Gas Reduction Program (Rule 2702). California's Cap-and-Trade program helps to ensure that emissions continually decline, even alongside stronger economic growth and potentially drier hydrological conditions, and in the event of any additional unforeseen circumstances. The 2014 edition GHG inventory represents a transition to global warming potentials (GWPs) derived from the Intergovernmental Panel on Climate Change (IPCC) 4th Assessment Report (AR4). Previous GHG inventories relied on GWPs from IPCC's Second Assessment Report (SAR).

California Code of Regulations Title 24

Although not originally intended to reduce GHG emissions, Title 24 of the California Code of Regulations, Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings, was first established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow for the consideration and possible incorporation of new energy efficiency technologies and methods. Energy efficient buildings require less electricity, natural gas, and other fuels. Electricity production from fossil fuels and on-site fuel combustion (typically for water heating) results in GHG emissions. Therefore, increased energy efficiency results in decreased GHG emissions.

The GHG emission inventory was based on Title 24 standards as of October 2005; however, Title 24 has been updated as of 2008 and standards are currently being phased in.

Executive Order S-3-05

Executive Order S-3-05, signed by Governor Schwarzenegger on June 1, 2005, calls for a reduction in GHG emissions to 1990 levels by 2020 and for an 80 percent reduction in GHG emissions below 1990 levels by 2050. Executive Order S-3-05 also calls for the California EPA to prepare biennial science reports on the potential impact of continued global climate change on certain sectors of the California economy. The first of these reports, "Our Changing Climate: Assessing Risks to California," and its supporting document, "Scenarios of Climate Change in California: An Overview," were published by the California Climate Change Center in 2006.

Senate Bill 1078, Senate Bill 107, and Executive Order S-14-08

SB 1078 initially set a target of 20 percent of energy to be sold from renewable sources by the year 2017. The schedule for implementation of the renewable portfolio standard (RPS) was accelerated in 2006 with the Governor's signing of SB 107, which accelerated the 20 percent RPS goal from 2017 to 2010. On November 17, 2008, the Governor signed Executive Order S-14-08, which establishes a goal of having all retail sellers of electricity to serve 33 percent of their load with renewable energy by 2020. The Governor signed Executive Order S-21-09 on September 15, 2009, which directs the CARB to implement a regulation consistent with the 2020 33 percent renewable energy target by July 31, 2010.

Senate Bill 1368

SB 1368 was enacted in 2006, and required the CPUC to establish a CO_2 emissions standard for base load generation owned by or under long-term contract with publicly owned utilities. The CPUC established a GHG Emissions Performance Standard of 1,100 pounds of CO_2 per megawatt-hour (MWh). SB 1368 also requires the posting of notices of public deliberations by publicly owned companies on the CPUC website and establishes a process to determine compliance with the Emissions Performance Standard. The Project, as a renewable energy generation facility, is determined by rule to comply with the GHG Emission Performance Standard requirements of SB 1368.

Assembly Bill 32

In September 2006, Governor Schwarzenegger signed Assembly Bill (AB) 32 into law. AB 32 required that, by January 1, 2008, the CARB determine what the statewide GHG emissions level was in 1990, and approve a statewide GHG emissions limit that is equivalent to that level, to be achieved by 2020. The CARB adopted its Scoping Plan, which provided estimates of the 1990 GHG emissions level and identified sectors for the reduction of GHG emissions, in December 2008. The CARB has estimated that the 1990 GHG emissions level was 427 MMT CO_2e (CARB 2009). The CARB estimates that a reduction of 173 MMT CO_2e emissions below business-as-usual would be required by 2020 to meet the 1990 levels (CARB 2009). This amounts to roughly a 30 percent reduction from projected business-as-usual levels in 2020 (CARB 2009). Under Executive Order B-30-15, the goals of AB 32 were extended to a 40 percent reduction from 2020 levels by 2030. In 2017, CARB issued their Climate Change Scoping Plan, which presented a strategy for achieving the 2030 target.

Senate Bill 97

Senate Bill (SB) 97, enacted in 2007, amends the CEQA statute to clearly establish that GHG emissions and the effects of GHG emissions are appropriate subjects for CEQA analysis. SB 97 directed the Governor's Office of Planning and Research to develop draft state CEQA guidelines "for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions" by July 1, 2009, and directed the California Natural Resources Agency to certify and adopt the state CEQA guidelines by January 1, 2010.

The Office of Planning and Research published a technical advisory on CEQA and climate change on June 19, 2008. The guidance did not include a suggested threshold, but stated that the Office of Planning and Research had asked the CARB to "recommend a method for setting thresholds which will encourage consistency and uniformity in the CEQA analysis of greenhouse gas emissions throughout the state." The Office of Planning and Research technical advisory does recommend that CEQA analyses include the following components:

- identification of greenhouse gas emissions;
- determination of significance; and
- mitigation of impacts, as needed and as feasible.

On December 31, 2009, the California Natural Resources Agency adopted the proposed amendments to the state CEQA Guidelines. These amendments became effective on March 18, 2010.

Executive Order S-21-09

Executive Order S-21-09 was enacted by the Governor on September 15, 2009. Executive Order S-21-09 requires that the CARB, under its AB 32 authority, adopt a regulation by July 31, 2010 that sets a 33 percent renewable energy target. Under Executive Order S-21-09, the CARB will work with the Public Utilities Commission and California Energy Commission to encourage the creation and use of renewable energy sources, and will regulate all California utilities. The CARB will also consult with the Independent System Operator and other load balancing authorities on the impacts on reliability, renewable integration requirements, and interactions with wholesale power markets in carrying out the provisions of the Executive Order. The order requires the CARB to establish highest priority for those resources that provide the greatest environmental benefits with the least environmental costs and impacts on public health.

17 CCR §95350 et seq.

The purpose of this regulation is to achieve GHG emission reductions by reducing SF_6 emissions from gas-insulated switchgear. Gas-insulated switchgear owners must not exceed maximum allowable annual emissions rates, which are reduced each year until 2020, after which annual emissions must not exceed 1.0 percent. Owners must regularly inventory gas-insulated switchgear equipment and measure quantities of SF_6 and maintain records of these for at least 3 years. Additionally, by June 1, 2012, and June 1 of each year thereafter, each gas-insulated switchgear owner must submit an annual report to the Executive Officer for emissions that occurred during the previous calendar year.

State Standards Addressing Vehicular Emissions

California Assembly Bill 1493 (Pavley), enacted on July 22, 2002, required the CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. Regulations adopted by the CARB would apply to 2009 and later model year vehicles. The CARB estimated that the regulation would reduce climate change emissions from light duty passenger vehicle fleet by an estimated 18 percent in 2020 and by 27 percent in 2030 (AEP 2007). Overall within the state of California, implementation of the Pavley standards is anticipated to reduce GHG emissions by 17.23 percent (CARB 2013).

The CARB has adopted amendments to the Pavley regulations that reduce GHG emissions in new passenger vehicles from 2009 through 2016. The amendments, approved by the CARB Board on September 24, 2009, are part of California's commitment toward a nationwide program to reduce new passenger vehicle GHGs from 2012 through 2016, and prepare California to harmonize its rules with the Federal rules for passenger vehicles.

Executive Order S-01-07

Executive Order S-01-07 was enacted by the Governor on January 18, 2007, and mandates that: 1) a statewide goal be established to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020; and 2) a Low Carbon Fuel Standard for transportation fuels be established for California. On April 23, 2009, the CARB adopted regulations to implement the Low Carbon Fuel Standard.

Senate Bill 375

SB 375 finds that GHG from autos and light trucks can be substantially reduced by new vehicle technology, but even so, "…it will be necessary to achieve significant additional greenhouse gas reductions from changed land use patterns and improved transportation. Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32." Therefore, SB 375 requires that regions with metropolitan planning organizations adopt sustainable community strategies, as part of their regional transportation plans, which are designed to achieve certain goals for the reduction of GHG emissions from mobile sources.

Senate Bill 350

Senate Bill 350 was signed into legislation in October 2015. SB 350 requires retail sellers and publicly owned utilities to procure 50 percent of their electricity from eligible renewable energy resources by 2030.

D.8.3 Local

Riverside County Climate Action Plan

Riverside County adopted a Climate Action Plan in December, 2015 (Riverside County 2015). The plan included completion of a GHG emissions inventory, and established a goal to reduce emissions to 1990 levels by 2020, a reduction of 15 percent below the 2008 emissions. The plan summarized the General Plan policies that also affect GHG emissions, as well as measures from AB 32 and the County related to transportation, energy, and other sources. The energy-related measures include the state's Renewable Portfolio Standard related to renewable energy production, as well as a variety of measures to encourage energy efficiency and onsite generation of solar energy at residential and commercial buildings. The plan does not specifically address County policies related to approval of commercial-scale solar power plants.

D.9 HAZARDS AND HAZARDOUS MATERIALS

D.9.1 Federal

Comprehensive Environmental Response and Liability Act and Superfund Amendments and Reauthorization Act

The Superfund Amendments and Reauthorization Act (SARA) amended the Comprehensive Environmental Response and Liability Act (CERCLA) and governs hazardous substances. The applicable part of SARA is Title III, otherwise known as the Emergency Planning and Community Right-To-Know Act of 1986 (EPCRA). EPCRA establishes requirements for Federal, state, and local governments, as well as Indian Tribes and industry members regarding emergency planning and reporting on hazardous and toxic chemicals (USEPA, 2000). Key sections of the law include:

***§304*:** Requires immediate notification to the local emergency planning committee (LEPC) and the state emergency response commission (SERC) when a hazardous material is released in excess of its reportable quantity (RQ). If a CERCLA-listed hazardous substance RQ is released, notification must also be given to the National Response Center in Washington, D.C. (RQs are listed in 40 CFR Part 302, Table 302.4). These notifications are in addition to notifications given to the local emergency response team or fire personnel.

***§311*:** Requires that either material safety data sheets (MSDSs) for all hazardous materials or a list of all hazardous materials be submitted to the SERC, LEPC, and local fire department.

Clean Air Act

Regulations under the CAA are designed to prevent accidental releases of hazardous materials. The regulations require facilities that store a Threshold Quantity (TQ) or greater of listed regulated substances to develop a Risk Management Plan (RMP), including hazard assessments and response programs to prevent accidental releases of listed chemicals. The list of regulated substances and their threshold quantities is found under Section 112(r) of the Clean Air Act.

Hazardous Materials Transport Act

The U.S. Department of Transportation (USDOT), in conjunction with the USEPA, is responsible for enforcement and implementation of Federal laws and regulations pertaining to transportation of hazardous materials. The Hazardous Materials Transportation Act of 1974 directs the USDOT to establish criteria and regulations regarding the safe storage and transportation of hazardous materials. 49 CFR Parts 171–180 regulate the transportation of hazardous materials, the types of material that are defined as hazardous, and the marking of vehicles transporting hazardous materials.

Federal Water Pollution Control Act (Clean Water Act)

The CWA is a comprehensive statute focused on restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. Originally enacted in 1948, the CWA was amended numerous times until it was reorganized and expanded in 1972. It continues to be amended almost on an annual basis.

Primary authority for the implementation and enforcement of the CWA rests with the EPA. The CWA authorizes water quality programs, requires Federal effluent limitations and state water quality standards, requires permits for the discharge of pollutants into navigable waters, provides enforcement mechanisms, and authorizes funding for wastewater treatment works construction grants and state revolving loan programs, as well as funding to states and Tribes for their water quality programs. Provisions have also been added to address water quality problems in specific regions and specific waterways. The Project would be subject to a National Pollutant Discharge Elimination System (NPDES) Construction General Permit during construction and a General Industrial Permit during operations and maintenance to address water quality.

Resource Conservation and Recovery Act of 1976 (42 U.S.C. § 6901 et seq.)

The RCRA grants authority to the EPA to control hazardous waste from start to finish. This covers the production, transportation, treatment, storage, and disposal of hazardous waste. The RCRA also sets forth a framework for the management of non-hazardous solid waste. The 1986 amendments to the RCRA enabled the EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances.

Occupational Safety and Health Act

Congress passed the Occupational Safety and Health Act (OSHA) to ensure safe and healthful working conditions for working men and women. OSHA authorized enforcement of the standards developed under the Act and assisted states in their efforts to ensure safe and healthful working conditions. OSHA also provides for research, information, education, and training in the field of occupational safety and health. The Project would be subject to OSHA requirements during construction, operations and maintenance, and decommissioning.

Federal Aviation Administration Regulations Part 77

Federal Aviation Administration (FAA) regulations, 14 CFR Part 77, establish standards and notification requirements for objects affecting navigable airspace. This notification serves as the basis for evaluating the effects of construction or alteration on operating procedures; determining the potential hazardous effect of the proposed construction on air navigation; identifying mitigation measures to enhance safe air navigation; and charting of new objects.

These regulations apply to the following:

- Any construction or alteration exceeding 200 feet above ground level;
- Any construction or alteration:
  - within 20,000 feet of a public use or military airport that exceeds a 100:1 surface from any point on the runway of each airport with at least one runway more than 3,200 feet long
  - within 10,000 feet of a public use or military airport that exceeds a 50:1 surface from any point on the runway of each airport with its longest runway no more than 3,200 feet long
  - within 5,000 feet of a public use heliport that exceeds a 25:1 surface;
  - Any highway, railroad or other traverse way whose prescribed adjusted height would exceed the above-noted standards:
  - when requested by the FAA; and
  - any construction or alteration located on a public use airport or heliport regardless of height or location.

Western Electricity Coordinating Council (WECC)

There are no health-based Federal regulations or industry codes specifying environmental limits on the strengths of fields from power lines. However, the Western Electricity Coordinating Council (WECC), a regional entity responsible for promoting and coordinating bulk electric system reliability in the western United States, has adopted a policy to separate parallel transmission lines within a common corridor by the greatest of 500 feet or the length of the longest span (distance between adjacent transmission structures).

D.9.2 State

Safe Drinking Water and Toxics Enforcement Act

The Safe Drinking Water and Toxics Enforcement Act (Health and Safety Code §25249.5 et seq.) identifies chemicals that cause cancer and reproductive toxicity, provides information for the public, and prevents discharge of the chemicals into sources of drinking water. Lists of the chemicals of concern are published and updated periodically. The Act is administered by California's Office of Environmental Health Hazard Assessment (OEHHA).

Aboveground Petroleum Storage Act

Assembly Bill 1130 (2007) updated the Aboveground Petroleum Storage Act of 1990 (Health and Safety Code §§25270 to 25270.13) and requires the owner or operator of a tank facility with an aggregate storage capacity greater than 1,320 gallons of petroleum to file an inventory statement with the local Certified Unified Program Agency (CUPA) and to prepare an SPCC plan. An SPCC plan must identify appropriate spill containment or equipment for diverting spills from sensitive areas, as well as discuss facility-specific requirements for the storage system, inspections, recordkeeping, security, and personnel training.

Hazardous Materials Release Response Plans and Inventory Act of 1985

The Hazardous Materials Release Response Plans and Inventory Act, also known as the Business Plan Act (Health and Safety Code §25500 *et seq*.; 19 CCR §2620, *et seq*.), requires local governments to regulate local businesses using hazardous materials in excess of certain quantities to prepare a Hazardous Materials Business Plan (HMBP) that describes their facilities, inventories, emergency response plans, and training programs to their local CUPA and to report releases to their CUPA and the California Office of Emergency Services. Hazardous materials are defined as unsafe raw or unused materials that are part of a process or manufacturing step. They are not considered hazardous waste. Health concerns pertaining to the release of hazardous materials, however, are similar to those relating to hazardous waste. HMBPs shall include the following: (1) a hazardous material inventory in accordance with 19 CCR §§2729.2 to 2729.7; (2) emergency response plans and procedures in accordance with 19 CCR §2731; and (3) training program information in accordance with 19 CCR §2732. Business plans contain basic information on the location, type, quantity, and health risks of hazardous materials stored, used, or disposed of in the state. Each business shall prepare a HMBP if that business uses, handles, or stores a hazardous material or an extremely hazardous material in quantities greater than or equal to the following:

1. 500 pounds of a solid substance,
2. 55 gallons of a liquid,
3. 200 cubic feet of compressed gas,
4. A hazardous compressed gas in any amount, and
5. Hazardous waste in any quantity.

Health and Safety Code §25531

This code section and the California Accidental Release Program (CalARP) regulate the registration and handling of regulated substances. Regulated substances are any chemicals designated as an extremely hazardous substance by the USEPA as part of its implementation of SARA Title III. Health and Safety Code §25531 overlaps or duplicates some of the requirements of SARA and the CAA. Facilities handling or storing regulated substances at or above Threshold Planning Quantities must register with their local CUPA and prepare an RMP.

8 CCR §5189

This regulation requires facility owners that store a TQ of hazardous materials to develop and implement effective safety management plans that ensure that hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the RMP process.

Health and Safety Code §41700

This code section states, "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."

Hazardous Waste Control Law

The Hazardous Waste Control Law (HWCL) (Health and Safety Code §§25100-25249) created the state hazardous waste management program, which is similar to but more stringent than the Federal RCRA program. The act is implemented by regulations contained in 22 CCR §66250 et seq., which describes the following required aspects for the proper management of hazardous waste:

1. Identification and classification;
2. Generation and transportation;
3. Design and permitting of recycling, treatment, storage, and disposal facilities;
4. Treatment standards;
5. Operation of facilities and staff training; and
6. Closure of facilities and liability requirements.

These regulations list more than 800 materials that may be hazardous and establish criteria for identifying, packaging, and disposing of such waste. Under the HWCL and its implementing regulations, the generator of hazardous waste must complete a manifest that accompanies the waste from generator to transporter to the ultimate disposal location. Copies of the manifest must be filed with the DTSC.

Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program)

This program requires the administrative consolidation of six hazardous materials and waste programs (Program Elements) under one agency, a CUPA. The Program Elements consolidated under the Unified Program are:

1. Hazardous Waste Generator and On-site Hazardous Waste Treatment Programs (a.k.a., Tiered Permitting),
2. Aboveground Petroleum Storage Tank SPCC,

3. Hazardous Materials Release Response Plans and Inventory Program (a.k.a. Hazardous Materials Disclosure or "Community-Right-To-Know"),
4. CalARP,
5. Underground Storage Tank (UST) Program, and
6. Uniform Fire Code Plans and Inventory Requirements.

The Unified Program is intended to provide relief to businesses complying with the overlapping and sometimes conflicting requirements of formerly independently managed programs. The Unified Program is implemented at the local government level by CUPAs. Most CUPAs have been established as a function of a local environmental health or fire department. Some CUPAs have contractual agreements with another local agency, a participating agency, which implements one or more Program Elements in coordination with the CUPA. The Riverside County Department of Environmental Health is the CUPA in the Project area.

California Environmental Protection Agency

The California Environmental Protection Agency (CalEPA) and the State Water Resources Control Board establish rules governing the use of hazardous materials and the management of hazardous waste. Applicable state and local laws include the following:

- Public Safety/Fire Regulations/Building Codes
- Hazardous Waste Control Law
- Hazardous Substances Information and Training Act
- Air Toxics Hot Spots and Emissions Inventory Law
- Underground Storage of Hazardous Substances Act
- Porter-Cologne Water Quality Control Act

Department of Toxic Substance Control

The Department of Toxic Substances Control (DTSC) has primary regulatory responsibility for the management of hazardous materials and the generation, transport, and disposal of hazardous waste under the authority of the Hazardous Waste Control Law. Enforcement is delegated to local jurisdictions that enter into agreements with the DTSC.

California's Secretary of Environmental Protection established a unified hazardous waste and hazardous materials management regulatory program as required by Health and Safety Code Chapter 6.11. The unified program consolidates, coordinates, and makes consistent portions of the following six existing programs:

- Hazardous Waste Generations and Hazardous Waste On-site Treatment
- Underground Storage Tanks
- Hazardous Material Release Response Plans and Inventories
- California Accidental Release Prevention Program
- Aboveground Storage Tanks (spill control and countermeasure plan only)

- Uniform Fire Code Hazardous Material Management Plans and Inventories

The statute requires all counties to apply to the CalEPA Secretary for the certification of a local unified program agency. Qualified cities are also permitted to apply for certification. The local Certified Unified Program Agency (CUPA) is required to consolidate, coordinate, and make consistent the administrative requirements, permits, fee structures, and inspection and enforcement activities for these six program elements within the county. Most CUPAs have been established as a function of a local environmental health or fire department.

The Office of the State Fire Marshal participates in all levels of the CUPA program including regulatory oversight, CUPA certifications, evaluations of the approved CUPAs, training, and education. The Riverside County Department of Environmental Health serves as the CUPA in Riverside County.

California Office of Emergency Services

In order to protect the public health and safety and the environment, the California Office of Emergency Services is responsible for establishing and managing statewide standards for business and area plans relating to the handling and release or threatened release of hazardous materials. Basic information on hazardous materials handled, used, stored, or disposed of (including location, type, quantity, and the health risks) needs to be available to firefighters, public safety officers, and regulatory agencies. Such information needs to be included in business plans in order to prevent or mitigate the damage to the health and safety of persons and the environment from the release or threatened release of these materials into the workplace and environment.

California Occupational Safety and Health Administration

The California Occupational Safety and Health Administration (Cal/OSHA) is the primary agency responsible for worker safety in the handling and use of chemicals in the workplace. Cal/OSHA standards are generally more stringent than Federal regulations. The employer is required to monitor worker exposure to listed hazardous substances and notify workers of exposure (8 CCR 337-340). The regulations specify requirements for employee training, availability of safety equipment, accident-prevention programs, and hazardous substance exposure warnings.

California Highway Patrol

A valid Hazardous Materials Transportation License, issued by the California Highway Patrol, is required by the laws and regulations of Vehicle Code §3200.5 for transportation of either:

1. Hazardous materials shipments for which the display of placards is required by state regulations; or
2. Hazardous materials shipments of more than 500 pounds, which would require placards if shipping greater amounts in the same manner.

Additional requirements on the transportation of explosives, inhalation hazards, and radioactive materials are enforced by the California Highway Patrol under the authority of the Vehicle Code. Transportation of explosives generally requires consistency with additional rules and regulations for routing, safe stopping distances, and inspection stops (14 CCR §§1150-1152.10). Inhalation hazards face similar, more restrictive rules and regulations (13 CCR §§1157-1157.8). Radioactive materials are restricted to specific safe routes for transportation of such materials.

Hazardous Waste Control Act

The Hazardous Waste Control Act created the state hazardous waste management program, which is similar to but more stringent than the Federal RCRA program. The act is implemented by regulations contained in Title 26 of the CCR, which describes the following required aspects for the proper management of hazardous waste:

- identification and classification;
- generation and transportation;
- design and permitting of recycling, treatment, storage, and disposal facilities;
- treatment standards;
- operation of facilities and staff training; and
- closure of facilities and liability requirements.

These regulations list more than 800 materials that may be hazardous and establish criteria for identifying, packaging, and disposing of such waste. Under the Hazardous Waste Control Act and Title 26, the generator of hazardous waste must complete a manifest that accompanies the waste from generator to transporter to the ultimate disposal location. Copies of the manifest must be filed with the DTSC.

CPUC Rules for Overhead Electric Line Construction, General Order No. 95 (GO-95)

CPUC General Order No. 95 specifies requirements for overhead line design, construction, and maintenance, the application of which is intended to ensure adequate service and secure safety to persons engaged in the construction, maintenance, operation or use of overhead lines and to the public in general.

D.9.3 Local

Riverside County Airport Land Use Compatibility Plan

The Project would be located within the area covered by the RCALUCP, within Zones D and E of the AIA. The RCALUCP sets forth the criteria and policies that the Riverside County ALUC uses in assessing the compatibility between the principal airports in Riverside County and proposed land use development in the areas surrounding them. The RCALUCP primarily deals with review of local general plans, specific plans, zoning ordinances, and other land use documents covering broad geographic areas. Certain individual land use development proposals also may be reviewed by the ALUC as provided in the policies identified in the RCALUCP. The ALUC does not have authority over existing incompatible land uses or the operation of any airport.

The ALUC adopts Airport Land Use Compatibility Plans for the areas surrounding the airports within its jurisdiction. Local development approvals must be found consistent with the RCALUCP unless approved by a 4/5th supermajority vote. The RCALUCP identifies AIAs to protect the public from the adverse effects of aircraft noise, ensure that facilities and people are not concentrated in areas susceptible to aircraft accidents, and ensure that no structures or activities adversely affect or encroach upon the use of navigable airspace (ALUC 2012). The Compatibility Plan for Blythe Airport is based upon the Airport Master Plan adopted by the Riverside County Board of Supervisors in 2001.

The following RCALUCP county-wide policies are applicable to the proposed Project:

Policy 1.5.3. Major Land Use Actions: The scope or character of certain major land use actions, as listed below, is such that their compatibility with airport activity is a potential concern. Even though these actions may be basically consistent with the local general plan or specific plan, sufficient detail may not be known to enable a full airport compatibility evaluation at the time that the general plan or specific plan is reviewed. To enable better assessment of compliance with the compatibility criteria set forth herein, ALUC review of these actions may be warranted. The circumstances under which ALUC review of these actions is to be conducted are indicated in Policy 1.5.2 above.

1. Actions affecting land uses within any compatibility zone.
    - Any proposed expansion of the sphere of influence of a city or special district.
    - Proposed pre-zoning associated with future annexation of land to a city.
    - Proposed development agreements or amendments to such agreements.
    - Proposed residential development, including land divisions, consisting of five or more dwelling units or lots.
    - Any discretionary development proposal for projects having a building floor area of 20,000 square feet or greater unless only ministerial approval (e.g., a building permit) is required.
    - Major capital improvements (e.g., water, sewer, or roads) which would promote urban uses in undeveloped or agricultural areas to the extent that such uses are not reflected in a previously reviewed general plan or specific plan.
    - Proposed land acquisition by a government entity for any facility accommodating a congregation of people (for example, a school or hospital).
    - Any off-airport, non-aviation use of land within Compatibility Zone A of any airport.
    - Proposals for new development (including buildings, antennas, and other structures) having a height of more than:
        - 35 feet within Compatibility Zone B1, B2, or a Height Review Overlay Zone;
        - 70 feet within Compatibility Zone C; or
        - 150 feet within Compatibility Zone D or E.
    - Any obstruction reviewed by the Federal Aviation Administration in accordance with Part 77 of the Federal Aviation Regulations that receives a finding of anything other than "not a hazard to air navigation."
    - Any project having the potential to create electrical or visual hazards to aircraft in flight, including:

  - Electrical interference with radio communications or navigational signals;
  - Lighting which could be mistaken for airport lighting;
  - Glare in the eyes of pilots of aircraft using the airport; and
  - Impaired visibility near the airport.
- Projects having the potential to cause attraction of birds or other wildlife that can be hazardous to aircraft operations to be increased within the vicinity of an airport.

2. Proposed non-aviation development of airport property if such development has not previously been included in an airport master plan or community general plan reviewed by the Commission. (See Policy 1.2.5 for definition of aviation-related use.)
3. Regardless of location within Riverside County, any proposal for construction or alteration of a structure (including antennas) taller than 200 feet above the ground level at the site. (Such structures also require notification to the Federal Aviation Administration in accordance with Federal Aviation Regulations, Part 77, Paragraph 77.13(a) (1).)
4. Any other proposed land use action, as determined by the local planning agency, involving a question of compatibility with airport activities.

Policy 3.1.4. Nonresidential Development: The compatibility of nonresidential development shall be assessed primarily with respect to its usage intensity (the number of people per acre) and the noise-sensitivity of the use. Additional criteria listed in Table 2A shall also apply.

a) The total number of people permitted on a project site at any time, except for rare special events, must not exceed the indicated usage intensity times the gross acreage of the site.

   1) Usage intensity calculations shall include all people (e.g., employees, customers/ visitors, etc.) who may be on the property at any single point in time, whether indoors or outside.

   2) Rare special events are ones (such as an air show at an airport) for which a facility is not designed and normally not used and for which extra safety precautions can be taken as appropriate.

b) No single acre of a project site shall exceed the number of people per acre indicated in Policy 4.2.5(b) and listed in Table 2A unless special risk reduction building design measures are taken as described in Policy 4.2.6.

c) The noise exposure limitations cited in Policy 4.1.4 and listed in Table 2B shall be the basis for assessing the acceptability of proposed nonresidential land uses relative to noise impacts. The ability of buildings to satisfy the interior noise level criteria noted in Policy 4.1.6 shall also be considered.

Policy 3.1.5. Prohibited Uses: Regardless of usage intensity, certain types of uses are deemed unacceptable within portions of an airport influence area. See Policy 4.2.3 and Table 2A. In addition to these explicitly prohibited uses, other uses will normally not be permitted in the respective compatibility zones because they do not meet the usage intensity criteria.

Policy 3.1.6. Other Development Conditions: All types of proposed development shall be required to meet the additional conditions listed in Table 2A [Table 3.3.8-1 above] for the respective compatibility zone where the development is to be located. Among these conditions are the following:

a) Aviation Easement Dedication: See Policy 4.3.5.

b) Deed Notice: See Policy 4.4.3.

c) Real Estate Disclosure: See Policy 4.4.2.

d) Noise Level Reduction: See Policy 4.1.6.

e) Airspace Review: See Policy 4.3.3.

Policy 4.3.7. New land uses that may cause visual, electronic, or increased bird strike hazards to aircraft in flight shall not be permitted within any airport's influence area.

Riverside County General Plan

The Riverside County General Plan (Riverside County 2015a) Safety Element provides policies for development of the Project area within Riverside County. In compliance with state law, the primary objective of the Safety Element is to "reduce death, injuries, property damage, and economic and social impact from hazards." Countywide policies that address health and safety within the County boundaries are also located in the Land Use Element of the County General Plan.

Hazardous Waste and Materials – Hazardous Waste Management Plan

Policy S 7.3. Require commercial businesses, utilities, and industrial facilities that handle hazardous materials to:

- Install automatic fire and hazardous materials detection, reporting and shut -off devices; and
- Install an alternative communication system in the event power is out or telephone service is saturated following an earthquake.

Land Use Element (LU)

Policy LU 15.9. Ensure that no structures or activities encroach upon or adversely affect the use of navigable airspace.

Riverside County Hazardous Waste Management Plan

The Riverside County Hazardous Waste Management Plan (CHWMP) uses a framework of 24 existing and recommended programs. The CHWMP serves as the County's primary planning document for the management of hazardous substances. Although the title refers only to hazardous waste, the CHWMP is a comprehensive document containing all of the County programs for managing both hazardous materials and waste.

Southern California Hazardous Waste Management Authority

The SCHWMA was formed through a joint powers agreement between Santa Barbara, Ventura, San Bernardino, Orange, San Diego, Imperial, and Riverside Counties and the Cities of Los Angeles and San Diego. Each SCHWMA county has agreed to take responsibility for the treatment and disposal of hazardous waste in an amount that is at least equal to the amount generated within that county. This responsibility can be met by siting hazardous waste management facilities (transfer, treatment, and/or repository) capable of processing an amount of waste equal to or larger than the amount generated within the county, or by creating intergovernmental agreements between counties to provide compensation to a county for taking another county's waste, or through a combination of both facility siting and intergovernmental agreements. When and where a facility is to be sited is primarily a function of the private market. However, once an application to site a facility has been received, the county will review the requested facility and its location against a set of established siting criteria to ensure that the location is appropriate, and may deny the application based on the findings of this review. The County of Riverside does not presently have any of these facilities within its jurisdiction and therefore must rely on intergovernmental agreements to fulfill its fair share responsibility to SCHWMA.

Riverside County Department of Environmental Health

The Riverside County Department of Environmental Health, under the Health and Safety Code, is responsible for oversight of activities pertaining to the generation, storage, handling, disposal, treatment, and recycling of hazardous waste. Ordinance No. 615.3 has been implemented for the purpose of monitoring establishments where hazardous waste is generated, stored, handled, disposed, treated, or recycled and to regulate the issuance of permits and the activities of establishments where hazardous waste is generated. The Department of Environmental Health also contains a Hazardous Materials Management Branch, which is the CUPA for the entire County, and oversees all hazardous materials and hazardous waste-related activities.

D.10 LANDS, REALTY, AND AGRICULTURAL AND FORESTRY RESOURCES

D.10.1 Federal

Federal Land Policy and Management Act, 1976 as Amended

The United States Congress passed the FLPMA in 1976. Title V, "Rights-of-Way," of the FLPMA establishes public land policy and guidelines for administration, provides for management, protection, development, and enhancement of public lands, and provides the BLM authorization to grant ROW. Authorization of systems for generation, transmission, and distribution of electric energy is addressed in Section 501(4) of Title V. In addition, Section 503 specifically addresses "Right of Way Corridors" and requires common ROWs "to the extent practical." FLPMA, Title V, Section 501(a)(6) states, "[t]he Secretary, with respect to the public lands (including public lands, as defined in section 103(e) of this Act, which are reserved from entry pursuant to section 24 of the Federal Power Act (16 U.S.C. § 818)) [P.L. 102-486, 1992] and, the Secretary of Agriculture, with respect to lands within the National Forest System (except in each case land designated as wilderness), are authorized to grant, issue, or renew rights-of-way over, upon, under, or through such lands for roads, trails, highways, railroads, canals, tunnels, tramways, airways, livestock driveways, or other means of transportation except where such facilities are constructed and maintained in connection with commercial recreation facilities on lands in the National Forest System."

The Applicant is seeking a ROW grant from the BLM Palm Springs-South Coast Field Office Authorized Officer to authorize the construction, operation, maintenance and decommissioning of a proposed solar facility and gen-tie line on land under the jurisdiction of the BLM.

California Desert Conservation Area Plan, 1980 as Amended

Section 601 of the FLPMA required preparation of a long range plan for the CDCA. The CDCA Plan was adopted in 1980 to provide for the use of public lands and resources of the CDCA in a manner that enhances, wherever possible, and does not diminish, on balance, the environmental, cultural, and aesthetic values of the Desert and its productivity. The CDCA Plan is a comprehensive, long range plan covering 25 million acres. Approximately 10 million acres (about half) of this total are public lands administered by the BLM. These public lands are dispersed throughout the California Desert, which includes the Mojave Desert, the Sonoran Desert, and a small portion of the Great Basin Desert.

The CDCA Plan includes 12 elements: Cultural Resources; Native American; Wildlife; Vegetation; Wilderness; Wild Horse and Burro; Livestock Grazing; Recreation; Motorized Vehicle Access; Geology, Energy and Mineral Resources; Energy Production and Utility Corridors; and Land Tenure Adjustment. Each of the elements contains goals and specific actions for the management, use, development, and protection of the resources and public lands within the CDCA, and is based on the concepts of multiple use, sustained yield, and maintenance of environmental quality. In addition, each element provides both a desert wide perspective of the planning decisions for one major resource or issue of public concern as well as more specific interpretation of multiple-use class guidelines for a given resource and its associated activities.

Programmatic Environmental Impact Statement to Develop and Implement Agency-Specific Programs for Solar Energy Development

In response to direction from Congress under Title II, Section 211 of the Energy Policy Act of 2005, as well as Executive Order 13212, Actions to Expedite Energy-Related Projects, the BLM and the U.S. Department of Energy have prepared a Solar Programmatic EIS (PEIS) pursuant to NEPA and CEQ regulations. The Solar PEIS evaluates utility-scale solar energy development in a six-state area, including that portion of the CDCA that is open to solar energy development in accordance with the provisions of the CDCA Plan. The Solar PEIS planning effort has focused on identifying locations on BLM lands that are most suitable for solar energy development. The entire Project would be located within BLM-managed lands and within the Riverside East SEZ. The Final Solar PEIS was released on July 24, 2012. The BLM issued a Record of Decision on October 12, 2012, that amended the CDCA Plan to identify all SEZ lands within the CDCA as sites associated with power generation or transmission (BLM 2012c).

Resource Management Plan/Record of Decision for Designation of Energy Corridors on Bureau of Land Management Administered Lands in the 11 Western States

Section 368 of the EPAct (Public Law 109-58) requires the DOI to examine and designate energy transportation corridors in the West. In response, the BLM issued the "Approved

Resource Management Plan Amendments/Record of Decision (ROD) for Designation of Energy Corridors on Bureau of Land Management-Administered Lands in the 11 Western States" (BLM 2009) which designated §368 Corridors in the western United States. Section 368 corridors are identified with a numeric designation and are often overlain on locally designated corridors, as is the case with the east-west §368 2-mile wide Corridor 30-52 overlying Corridor K.

Appendix B to the ROD specifies Interagency Operating Procedures (IOPs) to meet the Section 368 requirement to improve the ROW application process and to meet NEPA requirements to provide practicable means to avoid or minimize environmental harm which may result from future ROW grants within the designated corridors. The IOPs specify regulatory compliance, agency coordination, government-to-government consultation, project design, and resource-specific considerations that must be addressed through NEPA analysis of the proposed use of the corridor.

D.10.2 Local

Land use and planning decisions for the 160-acre private inholding, and for non-BLM lands adjacent to the Project area, are guided and regulated by the Riverside County General Plan, PVVAP, and Riverside County Zoning Ordinance. The relevant plans contain goals, policies, and implementation measures that provide an overall foundation for establishing land use patterns. This section lists relevant goals, objectives, policies, and implementation measures related to the proposed land use. The Riverside County Zoning Ordinance contains regulations through which the applicable General Plan's provisions are implemented. The ALUCP establishes procedures and criteria by which the County can address compatibility issues when making planning decisions concerning airports. The most relevant regulations pertaining to solar energy development are presented below.

Riverside County General Plan

Adoption of the 2003 Riverside County General Plan (RCGP) occurred on October 7, 2003, with revisions in 2008 and 2015 (Riverside County 2015a). The RCGP consists of a vision statement and the following elements: Land Use, Circulation, Multi-purpose Open Space, Safety, Noise, Housing, Air Quality, and Administration. The RCGP sets forth County land use policies and guidance for implementation. The RCGP is augmented by more detailed Area Plans covering the County's territory. Area Plans provide a clear and more focused opportunity to enhance community identity within the County and stimulate quality of life at the community level.

RCGP land use designations adjacent to the Project area include Agriculture (AG) and Open Space Rural (OS-RUR). The Agriculture land use designation is established to help conserve productive agricultural lands within the County. These include row crops, nurseries, citrus groves and vineyards, dairies, ranches, poultry and hog farms, and other agriculture-related uses. Areas designated AG generally lack an infrastructure that is supportive of urban development. This land use designation allows one single-family residence per 10 acres except as otherwise specified by a policy or an overlay. The OS-RUR designation is applied to remote, privately owned open space areas with limited access and a lack of public services. This land use designation allows one single family residence per 20 acres. Mineral extraction is also allowed subject to an approved surface mining permit and provided that the proposed project is consistent with the maintenance of scenic resources and views from residential neighborhoods and major roadways and the project does not detract from efforts to protect endangered species (Riverside County 2015a).

Policies at the General Plan and Area Plan levels implement the vision and goals of Riverside County. The County of Riverside Vision details the physical, environmental, and economic qualities that the County aspires to achieve by the year 2020. Using that Vision as the primary foundation, the RCGP establishes policies for development and conservation within the entire unincorporated County territory (Riverside County 2015a). The General Plan's policy goals that are potentially relevant to land use for the Project are provided below. Additional County of Riverside General Plan policy goals are detailed in other sections of this chapter, as applicable to the environmental resource topic analyzed.

Land Use Element (LU)

Policy LU 1.8. As required by the Airport Land Use Law, submit certain proposed actions to the Riverside County Airport Land Use Commission for review. Such actions include proposed amendments to the general plan, area plans, or specific plans, as well as proposed revisions to the zoning ordinance and building codes.

Policy LU 5.1. Ensure that development does not exceed the ability to adequately provide supporting infrastructure and services, such as libraries, recreational facilities, educational and child day care centers (i.e. infant, toddlers, preschool and school age children), transportation systems, and fire/police/medical services.

Policy LU 9.2. Require that development protect environmental resources by compliance with the Multipurpose Open Space Element of the General Plan and Federal and state regulations such as CEQA, NEPA, the Clean Air Act, and the Clean Water Act.

Policy LU 17.2. Permit and encourage, in an environmentally and fiscally responsible manner, the development of renewable energy resources and related infrastructure, including but not limited to, the development of solar power plants in the County of Riverside.

Multi-Purpose Open Space Element (OS)

Policy OS 15.2. Development of renewable resources should be encouraged.

Palo Verde Valley Area Plan

The Project is located on the Palo Verde Mesa in the Palo Verde Valley area within unincorporated Riverside County. The Project is within the planning area for the PVVAP. The PVVAP provides customized direction specifically for this easternmost reach of the County. The PVVAP guides the evolving character of the agricultural and desert area. The PVVAP focus is on the Colorado River and is anchored in the City of Blythe. The PVVAP planning area is bordered by Imperial County on the south, desert lands on the north and west, and the Colorado River on the east. The PVVAP is an extension of the RCGP and vision. The PVVAP's policy goals most relevant to the Project are provided in Sections 3.19 *Visual Resources*, 3.7 *Geology and Soil Resources*, and 3.14 *Recreation and Public Access*.

Riverside County Land Use Ordinance

Ordinance No. 348.4596 amends Ordinance No. 348 to authorize solar power plants on lots ten acres or larger, subject to a conditional use permit in the following zone classifications: General Commercial (C-1/C-P), Commercial Tourist (C-T), Scenic Highway Commercial (C-P-S), Rural Commercial (C-R), Industrial Park (I-P), Manufacturing Servicing Commercial (M-SC), Medium Manufacturing (M-M), Heavy Manufacturing (M-H), Mineral Resources (M-R), Mineral Resource and Related Manufacturing (M-R-A), Light Agriculture (A-1), Light Agriculture with Poultry (A-P), Heavy Agriculture (A-2), Agriculture-Dairy (AD), Controlled Development (W-2), Regulated Development Areas (R-D), Natural Assets (N-A), Waterways and Watercourses (W-1), and Wind Energy Resource Zone (W-E). Ordinance No. 348.4596 was last updated in 2010.

The proposed solar facility site would be located on BLM-managed lands in unincorporated Riverside County. Lands adjacent to the Project are currently zoned as Controlled Development Areas (W-2-10), including the privately-owned inholding within the Project area (Riverside County 2015b).

D.11 MINERAL RESOURCES

D.11.1 Federal

General Mining Act of 1872 as amended

This act (30 U.S.C. 22-42) Codified the system of acquiring and protecting mining claims on public land open to mineral entry and obtaining patent (fee simple title) to valid mining claims.

Mineral Leasing Act of 1920 as amended

Authorizes and governs leasing of public lands for developing deposits of coal, petroleum, natural gas and certain solid minerals (phosphates, sodium, sulfur, and potassium) (30 U.S.C. § 181 et seq.).

Surface Resources Act of 1955

This act (30 U.S.C. 612) exempts common-variety minerals such as gravel, sand, building stone, volcanic cinder, petrified wood etc. from location under the General Mining Act of 1872.

Geothermal Steam Act of 1970

Allows leasing of public lands for the development of Geothermal Resources (30 U.S.C. 1001–1028)

Mining and Mineral Policy Act of 1970

This act (30 USC §21 et seq.) declared that the policy of the Federal government is to encourage private enterprise in the development of a sound and stable domestic mineral industry and in orderly and economic development of mineral resources, research, and reclamation methods.

California Desert Conservation Area Plan, 1980 as Amended

The CDCA Plan defines multiple-use classes for BLM-managed lands within the CDCA, which includes land area encompassing the Project site. With respect to mineral resources, the CDCA Plan aims to maintain the availability of mineral resources on public lands for exploration and development. The Project site is located within lands designated "Class M," or moderate use. Mineral exploration and development is allowed on Class M lands provided that NEPA requirements are met.

Public Land Order No. 7818

Under Public Land Order No. 7818, the Riverside East SEZ was withdrawn from location and entry under the United States mining laws, subject to valid existing rights, for a period of 20 years (Federal Register Vol. 78, No. 129, Pg. 40499, July 5, 2013). The lands remain open to mineral and geothermal leasing, and mineral material sales.

43 CFR § 3100 – 3120 (Competitive and non-Competitive Oil and Gas Leasing)

43 CFR § 3200 (Geothermal Resource Leasing)

43 CFR § 3600 (Mineral Materials Disposal)

43 CFR § 3715 (Use and Occupancy of Mining Claims)

43 CFR § 3809 (Surface Management)

D.11.2 State

State Surface Mining and Reclamation Act of 1975

The Surface Mining and Reclamation Act of 1975 (PRC §2710 et seq.) mandated the initiation by the State Geologist of mineral land classification in order to help identify and protect mineral resources in areas within the state subject to urban expansion or other irreversible land uses that would preclude mineral extraction. The Surface Mining and Reclamation Act also allowed the State Mining and Geology Board, after receiving classification information from the State Geologist, to designate lands containing mineral deposits of regional or statewide significance. Mineral lands are mapped according to jurisdictional boundaries (i.e., counties), mapping all mineral commodities at one time in the area, using the California Mineral Land Classification System.

The objective of classification and designation processes is to ensure, through appropriate lead agency policies and procedures, that mineral deposits of statewide or of regional significance are available when needed. The State Mining and Geology Board, based on recommendations from the State Geologist and public input, prioritizes areas to be classified and/or designated. Areas that are generally given highest priority are those areas within the state that are subject to urban expansion or other irreversible land uses that would preclude mineral extraction.

Classification is completed by the State Geologist in accordance with the State Mining and Geology Board's priority list, into MRZs, as defined below. Classification of these areas is based on geologic and economic factors without regard to existing land use and land ownership. As stated above, the Project area and vicinity have been classified as MRZ-4 for mineral resources and are not designated as being of regional or state-wide importance. MRZ-4 is defined as areas where geologic information does not rule out either the presence or absence of mineral resources. It must be emphasized that MRZ-4 classification does not imply that there is little likelihood for the presence of mineral resources, but rather there is a lack of knowledge regarding mineral occurrence.

D.11.3 Local

Riverside County uses the SMGB Mineral Resource Zone classifications, the designation of Aggregate Mineral Resource areas, and a County designation for Open Space – Mineral Resources in its General Plan. The Plan does not designate any areas within the Palo Verde Valley area for Open Space – Mineral Resources (Riverside County 2015b).

D.12 NOISE

Regulating environmental noise is generally the responsibility of local governments. The USEPA, however, has published guidelines on recommended maximum noise levels to protect public health and welfare.

D.12.1 Federal

Occupational Safety and Health Act

The Occupational Safety and Health Act of 1970 (OSHA) set on-site occupational noise exposure levels, which are regulated in California via the Cal/OSHA. The maximum time-weighted average noise exposure level of workers is 90 dBA over an eight-hour work shift (29 CFR Part 1910.95).

California Desert Conservation Area Plan, 1980 as Amended

The CDCA Plan (BLM 1980) contains provisions for public land-use management in the California Desert District under the BLM's jurisdiction. Since its first date of publication in 1980, the CDCA Plan has been amended in order to incorporate public concerns and congressional mandates in regard to the use of desert resources, such as the provisions of the 1994 California Desert Protection Act.

In particular, noise-related guidelines established in the CDCA Plan include long-term monitoring of effects of vehicle noise on wildlife (Chapter 3, Wildlife Element) and implementation of land use compatibility standards with limited (vehicle use) areas in order to minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands (Chapter 3, Motorized-Vehicle Access Element). The CDCA Plan also identifies energy and utility corridors and power plant sites within the California Desert District (Chapter 3, Energy Production and Utility Corridors Element).

D.12.2 State

California Occupational Safety and Health Administration

The California Department of Industrial Relations, Division of Occupational Safety and Health, enforces Cal/OSHA regulations, which are the same as the Federal OSHA regulations described above. The regulations are contained in Title 8 of the CCR, General Industrial Safety Orders, Article 105, Control of Noise Exposure, Section 5095.

California Vehicle Code

The California Vehicle Code, Sections 23130 and 23130.5, limits highway vehicle noise and is enforced by the California Highway Patrol and the County Sheriff's Office.

California State Planning Law

The State of California requires local jurisdictions (via California Government Code Section 65302(f)) to develop general plans that include "Noise Elements." A key component of determining land use compatibility is defining appropriate noise thresholds and where such standards apply. "Noise-sensitive" land use classifications in the state of California include residential areas, schools, convalescent and acute care hospitals, parks and recreational areas, and churches. For exterior living areas, such as yards and patios, the noise threshold guideline for new residential land uses is 55 dBA CNEL and must not exceed 65 dBA CNEL.

D.12.3 Local

Riverside County General Plan

The Riverside County General Plan's (Riverside County 2015a) Noise Element includes noise compatibility guidance. The Land Use Compatibility for Community Noise Exposure, included in the noise element, indicates that residential low density, single family, duplex, and mobile homes are normally acceptable up to 60 dBA day-night average sound level (Ldn) or CNEL.

Riverside County's Ordinance No. 847 addresses noise. Ordinance No. 847 states: "This ordinance is not intended to establish thresholds of significance for the purpose of any analysis required by the California Environmental Quality Act and no such thresholds are hereby established." Accordingly, noise in excess of the standards set in Ordinance 847 does not necessarily create a significant impact. Section 4 of Ordinance 847, lists maximum nighttime and daytime sound levels for occupied property by General Plan land use designation. The most restrictive limit would apply to the nearest occupied receptors, which are classified as Rural Residential. The ordinance indicates the maximum decibel level allowed in Rural Residential is a daytime and nighttime limit of 45 dBA Lmax (maximum sound level) when measured at the exterior of an occupied property, except:

- Private construction projects located one-quarter of a mile or more from an inhabited dwelling; or
- private construction projects located within one-quarter of a mile from an inhabited dwelling, provided that: 1) Construction does not occur between the hours of 6 p.m. and 6 a.m. during the months of June through September; and 2) Construction does not occur between the hours of 6 p.m. and 7 a.m. during the months of October through May (Riverside County 2007).

The Riverside County General Plan (Riverside County 2015a) includes policies that address noise within the County boundaries. The policies that would be applicable to the proposed Project are included below.

Noise Element (N)

Policy N 1.4. Determine if existing land uses will present noise compatibility issues with proposed projects by undertaking site surveys.

Policy N 1.5. Prevent and mitigate the adverse impacts of excessive noise exposure on the residents, employees, visitors, and noise-sensitive uses of Riverside County.

Policy N 3.3. Ensure compatibility between industrial development and adjacent land uses. To achieve compatibility, industrial development projects may be required to include noise mitigation measures to avoid or minimize project impacts on adjacent uses.

Policy N 7.4. Check each development proposal to determine if it is located within an airport noise impact area as depicted in the applicable Area Plan's Policy Area section regarding Airport Influence Areas. Development proposals within a noise impact area shall comply with applicable airport land use noise compatibility criteria.

Policy N 12.1. Minimize the impacts of construction noise on adjacent uses within acceptable practices.

Policy N 12.2. Ensure that construction activities are regulated to establish hours of operation in order to prevent and/or mitigate the generation of excessive or adverse noise impacts on surrounding areas.

Land Use Element (LU)

Policy LU 29.6. Require that commercial projects abutting residential properties protect the residential use from the impacts of noise, light, fumes, odors, vehicular traffic, parking, and operational hazards.

Riverside County Airport Land Use Compatibility Plan

Noise policies related to the Riverside County ALUC's New Compatibility Plan (RCALUCP 2004) are provided below.

Policy 3.1.4. *Nonresidential Development:* The compatibility of nonresidential development shall be assessed primarily with respect to its usage intensity (the number of people per acre) and the noise-sensitivity of the use. Additional criteria listed in Table 2A shall also apply.

a) The total number of people permitted on a project site at any time, except for rare special events, must not exceed the indicated usage intensity times the gross acreage of the site.

   1) Usage intensity calculations shall include all people (e.g., employees, customers/ visitors, etc.) who may be on the property at any single point in time, whether indoors or outside.

   2) Rare special events are ones (such as an air show at an airport) for which a facility is not designed and normally not used and for which extra safety precautions can be taken as appropriate.

b) No single acre of a project site shall exceed the number of people per acre indicated in Policy 4.2.5(b) and listed in Table 2A unless special risk reduction building design measures are taken as described in Policy 4.2.6.

c) The noise exposure limitations cited in Policy 4.1.4 and listed in Table 2B shall be the basis for assessing the acceptability of proposed nonresidential land uses relative to noise impacts. The ability of buildings to satisfy the interior noise level criteria noted in Policy 4.1.6 shall also be considered.

Policy 3.1.6. *Other Development Conditions:* All types of proposed development shall be required to meet the additional conditions listed in Table 2A for the respective compatibility zone where the development is to be located. Among these conditions are the following:

a) Avigation Easement Dedication: See Policy 4.3.5.

b) Deed Notice: See Policy 4.4.3.

c) Real Estate Disclosure: See Policy 4.4.2.

d) Noise Level Reduction: See Policy 4.1.6.

e) Airspace Review: See Policy 4.3.3.

Policy 4.1.1. *Policy Objective:* The purpose of noise compatibility policies is to avoid establishment of noise-sensitive land uses in the portions of airport environs that are exposed to significant levels of aircraft noise.

Policy 4.1.5. *Noise Exposure for Other Land Uses:* Noise level compatibility standards for other types of land uses shall be applied in the same manner as the above residential noise level criteria. The extent of outdoor activity associated with a particular land use is an important factor to be considered in evaluating its compatibility with airport noise. Examples of acceptable noise levels for other land uses in an airport's vicinity are presented in Table 2B.

Policy 4.1.6. *Interior Noise Levels:* Land uses for which interior activities may be easily disrupted by noise shall be required to comply with the following interior noise level criteria.

a) The maximum, aircraft-related, interior noise level that shall be considered acceptable for land uses near airports is 45 dB CNEL in:

- Any habitable room of single- or multi-family residences;
- Hotels and motels;
- Hospitals and nursing homes;
- Churches, meeting halls, theaters, and mortuaries;
- Office buildings; and
- Schools, libraries, and museums.

b) The noise contours depicted in Chapter 3 of this Plan shall be used in calculating compliance with these criteria. The calculations should assume that windows are closed.

c) When reviewed as part of a general plan or zoning ordinance amendment or as a major land use action, evidence that proposed structures will be designed to comply with the above criteria shall be submitted to the ALUC under the following circumstances:

Any mobile home situated within an airport's 55-dB CNEL contour. [A typical mobile home has an average exterior-to-interior noise level reduction (NLR) of approximately 15 dB with windows closed.]

D.13 PALEONTOLOGICAL RESOURCES

D.13.1 Federal

The management and preservation of paleontological resources on public lands are governed under various laws, regulations, and standards. For the past several decades, the BLM has used the FLMPA as the legislative foundation for its paleontological resource management policies. The BLM has also developed general procedural guidelines (Manual H-8720-1; Instructional Memorandum [IM] 2008-009; IM 2009-011) for the management of paleontological resources (BLM 2007). Paleontological resource management objectives include the evaluation, management, protection, and location of fossils on BLM-managed lands. Management policy also includes measures to ensure that proposed land use projects do not inadvertently damage or destroy scientifically significant paleontological resources.

Federal Land Management and Policy Act

FLMPA defines significant fossils as: unique, rare or particularly well-preserved; an unusual assemblage of common fossils; being of high scientific interest; or providing important new data concerning [1] evolutionary trends, [2] development of biological communities, [3] interaction between or among organisms, [4] unusual or spectacular circumstances in the history of life, [5] or anatomical structure.

Paleontological Resources Preservation Act

The Paleontological Resources Preservation Act (PRPA), Title VI, Subtitle D of the Omnibus Public Lands Act directs the Secretaries of the Interior and Agriculture to manage and protect paleontological resources on Federal land using “scientific principles and expertise.” The PRPA incorporates most of the recommendations of the report of the Secretary of the Interior entitled "Assessment of Fossil Management on Federal and Indian Lands” (USDI 2000) in order to formulate a consistent paleontological resources management framework. In passing the PRPA, Congress officially recognized the scientific importance of paleontological resources on some Federal lands by declaring that fossils from these lands are Federal property that must be preserved and protected.

The PRPA codifies existing policies of the BLM, NPS, USFS, Bureau of Reclamation, and USFWS, and provides the following:

1. criminal and civil penalties for illegal sale and transport, and theft and vandalism of fossils from Federal lands;
2. minimum requirements for paleontological resource-use permit issuance (terms, conditions, and qualifications of applicants);
3. definitions for “paleontological resources” and “casual collecting”; and
4. requirements for curation of Federal fossils in approved repositories.

Federal legislative protections for scientifically significant fossils apply to projects that take place on Federal lands (with certain exceptions such as DOD), involve Federal funding, require a Federal permit, or involve crossing state lines. Because most of the Project site is located on

BLM-managed lands, Federal protections for paleontological resources apply under NEPA and FLPMA.

Potential Fossil Yield Classification System

Occurrences of paleontological resources are closely tied to the geologic units (i.e., formations, members, or beds) that contain them. The probability for finding paleontological resources can be broadly predicted from the geologic units present at or near the surface. Therefore, geologic mapping can be used for assessing the potential for the occurrence of paleontological resources.

The BLM uses the PFYC system, which classifies geologic units based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher potential. This classification is applied to the geologic formation, member, or other distinguishable unit, preferably at the most detailed mappable level. It is not intended to be applied to specific paleontological localities or small areas within units. Although significant localities may occasionally occur in a geologic unit, a few widely scattered important fossils or localities do not necessarily indicate a higher class; instead, the relative abundance of significant localities is intended to be the major determinant for the class assignment.

D.13.2 State

Public Resources Code §5097.5

PRC §5097.5 includes additional state-level requirements for the assessment and management of paleontological resources, including the reasonable mitigation of adverse impacts to paleontological resources resulting from development on public lands (lands under state, county, city, or public district or agency ownership or jurisdiction). This regulation defines the removal of paleontological "sites" or "features" from public lands as a misdemeanor, and prohibits the removal of any paleontological "site" or "feature" from public land without permission of the applicable jurisdictional agency. These protections apply only to non-Federal public lands within California, and thus apply only to private land portion of the DQSP.

Public Resources Code §30244

If paleontological resources would be adversely impacted as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.

D.13.3 Local

Riverside County General Plan

The Multipurpose Open Space Element of the Riverside County General Plan (Riverside County 2015a) identifies policies intended to minimize impacts to paleontological resources. It also includes a Paleontological Sensitivity Resources map indicating lands with low, undetermined, or high potential for finding paleontological resources. The following policies apply to the portions of the Project site within County- and privately-owned lands (Riverside County 2015a):

OS 19.6. Whenever existing information indicated that a site proposed for development has high paleontological sensitivity as shown on Figure OS-7, a paleontological resource impact mitigation program (PRIMP) shall be filed with the County Geologist. The PRIMP shall specify the steps to be taken to mitigate impacts to paleontological resources.

OS 19.7. Whenever existing information indicates that a site proposed for development has low paleontological sensitivity as shown in Figure OS-7, no direct mitigation is required unless a fossil is encountered during site development. Should a fossil be encountered, the County Geologist shall be notified and a paleontologist shall document the extent and potential significance of the paleontological resources on the site and establish appropriate mitigation measures for further site development.

OS 19.8. Whenever existing information indicates that a site proposed for development has undetermined paleontological sensitivity as shown on Figure OS-7, a report shall be filed with the County Geologist documenting the extent and potential significance of the paleontological resources on site and identifying mitigation measures for the fossil and for impacts to significant paleontological resources.

D.14 RECREATION AND PUBLIC ACCESS

D.14.1 Federal

The Project would be located primarily on BLM-administered lands. The following is a discussion of the Federal plans and policies that would be applicable to the BLM-administered lands on the Project site.

Federal Land Policy and Management Act, 1976 as Amended

FLPMA establishes public land policy; guidelines for administration; and provides for the management, protection, development, and enhancement of public lands. In particular, the FLPMA's relevance to the Project is that Title V, §501, establishes BLM's authority to grant ROWs for generation, transmission, and distribution of electrical energy. Under FLPMA, the BLM is responsible for the development of energy resources on BLM-administered lands in a manner that balances diverse resource uses and that takes into account the long-term needs of future generations for renewable and non-renewable resources. Among those uses, FLPMA recognizes that the public lands should be managed in a manner that will provide for outdoor recreation.

California Desert Conservation Area Plan, 1980 as Amended

The CDCA Plan (BLM 1980) includes a Recreation Element to address use of, and access to, recreational destinations within the California Desert. The management goals of the CDCA Plan Recreation Element are as follows:

1) Provide for a wide range of quality recreation opportunities and experiences emphasizing dispersed undeveloped use.
2) Provide a minimum of recreation facilities. Those facilities should emphasize resource protection and visitor safety.
3) Manage recreation use to minimize user conflicts, provide a safe recreation environment, and protect desert resources.

4) Emphasize the use of public information and educational techniques to increase public awareness, enjoyment, and sensitivity to desert resources.
5) Adjust management approach to accommodate changing visitor use patterns and preferences.
6) Encourage the use and enjoyment of desert recreation opportunities by special populations, and provide facilities to meet the needs of those groups.

In order to accommodate the goals, access to the desert must be provided while protecting sensitive resources. The Recreation Element states the following with regard to access:

"To engage in most desert recreational activities outside of open areas, visitors must use motorized vehicles and usually travel on some previously used or marked motorized-vehicle route. Understandably, vehicle access is among the most important recreation issues in the Desert. A primary consideration of the recreation program, therefore, is to ensure that access routes necessary for recreation enjoyment are provided" (BLM 1980, p. 84).

Northern and Eastern Colorado Desert Coordinated Management Plan

The NECO Plan (BLM 2002), as amended to the CDCA Plan, provides for management of recreation within the California Desert area of El Centro, Blythe, Needles, and cities in the Coachella Valley, including the Project study area. The NECO Plan Amendment to the CDCA Plan specifies the type of recreational activities allowed in Multiple-Use Classes on BLM-administered land. Under this plan, new routes may be allowed if approved by the authorized officer through the appropriate public process.

D.14.2 State

There are no state regulations that are applicable to recreational resources within the vicinity of the Project site.

D.14.3 Local

Riverside County General Plan

Private lands around the Project area, including the inholding within the Project area, are designated as Agriculture (AG) and Open Space Rural (OS-RUR) according to the Riverside County General Plan Land Use Map (Riverside County 2015a). Both designations allow for residential development at low density. Agricultural areas may be used for recreational activities, such as hunting or walking. No specific policies relating to recreation apply to the proposed Project.

D.15 SOCIAL AND ECONOMIC SETTING

D.15.1 Federal

National Environmental Policy Act

Under NEPA (42 USC §4321 et seq.), an EIS must include an analysis of the proposed action's economic, social, and demographic effects related to effects on the natural or physical environment in the affected area, but does not allow for economic, social, and demographic effects to be analyzed in isolation from the physical environment.

The President's CEQ developed guidelines and procedures to assist Federal agencies with NEPA procedures so that environmental justice concerns are effectively identified and addressed. This includes guidelines for public participation, alternatives, and mitigation.

D.15.2 State

Title 14 California Code of Regulations § 15131

The regulations implementing CEQA state that economic or social factors of a project may be included in a CEQA document but shall not be treated as significant effects on the environment. However, economic or social effects of a project may be used to determine the significance of physical changes caused by the Project. Additionally, economic, social, and housing factors should be considered by public agencies together with technological and environmental factors in deciding whether changes in a project are feasible to reduce or avoid the significant effects on the environment.

D.15.3 Local

There are no applicable local social or economic statutes, regulations, plans, or standards that apply to the Proposed Action.

D.16 SPECIAL DESIGNATIONS AND LANDS WITH WILDERNESS CHARACTERISTICS

D.16.1 Federal

The following summarizes the Federal statutes, regulations, plans and standards that would be applicable to the special designations on BLM-administered lands on and in the vicinity of the Project.

Federal Land Policy and Management Act, 1976 as Amended

FLPMA (Public Law 94-579, October 21, 1976), is called the BLM Organic Act because it consolidates and articulates BLM's management responsibilities. Many land and resource management authorities were established, amended, or repealed by FLPMA, and it proclaimed multiple use, sustained yield, and environmental protection as the guiding principles for public land management (BLM 2015).

Several sections of FLPMA provide guidance regarding the establishment, management, and inventory of resource values that are considered for special designations.

Lands in the vicinity of the Project were recently reviewed for wilderness characteristics based on FLPMA §201(a) requiring the BLM to:

> *prepare and maintain on a continuing basis an inventory of all public lands and their resource and other values (including, but not limited to, outdoor recreation and scenic values), giving priority to areas of critical environmental concern. This inventory shall be*

> *kept current so as to reflect changes in conditions and to identify new and emerging resource and other values. The preparation and maintenance of such inventory or the identification of such areas shall not, of itself, change or prevent change of the management or use of public lands.*

Section 202(c)(3) requires the BLM, through the land use planning system, to "give priority to the designation and protection of areas of critical environmental concern." In §103(a), an ACEC is defined as the following:

> *An area within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards.*

Section 603(a) of FLPMA required BLM to conduct the original inventory of wilderness characteristics, which was completed in 1979, while §603(c) stated that "once an area has been designated for preservation as wilderness, the provisions of the Wilderness Act (16 USC 1131 et seq.) which apply to national forest wilderness areas shall apply with respect to the administration and use of such designated area".

Wilderness Act of 1964

The "Wilderness Act" (Public Law 88-577; September 3, 1964) is the legislation authorizing the establishment and management of the seven wilderness areas in the vicinity of Project Area. Section 4(a) states:

> *…….each agency administering any area designated as wilderness shall be responsible for preserving the wilderness character of the area and shall so administer such area for such other purposes for which it may have been established as also to preserve its wilderness character. Except as otherwise provided in this Act, wilderness areas shall be devoted to the public purposes of recreational, scenic, scientific, educational, conservation, and historical use.*

California Desert Protection Act of 1994

The CDPA (Public Law 103-433, October 31, 1994) designated 69 areas as components of the National Wilderness Preservation System on BLM-managed public lands in the California Desert. Section 103(d) states that "wilderness is a distinguishing characteristic of the public lands in the California desert" and "the wilderness values of desert lands are increasing threatened by …development." The CDPA further states that there are no buffer zones designated along with the wilderness areas: "The fact that non-wilderness activities or uses can be seen or heard from areas within a wilderness area shall not, in itself, preclude such activities or uses up to the boundary of a wilderness area."

Omnibus Public Lands Management Act of 2009

The Bureau of Land Management's National Landscape Conservation System (NLCS) was created in June 2000 to conserve, protect, and restore special areas and unique resources. The lands are prized for their cultural, ecological, scientific, educational, wildlife, and aesthetic values for the benefit of current and future generations. The NLCS system gained legal permanence in 2009 with the passage of the Omnibus Public Land Management Act (Public Law 111-11, March 30, 2009) §2002(a). Section 2002(c) directed the BLM "to manage the system in accordance with any applicable law (including regulations) relating to any of component of the system in a manner that protects the values for which the components of the system were designated." The Public Lands within the CDCA and components of the National Wilderness Preservation System are areas included under this authorization.

California Desert Conservation Area Plan, 1980 as Amended

The CDCA is a 25-million acre expanse of land designated by Congress in 1976 through §601 of FLPMA. The BLM administers about 10 million of those acres. When Congress created the CDCA, it recognized its special values, and the need for a comprehensive plan for managing the area.

The CDCA Plan recognized the need to maintain and perpetuate wilderness resources, including plants and animals indigenous to the area, and to the extent consistent provide the above for opportunities for public use, enjoyment, and understanding, and the unique experiences dependent upon a wilderness setting, including maintaining access to these areas. The plan also directed managers to consider valid nonconforming uses and activities in the management of the wilderness so as to have the least possible adverse effect and/or wherever possible a positive effect (BLM 1980).

In addition, the plan established ACECs as a management tool for the protection of special values, including cultural resources, prehistoric archaeological features, wildlife habitat, and sensitive plant species. Prior to its designation, management prescriptions are developed for each proposed ACEC. These prescriptions are site specific and include actions that the BLM has the authority to carry out, as well as recommendations for actions that the BLM does not have direct authority to implement, such as cooperative agreements with other agencies and mineral withdrawals (BLM 1980).

Additional discussion regarding management prescriptions of specific ACECs are found in the relevant sections: 3.3, *Biological Resources – Vegetation*; 3.4, *Biological Resources – Wildlife*; and 3.5, *Cultural Resources*.

Northern and Eastern Colorado Desert Coordinated Management Plan

The NECO Plan Amendment to the CDCA Plan is a landscape-scale, multi-agency planning effort that protects and conserves natural resources while simultaneously balancing human uses of the California portion of the Sonoran Desert ecosystem. The planning area encompasses over 5 million acres and hosts 60 sensitive plant and animal species. Lands within the planning area are also popular for hiking, hunting, rockhounding, and driving for pleasure. Several commercial mining operations, livestock grazing, and utility transmission lines exist in the area as well (BLM 2002a).

The record of decision for the NECO Plan Amendment to the CDCA Plan, signed December 12, 2002, amended the 1980 CDCA Plan by formally incorporating the 23 wilderness areas (including the seven in the vicinity) established by the 1994 CDPA in the CDCA (BLM 2002b).

BLM Manual 6340, Management of Designated Wilderness Areas

This manual section identifies BLM's role in administering wilderness areas on public lands, provides policy guidance for BLM personnel, and sets the framework for wilderness management program development. It states the goals of wilderness management, as well as administrative functions and specific activities related to wilderness management (BLM 2012d).

BLM Handbook 1601-1 Land Use Planning Handbook

This handbook provides general guidance for the establishment of BLM administrative designations including those in the vicinity of the Project: ACECs and Back Country Byways. It specifically states that designated ACECs must be managed to protect the area and prevent irreparable damage or natural systems (BLM 2005).

BLM Handbook 8357-1, 1993 BLM Byways Handbook

This handbook provides specific direction for BLM's Back Country Byways program, including information of Byways nomination and designation, planning criteria, visitor safety, and specifications for entrance kiosks (BLM 1993).

BLM Instruction Memorandum No. 2011-154

This Instruction Memorandum directs offices to continue to conduct and maintain inventories regarding the presence or absence of wilderness characteristics, and to consider lands with wilderness characteristics in land use plans and when analyzing projects under NEPA (BLM 2011).

D.16.2 State

Special designations refer specifically to the BLM and are not relevant to the state government.

D.17 TRANSPORTATION AND TRAFFIC

Construction, operation, maintenance, and decommissioning of the Project could affect access and traffic flow patterns on public streets and highways. The following sections provide the Federal, state and local transportation and traffic laws, regulations, and policies pertinent to the Project.

D.17.1 Federal

The Code of Federal Regulations provides guidelines for regulations as they relate to the movement of hazardous materials via the Federal Motor Carrier Safety Administration. Federal Aviation Administration (FAA) guidelines and regulations are provided for aviation activities during the construction and post-construction periods.

D.17.2 State

The California Vehicle Code (CVC) and the California Streets and Highway Code outline regulations pertaining to the transportation of hazardous waste within the state. The following laws and regulations would be potentially applicable to the Project.

CVC, Div 2, Chapter 2.5; Div 6; Chap. 7; Div 13; Chap. 5; Div. 14.1; Chap 1 & 2; Div. 14.8; Div. 15

These regulations pertain to licensing, size, weight, and load of vehicles operated on highways; safe operation of vehicles; and the transportation of hazardous materials.

California Streets and Highway Code, Div 1, Chap 3; Div 2 Chap 5.5

These regulations cover the care and protection of state and county highways and provisions for the issuance of written permits.

CVC Section 353

This regulation defines hazardous materials.

CVC Sections 2500-2505

This regulation authorizes the issuance of licenses for the transport of hazardous materials.

CVC Sections 13369, 15275 and 15278

These regulations address the licensing of drivers and the classification of licenses required for the operation of particular types of vehicles. The regulations also require certificates permitting operation of vehicles transporting hazardous materials.

CVC Sections 31303-31309

These regulations address the highway transport of hazardous materials, the routes used, and restrictions on those facilities.

CVC Sections 31600-31620

These regulations control the transportation of explosive materials.

CVC Sections 32000-32053

These regulations standardize the licensing of carriers of hazardous materials, including noticing requirements.

CVC Section 32100-32109

These regulations establish special requirements for the transportation of inhalation hazards and poisonous gases.

CVC Sections 34000-34121

These regulations establish special requirements for the transportation of flammable and combustible liquids over public roads and highways.

CVC Section 34500 et seq.

These regulations address the safe operation of vehicles, including those that are used for the transportation of hazardous materials.

CVC Sections 35780

These regulations require permits for any load exceeding California Department of Transportation (Caltrans) weight, length, or width standards for public roadways.

California Streets and Highway Code, Div 1, Chap 3; Div 2 Chap 5.5

These regulations cover the care and protection of state and county highways and provisions for the issuance of written permits.

California Health and Safety Code Section 25160 et seq.

These regulations require that an authorized representative of the generator or facility operator that is responsible for loading hazardous waste into a transport vehicle shall, prior to loading, ensure that the driver of the transport vehicle is in possession of the appropriate class of driver's license and any endorsements required to operate the transport vehicle with the intended load.

California Streets and Highways Code Sections 117, 660-695, and 700-711

These regulations govern right-of-way (ROW) encroachment and the granting of permits for encroachments on state highways and freeways.

California Streets and Highways Code Sections 1450, 1460 et seq., and 1480 et seq.

These regulations govern ROW encroachment and the granting of permits for encroachments on county roads.

California Government Code Sections 65352, 65940, and 65944

These regulations require evaluation of compatibility with military activities for any land use proposal located near a military installation or airspace.

Caltrans Encroachment Permit

The use of state highways for purposes other than transportation purposes requires an encroachment permit, which an applicant can obtain through submission of Caltrans form TR-0100. This permit is required for utilities, developers, and non-profit organizations for use of the state highway system to conduct activities other than transportation (e.g., landscape work, utility installation, film production) within the ROW. The application would be forwarded to Caltrans District 8, whose jurisdiction includes the DQSP site. Part 5 of the Caltrans Traffic Manual provides Traffic Control Devices for Low-Volume Roads (Caltrans 2014). Additionally, the transport of oversize or overweight loads would require approval from Caltrans.

Caltrans Traffic Impact Study

Caltrans reviews Federal, state, and local agency development projects and land use change proposals for their potential impact to state highway facilities. The applicability and scope of a traffic impact study are presented in the Caltrans Guide for the Preparation of Traffic Impact Studies (Caltrans 2002).

D.17.3 Local

2011 Riverside County Congestion Management Program

Riverside County's Congestion Management Plan specifies that all Congestion Management Plan roadways operate at a Level of Service (LOS) of "E" or better. All state highways and principal arterials are Congestion Management Plan roadways. I-10 and SR-78 are the only Congestion Management Plan roadways in the Project study area (RCTC 2011). The Congestion Management Plan was first established in 1990 under Proposition 111.

Proposition 111 established a process for each metropolitan county in California to designate a Congestion Management Agency that would be responsible for development and implementation of the Congestion Management Plan within county boundaries. The Riverside County Transportation Commission (RCTC) was designated as the Congestion Management Agency in 1990 and, therefore, prepares the Congestion Management Plan updates in consultation with the Technical Advisory Committee, which consists of local agencies, the County of Riverside, transit agencies, and subregional agencies.

The RCTC's adopted minimum LOS threshold is LOS "E." Therefore, when a Congestion Management Plan street or highway segment falls to "F," a deficiency plan would be required. Preparation of a deficiency plan would be the responsibility of the local agency where the deficiency is located. Other agencies identified as contributors to the deficiency would also be required to coordinate with the development of the plan. The plan must contain mitigation measures, including consideration of Transportation Demand Management strategies and transit alternatives, and a schedule for mitigating the deficiency.

Regional Comprehensive Plan and Regional Transportation Plan

The Southern California Association of Government's (SCAG's) Intergovernmental Review section, part of the Environmental Planning Division of Planning and Policy, is responsible for performing consistency review of regionally significant local plans, projects, and programs. Regionally significant projects are required to be consistent with SCAG's adopted regional plans and policies, such as the Regional Comprehensive Plan and the Regional Transportation Plan. The criteria for projects of regional significance are outlined in state CEQA Guidelines Sections 15125 and 15206. According to the SCAG Intergovernmental Review Procedures Handbook, "new or expanded electrical generating facilities and transmission lines" qualify as regionally significant projects.

Policy 3.05: *Encourage patterns of urban development and land use which reduce costs on infrastructure construction and make better use of existing facilities.*

Policy 3.14: *Support local plans to increase density of future development located at strategic points along the regional commuter rail, transit systems, and activity centers.*

Policy 3.16: *Encourage developments in and around activity centers, transportation corridors, underutilized infrastructure systems, and areas needing recycling and redevelopment.*

Policy 3.17: *Support and encourage settlement patterns which contain a range of urban densities.*

Policy 3.18: *Encourage planned development in locations least likely to cause adverse environmental impact.*

Policy RTP G5: *Protect the environment, improve air quality and promote energy efficiency.*

Policy RTP G6: *Encourage land use and growth patterns that complement our transportation investments and improve the cost-effectiveness of expenditures.*

Policy GV P1.1: *Encourage transportation investments and land use decisions that are mutually supportive.*

Policy GV P4.2: *Focus development in urban centers and existing cities.*

Policy GV P4.3: *Develop strategies to accommodate growth that uses resources efficiently, eliminate pollution and significantly reduce waste.*

Policy GV P4.4: *Utilize "green" development techniques.*

Riverside County General Plan

The Riverside County General Plan (Riverside County 2015a) is applicable to all unincorporated lands within Riverside County. Countywide policies that address traffic and transportation within the County boundaries are located in the Circulation and Land Use Elements of the County's General Plan (Riverside County 2015a), and include:

Circulation Element (C)

Policy C 2.1. The following minimum target levels of service have been designated for the review of development proposals in the unincorporated areas of Riverside County with respect to transportation impacts on roadways designated in the Riverside County Circulation Plan (Figure-1) which are currently County maintained, or are intended to be accepted into the County maintained roadway system:

LOS C shall apply to all development proposals in any area of the Riverside County not located within the boundaries of an Area Plan, as well those areas located within the following Area Plans: REMAP, Eastern Coachella Valley, Desert Center, Palo Verde Valley, and those non-Community Development areas of the Elsinore, Lake Mathews/Woodcrest, Mead Valley and Temescal Canyon Area Plans.

LOS D shall apply to all development proposals located within any of the following Area Plans: Eastvale, Jurupa, Highgrove, Reche Canyon/Badlands, Lakeview/Nuevo, Sun City/Menifee Valley, Harvest Valley/Winchester, Southwest Area, The Pass, San Jacinto Valley, Western Coachella Valley and those Community Development Areas of the Elsinore, Lake Mathews/Woodcrest, Mead Valley and Temescal Canyon Area Plans.

LOS E may be allowed by the Board of Supervisors within designated areas where transit-oriented development and walkable communities are proposed.

Notwithstanding the forgoing minimum LOS targets, the Board of Supervisors may, on occasion by virtue of their discretionary powers, approve a project that fails to meet these LOS targets in order to balance congestion management considerations in relation to benefits, environmental impacts and costs, provided an Environmental Impact Report, or equivalent, has been completed to fully evaluate the impacts of such approval. Any such approval must incorporate all feasible mitigation measures, make specific findings to support the decision, and adopt a statement of overriding considerations.

Policy C 2.2. Require that new development prepare a traffic impact analysis as warranted by the Riverside County Traffic Impact Analysis Preparation Guidelines or as approved by the Director of Transportation. Apply level of service targets to new development per the Riverside County Traffic Impact Analysis Preparation Guidelines to evaluate traffic impacts and identify appropriate mitigation measures for new development.

Policy C 2.3. Traffic studies prepared for development entitlements (tracts, plot plans, public use permits, conditional use permits, etc.) shall identify project related traffic impacts and determine the "significance" of such impacts in compliance with CEQA and the Riverside County Congestion Management Program Requirements.

Policy C 20.6. Control dust and mitigate other environmental impacts during all stages of roadway construction.

Policy C 20.15. Implement National Pollutant Discharge Elimination System Best Management Practices relating to construction of roadways to control runoff contamination from affecting the groundwater supply.

Land Use Element (LU)

Policy LU 7.4. Retain and enhance the integrity of existing residential, employment, agricultural, and open space areas by protecting them from encroachment of land uses that would result in impacts from noise, noxious fumes, glare, shadowing, and traffic.

Palo Verde Valley Area Plan

The applicable policy related to traffic and transportation included with the PVVAP is provided below (Riverside County 2015b).

Policy PVVAP 7.2. Maintain Riverside County's roadway Level of Service standards as described in the Level of Service section of the General Plan Circulation Element.

Riverside County Municipal Code Title 10, Chapter 10.08, Sections 10.08.010 – 10.08.180

These regulations establish requirements and permits for oversize and overweight vehicles.

Riverside County Ordinance No. 460

This ordinance specifies that all work shall conform to the requirements of the Riverside County Transportation Department Subdivision Regulations.

Riverside County Ordinance No. 461

This ordinance specifies that all work shall conform to the requirements of the Riverside County Transportation Department Road Improvement Standards and Specifications.

Riverside County Ordinance No. 500.1

This ordinance specifies the permissible weight of vehicles on unimproved County highways.

Riverside County Ordinance No. 524.1

This ordinance regulates oversize and overweight vehicles and loads.

Riverside County Ordinance No. 846

This ordinance specifies the permissible vehicle weight in the community of Mesa Verde/County Service Area (CSA) 122. Pursuant to California Vehicle Code § 35712, any commercial vehicle exceeding a manufacturer's gross vehicle weight rating of 14,000 pounds is prohibited from using the local streets within the community of Mesa Verde and CSA 122 as identified in the restricted list. Certain exemptions apply to commercial vehicles owned by a public utility or a contractor while necessarily in use in the construction, installation, or repair of any public utility are exempt from the vehicle weight restriction.

D.18 UTILITIES AND PUBLIC SERVICES

D.18.1 Federal

Safe Drinking Water Act

Under the Safe Drinking Water Act (SDWA) (Public Law 93-523), passed in 1974, the USEPA regulates contaminants of concern to domestic water supply. Contaminants of concern relevant to domestic water supply are defined as those that pose a public health threat or that alter the aesthetic acceptability of the water. These types of contaminants are regulated by USEPA primary and secondary Maximum Contaminant Levels (MCLs) that are applicable to treated water supplies delivered to the distribution system. MCLs and the process for setting these standards are reviewed triennially. Amendments to the SDWA enacted in 1986 established an accelerated schedule for setting MCLs for drinking water. USEPA has delegated to the California Department of Health Care Services (CDHCS) the responsibility for administering California's drinking-water program. The State Water Resources Control Board is accountable to USEPA for program implementation and for adopting standards and regulations that are at least as stringent as those developed by USEPA. The California Department of Public Health (CDPH) provides laboratory support that ensures the public's safety from unsafe drinking water. The applicable state primary and secondary MCLs for this Project are set forth in 22 CCR §64431 inorganic chemicals), and §64444 (organic chemicals – both volatile and non-volatile and including herbicides).

D.18.2 State

California Government Code §4216.2 Notification of Underground Work

California Government Code §4216.2 requires excavators to contact a regional notification center at least two working days before, but not more than 14 calendar days prior to beginning excavation work. Notification is required to be completed for all areas that are known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the excavator. If practical, the excavator is required to delineate, with white paint or other acceptable markings, the area to be excavated. Additional restrictions are provided for locations within 10 feet of a high priority subsurface installation. Additional provisions are applicable to emergency situations.

14 CCR Division 7.3

Title 14 of the CCR provides minimum requirements for solid waste handling and disposal within the state. The regulations implement standards for the disposal and storage of solid waste, for nonhazardous wastes, and including solid wastes from industrial sources. Specific requirements are included for the handling and disposal of construction and demolition wastes, nonhazardous contaminated soil, waste tires, nonhazardous ash, and inert debris. Additional requirements are provided for transfer and processing facilities, siting and design standards, operation, and record keeping and reporting.

22 CCR Division 4.5

Title 22 of the CCR discusses an array of requirements with respect to the disposal and recycling of hazardous and universal wastes. Specific standards and requirements are included for the identification, collection, transport, disposal, and recycling of hazardous wastes. Additional standards are included for the collection, transport, disposal and recycling of universal wastes, where universal wastes are defined as those wastes identified in 22 CCR §66273.9, including batteries, electronic devices, mercury containing equipment, lamps, cathode ray tubes, and aerosol cans. Requirements include recycling, recovery, returning spent items to the manufacturer, or disposal at an appropriately permitted facility. 22 CCR Division 4.5 also provides restrictions and standards relevant to waste destination facilities, and provides authorization requirements for various waste handlers. Note that Title 22 includes California's Universal Waste Rule, as well as other additional waste handling and disposal requirements.

27 CCR Division 2

Title 27 of the CCR implements regulations of CalRecycle and the State Water Resources Control Board (SWRCB), with respect to disposal of wastes on land. The regulations implement a waste classification and management system, which determines whether or not wastes are compatible with containment features of specific disposal facilities, and whether or not wastes are considered hazardous. Additional requirements are included for the waste disposal sites, including construction standards, liner requirements, siting criteria, and operational management requirements. Water quality monitoring requirements are also included, along with associated contamination response programs. Finally, disposal facility closure and post closure requirements, compliance with reporting programs, and financial assurance requirements are also included.

Integrated Waste Management Act

The Integrated Waste Management Act was enacted in 1989, as AB 939. The Act required each of the cities and unincorporated portions of counties throughout the state of California to divert a minimum of 25 percent of solid waste from landfills by 1995 and 50 percent by 2000. To attain these goals for reductions in disposal, the Act established a planning hierarchy utilizing integrated solid waste management practices. The Act resulted in the creation of the California Integrated Waste Management Board, which is now known as CalRecycle. Under the Act, jurisdictions also have to submit solid waste planning documentation to CalRecycle. The Act also set into place a comprehensive statewide system of permitting, inspections, and maintenance for solid waste facilities, and authorized local jurisdictions to impose fees based on the types and amounts of waste generated.

California Revenue and Taxation Code § 73

California Revenue and Taxation Code § 73 allows property tax exclusion for certain types of solar energy systems installed before December 31, 2016. This section was amended in 2008 to include exemptions for active solar energy systems incorporated by an owner-builder in the initial construction of a new building that the owner-builder does not intend to occupy or us e. Qualifying active solar energy systems are defined as those that are thermally isolated from living space or any other area where the energy is used, to provide for the collection, storage, or distribution of solar energy. These include solar space conditioning systems, solar water heating systems, active solar energy systems, solar-process heating systems, photovoltaic systems, solar thermal electric systems, and solar mechanical energy.

Components included under the exclusion include storage devices, power conditioning equipment, transfer equipment, and parts. Pipes and ducts that are used to carry both solar energy and energy derived from other sources qualify for the exemption only to the extent of 75 percent of their full cash value. Likewise, dual-use equipment for solar-electric systems qualifies for the exclusion only to the extent of 75 percent of its value.

Assembly Bill X1 15, signed by the California governor in June 2011, modified and extended existing state law excluding an “active solar energy system” from calculation of cash value subject to property taxation. An active solar energy system includes PV panels, inverters, and other improvements necessary to deliver electric power for transmission or final use. The exclusion applies to new systems constructed prior to January 1, 2017, and remains in effect until a change in ownership occurs.

Education Code §17620

Education Code § 17620 allows a school district to levy a fee, charge, dedication, or other requirement against any construction within the boundaries of the district for the purpose of funding construction or reconstruction of school facilities, provided the district can show justification for the fees. California Government Code (GC) §65995 limits the fee to a statutory fee unless a school district conducts a Facility Needs Assessment (GC §65995.6) and meets certain conditions. The administering agent implementing school impact fees for the Project is the Palo Verde Unified School District.

California Government Code §§ 65995-65998 (amended by State Bill 50)

California GC §§ 65995-65998 limits fees, charges, dedications, or other requirements for the construction or reconstruction of school facilities. State Bill 50, adopted in 1998, imposed limitations on the power of cities and counties to require mitigation of school facilities impacts as a condition of approving new development. In the case of industrial construction, the amount of fees and/or charges levied under Education Code § 17620 with support of a Facilities Needs Assessment may not exceed $0.31 per square foot of covered, enclosed space. Development of the Project may require school impact fees.

California Assembly Bill 1826

Effective January 1, 2019, Assembly Bill 1826 requires businesses that generate four cubic yards or more of commercial solid waste per week to arrange for recycling services specifically for organic waste.

D.18.3 Local

Riverside County General Plan

The Riverside County General Plan (Riverside County 2015a) does not have an element that specifically addresses public services and utilities. However, the Plan addresses safety issues through the Safety Element. Issues addressing open space and land use are discussed in the Plan's Multipurpose Open Space Element and the Land Use Element (LU) and include:

Land Use Element

Policy LU 5.1. Ensure that development does not exceed the ability to adequately provide supporting infrastructure and services, such as libraries, recreational facilities, transportation systems, and fire/police/medical services.

Riverside County Ordinance No. 659

This ordinance creates development impact fees "in order to effectively implement the Riverside County Comprehensive General Plan, manage new residential, commercial, and industrial development, and address impacts caused by such development" by providing funds for the construction of new or expanded public service facilities and open space.

Riverside County Countywide Integrated Waste Management Plan (CIWMP)

This CIWMP was prepared by the County to comply with the requirements of AB 939. The CIWMP requires that the County update their landfill disposal capacity annually and certify that they have at least 15 years of remaining disposal capacity.

D.19 VISUAL RESOURCES

D.19.1 Federal

Federal Land Policy and Management Act

Section 102(a)(8) of the Federal Land Policy and Management Act of 1976 (FLPMA), 43 United States Code (U.S.C.) § 1701(a)(8), states that "...the public lands [are to] be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values." Section 103(c) of the Act, 43 U.S.C. § 1702(c), identifies "scenic values" as one of the resources for which public land should be managed. Section 201(a), 43 U.S.C. § 1711(a), states that "[t]he Secretary shall prepare and maintain on a continuing basis an inventory of all public lands and their resources and other values (including . . . scenic values)." Section 505(a)(ii) requires that "each right-of-way shall contain terms and conditions which will… minimize damage to scenic and esthetic values." 43 U.S.C. § 1765(a) (ii).

CDCA Plan

Under FLPMA §601, the BLM has developed the CDCA Plan to "provide for the immediate and future protection and administration of the public lands in the California desert within the framework of a program of multiple use and sustained yield, and the maintenance of environmental quality." Central to the CDCA Plan is the establishment of Multiple Use Classes that govern the management of the public lands based on the sensitivity of the resources and types of uses for each geographic area. As discussed in greater detail in Section 3.10, *Lands, Realty, and Agricultural and Forestry Resources*, multiple use classes are divided into four categories, each of which have specific guidelines for the management of specific resource or activity areas contained and discussed in each of the CDCA Plan Elements. Lands within the Project area are designated Multiple-Use Class M (Moderate), which allows energy and utility development (BLM 1980).

There is no stand-alone visual resource plan element within the CDCA; however, visual resources values are addressed within the recreation element of the CDCA Plan. According to the recreation element, the BLM will take the following actions to effectively manage for activities involving the alteration of the natural character of the landscape (BLM 1980):

1. The appropriate levels of management, protection, and rehabilitation on all public lands in the CDCA will be identified, commensurate with visual resource management objectives in the multiple use class guidelines.
2. Proposed activities will be evaluated to determine the extent of change created in any given landscape and to specify appropriate design or mitigation measures using the BLM's contrast rating process.

The contrast rating process is a tool used to determine the extent of visual impact that proposed resource management activities would create in a landscape. It serves as a guide for reducing visual impacts to acceptable levels as defined by the visual management objectives and multiple use class guidelines. Applicable visual resource management objectives for a Class III area are defined in Table 3.19-2. The visual contrast rating process is further discussed in Section 4.19.

D.19.2 State

No applicable state statutes, regulations, plans, or standards related to visual resources were found.

D.19.3 Local

The Project would be subject to visual policies from the Riverside County General Plan (Riverside County 2015a) and the Palo Verde Valley Area Plan (Riverside County 2015b).

Riverside County General Plan

The Riverside County General Plan (Riverside County 2015a) is applicable to all unincorporated lands within Riverside County. Under the Riverside County General Plan, areas that are visible to the general public and considered visually attractive are deemed to be scenic resources, including scenic corridors, natural landmarks and prominent or unusual features of the landscape (Riverside County 2015a). Countywide policies that seek to preserve visual quality are located in the Land Use Element, Open Space Element, and Circulation Element of the County's General Plan, and include:

Land Use Element (LU)

Policy LU 7.4. Retain and enhance the integrity of existing residential, employment, agricultural, and open space areas by protecting them from encroachment of land uses that would result in impacts from noise, noxious fumes, glare, shadowing, and traffic.

Policy LU 14.1. Preserve and protect outstanding scenic vistas and visual features for the enjoyment of the traveling public.

Policy LU 14.3. Ensure that the design and appearance of new landscaping, structures, equipment, signs or grading within Designated and Eligible State and County scenic highway corridors are compatible with the surrounding scenic setting or environment.

Policy LU 14.4. Maintain at least a 50-foot setback from the edge of the right-of-way for new development adjacent to Designated and Eligible State and County Scenic Highways.

Policy LU 14.5. Require "new or relocated electric or communication distribution lines, which would be visible from Designated and Eligible State and County Scenic Highways, to be placed underground."

Policy LU 30.8. Require that industrial development be designed to consider their surroundings and visually enhance, not degrade, the character of the surrounding area.

Open Space and Circulation Element (OS)

The Public Facilities area plan land use designation provides for the development of private uses with similar characteristics to public uses and includes utility facilities such as public and private electric generating station and corridors. Privately held uses with public facility characteristics are not required to be designated as Public Facilities, but are eligible to be so designated based on site-specific reviews of the characteristics of the use in question.

Policy OS 21.1. Identify and conserve the skylines, view corridors, and outstanding scenic vistas within Riverside County.

Policy OS 22.1. Design developments within designated scenic highway corridors to balance the objectives of maintaining scenic resources with accommodating compatible land uses.

Policy OS 22.4. Impose conditions on development within scenic highway corridors requiring dedication of scenic easements consistent with the Scenic Highways Plan, when it is necessary to preserve unique or special visual features.

Policy C 25.2. Locate new and relocated utilities underground when possible. All remaining utilities shall be located or screened in a manner that minimizes their visibility by the public.

Scenic Corridors

I-10 is not a state- or county-designated scenic highway; however, it has been identified by Riverside County in its Circulation Element as eligible for designation as a scenic corridor. The County has indicated in its General Plan Land Use Element that I-10 should be designated a scenic highway and has developed General Plan scenic corridor policies. These policies seek to maintain resources in corridors along scenic highways. Policies for Scenic Corridors include:

- Preserve and protect outstanding scenic vistas and visual features for the enjoyment of the traveling public.
- Incorporate riding, hiking, and bicycle trails and other compatible public recreational facilities within scenic corridors.
- Ensure that the design and appearance of new landscaping, structures, equipment, signs, or grading within Designated and Eligible State and County Scenic Highway corridors are compatible with the surrounding scenic setting or environment.
- Maintain at least a 50-foot setback from the edge of the right-of-way (ROW) for new development adjacent to designated and eligible State and County Scenic Highways.
- Require new or relocated electric or communication distribution lines that would be visible from Designated and Eligible State and County Scenic Highways to be placed underground.
- Prohibit off-site outdoor advertising displays that are visible from Designated and Eligible State and County Scenic Highways.
- Require that the size, height, and type of on-premise signs visible from Designated and Eligible State and County Scenic Highways be the minimum necessary for identification. The design, materials, color, and location of the signs shall blend with the environment, utilizing natural materials where possible.
- Avoid the blocking of public views by solid walls.

Palo Verde Valley Area Plan

Palo Verde Valley Area Plan (Riverside County 2015b) policies that address visual quality are located in the Local Circulation Policies, Scenic Highways, and include:

PVVAP 10.1. Protect the scenic highways in the Palo Verde Valley planning area from change that would diminish the aesthetic value of adjacent properties in accordance with the Scenic Corridors sections of the General Plan Land Use, Multipurpose Open Space, and Circulation Elements.

Riverside County Airport Land Use Compatibility Plan

Several countywide policies related to glare are included in the Riverside County ALUCP. For more information on the ALUCP, please see Section 3.9, *Hazards and Hazardous Materials*.

D.20 WATER RESOURCES

D.20.1 Federal

Clean Water Act

The CWA established the basic structure for regulating discharges of pollutants into "waters of the United States." The act specifies a variety of regulatory and non-regulatory tools to sharply reduce direct pollutant discharges into waterways, finance municipal wastewater treatment facilities, and manage polluted runoff.

1. Sections 303 and 304, which provide for water quality standards, criteria, and guidelines.
2. Section 401 requires every applicant for a Federal permit or license for any activity that may result in a discharge to a water body to obtain a water quality certification that the proposed activity will comply with applicable water quality standards.
3. Section 402 regulates point- and nonpoint-source discharges to surface waters through the National Pollutant Discharge Elimination System (NPDES) program. In California, the SWRCB oversees the NPDES program, which is administered by the Regional Water Quality Control Boards (RWQCBs). The NPDES program provides for both general permits (those that cover a number of similar or related activities) and individual permits. Anti-backsliding requirements provided for under CWA §§402(o)(2) and 303(d)(4) prohibit slackening of discharge requirements and regulations under revised NPDES permits. With isolated/limited exceptions, these regulations require effluent limitations in a reissued permit to be at least as stringent as those contained in the previous permit.
4. Section 404 of the CWA establishes a program to regulate the discharge of dredged and fill material into waters of the U.S., including some wetlands. Activities in waters of the U.S. that are regulated under this program include fills for development, water resource projects (e.g., dams and levees), infrastructure development (e.g., highways and airports), and conversion of wetlands to uplands for farming and forestry. The Los Angeles District of the USACE provides review and permitting services for this Project.

Executive Order 11988 and the Federal Emergency Management Agency (FEMA)

Under Executive Order 11988, FEMA is responsible for management of floodplain areas. FEMA administers the National Flood Insurance Program to provide subsidized flood insurance to communities that comply with FEMA regulations limiting development in floodplains. FEMA also issues Flood Insurance Rate Maps that identify which land areas are subject to flooding.

These maps provide flood information and identify flood hazard zones in the community. The design standard for flood protection is established by FEMA, with the minimum level of flood protection for new development determined to be the 1-in-100 annual exceedance probability (i.e., the 100-year flood event).

Safe Drinking Water Act

Under the Safe Drinking Water Act (Public Law 93-523), passed in 1974, the USEPA regulates contaminants of concern to domestic water supply. Contaminants of concern relevant to domestic water supply are defined as those that pose a public health threat or that alter the aesthetic acceptability of the water. These types of contaminants are regulated by USEPA primary and secondary Maximum Contaminant Levels (MCLs) that are applicable to treated water supplies delivered to the distribution system. MCLs and the process for setting these standards are reviewed triennially. Amendments to the SDWA enacted in 1986 established an accelerated schedule for setting MCLs for drinking water. USEPA has delegated to the CDPH the responsibility for administering California's drinking-water program. DHS is accountable to USEPA for program implementation and for adopting standards and regulations that are at least as stringent as those developed by USEPA. The applicable state primary and secondary MCLs are set forth in Title 22, Division 4, Chapter 15, Article 4 of the California Code of Regulations.

Energy Independence and Security Act, Section 438

Under Section 438 of the Energy Independence and Security Act of 2007 (EISA), Federal agencies are required to reduce stormwater runoff from Federal development and redevelopment projects to protect water resources. Federal agencies can comply using a variety of stormwater management practices often referred to as "green infrastructure" or "low impact development" practices, including reducing impervious surfaces and using vegetative practices, porous pavements, cisterns and green roofs.

BLM Water Rights Manual 7250

The BLM Water Rights Manual 7250 establishes policy and guidance for locating, perfecting, documenting, and protecting BLM-administered water rights necessary to manage and conserve the economic and resource values of the public lands. An objective of the BLM eater rights program is to ensure the availability of water for public land management purposes by acquiring and protecting BLM-administered water rights, as part of an overall strategy that may include other cooperative techniques for insuring water availability.

D.20.2 State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act defines "water quality goals" as the allowable "limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area." Thus, water quality goals are intended to protect the public health and welfare, and to maintain or enhance water quality in relation to the existing and/or potential beneficial uses of the water. Water quality objectives apply to both Waters of the United States and Waters of the State.

Water Quality Control Plans

The SWRCB requires individual RWQCBs to develop Water Quality Control Plans (also known as Basin Plans) designed to preserve and enhance water quality and protect the beneficial uses of all Regional waters. Specifically, Water Quality Control Plans designate beneficial uses for surface waters and groundwater, set narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's antidegradation policy, and describe implementation programs to protect all waters in the Regions. In addition, Water Quality Control Plans incorporate by reference all applicable state and Regional Board plans and policies, and other pertinent water quality policies and regulations. The Project is under the jurisdiction of the Water Quality Control Plans of the Colorado River Regional Water Quality Control Board.

Colorado River Regional Water Quality Control Plan

The Colorado River RWQCB's Water Quality Control Plan establishes water quality objectives, including narrative and numerical standards that protect the beneficial uses of surface and ground waters in the region. The Water Quality Control Plans describes implementation activities and other control measures designed to ensure compliance with statewide plans and policies, and to provide comprehensive water quality planning.

Beneficial water uses are of two types: consumptive and non-consumptive. Consumptive uses are those normally associated with human activities, primarily municipal, industrial and irrigation uses that consume water and cause corresponding reduction and/or depletion of water supply. Non-consumptive uses include swimming, boating, waterskiing, fishing, hydropower generation, and other uses that do not significantly deplete water supplies. Historical beneficial uses of water within the Colorado River Basin Region have largely been associated with irrigated agriculture and mining. Industrial use of water has become increasingly important in the region, particularly in the agricultural areas.

With respect to present beneficial uses, agricultural use is the predominant beneficial use of water in the Colorado River Region, with the major irrigated acreage being located in the Coachella, Imperial, and Palo Verde valleys. The next largest use of water is for municipal and industrial purposes. The third major category of beneficial use, recreational use of surface waters, represents another important segment of the region's economy. The Colorado River Basin Region functions as a portion of the larger Colorado River watershed, which supplies water for agricultural and urban uses, fisheries, hydroelectric power production, recreation, and international treaty obligations.

According to the Water Quality Control Plan, all surface and ground waters are considered to be suitable, or potentially suitable, for municipal or domestic water supply with the exception of:

1. Surface and ground waters where the TDS exceed 3,000 mg/L, and the source is not reasonably expected by the RWQCB to supply a public water system, or
2. There is contamination, either by natural process or human activity, that cannot be treated for domestic use using either best management practices or best economically achievable treatment practices, or
3. The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day.

Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act (SGMA) requires governments and water agencies of high and medium priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. Under SGMA, these basins should reach sustainability within 20 years of implementing their sustainability plans. The SGMA empowers local agencies to form Groundwater Sustainability Agencies (GSAs) to manage basins sustainably and requires those GSAs to adopt Groundwater Sustainability Plans (GSPs) for crucial groundwater basins in California.

California Fish and Game Code §1601-1603

Sections 1601-1603 of the CDFW Fish and Game Code protect the natural flow, bed, channel, and bank of any river, stream, or lake designated by the CDFW, in which there is at any time an existing fish or wildlife resource, or from which these resources derive benefit. General Project plans must be submitted to the CDFW in sufficient detail to indicate the nature of a project for construction, if the project would:

- Divert, obstruct, or change a streambed, bank, or riparian zone.
- Use material from the streambeds.
- Result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a stream.

The Inland Deserts Region of the CDFW serves Riverside County.

22 CCR §§ 64400.80-64445

These CCR sections require monitoring for potable water wells, defined as non-transient, non-community water systems (serving 25 people or more for more than 6 months). Regulated wells must be sampled for bacteriological quality once a month and the results submitted to the CDPH for review and comment. The wells must also be monitored for inorganic chemicals once and organic chemicals quarterly during the year designated with the year designation based on historical monitoring frequency and laboratory capacity.

27 CCR §§ 20200

27 CCR §§ 20200 *et seq.* provides a waste classification system that applies to wastes that cannot be discharged to waters of the state. Applicable facilities include evaporation ponds, as well as various other types of disposal.

California Water Code §13751

California Water Code §13751 requires a Report of Well Completion to be filed with the DWR within 60 days of well completion. New wells must comply with DWR Well Standards as described in Water Resources Bulletins 74-81 and 74-90.

Construction Stormwater Program

The SWRCB and the nine RWQCBs implement water quality regulations under the Federal CWA and the California Porter-Cologne Water Quality Control Act. Existing water quality regulations require compliance with the NPDES for discharges of stormwater runoff associated with construction activity.

Dischargers are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction and Land Disturbance Activities (Construction General Permit, 2009-0009-DWQ). Construction activity subject to this permit includes clearing, grading, and disturbances to the ground, such as stockpiling or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP should contain a site map(s) that shows the construction site perimeter, existing and proposed structures, lots, roadways, stormwater collection and discharge points, general topography both before and after construction, and drainage patterns across the Project. The SWPPP must list Best Management Practices (BMPs) the discharger will use to protect stormwater runoff and the placement of those BMPs. Additionally, the SWPPP must contain a monitoring program for visible and non-visible pollutants and changes in water quality, such as substantial alteration in pH (a measure of acid and base properties).

Senate Bill 610

SB 610 requires that a Water Supply Assessment (WSA) be prepared for certain projects subject to CEQA that will use water. The WSA is required to address the sources of water for the Project, and an assessment of the sufficiency of those sources to serve the Project over a period of 20 years.

D.21 WILDLAND FIRE

D.21.1 Federal

Federal Energy Regulatory Commission

The Federal Energy Regulatory Commission (FERC) requires utilities to adopt and maintain minimum clearance standards between vegetation and transmission voltage power lines. These clearances vary depending on voltage. In most cases, however, the minimum clearances required in state regulations are greater than the Federal requirement. In California for example, the state has adopted General Order 95 rather than the NERC Standards as the electric safety standard for the state. Since the state regulations meet or exceed the FERC standards, the FERC requirements are not discussed further in this section, as compliance with the state requirements will ensure that the Federal requirements are met.

Federal Wildland Fire Management Policy

The Federal Wildland Fire Management Policy was developed in 1995 and updated in 2001 by the National Wildfire Coordinating Group, a Federal multi-agency group that establishes consistent and coordinated fire management policy across multiple Federal jurisdictions. An important component of the Federal Wildland Fire Management Policy is the acknowledgement of the essential role of fire in maintaining natural ecosystems. The Federal Wildland Fire Management Policy and its implementation are founding on the following guiding principles:

1. Firefighter and public safety is the first priority in every fire management activity.
2. The role of wildland fire as an essential ecological process and natural change agent will be incorporated into the planning process.
3. Fire management plans, programs, and activities support land and resource management plans and their implementation.
4. Sound risk management is a foundation for all fire management activities.
5. Fire management programs and activities are economically viable, based upon values to be protected, costs, and land and resource management objectives.
6. Fire management plans and activities are based upon the best available science.
7. Fire management plans and activities incorporate public health and environmental quality considerations.
8. Federal, state, tribal, local, interagency, and international coordination and cooperation are essential.
9. Standardization of policies and procedures among Federal agencies is an ongoing objective.

International Fire Code

Created by the International Code Council, the International Fire Code addresses a wide array of conditions hazardous to life and property including fire, explosions, and hazardous materials handling or usage. The International Fire Code places an emphasis on prescriptive and performance-based approaches to fire prevention and fire protection systems. Updated every 3 years, the International Fire Code uses a hazards classification system to determine the appropriate measures to be incorporated in order to protect life and property (often, these measures include construction standards and specialized equipment). The International Fire Code uses a permit system based on hazard classification to ensure that required measures are instituted.

North American Electric Reliability Corporation Standards

The NERC is a nonprofit corporation comprising 10 regional reliability councils. The overarching goal of NERC is to ensure the reliability of the bulk power system in North America. To achieve its goal, the NERC develops and enforces reliability standards, monitors the bulk power systems, and educates, trains, and certifies industry personnel (NERC 2014). In order to improve the reliability of regional electric transmission systems and in response to the massive widespread power outage that occurred on the Eastern Seaboard, NERC developed a transmission vegetation management program that is applicable to all transmission lines operated at 200 kV and above to lower voltage lines designated by the Regional Reliability Organization as critical to the reliability of the electric system in the region. The plan, which became effective on April 7, 2006, establishes requirements of the formal transmission vegetation management program, which include identifying and documenting clearances between vegetation and any overhead, ungrounded supply conductors, while taking into consideration transmission line voltage, the effects of ambient temperature on conductor sag under maximum design loading, fire risk, line terrain and elevation, and the effects of wind velocities on conductor sway (NERC 2006). The clearances identified must be no less than those set forth in the IEEE Standard 516-2003 (*Guide for Maintenance Methods on Energized Power Lines*).

Institute of Electrical and Electronics Engineers Standard 516-2003

The IEEE is a leading authority in setting standards for the electric power industry. Standard 516-2003, *Guide for Maintenance Methods on Energized Power Lines*, establishes minimum vegetation-to-conductor clearances in order to maintain electrical integrity of the electrical system.

D.21.2 State

California Fire Code

The California Fire Code is contained within Title 24, Chapter 9 of the CCR. Based on the International Fire Code, the California Fire Code is created by the California Buildings Standards Commission and regulates the use, handling, and storage requirements for hazardous materials at fixed facilities. Similar to the International Fire Code, the California Fire Code and the CBC use a hazards classification system to determine the appropriate measures to incorporate to protect life and property.

Title 14 CCR §§1250-1258, Fire Prevention Standards for Electric Utilities, provides specific exemptions from electric pole and tower firebreak and electric conductor clearance standards, and specifies when and where standards apply.

California Health and Safety Code

State fire regulations are established in §13000 of the California Health and Safety Code. The section establishes building standards, fire protection device equipment standards, high-rise building and childcare facility standards, interagency support protocols, and emergency procedures. Also, §13027 states that the state fire marshal shall notify industrial establishments and property owners having equipment for fire protective purposes of the changes necessary to bring their equipment into conformity with, and shall render them such assistance as may be available in converting their equipment to, standard requirements.

California Public Resources Code

The Public Resources Code (PRC) includes fire safety regulations that apply to SRAs during the time of year designated as having hazardous fire conditions. During the fire hazard season, these regulations restrict the use of equipment that may produce a spark, flame, or fire; require the use of spark arrestors on equipment that has an internal combustion engine; specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and specify fire-suppression equipment that must be provided on-site for various types of work in fire-prone areas.

PRC §4291 provides that a person who owns, leases, controls, operates, or maintains a building or structure in, upon, or adjoining a mountainous area, forest-covered lands, brush-covered lands, grass-covered lands, or land that is covered with flammable material, shall at all times maintain defensible space of 100 feet from each side and from the front and rear of the structure, but not beyond the property line.

PRC §§4292 and 4293 require that any person who owns, controls, operates, or maintains any electrical transmission or distribution line shall maintain a firebreak clearing around and adjacent to any pole, tower, and conductor that carries electric current as specified in the section.

California Strategic Fire Plan

The 2010 Strategic Fire Plan for California is the statewide plan for adaptive management of wildfire. The Fire Plan is a cooperative effort between the State Board of Forestry and Fire Protection and the CAL FIRE. The central goals that are critical to reducing and preventing the impacts of fire revolve around both suppression efforts and fire prevention efforts. The key goals of the plan are:

1. Improved availability and use of information on hazard and risk assessment;
2. Land use planning: including general plans, new development, and existing developments;
3. Shared vision among communities and the multiple fire protection jurisdictions, including county-based plans and community-based plans such as Community Wildfire Protection Plans;
4. Establishing fire resistance in assets at risk, such as homes and neighborhoods;
5. Shared vision among multiple fire protection jurisdictions and agencies;
6. Levels of fire suppression and related services; and
7. Post-fire recovery.

The plan puts emphases on pre-fire adaptive management of risk, including measures such as fuelbreaks, defensible space, and other fuel reduction strategies. The Fire Plan does not contain any specific requirements or regulations. Rather, it acts as an assessment of current fire management practices and standards and makes recommendations on how best to improve the practices and standards in place (CAL FIRE 2010).

Fire Hazard Severity Zones

CAL FIRE mapped FHSZs in Riverside County based on fuel loading, slope, fire weather, and other relevant factors under the direction of PRC §§4201-4204 and Government Code §§51175-89. FHSZs are ranked from moderate to very high and are categorized for fire protection as within a FRA under the jurisdiction of a Federal agency, within a SRA under the jurisdiction of CAL FIRE, or within a LRA under the jurisdiction of a local agency.

Public Resources Code §§4292-4293, Powerline Hazard Reduction

PRC §4292 requires and presents guidelines for a 10-foot firebreak consisting of a clearing of not less than 10 feet in each direction from the outer circumference of the base of power poles. PRC §4293 requires and presents guidelines for maintaining a 4-foot clearance in all directions between all vegetation and all conductors carrying between 2.4 and 72 kV, and a 10-foot clearance for lines carrying over 110 kV. The proposed distribution line would operate at 34.5 kV, and the gen-tie line would operate at 230 kV.

14 California Code of Regulations, Sections 1250 – 1258, "Fire Prevention Standards for Electric Utilities"

14 CCR provides specific exemptions from electric pole and tower firebreak. 14 CCR also provides conductor clearance standards and specifies when and where standards apply. These standards address hazards that could be caused by sparks from conductors of overhead lines, or that could result from direct contact between the line and combustible objects. The proposed Project would be subject to these standards.

D.21.3 Local

Riverside County Fire Department Fire Prevention Standards

In accordance with the 2010 California Fire Code, the RCFD incorporated the Fire Apparatus Access Roads standard (§503) and Knox Box Emergency Access System standard (§506) into its operational standards. Under these standards, all required building plans must be submitted to the RCFD for review and approval of access roads and points and Knox Box mounting location and position and operating standards prior to installation.

Riverside County General Plan

Safety Element (S)

Fire Hazards – Building Code and Performance Standards

Policy S 1.1. Mitigate hazard impacts through adoption and strict enforcement of current building codes, which will be amended as necessary when local deficiencies are identified.

Policy S 5.1. Develop and enforce construction and design standards that ensure that proposed development incorporates fire prevention features through the following:

a) All proposed development and construction within Fire Hazard Severity Zones shall be reviewed by the Riverside County Fire and Building and Safety departments.

b) All proposed development and construction shall meet minimum standards for fire safety as defined in the Riverside County Building or County Fire Codes, or by County zoning, or as dictated by the Building Official and Management Agency based on building type, design, occupancy, and use.

c) In addition to the standards and guidelines of the California Building Code and California Fire Code fire safety provisions, continue to implement additional standards for high-risk, high occupancy, dependent, and essential facilities where appropriate under the Riverside County Fire Code (Ordinance No. 787) Protection Ordinance. These shall include assurance that structural and nonstructural architectural elements of the building will not impede emergency egress for fire safety staffing/personnel, equipment, and apparatus, nor hinder evacuation from fire, including potential blockage of stairways or fire doors.

d) Proposed development and construction in Fire Hazard Severity Zones shall provide secondary public access, in accordance with Riverside County Ordinances.

e) Proposed development and construction in Fire Hazard Severity Zones shall use single loaded roads to enhance fuel modification areas, unless otherwise determined by the Riverside County Fire Chief.

Riverside County Brush Clearance

County of Riverside Ordinance No. 695 provides brush clearance requirements on unincorporated County land that are designed to reduce risks from wildland fires. The code requires that every owner, occupant, and person in control of any unimproved parcel of land clear vegetation on a 100-foot-wide strip of land at the boundary of the parcel adjacent to a roadway and/or a 100-foot-wide strip of land around any structures located on an adjacent improved parcel. The Riverside County Fire Department can require different clearance distances based upon a visual inspection of the parcel and factors including local weather conditions, fuel types, topography, and the environment where the property or adjoining structures are located.

APPENDIX E

RELATIONSHIP BETWEEN THE DESERT QUARTZITE SOLAR PROJECT PA/EIS/EIR AND THE DESERT RENEWABLE ENERGY CONSERVATION PLAN AND CONFORMANCE WITH CONSERVATION AND MANAGEMENT ACTIONS

APPENDIX E - RELATIONSHIP BETWEEN THE DESERT QUARTZITE SOLAR PROJECT PA/EIS/EIR AND THE DESERT RENEWABLE ENERGY CONSERVATION PLAN AND CONFORMANCE WITH CONSERVATION AND MANAGEMENT ACTIONS

1.0 Introduction

The Bureau of Land Management (BLM) issued the Desert Renewable Energy Conservation Plan (DRECP) in October, 2016. The DRECP amends the California Desert Conservation Area (CDCA) Plan, specifically with respect to natural resource conservation and renewable energy development. The DRECP provides a new framework under which lands in the CDCA are managed for resource conservation, and under which new applications for renewable energy projects are considered and evaluated.

Although the new framework is now in place as of October, 2016, the new management prescriptions are not applicable to the Desert Quartzite Solar Project (DQSP, or the Project), or to the analysis of the DQSP in this Environmental Impact Statement/Environmental Impact Report (EIS/EIR), for two reasons:

- According to the DRECP, renewable energy applications in the Riverside East Solar Energy Zone filed before June 30, 2009, including the application for DQSP, are not, and will not be, subject to the terms of the DRECP. The DRECP recognizes that the DQSP would not be subject to the DRECP due to its status as a "pending" right-of-way (ROW) application under the Western Solar Plan and its location within a SEZ (DRECP Section II.3.2.4, p. 68-69).
- The data collection, field surveys, and impact analyses for this EIS/EIR are based on BLM's requirements as of the date of the Notice of Intent, which was on March 6, 2015. The DRECP's designations and classifications were not issued until 18 months later.

Based on these factors, this EIS/EIR has been based on the management framework that was available under the CDCA Plan, and on BLM's renewable energy siting, data collection, and impact analysis requirements that were in place as of March 6, 2015. However, BLM has also considered and evaluated the effects of the DRECP changes on the impact analysis. The purpose of this Appendix is to summarize the changes that occurred under the DRECP, and to discuss how these changes would, or would not, have affected the impact analysis if the analysis had been performed under the new DRECP requirements.

2.0 BLM Land Use Allocations

One major effect of the DRECP was to modify BLM's land management use allocations that were operative under the CDCA Plan prior to October, 2016. These included:

- The Multiple-Use Classes (MUCs) that were previously in effect under the CDCA Plan, as well as previous land use allocations made for resource protection, including Areas of Critical Environmental Concern (ACECs) and Desert Wildlife Management Areas (DWMAs), have been replaced by a new classification system. Under the DRECP, land use allocations are now categorized as Development Focus Areas (DFAs), Variance

Process Lands (VPLs), General Public Lands, and Resource Conservation Areas. Lands have also been designated for recreation purposes.

- Under the previous CDCA Plan, no Visual Resource Management (VRM) classes had been established in the CDCA, and the designation and adoption of Interim VRM classes in response to a specific project was a BLM Field Office Manager decision. The DRECP has now established VRM Classes for the entire CDCA, including the Project area.

While these changes do not affect the physical resources on and around the DQSP site, they do affect how those resources are managed. The affected environment in which the DQSP is proposed (discussed in Chapter 3 of the EIS/EIR) includes physical resources such as wildlife and water resources. The analysis of Project impacts in Chapter 4 is, for some resources, based only on the direct impact of the Project on that physical resource. For instance, Section 4.3 quantifies the number of individuals of each special-status plant species that would be removed under each alternative. However, the impact analysis for other resources is based on how the Project conforms to BLM's requirements for management of that resource. For example, while Section 4.5 quantifies the impact of the Project on cultural resources, Section 4.16 evaluates the impact of the Project on the Mule Mountain ACEC, which was established for the protection of cultural resources. In this way, the EIS/EIR evaluates both the effect of the Project on a resource, as well as the effect of the Project on the status or management goals of an area established for protection of that resource. It is the status and management goals of these areas that have changed under the DRECP.

The DRECP does not affect how the EIS/EIR evaluates physical impacts to physical resources, but it does affect how the EIS/EIR evaluates impacts to land use status or management goals. Because the Project is not subject to DRECP, or to BLM's land use allocation changes made after March 6, 2015, the analysis of the impact of the Project on land use status or management goals is based on the land use status and management goals that were in place on March 6, 2015. The following subsections summarize the land use allocations that have changed, and how the changes do, or do not, affect the impact analysis in the EIS/EIR.

2.1 Onsite and Adjacent Land Use Allocations

Under the CDCA Plan, the Project area was designated as Multiple Use Class – Moderate (MUC-M). Section 4.10 of the EIS/EIR evaluates the conformance of the Project with this classification. In the DRECP, the Project site is designated as a DFA, which is an area where activities associated with solar, wind, and geothermal energy are allowed, streamlined, and incentivized. Because solar projects are allowed on DFA lands, the Project is in conformance with this new land use allocation.

Under the CDCA Plan, there was no formal VRM classification of the Project site, but the BLM Field Office Manager had assigned a Class III Interim VRM Objective to the site. Section 4.19 of the EIS/EIR evaluates the conformance of the Project with this classification. The DRECP designates the Project area as VRM Class IV. VRM Class IV allows for management activities and uses requiring major modifications to the natural landscape, while the objective of VRM Class III class is to partially retain the existing character of the landscape, and the level of change to characteristic landscape should be moderate. As a result, the analysis of the Project in Section 4.19 evaluates the Project against a more restrictive management objective, and is therefore an overly conservative analysis as compared to the analysis that would occur under the DRECP.

Under the CDCA Plan, there were no resource protection allocations, such as ACECs, DWMAs, Wilderness Areas, or Lands Managed for Wilderness Characteristics on the site. There were also no formal recreation designations for the site. Similarly, under the DRECP, no resource conservation or recreation designations have been made for the site, so no changes in impact analyses would have been needed in these areas.

2.2 Nearby Land Use Allocations

Under the CDCA Plan, land use allocations in the vicinity of the Project were designated according to the MUC system. The directly adjacent lands were designated the same as the Project site, as MUC-M. MUC-Limited (MUC-L) and MUC-Intensive (MUC-I) lands are also present in the Project vicinity. Section 4.10 of the EIS/EIR evaluated the impact of the Project within the context of the overall amount of MUC-M land within the Project vicinity. Under DRECP, the distinction between MUC-M, MUC-I, and MUC-L on the lands in the vicinity of the Project no longer exists. Instead, almost all lands have been designated for resource conservation, development, and/or recreation. Therefore, there is no correlative analysis under the DRECP. Although the analysis of the Project within the context of the MUC system is moot under the DRECP, there is no other analysis that would have been needed to be performed in its place.

Under both the CDCA Plan and DRECP, lands have been designated for resource conservation purposes. Section 3.16 of the EIS/EIR identified the locations of nearby areas designated for resource conservation, including ACECs, DWMAs, Wilderness Areas, Lands With Wilderness Characteristics, and Back Country By-Ways. In that analysis, the closest lands under each category were as follows:

- The closest ACEC was the Mule Mountains ACEC, designated for protection of cultural resources, one mile southwest of the Project;
- The closest DWMA was the Chuckwalla DWMA, designated for protection of the desert tortoise, approximately five miles west of the Project;
- The closest Wilderness Area was the Palo Verde Mountains, located more than 10 miles from the Project;
- The nearest land found to have wilderness characteristics was located on the eastern end of the Little Chuckwalla Mountains Wilderness Area, approximately 10 miles southwest of the Project site; and
- The nearest Back Country By-Way was the Bradshaw Trail, located four miles southwest of the Project.

Section 4.16 evaluated the impact of the Project on the designation status and management objectives of each of these areas. Section 4.4 evaluated the impact of the Project on wildlife in the ACECs and DWMAs, and Section 4.5 evaluated the direct and indirect impact of the Project on cultural resources, including those in the Mule Mountains ACEC. Section 4.14 evaluated the impact of the Project on recreation in these specially designated areas.

Under the DRECP, the boundaries of some of these areas have changed. The largest change, and that closest to the Project site, is that several of the ACECs west of the project, including the Mule Mountains ACEC, have been expanded and combined into a single ACEC. However, the change in the boundary was to the west, away from the Project area. None of the newly designated areas is located closer to the Project site than was the case under the CDCA Plan prior to October, 2016. Tthere are no newly designated areas (under the DRECP) that would be impacted but are left unevaluated.

Under both the CDCA Plan and the DRECP, lands have been designated for recreation purposes. Section 4.14 of the EIS/EIR evaluated the impact of the Project on general recreation on BLM land, including OHV access to recreation areas, as well as on City of Blythe parks and recreation facilities. None of the general recreation opportunities or City of Blythe facilities have been changed as a result of the DRECP.

Section 3.14 identified the locations of nearby areas specially designated for recreation, including the Mule Mountains and Midland Long-Term Visitor Areas (LTVAs), campgrounds, and the Bradshaw Trail. Impacts to these areas were evaluated in Section 4.14. Under the DRECP, the new land use allocations included designation of both the Mule Mountains and Midland LTVAs as SRMAs. However, the boundaries or management objectives of these areas were not changed in a way that would make the current impact analysis inapplicable.

3.0 Conservation and Management Actions

The second major component of the DRECP was the implementation of Conservation and Management Actions (CMAs), which include a variety of project siting, impact mitigation, and BLM management requirements. CMAs were developed on a Land Use Plan Area (LUPA) - Wide basis, as well as specifically for Conservation Lands, DFAs, VPLs, and lands used for power transmission.

Because the DQSP is exempted from the DRECP, the CMAs are not applicable to the Project. However, to ensure that the impact analysis is complete, and resources are protected to the maximum extent practicable, BLM has performed an applicability analysis of the Project with respect to the CMAs. Because the Project is located wholly on DFA lands and includes transmission, the CMAs evaluated were those included in the LUPA-Wide, DFA, DFA/VPL, and TRANS categories.

The analysis, presented in Table B-1, includes a determination of whether the CMA would have applied to the project, if the Project had been subject to the DRECP. This includes an evaluation of whether the type of action covered by the CMA is within the scope of the Project, i.e., approval of a solar energy project. In addition, it includes a determination of whether the resource addressed by the CMA is present, or potentially impacted, on the Project site.

Following the applicability determination, the analysis included an evaluation of the design of the Project, the scope of the Applicant’s field surveys and technical analyses, the Applicant’s Proposed Measures, and the preliminary mitigation measures developed by the agencies with respect to each CMA. The evaluation was performed to verify that the resource conservation objectives of each CMA were met, whether changes could be made to Project design and technical analysis to improve conformance, and whether changes could be made to the preliminary mitigation measures, within the limitation that the Project is not legally subject to the CMAs.

In general, the analysis revealed that the Project design and/or mitigation measures satisfy applicable CMAs. In many cases, wording changes were made to mitigation measures to bring the language into line with the CMA language. In cases where no such changes are made, the analysis describes why the Applicant is not required to modify the Project or mitigate potential impacts, or why the CMA does not apply.

4.0 Datasets

Another effect of the approval of the DRECP is that it based its analysis on region-wide datasets for identification of potentially-affected resources, and required use of these datasets by future Applicants. This included mapping of habitat and migration corridors for various wildlife and plant species. Many of the CMAs were, in turn, based on the relationship of the Project to the resources as they were presented in the datasets.

In general, the datasets used by the DRECP have no effect on the analysis of the Project in the EIS/EIR. However, the difference in datasets was an issue for the analysis of and sand dune vegetation impacts. For the DRECP, broad scale mapping of vegetation alliances was done by California Department of Fish and Wildlife (CDFW). The vegetation classification for the DRECP follows Federal Geographic Data Committee (FGDC) and National Vegetation Classification Standards (NVCS). In contrast, for the analysis in this EIS/EIR, the vegetation was mapped as vegetation communities, on a site-specific basis, by the Applicant under direction from BLM. Vegetation communities were characterized by the classification system used by Holland (1986) and the NECO Plan Amendment to the CDCA Plan (Evens and Hartman 2007), and cross-referenced with *A Manual of California Vegetation* (Sawyer and Keeler-Wolf 2009), where appropriate.

To address this discrepancy, the text in Section 3.3.1.1 discusses the relationship between the two different systems, as well as the advantages and disadvantages of the use of each in the EIS/EIR analysis. The text also describes how the onsite mapping is correlated to the DRECP mapping, thus allowing evaluation of the conformance of the Project and EIS/EIR with the vegetation-specific CMAs. In reviewing these differences, BLM believes that the method used in the EIS/EIR adequately addresses the data needed to adequately conduct impact analysis of this resource.

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-BIO-1: Conduct a habitat assessment (see Glossary of Terms) of Focus and BLM Special Status Species' suitable habitat for all activities and identify and/or delineate the DRECP vegetation types, rare alliances, and special features (e.g., Aeolian sand transport resources, Joshua tree, microphyll woodlands, carbon sequestration characteristics, seeps, climate refugia) present using the most current information, data sources, and tools (e.g., DRECP land cover mapping, aerial photos, DRECP species models, and reconnaissance site visits) to identify suitable habitat (see Glossary of Terms) for Focus and BLM Special Status Species. If required by the relevant species specific CMAs, conduct any subsequent protocol or adequate presence/absence surveys to identify species occupancy status and a more detailed mapping of suitable habitat to inform siting and design considerations. If required by relevant species specific CMAs, conduct analysis of percentage of impacts to suitable habitat and modeled suitable habitat. • BLM will not require protocol surveys in sites determined by the designated biologist to be unviable for occupancy of the species, or if baseline studies inferred absence during the current or previous active season. • Utilize the most recent and applicable assessment protocols and guidance documents for vegetation types and jurisdictional waters and wetlands that have been approved by BLM, and the appropriate responsible regulatory agencies, as applicable.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Survey protocols are described in the BRTR. The protocols and results for vegetation surveys are summarized in Section 3.3.1.2. The protocols and results for wildlife surveys are summarized in Section 3.4.1.1. All surveys were conducted in accordance with protocols in place at the time of the NOI, under the direction of BLM biologists assigned to the Project.		
LUPA-BIO-2: Designated biologist(s) (see Glossary of Terms), will conduct, and oversee where appropriate, activity-specific required biological monitoring during pre-construction, construction, and decommissioning to ensure that avoidance and minimization measures are appropriately implemented and are effective. The appropriate required monitoring will be determined during the environmental analysis and BLM approval process. The designated biologist(s) will submit monitoring reports directly to BLM.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Mitigation Measures VEG-1 through VEG-5 specify the qualifications, duties, and authorities of the Designated Biologist(s) and Monitor(s).		
LUPA-BIO-3: Resource setbacks (see Glossary of Terms) have been identified to avoid and minimize the adverse effects to specific biological resources. Setbacks are not considered additive and are measured as specified in the applicable CMA. Allowable minor incursions (see Glossary of Terms), as per specific CMAs do not affect the following setback measurement descriptions. Generally, setbacks (which range in distances for different biological resources) for the appropriate resources are measured from: • The edge of each of the DRECP desert vegetation types, including but not limited to those in the riparian or wetland vegetation groups (as defined by alliances within the vegetation type descriptions and mapped based on the vegetation type habitat assessments described in **LUPA-BIO-1**). • The edge of the mapped riparian vegetation or the Federal Emergency Management Agency (FEMA) 100-year floodplain, whichever is greater, for the Mojave River. • The edge of the vegetation extent for specified Focus and BLM sensitive plant species. • The edge of suitable habitat or active nest substrates for the appropriate Focus and BLM Special Status Species.	Yes	No	Partial	Yes	No	Partial
			X			X
	The resources for which setback distances are established in DRECP CMAs, and which are potentially present in the Proposed Action area, include the Blue paloverde-Desert Ironwood Alliance (within the Madrean Warm Semi-Desert Wash Woodland/Scrub and Sonoran-Coloradan Semi-Desert Wash Woodland/Scrub; 200 foot setback), one BLM Sensitive plant species (Harwood's eriastrum; 0.25 miles), and the Burrowing owl (656 feet). The Project is not located near the Mojave River, so the second bullet does not apply. No Plant Focus species, as defined in Table 23, are present in the Project area. Setback distances for golden eagles and Swainson's hawk do not apply, because no nests were identified within the setback distances. Setback distances for Bendire's thrasher do not apply, because the site was determined to have low potential for this species.			No Alternatives would directly impact the Blue paloverde-Desert Ironwood Alliance. However, the Proposed Action would be situated within the 200 foot setback distance of an area of Blue paloverde-Desert Ironwood Alliance that is located outside of the Project footprint. Alternatives 2 and 3 would be located more than 200 feet away from the Blue paloverde-Desert Ironwood Alliance. Table 4.3-3 shows that all alternatives would directly impact Harwood's eriastrum. Section 4.4.3 discusses impacts of the Proposed Action to the Burrowing owl. The EIS/EIR mitigation measure WIL-9 specifies a setback requirement for Burrowing owl nests (656 feet), as specified in DFA-BIO-IFS-2, Table 22).		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-BIO-4: For activities that may impact Focus and BLM Special Status Species, implement all required species-specific seasonal restrictions on pre- construction, construction, operations, and decommissioning activities. Species-specific seasonal restriction dates are described in the applicable CMAs. Alternatively, to avoid a seasonal restriction associated with visual disturbance, installation of a visual barrier may be evaluated on a case-by-case basis that will result in the breeding, nesting, lambing, fawning, or roosting species not being affected by visual disturbance from construction activities subject to seasonal restriction. The proposed installation and use of a visual barrier to avoid a species seasonal restriction will be analyzed in the activity/project specific environmental analysis.	Yes	No	Partial	Yes	No	Partial
		X				
	A review of CMAs shows that seasonal restrictions are only required for Mohave ground squirrel (LUPA-BIO-IFS-38) and for birds nesting in vegetation alliances specified in Table 17 (LUPA-BIO-RIPWET-1). Mohave ground squirrel habitat is not present in the Project area, per DRECP Figure D-18. The Blue paloverde-Desert Ironwood Alliance (within the Madrean Warm Semi-Desert Wash Woodland/Scrub and Sonoran-Coloradan Semi-Desert Wash Woodland/Scrub specified in Table 17) is present outside in the area, but is avoided by the footprint of all alternatives.					
LUPA-BIO-5: All activities, as determined appropriate on an activity-by-activity basis, will implement a worker education program that meets the approval of the BLM. The program will be carried out during all phases of the project (site mobilization, ground disturbance, grading, construction, operation, closure/decommissioning or project abandonment, and restoration/reclamation activities). The worker education program will provide interpretation for non-English speaking workers, and provide the same instruction for new workers prior to their working on site. As appropriate based on the activity, the program will contain information about: • Site-specific biological and nonbiological resources. • Information on the legal protection for protected resources and penalties for violation of federal and state laws and administrative sanctions for failure to comply with LUPA CMA requirements intended to protect site-specific biological and nonbiological resources. • The required LUPA and project-specific measures for avoiding and minimizing effects during all project phases, including but not limited to resource setbacks, trash, speed limits, etc. Reporting requirements and measures to follow if protected resources are encountered, including potential work stoppage and requirements for notification of the designated biologist. • Measures that personnel can take to promote the conservation of biological and nonbiological resources.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Mitigation Measure VEG-6 describes the requirements for the Worker Environmental Awareness Program (WEAP).		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
	Yes	No	Partial	Yes	No	Partial
LUPA-BIO-6: Subsidized predator standards, approved by BLM, in coordination with the USFWS and CDFW, will be implemented during all appropriate phases of activities, including but not limited to renewable energy activities, to manage predator food subsidies, water subsidies, and breeding sites including the following: • Common Raven management actions will be implemented for all activities to address food and water subsidies and roosting and nesting sites specific to the Common Raven. These include identification of monitoring reporting procedures and requirements; strategies for refuse management; as well as design strategies and passive repellant methods to avoid providing perches, nesting sites, and roosting sites for Common Ravens. • The application of water and/or other palliatives for dust abatement in construction areas and during project operations and maintenance will be done with the minimum amount of water necessary to meet safety and air quality standards and in a manner that prevents the formation of puddles, which could attract wildlife and wildlife predators. • Following the most recent national policy and guidance, BLM will take actions to not introduce, dispose of, or release any non- native species into areas of native habitat, suitable habitat, and natural or artificial waterways/water bodies containing native species. • All activity work areas will be kept free of trash and debris. Particular attention will be paid to “micro-trash” (including such small items as screws, nuts, washers, nails, coins, rags, small electrical components, small pieces of plastic, glass or wire, and any debris or trash that is colorful or shiny) and organic waste that may subsidize predators. All trash will be covered, kept in closed containers, or otherwise removed from the project site at the end of each day or at regular intervals prior to periods when workers are not present at the site. In addition to implementing the measures above on activity sites, each activity will provide compensatory mitigation that contributes to LUPA-wide raven management.	X			X		
				• The Raven Management Plan is specified in Mitigation Measure WIL-5. • Mitigation Measure VEG-8 requires that dust control be performed with a minimum amount of water, to avoid formation of puddles. • Applicant-Proposed Measure APM-BIO-5 discusses the Applicant’s Integrated Weed Management Plan, which has been reviewed and approved by the BLM Field Office. • Applicant-Proposed Measure APM-BIO-3 discusses the Construction BMPs, which include measures for managing trash and debris. Additional information is provided in Mitigation Measures VEG-8. However, neither of these measures discusses “micro-trash”. • Mitigation Measure WIL-5 includes compensatory mitigation for the Regional Raven Management Program.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
	Yes	No	Partial	Yes	No	Partial
LUPA-BIO-7: Where DRECP vegetation types or Focus or BLM Special Status Species habitats may be affected by ground- disturbance and/or vegetation removal during pre-construction, construction, operations, and decommissioning related activities but are not converted by long-term (i.e., more than two years of disturbance, see Glossary of Terms) ground disturbance, restore these areas following the standards, approved by BLM authorized officer, following the most recent BLM policies and procedures for the vegetation community or species habitat disturbance/impacts as appropriate, summarized below: ● Implement site-specific habitat restoration actions for the areas affected including specifying and using: • The appropriate seed (e.g., certified weed- free, native, and locally and genetically appropriate seed) • Appropriate soils (e.g., topsoil of the same original type on site or that was previously stored by soil type after being salvaged during excavation and construction activities) • Equipment • Timing (e.g., appropriate season, sufficient rainfall) • Location • Success criteria • Monitoring measures • Contingency measures, relevant for restoration, which includes seeding that follows BLM policy when on BLM administered lands. ● Salvage and relocate cactus, nolina, and yucca from the site prior to disturbance using BLM protocols. To the maximum extent practicable for short-term disturbed areas (see Glossary of Terms), the cactus and yucca will be re-planted back to the original site. ● Restore and reclaim short-term (i.e. 2 years or less, see Glossary of Terms) disturbed areas, including pipelines, transmission projects, staging areas, and short-term construction-related roads immediately or during the most biologically appropriate season as determined in the activity/project specific environmental analysis and decision, following completion of construction activities to reduce the amount of habitat converted at any one time and promote recovery to natural habitats and vegetation as well as climate refugia and ecosystem services such carbon storage.	X			X		
				The Applicant's Revegetation Plan has not yet been submitted. But its components are described throughout the EIS/EIR, including Section 2.3.6 (Decommissioning), 2.3.7.2 (Vegetation Management), 2.3.7.9 (Stormwater Management), Applicant-Proposed Measure BIO-4 (Vegetation Resources Management Plan), Mitigation Measure VEG-8.17 (Revegetation of Temporarily Disturbed Areas), and Mitigation Measure VIS-4 (Decommissioning and Site Restoration Plan).		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-BIO-8: All activities that are required to close and decommission the site (e.g., renewable energy activities) will specify and implement project-specific closure and decommissioning actions that meet the approval of BLM, and that at a minimum address the following: • Specifying and implementing the methods, timing (e.g., criteria for triggering closure and decommissioning actions), and criteria for success (including quantifiable and measureable criteria). • Recontouring of areas that were substantially altered from their original contour or gradient and installing erosion control measures in disturbed areas where potential for erosion exists. • Restoring vegetation as well as soil profiles and functions that will support and maintain native plant communities, associated carbon sequestration and nutrient cycling processes, and native wildlife species. • Vegetation restoration actions will identify and use native vegetation composition, native seed composition, and the diversity to values commensurate with the natural ecological setting and climate projections.	Yes	No	Partial	Yes	No	Partial
	X			X		
				The Applicant's Draft Decommissioning Plan is described in Section 2.3.6. Revegetation requirements are specified in Section 2.3.7.2 (Vegetation Management), 2.3.7.9 (Stormwater Management), Applicant-Proposed Measure BIO-4 (Vegetation Resources Management Plan), Mitigation Measure VEG-8.17 (Revegetation of Temporarily Disturbed Areas), and Mitigation Measure VIS-4 (Decommissioning and Site Restoration Plan).		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-BIO-9: Implement the following general LUPA CMA for water and wetland dependent resources:	Yes	No	Partial	Yes	No	Partial
● Implement construction site standard practices to prevent toxic chemicals, hazardous materials, and other fluids from entering vegetation type streams, washes, and tributary networks through water runoff, erosion, and sediment transport by, at a minimum, implementing the following: • On project sites, vehicles and other equipment will be maintained in proper working condition and only stored in designated containment areas where runoff is collected or controlled and that are located outside of streams, washes, and distributary networks to minimize accidental fluids and hazardous materials spills. • Hazardous material leaks, spills, or releases will be immediately cleaned and equipment will be repaired upon identification. Removal and disposal of spill and related clean-up materials will occur at an approved off-site landfill. • Maintenance and operations vehicles will carry the appropriate equipment and materials to isolate, clean up, and repair any hazardous material leaks, spills, or releases. ● Activity-specific drainage, erosion, and sedimentation control actions, which meet the approval of BLM and the applicable regulatory agencies, will be carried out during all appropriate phases of the approved project. These actions, as needed, will address measures to ensure the proper protection of water quality, site-specific stormwater and sediment retention, and design of the project to minimize site disturbance, including the following: • Identify site-specific surface water runoff patterns and implement measures to prevent excessive and unnatural soil deposition and erosion. • Implement measures to maintain natural drainages and to maintain hydrologic function in the event drainages are disturbed. • Reduce the amount of area covered by impervious surfaces through use of permeable pavement or other pervious surfaces. Direct runoff from impervious surfaces into retention basins. • Stabilize disturbed areas following grading in the manner appropriate to the soil type so that wind or water erosion is minimized. • Minimize irrigation runoff by using low or no irrigation native vegetation landscaping for landscaped retention basins. • Conduct regular inspections and maintenance of long-term erosion control measures to ensure long-term effectiveness. • Project applicants for sites that may affect intermittent and perennial streams, springs, swales, ephemeral washes, wetland vegetation, other DRECP water land covers, or sites occupied by aquatic or riparian Focus and BLM Special Status Species due to groundwater or surface water extraction will conduct hydrologic studies during project planning to determine the potential effect of groundwater and surface water extraction on the hydrologic unit. These studies will include both watershed effects as well as effects on perched, alluvial, and regional aquifers. Projects that are likely to affect ground-water resources in a manner that would result in substantial loss of riparian or wetland communities or habitat for riparian or aquatic Focus and BLM Special Status Species are prohibited. • The use of evaporation ponds for water management will be avoided when the water could harm birds or other terrestrial wildlife due to constituents of concern present in the wastewater (e.g., selenium, hypersalinity, etc.). Evaporation ponds will be configured to minimize attractiveness to shorebirds (e.g., maintain water depths over two feet; maintain steep slopes along edge; enclose evaporation ponds in long-term structures; or obscure evaporation ponds from view using materials that blend in with the natural surroundings). • Ramps that allow the egress of wildlife from ponds or other water management infrastructure will be installed.	X			X		
				● Section 2.3.7.1 describes Hazardous Material and Waste Management procedures which are part of the Proposed Action, and Section 2.3.7.9 describes the Stormwater Management procedures. ● Section 4.20.2 describes the Applicant's proposed Construction Stormwater Pollution Prevention Plan (SWPPP). ● Applicant-Proposed Measure BIO-2 specifies the construction related plans to be followed. These include plans to prevent toxic chemicals, hazardous materials, and other fluids from entering vegetation-type streams (Waste Management Plan, Spill Prevention Control and Countermeasures Plan, and Hazardous Materials Plan), and plans to address drainage, erosion, and sedimentation control (SWPPP). ● Applicant-Proposed Measure BIO-3 describes construction BMPs which address these topics. ● Mitigation Measure WATER-1 provides further specification of the requirements for the Construction SWPPP. Mitigation Measures WATER-2 describes further requirements of the Comprehensive Drainage, Stormwater, and Sedimentation Control Plan.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
	Yes	No	Partial	Yes	No	Partial
LUPA-BIO-10: Consistent with BLM state and national policies and guidance, integrated weed management actions, will be carried out during all phases of activities, as appropriate, and at a minimum will include the following: • Thoroughly clean the tires and undercarriage of vehicles entering or reentering the project site to remove potential weeds. • Store project vehicles on site in designated areas to minimize the need for multiple washings whenever vehicles re-enter the project site. • Properly maintain vehicle wash and inspection stations to minimize the introduction of invasive weeds or subsidy of invasive weeds. • Closely monitor the types of materials brought onto the site to avoid the introduction of invasive weeds and non-native species. • Reestablish native vegetation quickly on disturbed sites. • Monitor and quickly implement control measures to ensure early detection and eradication of weed invasions to avoid the spread of invasive weeds and non-native species on site and to adjacent off-site areas. • Use certified weed-free mulch, straw, hay bales, or equivalent fabricated materials for installing sediment barriers.	X			X		
				Applicant-Proposed Measure APM-BIO-5 discusses the Applicant's Integrated Weed Management Plan, which has been reviewed and approved by the BLM Field Office.		
	Yes	No	Partial	Yes	No	Partial
LUPA-BIO-11: Implement the following CMAs for controlling nuisance animals and invasive species: • No fumigant, treated bait, or other means of poisoning nuisance animals including rodenticides will be used in areas where Focus and BLM Special Status Species are known or suspected to occur. • Manage the use of widely spread herbicides and do not apply herbicides effective against dicotyledonous plants within 1,000 feet from the edge of a 100-year floodplain, stream and wash channels, and riparian vegetation or to soils less than 25 feet from the edge of drains. Exceptions will be made when targeting the base and roots of invasive riparian species such as tamarisk and *Arundo donax* (giant reed). Manage herbicides consistent with the most current national and California BLM policies. • Minimize herbicide, pesticide, and insecticide treatment in areas that have a high risk for groundwater contamination. • Clean and dispose of pesticide containers and equipment following professional standards. Avoid use of pesticides and cleaning containers and equipment in or near surface or subsurface water. • When near surface or subsurface water, restrict pesticide use to those products labeled safe for use in/near water and safe for aquatic species of animals and plants.	X			X		
				Applicant-Proposed Measure APM-BIO-5 discusses the Applicant's Integrated Weed Management Plan, which has been reviewed and approved by the BLM Field Office.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-BIO-12: For activities that may impact Focus or BLM Special Status Species, implement the following LUPA CMA for noise: • To the extent feasible, and determined necessary by BLM to protect Focus and BLM sensitive wildlife species, locate stationary noise sources that exceed background ambient noise levels away from known or likely locations of and BLM sensitive wildlife species and their suitable habitat. • Implement engineering controls on stationary equipment, buildings, and work areas including sound-insulation and noise enclosures to reduce the average noise level, if the activity will contribute to noise levels above existing background ambient levels. • Use noise controls on standard construction equipment including mufflers to reduce noise.	Yes	No	Partial	Yes	No	Partial
			X	X		
	The Project does not involve stationary noise sources. It does involve the use of construction equipment.			Section 4.12.2 specifies that construction equipment would employ factory-approved exhaust mufflers.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-BIO-13: Implement the following CMA for project siting and design	Yes	No	Partial	Yes	No	Partial

• To the maximum extent practicable site and design projects to avoid impacts to vegetation types, unique plant assemblages, climate refugia as well as occupied habitat and suitable habitat for Focus and BLM Special Status Species (see "avoid to the maximum extent practicable" in Glossary of Terms).
• The siting of projects along the edges (i.e. general linkage border) of the biological linkages identified in Appendix D (Figures D-1 and D-2) will be configured (1) to maximize the retention of microphyll woodlands and their constituent vegetation type and inclusion of other physical and biological features conducive to Focus and BLM Special Status Species' dispersal, and (2) informed by existing available information on modeled focus and BLM Special Status Species habitat and element occurrence data, mapped delineations of vegetation types, and based on available empirical data, including radio telemetry, wildlife tracking sign, and road-kill information. Additionally, projects will be sited and designed to maintain the function of F Special Status Species connectivity and their associated habitats in the following linkage and connectivity areas:
  ◦ Within a 5-mile-wide linkage across Interstate 10 centered on Wiley's Well Road to connect the Mule and McCoy mountains (the majority of this linkage is within the Chuckwalla ACEC and Mule-McCoy Linkage ACEC).
  ◦ Within a 3-mile-wide linkage across Interstate 10 to connect the Chuckwalla and Palen mountains.
  ◦ Within a 1.5-mile-wide linkage across Interstate 10 to connect the Chuckwalla Mountains to the Chuckwalla Valley east of Desert Center.
  ◦ The confluence of Milpitas Wash and Colorado River floodplain within 2 miles of California State Route 78 (this linkage is entirely within the Chuckwalla ACEC).
• Delineate the boundaries of areas to be disturbed using temporary construction fencing and flagging prior to construction and confine disturbances, project vehicles, and equipment to the delineated project areas to protect vegetation types and focus and BLM Special Status Species.
• Long-term nighttime lighting on project features will be limited to the minimum necessary for project security, safety, and compliance with Federal Aviation Administration requirements and will avoid the use of constant-burn lighting.
• All long-term nighttime lighting will be directed away from riparian and wetland vegetation, occupied habitat, and suitable habitat areas for Focus and BLM Special Status Species. Long- term nighttime lighting will be directed and shielded downward to avoid interference with the navigation of night-migrating birds and to minimize the attraction of insects as well as insectivorous birds and bats to project infrastructure.
• To the maximum extent practicable (see Glossary of Terms), restrict construction activity to existing roads, routes, and utility corridors to minimize the number and length/size of new roads, routes, disturbance, laydown, and borrow areas.
• To the maximum extent practicable (see Glossary of Terms), confine vehicular traffic to designated open routes of travel to and from the project site, and prohibit, within project boundaries, cross- country vehicle and equipment use outside of approved designated work areas to prevent unnecessary ground and vegetation disturbance.
• To the maximum extent practicable(see Glossary of Terms) , construction of new roads and/or routes will be avoided within Focus and BLM Special Status Species suitable habitat within identified linkages for those Focus and BLM Special Status Species, unless the new road and/or route is beneficial to minimize net impacts to natural or ecological resources of concern. These areas will have a goal of "no net gain" of project roads and/or routes
• To the maximum extent practicable (see Glossary of Terms), any new road and/or route considered within Focus and BLM Special Status Species suitable habitat within identified linkages for those Focus and BLM Special Status Species will not be paved so as not to negatively affect the function of identified linkages.
• Use nontoxic road sealants and soil stabilizing agents.
			X			X

	• The Blue paloverde-Desert Ironwood Alliance (within the Madrean Warm Semi-Desert Wash Woodland/Scrub and Sonoran-Coloradan Semi-Desert Wash Woodland/Scrub specified in Table 17) is present outside in the area, but is avoided by the footprint of all alternatives. • The Project is situated so that it may impact Special Status Species (Harwood's eriastrum and Burrowing owl). No Plant Focus species, as defined in Table 23, are present in the Project area. • The Project is not located within or on the edges of any of the linkages shown in Maps D-1 or D-2. • The Project will require measures to protect vegetation types. • The Project will include nighttime lighting. • The Project will include roads.			• No Alternatives would directly impact the Blue paloverde-Desert Ironwood Alliance. However, the Proposed Action would be situated within the 200 foot setback distance of an area of Blue paloverde-Desert Ironwood Alliance that is located outside of the Project footprint. Alternatives 2 and 3 would be located more than 200 feet away from the Blue paloverde-Desert Ironwood Alliance. • Table 4.3-2 shows that all alternatives would directly impact Harwood's eriastrum. Because Alternatives 2 and 3 would still achieve the basic objectives of the activity, the Proposed Action does not avoid these resources to the maximum extent practicable, and does not conform. Alternatives 2 and 3 do conform. • All of the action alternatives would impact Burrowing owl habitat. However, because this is widespread across the site, it cannot be avoided by any reduced acreage configurations of the Project while still achieving the basic objectives of the activity. • Section 2.3.7.5 specifies flagging or staking or protected areas. Mitigation Measure VEG-8 specifies flagging and temporary fencing of work areas. • Nighttime lighting restrictions are discussed in Section 2.3.4.7 (Construction Schedule), Section 4.4.3.1 (impacts to wildlife habitat during construction), and the Applicant-Proposed Measures provided in Section 4.19.2. • Section 2.3.3.2 describes the location of the proposed gen-tie line within an existing utility corridor, and Section 2.3.3.3 describes the access roads that would be used. Mitigation Measure VEG-8.3 specifies that vehicles will be restricted to existing routes. Mitigation Measure VEG-8.6 specifies that soil stabilizers be non-toxic.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-BIO-14: Implement the following general standard practices to protect Focus and BLM Special Status Species: • Feeding of wildlife, leaving of food or trash as an attractive nuisance to wildlife, collection of native plants, or harassing of wildlife on a site is prohibited. • Any wildlife encountered during the course of an activity, including construction, operation, and decommissioning will be allowed to leave the area unharmed. • Domestic pets are prohibited on sites. This prohibition does not apply to the use of domestic animals (e.g., dogs) that may be used to aid in official and approved monitoring procedures/protocols, or service animals (dogs) under Title II and Title III of the American with Disabilities Act. • All construction materials will be visually checked for the presence of wildlife prior to their movement or use. Any wildlife encountered during the course of these inspections will be allowed to leave the construction area unharmed. • All steep-walled trenches or excavations used during the project will be covered, except when being actively used, to prevent entrapment of wildlife. If trenches cannot be covered, they will be constructed with escape ramps, following up-to-date design standards to facilitate and allow wildlife to exit, or wildlife exclusion fencing will be installed around the trench(s) or excavation(s). Open trenches or other excavations will be inspected by a designated biologist immediately before backfilling, excavation, or other earthwork. • Minimize natural vegetation removal through implementation of crush and drive or cut or mow vegetation rather than removing entirely.	Yes	No	Partial	Yes	No	Partial
	X			X		
				• Applicant-Proposed Measure APM-BIO-3 discusses the Construction BMPs, which include measures for managing trash and debris. Additional information is provided in Mitigation Measures VEG-8. • Mitigation Measures which specify means to allow wildlife to be moved out of harm's way include VEG-6, VEG-8.10, and WIL-1. • Mitigation Measures which prohibit bringing pets onsite include VEG-8.14, and WIL-8. • Mitigation Measure VEG-8.9 requires checking under vehicles for wildlife. Mitigation Measure 8.10(b) requires checking under construction materials. • Mitigation Measure 8.10 specifies procedures for avoiding wildlife pitfalls. • Section 2.3.4.3 discusses site preparation, and specifies that the preferred method is disk, rolling, and compacting vegetation, in order to leave vegetation in place to control erosion. Mitigation Measure VEG-9 also specifies crushing of vegetation, as opposed to blading, in order to maintain the seed bank.		
LUPA-BIO-15: Use state-of-the-art, as approved by BLM, construction and installation techniques, appropriate for the specific activity/project and site, that minimize new site disturbance, soil erosion and deposition, soil compaction, disturbance to topography, and removal of vegetation.	Yes	No	Partial	Yes	No	Partial
	X			X		
				The Project design presented in the POD, and the mitigation measures described in the EIS/EIR, have been developed based on the most recent available guidance and templates. Conformance is also to be achieved through BLM review and approval of the Final POD and mitigation measures.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
	Yes	No	Partial	Yes	No	Partial
LUPA-BIO-16: For activities that may impact Focus and BLM sensitive birds, protected by the ESA and/or Migratory Bird Treaty Act of 1918, and bat species, implement appropriate measures as per the most up-to-date BLM state and national policy and guidance, and data on birds and bats, including but not limited to activity specific plans and actions. The goal of the activity -specific bird and bat actions is to avoid and minimize direct mortality of birds and bats from the construction, operation, maintenance, and decommissioning of the specific activities. Activity-specific measures to avoid and minimize impacts may include, but are not limited to: • Siting and designing activities will avoid high bird and bat movement areas that separate birds and bats from their common nesting and roosting sites, feeding areas, or lakes and rivers. • For activities that impact bird and bat Focus and BLM Special Status Species, during project siting and design, conducting monitoring of bird and bat presence as well as bird and bat use of the project site using the most current survey methods and best procedures available at the time. • Reusing or co-locating new transmission facilities and other ancillary facilities with existing facilities and disturbed areas to reduce habitat destruction and avoid additional collision risks. • Reducing bird and bat collision hazards by utilizing techniques such as unguyed monopole towers or tubular towers. Where the use of guywires is unavoidable, demarcate guywires using the best available methods to minimize avian species strikes. • When fencing is necessary, use bird and bat compatible design standards. • Using lighting that does not attract birds and bats or their prey to project sites including using non-steady burning lights (red, dual red and white strobe, strobe- like flashing lights) to meet Federal Aviation Administration requirements, using motion or heat sensors and switches to reduce the time when lights are illuminated, using appropriate shielding to reduce horizontal or skyward illumination, and avoiding the use of high-intensity lights (e.g., sodium vapor, quartz, and halogen). • Implementing a robust monitoring program to regularly check for wildlife carcasses, document the cause of mortality, and promptly remove the carcasses. • Incorporating a bird and bat use and mortality monitoring program during operations using current protocols and best procedures available at time of monitoring.	X			X		
				• Protocols for presence and use surveys for birds are described in BRTR Section 2.8.3, and are summarized in EIS/EIR Section 3.4.1.1. Protocols for presence and use surveys for bats are described in BRTR Section 2.8.4.3, and are summarized in EIS/EIR Section 3.4.1.1. The surveys were conducted under the direction of BLM staff, and the resulting reports were approved by those staff. Therefore, the surveys used the most current survey methods available at the time. • Section 2.3.3.2 describes the location of the proposed gen-tie line within an existing utility corridor. • Nighttime lighting restrictions are discussed in Section 2.3.4.7 (Construction Schedule), Section 4.4.3.1 (impacts to wildlife habitat during construction), and the Applicant-Proposed Measures provided in Section 4.19.2.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-BIO-17: For activities that may result in mortality to Focus and BLM Special–Status bird and bat species, a Bird and Bat Conservation Strategy (BBCS) will be prepared with the goal of assessing operational impacts to bird and bat species and incorporating methods to reduce documented mortality. The BBCS actions for impacts to birds and bats during these activities will be determined by the activity-specific bird and bat operational actions. The strategy shall be approved by BLM in coordination with USFWS, and CDFW as appropriate, and may include, but is not limited to: ● Incorporating a bird and bat use and mortality monitoring program during operations using current protocols and best procedures available at time of monitoring. ● Activity-specific operational avoidance and minimization actions that reduce the level of mortality on the populations of bird and bat species, such as: • Use techniques that minimize attraction of birds to hazardous situations that are mistaken to be or simulate natural habitats (e.g., bodies of water). • Implement operational management techniques that minimize impacts to migratory birds during diurnal and seasonal cycles (e.g., positioning of heliostats to decrease surface area exposed to avian species). • Evaluation and installation of the best available bird and bat detection and deterrent technologies available at the time of construction. Known important Focus and BLM Special Status bird areas are: • Dry lakes and playas of the north Mojave region, which include China Lake, Koehn Lake, Harper Lake, and Searles Lake (as shown in the Audubon Important Bird Areas in Appendix D) • Antelope Valley (as shown in the Audubon Important Bird Areas in Appendix D) • Lower Colorado River Valley (as shown in the Audubon Important Bird Areas in Appendix D) • The Salton Sea and bordering areas including agricultural land of the Imperial Valley (as shown in the Audubon Important Bird Areas in Appendix D) • Documented avian movement corridors along the north slope of the San Gabriel and San Bernardino mountain ranges • Other regionally important seasonal use areas and migratory corridors identified in future studies or otherwise documented in the scientific literature over the term of the LUPA	Yes	No	Partial	Yes	No	Partial
	X			X		
	The Project is not located in an Audubon Important Bird Area, as shown in DRECP Figure D-3. However, the requirement still applies because it is an activity that may result in mortality to Focus and BLM Special–Status bird and bat species.			The BBCS will be finalized and approved by BLM and the USFWS prior to Project construction.		
LUPA-BIO-RIPWET-1: The riparian and wetland DRECP vegetation types and other features listed in Table 17 will be avoided to the maximum extent practicable, except for allowable minor incursions (see Glossary of Terms for "avoidance to the maximum extent practicable" and "minor incursion") with the specified setbacks. (see Table 17 in DRECP). For minor incursion (see "minor incursion" in the Glossary of Terms) to the DRECP riparian vegetation types, wetland vegetation types, or encroachments on the setbacks listed in Table 17, the hydrologic function of the avoided riparian or wetland communities will be maintained. • Minor incursions in the riparian and wetland vegetation types or other features including the setbacks listed in Table 17 will occur outside of the avian nesting season, February 1 through August 31 or otherwise determined by BLM, USFWS and CDFW if the minor incursion(s) is likely to result in impacts to nesting birds.	Yes	No	Partial	Yes	No	Partial
		X				
	No Alternatives would directly impact the Blue paloverde-Desert Ironwood Alliance.					
LUPA-BIO-RIPWET-2: Hydrologic function of the following DRECP vegetation types will be maintained: North American Warm Desert Alkaline Scrub and Herb Playa and Wet Flat, Southwestern North American Salt Basin and High Marsh, and other undifferentiated wetland-related land covers (i.e., "Playa," "Wetland," and "Open Water").	Yes	No	Partial	Yes	No	Partial
		X				
	None of the referenced vegetation types are present at the project site.					

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-BIO-RIPWET-3: For activities that occur within 0.25 mile of a riparian or wetland DRECP vegetation type and may impact BLM Special Status riparian and wetland birds species, conduct a pre-construction/activity nesting bird survey for BLM Special Status riparian and wetland birds according to agency-approved protocols. Based on the results of the nesting bird survey above, setback activities that are likely to impact BLM Special Status riparian and wetland bird species, including but not limited to pre-construction, construction and decommissioning, 0.25 mile from active nests Special Status during the breeding season (February 1 through August 31 or otherwise determined by BLM, USFWS and CDFW). For activities in areas covered by this provision that occur during the breeding season and that last longer than one week, nesting bird surveys may need to be repeated, as determined by BLM, in coordination with USFWS and CDFW, as appropriate. No pre-activity nesting bird surveys are necessary for activities occurring outside of the breeding season.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Mitigation Measure WIL-7 proposes pre-construction surveys with dates of February 1 through August 31. It states that a setback of an appropriate size will be established.		
LUPA-BIO-RIPWET-4: Setback pre-construction, construction, and decommissioning activities and other activities that may impact federally listed fish species, 0.25 mile from the edge of existing or newly discovered occurrences of federally listed fish species, except for minor incursions (see Glossary of Terms). • Demonstrate neutral or beneficial long-term hydrologic effects on federally listed fish species and the adjoining riparian and wetland habitat prior to seeking authorization for and commencing a minor incursion.	Yes	No	Partial	Yes	No	Partial
		X				
	There are no fish species present at the project site.					
LUPA-BIO-RIPWET-5: Site and design activities to fully avoid operational impacts to existing and newly discovered occurrences of federally listed fish species.	Yes	No	Partial	Yes	No	Partial
		X				
	There are no fish species present at the project site.					
LUPA-BIO-RIPWET-6: Avoid pre-construction, construction, and decommissioning activities or other activities that may impact the Tehachapi slender salamander within 0.25 mile of existing or newly discovered occurrences of or suitable habitat for Tehachapi slender salamander, except for minor incursions (see Glossary of Terms).	Yes	No	Partial	Yes	No	Partial
		X				
	The project is not located near habitat of the Tehachapi slender salamander.					
LUPA-BIO-RIPWET-7: Construct culverts or other suitable below-grade crossings for new or improved roadways that bisect suitable habitat for the Tehachapi Slender Salamander. • Construct barriers to reduce at-grade crossings along new or improved roadways that bisect suitable habitat.	Yes	No	Partial	Yes	No	Partial
		X				
	The project is not located near habitat of the Tehachapi slender salamander.					

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

<table>
<tr><th>CMA</th><th colspan="3">Applicability[1,2]</th><th colspan="3">Conformance[3]</th></tr>
<tr><td rowspan="3">LUPA-BIO-DUNE-1: Because DRECP sand dune vegetation types and Aeolian sand transport corridors are, by definition, shifting resources, activities that potentially occur within or bordering the sand dune DRECP vegetation types and/or Aeolian sand transport corridors must conduct studies to verify the location [refer to Appendix D, Figure D-7] and extent of the sand resource(s) for the activity-specific environmental analysis to determine:
• Whether the proposed activity(s) occur within a sand dune or an Aeolian sand transport corridor
• If the activity(s) is subject to dune/Aeolian sand transport corridor CMAs
• If the activity(s) needs to be reconfigured to satisfy applicable avoidance requirements</td><td>Yes</td><td>No</td><td>Partial</td><td>Yes</td><td>No</td><td>Partial</td></tr>
<tr><td>X</td><td></td><td></td><td>X</td><td></td><td></td></tr>
<tr><td colspan="3">Note – the reference to DRECP Figure D-7 in the CMA appears to be a typographical error. The CMA is actually referring the reader to use DRECP Figure D-15. The Project site is within the Dune/Sand area shown on DRECP Figure D-15.</td><td colspan="3">Figure 3.3-2 shows the location of the project with respect to the Dune/Sand area shown in DRECP Figure D-15. The Applicant has mapped the location and extent of the resource, and has determined that the Project does occur within the corridor. There are no specific avoidance requirements for the sand transport corridor, but DFA-VPL-BIO-DUNE-1 requires that projects avoid dune vegetation (i.e., North American Warm Desert Dune and Sand Flats). North American Warm Desert Dune and Sand Flats in the Project area is mapped on DRECP Figure D-7. The resolution of that map is not detailed enough to ensure that the Project entirely avoids the North American Warm Desert Dune and Sand Flats area, but it appears that it does avoid it.
Conformance with the other specific CMAs and avoidance requirements is addressed where applicable in other CMAs.</td></tr>
<tr><td rowspan="3">LUPA-BIO-DUNE-2: Activities that potentially affect the amount of sand entering or transported within Aeolian sand transport corridors will be designed and operated to:
• Maintain the quality and function of Aeolian transport corridors and sand deposition zones, unless related to maintenance of existing [at the time of the DRECP LUPA ROD] facilities/operations/activities
• Avoid a reduction in sand-bearing sediments within the Aeolian system
• Minimize mortality to DUNE associated Focus and BLM Special Status Species</td><td>Yes</td><td>No</td><td>Partial</td><td>Yes</td><td>No</td><td>Partial</td></tr>
<tr><td>X</td><td></td><td></td><td></td><td></td><td>X</td></tr>
<tr><td colspan="3">DRECP only maps one sand-related feature, which is the "Dunes/Sand" area mapped on DRECP Figure D-15. In contrast, the BRTR and EIS/EIR map two separate features. Figure 3.3-2 shows the location of the project with respect to the "Sand Corridor", which corresponds to the Dune/Sand area shown in DRECP Figure D-15, and covers virtually the entire project area.</td><td colspan="3">As discussed in Section 3.3.1.1, the Dunes/Sand area mapped on DRECP Figure D-15 is not actually a continuous, inter-connected series of sand transport areas, nor is it currently functioning to transport sand on a regional basis. Also, the Project is situated at the downwind end of the system, and evaluation of existing literature and local wind patterns indicates that any effects the Project has in an upwind direction would be very localized. Therefore, the Project would not affect the quality or function of the corridor, and would not reduce sand-bearing sediments within the system.
With respect to minimizing mortality to dune-associated species, the Harwood's eriastrum and the Mojave fringe-toed lizard, are specifically associated with dunes. All alternatives would include direct impacts to these species. However, most of these impacts under Alternatives 2 and 3 are associated with the gen-tie line, which is required under the CDCA Plan to be placed within the utility corridor. The utility corridor is coincident with the lizard and eriastrum habitat, so these impacts are unavoidable.</td></tr>
<tr><td rowspan="2">LUPA-BIO-DUNE-3: Any facilities or activities that alter site hydrology (e.g., sediment barrier) will be designed to maintain continued sediment transport and deposition in the Aeolian corridor in a way that maintains the Aeolian sorting and transport to downwind deposition zones. Site designs for maintaining this</td><td>Yes</td><td>No</td><td>Partial</td><td>Yes</td><td>No</td><td>Partial</td></tr>
<tr><td>X</td><td></td><td></td><td>X</td><td></td><td></td></tr>
</table>

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
transport function must be approved by BLM in coordination with USFWS and CDFW as appropriate.				All alternatives avoid direct impacts to sand dunes to the extent possible. The gen-tie line would be situated within an area of dunes, but is required under the CDCA Plan to be placed within the utility corridor, which is coincident with the dunes. The facility itself is a porous barrier. Localized sand deposition will occur at fencelines and at support posts, but long-term sand transport rates through the facility would not be changed. In addition, there are no deposition zones downwind of the facility to be impacted.		
LUPA-BIO-DUNE-4: Dune formations and other sand accumulations (i.e., sand ramps, sand sheets) with suitable habitat characteristics for the Mojave fringe-toed lizard (i.e., unconsolidated blow-sand) will be mapped according to mapping standards established by the BLM National Operations Center. For minor incursions (see "minor incursion" in the Glossary of Terms) into sand dunes and sand transport areas the activity will be sited in the mapped zone with the least impacts to sand dunes and sand transport and Mojave fringe-toed lizards.	Yes	No	Partial	Yes	No	Partial
	X					X
				The "Sand Corridor" (which corresponds to the Dune/Sand area shown in DRECP Figure D-15) was mapped in association with DRECP, and onsite vegetation was mapped by BLM biologists assigned to the Project. The map showing both features is Figure 3.3-2. Table 4.3-1 shows the relative disturbance of this habitat by Alternatives 1, 2, and 3, and Table 4.4-3 shows that the disturbance associated with impacts to Mojave fringe-toed lizards. With respect to both the habitat and the occurrences of Mojave fringe-toed lizards, Alternatives 2 and 3 avoid impacts to the extent feasible, while the Proposed Action does not avoid to the extent feasible, and therefore does not conform.		
LUPA-BIO-DUNE-5: If suitable habitat characteristics are identified during the habitat assessment, clearance surveys (see Glossary of Terms) for Mojave fringe-toed lizard will be performed in suitable habitat areas.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Section 2.3.4.1 specifies that clearance surveys for Mojave fringe-toed lizard will be performed.		
LUPA-BIO-BAT-1: Activities, except wind projects, will not be sited within 500 feet of any occupied maternity roost or presumed occupied maternity roost as described below. Refer to CMA DFA-VPL-BIO-BAT-1 for distances within DFAs and VPLs.	Yes	No	Partial	Yes	No	Partial
		X				
	As discussed in Section 2.8.4.3 of the Biological Resources Technical Report (BRTR), the closest bat colony is 3.4 miles away from the Project site.					
LUPA-BIO-BAT-2: Mines will be assumed to be occupied bat roosts, unless appropriate surveys for bat use have been conducted during all seasons (including maternity, lekking or swarming, and winter use). Mines not considered potential bat roosts are only those that have no structure/workings (adits or shafts or crevices out of view).	Yes	No	Partial	Yes	No	Partial
		X				
	As discussed in Section 2.8.4.3 of the BRTR, the closest bat colony is 3.4 miles away from the Project site.					
LUPA-BIO-PLANT-1: Conduct properly timed protocol surveys in accordance with the BLM's most current (at time of activity) survey protocols for plant Focus and BLM Special Status Species.	Yes	No	Partial	Yes	No	Partial
	X			X		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
				The vegetation surveys are described in Section 2.7 of the BRTR, and in Sections 3.3.1.1 and 3.3.1.2 of the EIS/EIR. The surveys were performed under the direction of BLM biologists assigned to the Project, who approved the BRTR. Therefore, the mapping was done according to the most current BLM survey protocols at the time of the surveys.		
LUPA-BIO-PLANT-2: Implement an avoidance setback of 0.25 mile for all Focus and BLM Special Status Species occurrences. Setbacks will be placed strategically adjacent to occurrences to protect ecological processes necessary to support the plant Species (see Appendix Q, Baseline Biology Report, in the Proposed LUPA and Final EIS [2015], or the most recent data and modeling).	Yes	No	Partial	Yes	No	Partial
	X					X
				Table 4.3-3 shows that the solar plant site for the Proposed Action would directly impact the Harwood's eriastrum, while the solar plant site for Alternatives 2 and 3 would avoid all occurrences of Harwood's eriastrum. However, the solar site for Alternative 2 does not meet the setback distance of 0.25 miles for BLM Sensitive plant species. The solar array footprint for Alternative 3 does meet the setback distance. The gen-tie corridor for all action alternatives also directly impacts the Harwood's eriastrum, but this impact is unavoidable because the gen-tie line is required to be placed within the approved utility corridor.		
LUPA-BIO-PLANT-3: Impacts to suitable habitat for Focus and BLM Special Status plant species should be avoided to the extent feasible, and are limited [capped] to a maximum of 1% of their suitable habitat throughout the entire LUPA Decision Area. The baseline condition for measuring suitable habitat is the DRECP modeled suitable habitat for these species utilized in the EIS analysis (2014 and 2015), or the most recent suitable habitat modeling. For those plants with Species Specific DFA Suitable Habitat Impact Caps listed in Table 23, those caps apply in the DFAs only. Refer to CMA **DFA-PLANT-1**.	Yes	No	Partial	Yes	No	Partial
			X			X
	One BLM Special Status plant species, the Harwood's eriastrum, is present in the Project area. No Plant Focus species, as defined in Table 23, are present in the Project area.			Table 4.3-3 shows that the solar plant site for the Proposed Action would directly impact the Harwood's eriastrum, while the solar plant site for Alternatives 2 and 3 would avoid all occurrences of Harwood's eriastrum. Because Alternatives 2 and 3 meet the purpose and need, the Proposed Action does not avoid this species to the extent feasible. Therefore, the Proposed Action does not conform, but Alternatives 2 and 3 do conform.		
LUPA-BIO-SVF-1: For activity-specific NEPA analysis, a map delineating potential sites and habitat assessment of the following special vegetation features is required: Yucca clones, creosote rings, Saguaro cactus, Joshua tree woodland, microphyll woodland, Crucifixion thorn stands. BLM guidelines for mapping/surveying cactus, yuccas, and succulents shall be followed.	Yes	No	Partial	Yes	No	Partial
			X	X		
	The following resources are not present at the project site, and are not applicable: Yucca clones, creosote rings, Saguaro cactus, and Joshua tree woodland. The following resource is present near the Project site: Microphyll woodland (desert dry wash woodland)[4]. The following resource was not identified in site surveys, but was determined to have a moderate potential to occur, and may be applicable: Crucifixion thorn stands.			All alternatives would avoid the mapped area of microphyll woodland. No map of Crucifixion thorn is provided, since no individuals were identified in site surveys. The BRTR recommends that focused surveys specific to the Emory's crucifixion thorn be conducted.		
LUPA-BIO-SVF-2: Yucca clones larger than 3 meters in diameter (longest diameter if the clone forms an ellipse rather than a circular ring) shall be avoided.	Yes	No	Partial	Yes	No	Partial
		X				
	Yucca clones are not present in the Project area.					
LUPA-BIO-SVF-3: Creosote bush rings (see Glossary of Terms) larger than 5 meters in diameter (longest	Yes	No	Partial	Yes	No	Partial

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
diameter if the "ring" forms an ellipse rather than a circle) shall be avoided.		X				
	Creosote rings are not present in the Project area.					
LUPA-BIO-SVF-4: Saguaro cactus should be managed in such a way as to provide long-term habitat for the California populations not just individual plants, except in DFAs.	Yes	No	Partial	Yes	No	Partial
		X				
	Saguaro cactus are not present in the Project area.					
LUPA-BIO-SVF-5: Joshua tree woodland (Yucca brevifolia Woodland Alliance): impacts to Joshua tree woodlands (see Glossary of Terms) will be avoided to the maximum extent practicable (see Glossary of Terms), except for minor incursions (see Glossary of Terms).	Yes	No	Partial	Yes	No	Partial
		X				
	Joshua tree woodland is not present in the Project area.					
LUPA-BIO-SVF-6: Microphyll woodland: impacts to microphyll woodland (see Glossary of Terms) will be avoided, except for minor incursions (see Glossary of Terms).	Yes	No	Partial	Yes	No	Partial
	X			X		
				All alternatives would avoid the microphyll woodland.		
LUPA-BIO-SVF-7: Crucifixion thorn stands: (Castela emoryi Shrubland Special Stands) Crucifixion thorn stands with greater than 100 individuals will be avoided.	Yes	No	Partial	Yes	No	Partial
		X				
	No crucifixion thorn stands were identified in plant surveys.					
LUPA-BIO-VEG-1: Management of cactus, yucca, and other succulents will adhere to current up-to-date BLM policy.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Applicant-Proposed Measure APM-BIO-4 specifies procedures for managing cacti.		
LUPA-BIO-VEG-2: Promote appropriate levels of dead and downed wood on the ground, outside of campground areas, to provide wildlife habitat, seed beds for vegetation establishment, and reduce soil erosion, as determined appropriate on an activity-specific basis.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Section 2.3.4.3 discusses site preparation, and specifies that the preferred method is disk, rolling, and compacting vegetation, in order to leave vegetation in place to control erosion. Mitigation Measures VEG-9 also specifies crushing of vegetation, as opposed to blading, in order to maintain the seed bank.		
LUPA-BIO-VEG-3: Allow for the collection of plant material consistent with the maintenance of natural ecosystem processes.	Yes	No	Partial	Yes	No	Partial
		X				
	The Project does not include the collection of plant material.					
LUPA-BIO-VEG-4: Within the Bishop Field Office area, provide yearlong protection of endangered, threatened, candidate, and sensitive plant and animal habitats. Yearlong protection means that no discretionary actions which would adversely affect target resources will be allowed.	Yes	No	Partial	Yes	No	Partial
		X				
	The Project is not within the Bishop Field Office area.					
LUPA-BIO-VEG-5: All activities will follow applicable BLM state and national regulations and policies for	Yes	No	Partial	Yes	No	Partial

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
salvage and transplant of cactus, yucca, other succulents, and BLM Sensitive plants.	X			X		
				Applicant-Proposed Measure APM-BIO-4 specifies procedures for managing cacti.		
LUPA-BIO-VEG-6: BLM may consider disposal of succulents through public sale, as per current up-to-date state and national policy.	Yes	No	Partial	Yes	No	Partial
		X				
	Although BLM may consider sale of succulents associated with the Project, this is an internal BLM actions, not a condition for approval for a ROW authorization.					
LUPA-BIO-IFS-1: Activities within desert tortoise linkages, identified in Appendix D, that may have a negative impact on the linkage will require an evaluation, in the environmental document(s), of the effects on the maintenance of long- term viable desert tortoise populations within the affected linkage. The analysis will consider the amount of suitable habitat, including climate refugia, required to ensure long-term viability within each linkage given the linkage's population density, long-term demographic and genetic needs, degree of existing habitat disturbance/impacts, mortality sources, and most up-to-date population viability modeling. Activities that would compromise the long-term viability of a linkage population or the function of the linkage, as determined by the BLM in coordination with USFWS and CDFW, are prohibited and will require reconfiguration or re-siting.	Yes	No	Partial	Yes	No	Partial
		X				
	The Project is not within a desert tortoise linkage, as identified in DRECP Figure D-16.					
LUPA-BIO-IFS-2: Construction of new roads and/or routes will be avoided to the maximum extent practicable (see Glossary of Terms) within desert tortoise habitat in tortoise conservation areas (TCAs) or tortoise linkages identified in Appendix D, unless the new road and/or route is beneficial to minimize net impacts to natural or ecological resources of concern for desert tortoise. TCAs and identified linkages should have the goal of "no net gain" of road density. Any new road considered within a TCA or identified linkage will not be paved and will be designed and sited to minimize the effect to the function of identified linkages or local desert tortoise populations and shall have a maximum speed limit of 25 miles per hour. Roads requiring the installation of long-term desert tortoise exclusion fencing for construction or operation will incorporate wildlife underpasses (e.g., culverts) to reduce population fragmentation.	Yes	No	Partial	Yes	No	Partial
		X				
	The Project is not within a desert tortoise conservation area (TCA) or linkage, as identified in DRECP Figure D-16.					
LUPA-BIO-IFS-3: All culverts for access roads or other barriers will be designed to allow unrestricted access by desert tortoises and will be large enough that desert tortoises are unlikely to use them as shelter sites (e.g., 36 inches in diameter or larger). Desert tortoise exclusion fencing may be utilized to direct tortoise use of culverts and other passages.	Yes	No	Partial	Yes	No	Partial
		X				
	Neither the POD nor the EIS/EIR identify that culverts will be installed.					

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
	Yes	No	Partial	Yes	No	Partial
LUPA-BIO-IFS-4: In areas where protocol and clearance surveys are required (see Appendix D), prior to construction or commencement of any long-term activity that is likely to adversely affect desert tortoises, desert tortoise exclusion fencing shall be installed around the perimeter of the activity footprint (see Glossary of Terms) in accordance with the Desert Tortoise Field Manual (USFWS 2009) or most up-to- date USFWS protocol. Additionally, short-term desert tortoise exclusion fencing will be installed around short-term construction and/or activity areas (e.g., staging areas, storage yards, excavations, and linear facilities), as appropriate, per the Desert Tortoise Field Manual (USFWS 2009) or most up-to-date USFWS protocol. • Exemption from desert tortoise protocol survey requirements can be obtained from BLM, in coordination with USFWS, and CDFW as applicable, on a case-by-case basis if a designated biologist determines the activity site does not contain the elements of desert tortoise habitat, is unviable for occupancy, or if baseline studies inferred absence during the current or previous active season. • Construction of desert tortoise exclusion fences will occur during the time of year when tortoise are less active in order to minimize impacts and to accommodate subsequent desert tortoise surveys. Any exemption or modification of desert tortoise exclusion fencing requirements will be based on the specifics of the activity and the site-specific population and habitat parameters. Sites with low population density and disturbed, fragmented, or poor habitat are likely to be candidates for fencing requirement exemptions or modifications. Substitute measures, such as on-site biological monitors in the place of the fencing requirement, may be required, as appropriate. • After an area is fenced, and until desert tortoises are removed, the designated biologist is responsible for ensuring that desert tortoises are not being exposed to extreme temperatures or predators as a result of their pacing the fence. Remedies may include the use of shelter sites placed along the fence, immediate translocation, removal to a secure holding area, or other means determined by the BLM, USFWS, and CDFW, as applicable. • Modification or elimination of the above requirement may also be approved if the activity design will allow retention of desert tortoise habitat within the footprint. If such a modification is approved, modified protective measures may be required to minimize impacts to desert tortoises that may reside within the activity area. • Immediately prior to desert tortoise exclusion fence construction, a designated biologist (see Glossary of Terms) will conduct a clearance survey of the fence alignment to clear desert tortoises from the proposed fence line's path. • All desert tortoise exclusion fencing will incorporate desert tortoise proof gates or other approved barriers to prevent access of desert tortoises to work sites through access road entry points. • Following installation, long-term desert tortoise exclusion fencing will be inspected for damage quarterly and within 48 hours of a surface flow of water due to a rain event that may damage the fencing. • All damage to long-term or short-term desert tortoise exclusion fencing will be immediately blocked to prevent desert tortoise access and repaired within 72 hours.	X			X		
				Mitigation Measure WIL-1 specifies requirements for desert tortoise fencing. That measure has been compiled from previous EISs (McCoy, Modified Blythe), and is based on the USFWS 2009 requirements.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-BIO-IFS-5: Following the clearance surveys (see Glossary of Terms) within sites that are fenced with long-term desert tortoise exclusion fencing a designated biologist (see Glossary of Terms) will monitor initial clearing and grading activities to ensure that desert tortoises missed during the initial clearance survey are moved from harm's way. A designated biologist will inspect construction pipes, culverts, or similar structures: (a) with a diameter greater than 3 inches, (b) stored for one or more nights, (c) less than 8 inches aboveground and (d) within desert tortoise habitat (such as, outside the long-term fenced area), before the materials are moved, buried, or capped. As an alternative, such materials shall be capped before storing outside the fenced area or placing on pipe racks. Pipes stored within the long-term fenced area after completing desert tortoise clearance surveys will not require inspection.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Mitigation Measures VEG-1 through VEG-5 specify the qualifications, duties, and authorities of the Designated Biologist(s) and Monitor(s). Specific requirements for inspecting pipes and culverts are provided in Mitigation Measure VEG-8.10.		
LUPA-BIO-IFS-6: When working in areas where protocol or clearance surveys are required (see Appendix D), biological monitoring will occur with any geotechnical boring or geotechnical boring vehicle movement to ensure no desert tortoises are killed or burrows are crushed.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Mitigation Measures VEG-1 through VEG-5 specify the qualifications, duties, and authorities of the Designated Biologist(s) and Monitor(s). Mitigation Measure VEG-8.16 specifies monitoring during geotechnical evaluations.		
LUPA-BIO-IFS-7: A designated biologist (see Glossary of Terms) will accompany any geotechnical testing equipment to ensure no tortoises are killed and no burrows are crushed.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Mitigation Measures VEG-1 through VEG-5 specify the qualifications, duties, and authorities of the Designated Biologist(s) and Monitor(s). Mitigation Measure VEG-8.16 specifies monitoring during geotechnical evaluations.		
LUPA-BIO-IFS-8: Inspect the ground under the vehicle for the presence of desert tortoise any time a vehicle or construction equipment is parked in desert tortoise habitat outside of areas fenced with desert tortoise exclusion fencing. If a desert tortoise is seen, it may move on its own. If it does not move within 15 minutes, a designated biologist may remove and relocate the animal to a safe location.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Mitigation Measure VEG-8.9 specifies the requirements for inspecting under vehicles.		
LUPA-BIO-IFS-9: Vehicular traffic will not exceed 15 miles per hour within the areas not cleared by protocol level surveys where desert tortoise may be impacted.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Applicant-Proposed Measure specifies a speed limit of 15 mph in all unimproved areas.		
LUPA-BIO-IFS-10: Comply with the conservation goals and objectives, criteria, and management planning actions identified in the most recent revision of the Flat-tailed Horned Lizard Rangewide Management Strategy (RMS). Activities will include appropriate design features using the most current information from the RMS and RMS Interagency Coordinating Committee to minimize adverse impacts during siting, design, pre- construction, construction, operation, and decommissioning; ensure that current or potential linkages and habitat quality are maintained; reduce mortality; minimize other adverse impacts during operation; and ensure that activities have a neutral or positive effect on the species.	Yes	No	Partial	Yes	No	Partial
		X				
	The Project site is not within the range of the Flat-tailed horned lizard.					

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-BIO-IFS-11: If Bendire's thrasher is present, conduct appropriate activity-specific biological monitoring (see Glossary of Terms) to ensure that Bendire's thrasher individuals are not directly affected by operations (i.e., mortality or injury, direct impacts on nest, eggs, or fledglings).	Yes	No	Partial	Yes	No	Partial
	X			X		
				Table 3.4-1 lists the species as Low Potential, with nesting habitat present. Mitigation Measure WIL-7 specifies requirements for pre-construction nest surveys. This measure specifies that, if active or suspected active nests are identified, a monitoring plan shall be developed, and a qualified biologist shall perform monitoring.		
LUPA-BIO-IFS-12: If burrowing owls are present, a designated biologist (see Glossary of Terms) will conduct appropriate activity-specific biological monitoring (see Glossary of Terms) to ensure avoidance of occupied burrows and establishment of the 656 feet (200 meter) setback to sufficiently minimize disturbance during the nesting period on all activity sites, when practical.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Mitigation Measure WIL-9 specifies requirements for burrowing owl surveys, avoidance, and monitoring, including the setback of 656 feet.		
LUPA-BIO-IFS-13: If burrows cannot be avoided on-site, passive burrow exclusion by a designated biologist (see Glossary of Terms) through the use of one-way doors will occur according to the specifications in Appendix D or the most up-to-date agency BLM or CDFW specifications. Before exclusion, there must be verification that burrows are empty as specified in Appendix D or the most up-to-date BLM or CDFW protocols. Confirmation that the burrow is not currently supporting nesting or fledgling activities is required prior to any burrow exclusions or excavations.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Mitigation Measure WIL-9 specifies requirements for burrowing owl surveys, avoidance, and monitoring, including passive burrow exclusion.		
LUPA-BIO-IFS-14: Activity-specific active translocation of burrowing owls may be considered, in coordination with CDFW.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Mitigation Measure WIL-9 specifies that active translocation may be done, in coordination with CDFW.		
LUPA-BIO-IFS-15: All activities will be designed and sited in a manner to avoid or minimize the likelihood of contact, injury, and mortality of California condors. If a condor is identified at a site, the BLM biological staff and USFWS will be immediately notified for guidance.	Yes	No	Partial	Yes	No	Partial
		X				
	The project site is not within the range of the condor.					
LUPA-BIO-IFS-16: Flight activity (e.g., surveys, construction, as well as operation and maintenance activities) related to any activities will not be allowed in the airspace extending to 3,000 feet above condor nest sites.	Yes	No	Partial	Yes	No	Partial
		X				
	The project site is not within the range of the condor.					
LUPA-BIO-IFS-17: In the range of the California condor, structures supported by guy wires will be marked with recommended bird deterrent devices at the appropriate spacing intervals.	Yes	No	Partial	Yes	No	Partial
		X				
	The project site is not within the range of the condor.					
LUPA-BIO-IFS-18: In the range of the California condor, all equipment and work-related materials that are potentially hazardous to condors, including but not limited to items that can be ingested, picked up, or carried away (e.g., loose-wires, open containers with fluids, some construction materials, etc.) will be kept in closed containers either in the work area or placed inside vehicles when they are not being used and at the end of every work day.	Yes	No	Partial	Yes	No	Partial
		X				
	The project site is not within the range of the condor.					

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
	Yes	No	Partial	Yes	No	Partial
LUPA-BIO-IFS-19: In the range of the California condor, when feasible, ethylene glycol-based anti-freeze or other ethylene glycol-based liquid substances will be avoided, and propylene glycol-based antifreeze will be used. Vehicles and equipment using ethylene glycol based substances will be inspected before and after field use as well as during storage on sites for leaks and puddles. Standing fluid will be remediated without unnecessary delay.		X				
	The project site is not within the range of the condor.					
LUPA-BIO-IFS-20: Activities that are determined to have a potential risk of taking condors will implement the best detect, deter, and curtailment strategy available at the time of the activity to minimize adverse effects, and avoid or minimize the likelihood of condor injury and mortality. (An example of a 2015 curtailment strategy is shutting down wind generation operations when condor(s) are present, or wind generation facilities switching to night operations only). The strategy must be approved by the BLM and USFWS, in coordination with CDFW as appropriate.		X				
	The project site is not within the range of the condor.					
LUPA-BIO-IFS-21: If condors begin to regularly visit a site, BLM may require, in coordination with USFWS, and CDFW as appropriate, the implementation of additional measures to minimize potential impacts to condors. These measures will be based on best available data, activity and areas specifics, and may include, but are not limited to: • Barriers, including welded wire fabric or hardware cloth, will be installed to prevent access around any facility element that poses a danger to condors. • Stainless steel lines, rather than poly chemical lines will be used to preclude condors from obtaining and ingesting pieces of poly chemical lines. • Landing deterrents attached to the walking perching substrates, such as porcupine wire or Daddi Long Legs ®.		X				
	The project site is not within the range of the condor.					
LUPA-BIO-IFS-22: Operations and/or activities that reach an activity-specified trigger for condor injury and/or mortality as determined by BLM and USFWS, and CDFW as appropriate, will curtail operations and/or activities using best available techniques, as determined by BLM and USFWS, and CDFW as appropriate. (An example of a 2015 curtailment strategy is shutting down wind generation operations when condor(s) are present, or wind generation facilities switching to night operations only.) If curtailment techniques are not viable or available, then operations and/or activities will be suspended until the injury and/or condor mortality issue is resolved to the satisfaction of BLM and USFWS, and CDFW, as appropriate.		X				
	The project site is not within the range of the condor.					
LUPA-BIO-IFS-23: In the range of the California condor, if an activity may have an impact on California condors, a Condor Operations Strategy (COS) will be developed and implemented on a activity-specific basis in order to avoid and/or reduce the likelihood of injury and mortality from activities. The COS shall be approved by BLM in coordination with USFWS, and CDFW as appropriate for third party activities, and may include, but is not limited, to detailing specifics on: the activity-specific detect, deter and curtailment strategy; monitoring approach to detect condor use of the site; adaptive management approach if condors are found to visit the site; and, activity-specific measures that assist in the recovery of condor.		X				
	The project site is not within the range of the condor.					
LUPA-BIO-IFS-24: Provide protection from loss and harassment of active golden eagle nests through the following actions: Activities that may impact nesting golden eagles, will not be sited or constructed within 1-mile of any active or alternative golden eagle nest within an active golden eagle territory, as determined by BLM in coordination with USFWS as appropriate.		X				
	Although DRECP identifies one nesting site in the McCoy Mountains within the 10-mile radius, no active golden eagle nests were detected within the 10 mile radius surrounding the Study Area during surveys. Although the site is considered foraging habitat, it would not be sited within 1 mile of any active or alternative golden eagle nest.					

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-BIO-IFS-25: Cumulative loss of golden eagle foraging habitat within a 1 to 4 mile radius around active or alternative golden eagle nests (as identified or defined in the most recent USFWS guidance and/or policy) will be limited to less than 20%. See **CONS-BIO-IFS-5** for the requirement in Conservation Lands.	Yes	No	Partial	Yes	No	Partial
		X				
	Although DRECP identifies one nesting site in the McCoy Mountains within the 10-mile radius, no active golden eagle nests were detected within the 10 mile radius surrounding the Study Area during surveys. Although the site is considered foraging habitat, it would not contribute to loss of foraging habitat within 1 to 4 mile radius around any nest.					
LUPA-BIO-IFS-26: For activities that impact golden eagles, applicants will conduct a risk assessment per the applicable USFWS guidance (e.g. the Eagle Conservation Plan Guidance) using best available information as well as the data collected in the pre-project golden eagle surveys.	Yes	No	Partial	Yes	No	Partial
	X			X		
	The project will impact foraging habitat for golden eagles.			BLM, USFWS, and Applicant will address risks to golden eagles through the BBCS.		
LUPA-BIO-IFS-27: If a permit for golden eagle take is determined to be necessary, an application will be submitted to the USFWS in order to pursue a take permit.	Yes	No	Partial	Yes	No	Partial
		X				
	Outside of land use plans, the BLM does not require applicants to apply for an eagle take permit.					
LUPA-BIO-IFS-28: In order to evaluate the potential risk to golden eagles, the following activities are required to conduct 2 years of pre-project golden eagle surveys in accordance with USFWS Eagle Conservation Plan Guidance as follows: • Wind projects and solar projects involving a power tower • Other activities for which the BLM, in coordination with USFWS, and CDFW as appropriate, determines take of golden eagle is reasonably foreseeable or there is a potential for take of golden eagle	Yes	No	Partial	Yes	No	Partial
	X			X		
				As reported in Section 2.8.3.4 of the Biological Resources Technical Report and EIS/EIR Section 3.4.1.1, two years of golden eagle surveys were done.		
LUPA-BIO-IFS-29: For active nests with recreational conflicts that risk the occurrence of take, provide public notification (e.g., signs) of the sensitive area and implement seasonal closures as appropriate.	Yes	No	Partial	Yes	No	Partial
		X				
	The CMA refers to an internal BLM activity or action (management of recreation) which is not related to authorization of the Project.					
LUPA-BIO-IFS-30: For activities where ongoing take of golden eagles is anticipated, develop advanced conservation practices per USFWS Eagle Conservation Plan Guidance.	Yes	No	Partial	Yes	No	Partial
	X			X		
	The project will impact foraging habitat for golden eagles.			BLM, USFWS, and Applicant will address risks to golden eagles through the BBCS.		
LUPA-BIO-IFS-31: As determined necessary by BLM in coordination with USFWS, and CDFW as appropriate, for activities/projects that are likely to impact golden eagles implement site-specific golden eagle mortality monitoring in support of the pre-construction, pre-activity risk assessment surveys.	Yes	No	Partial	Yes	No	Partial
	X			X		
	The project will impact foraging habitat for golden eagles.			BLM, USFWS, and Applicant will address risks to golden eagles through the BBCS.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-BIO-IFS-32: Avoid use of rodenticides and insecticides within five miles of active Swainson's hawk nest.	Yes	No	Partial	Yes	No	Partial
		X				
	Applicant does not propose to use insecticides or rodenticides.					
LUPA-BIO-IFS-33: Access to, and use of, designated water sources for desert bighorn sheep will not be impeded by activities in designated and new utility corridors.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Section 4.4.3.1 discusses Project impacts to bighorn sheep. That section states that the project would not present a barrier to movement of bighorn sheep.		
LUPA-BIO-IFS-34: Transmission projects and new utility corridors will minimize effects on access to, and use of, designated water sources for desert bighorn sheep.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Section 4.4.3.1 discusses Project impacts to bighorn sheep. That section states that the project would not present a barrier to movement of bighorn sheep.		
LUPA-BIO-IFS-35: Protocol surveys (see Glossary of Terms) are required for activities in Mohave ground squirrel key population centers and linkages as indicated in Appendix D. Results of protocol surveys will be provided to BLM and CDFW to consult on, as appropriate, for third party activities.	Yes	No	Partial	Yes	No	Partial
		X				
	Mohave ground squirrel habitat is not present in the Project area, per DRECP Figure D-18.					
LUPA-BIO-IFS-36: Activities in Mohave ground squirrel key population centers, as identified in Appendix D, requiring an Environmental Impact Statement are required to assess the effect of the activity on the long term function of the affected key population center. • Activities within a key population center, as identified in Appendix D, must be designed to avoid adversely impacting the long-term function of the affected key population center.	Yes	No	Partial	Yes	No	Partial
		X				
	Mohave ground squirrel habitat is not present in the Project area, per DRECP Figure D-18.					
LUPA-BIO-IFS-37: Activities in key population centers will be sited in previously disturbed areas, areas of low habitat quality and in areas with low habitat intactness, to the maximum extent practicable (see Glossary of Terms).	Yes	No	Partial	Yes	No	Partial
		X				
	Mohave ground squirrel habitat is not present in the Project area, per DRECP Figure D-18.					
LUPA-BIO-IFS-38: Disturbance of suitable habitat from activities, requiring an EA or EIS, within the Mohave ground squirrel key population centers and linkages (as identified in Appendix D) will not occur during the typical dormant season (August 1 through February 28) unless absence is inferred and supported by protocol surveys or other available data during the previous active season.	Yes	No	Partial	Yes	No	Partial
		X				
	Mohave ground squirrel habitat is not present in the Project area, per DRECP Figure D-18.					

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-BIO-IFS-39: During the typical active Mohave ground squirrel season (February 1 through August 31), conduct clearance surveys throughout the site, immediately prior to initial ground disturbance in the areas depicted in Appendix D. In the cleared areas, perform monitoring to determine if squirrels have entered cleared areas. Contain ground disturbance to within areas cleared of squirrels. • Detected occurrences of Mohave ground squirrel will be flagged and avoided, with a minimum avoidance area of 50 feet, until the squirrels have moved out of harm's way. A designated biologist (see Glossary of Terms) may also actively move squirrels out of harm's way.	Yes	No	Partial	Yes	No	Partial
		X				
	Mohave ground squirrel habitat is not present in the Project area, per DRECP Figure D-18.					
LUPA-BIO-IFS-40: Activities sited in a Mohave ground squirrel linkage (see Appendix D) that may impact the linkage are required to analyze the potential effects on connectivity through the linkage. The activity must be designed to maintain the function of the linkage after construction/implementation and during project/activity operations. Linkage function will be assessed by considering pre- and post-activity ability of the area to support resident Mohave ground squirrels and provide for dispersal of their offspring to key population centers outside the linkage, and dispersal through the linkage between key population centers. Activities that occur in Mohave ground squirrel linkages shown in Appendix D must be configured and located in a manner that does not diminish Mohave ground squirrel populations in the linkage.	Yes	No	Partial	Yes	No	Partial
		X				
	Mohave ground squirrel habitat is not present in the Project area, per DRECP Figure D-18.					
LUPA-BIO-IFS-41: For any ground-disturbing (e.g., vegetation removal, earthwork, trenching) activities, occurrences of Mohave ground squirrel will be flagged and avoided, with a minimum avoidance area of 50 feet, until the squirrels have moved out of harm's way. A designated biologist (see Glossary of Terms) may also actively move squirrels out of harm's way.	Yes	No	Partial	Yes	No	Partial
		X				
	Mohave ground squirrel habitat is not present in the Project area, per DRECP Figure D-18.					
LUPA-BIO-IFS-42: Rodenticides will not be used to manage rodents on activity within the range of the Mohave ground squirrel. Use of rodenticide inside of buildings is allowed.	Yes	No	Partial	Yes	No	Partial
		X				
	Mohave ground squirrel habitat is not present in the Project area, per DRECP Figure D-18.					
LUPA-BIO-COMP-1: Impacts to biological resources, identified and analyzed in the activity specific environmental document, from activities in the LUPA Decision Area will be compensated using the standard biological resources compensation ratio, except for the biological resources and specific geographic locations listed as compensation ratio exceptions, specifics in CMAs **LUPA-BIO-COMP-2** through **-4**, and previously listed CMAs. Compensation acreage requirements may be fulfilled through non-acquisition (i.e., restoration and enhancement), land acquisition (i.e., preserve), or a combination of these options, depending on the activity specifics and BLM approval/authorization. Compensation for the impacts to designated desert tortoise critical habitat will be in the same critical habitat unit as the impact (see Table 18). Compensation for impacts to desert tortoise will be in the same recovery unit as the impact. Refer to CMA **LUPA-COMP-1** and **2** for the timing requirements for initiation or completion of compensation.	Yes	No	Partial	Yes	No	Partial
			X	X		
	There are no state or Federally protected plant species present in the Project area, so compensatory mitigation for plant species likely does not apply. Applicable for impacts to state waters. Applicable to desert tortoise, except that the requirement associated with designated critical habitat does not apply. Applicable to burrowing owl. Applicable to Mojave fringe-toed lizard.			Mitigation Measure VEG-9D specifies compensatory mitigation requirements for state and Federally protected plant species, if necessary. Mitigation Measure VEG-10 specifies compensatory mitigation for riparian areas and state waters. Mitigation Measure WIL-4 specifies compensatory mitigation requirements for desert tortoise. Mitigation Measure WIL-9.3 specifies compensatory mitigation requirements for burrowing owl. Mitigation Measure WIL-10 specifies compensatory mitigation requirements for Mojave fringe-toed lizard.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
	Yes	No	Partial	Yes	No	Partial
LUPA-BIO-COMP-2: Birds and Bats – The compensation for the mortality impacts to bird and bat Focus and BLM Special Status Species from activities will be determined based on monitoring of bird and bat mortality and a fee re-assessed every 5 years to fund compensatory mitigation. The initial compensation fee for bird and bat mortality impacts will be based on pre-project monitoring of bird use and estimated bird and bat species mortality from the activity. The approach to calculating the operational bird and bat compensation is based on the total replacement cost for a given resource, a Resource Equivalency Analysis. This involves measuring the relative loss to a population (debt) resulting from an activity and the productivity gain (credit) to a population from the implementation of compensatory mitigation actions. The measurement of these debts and gains (using the same "bird years" metric as described in Appendix D) is used to estimate the necessary compensation fee. Each activity, as determined appropriate by BLM in coordination with USFWS, and CDFW as applicable, will include a monitoring strategy to provide activity-specific information on mortality effects on birds and bats in order to determine the amount and type of compensation required to offset the effects of the activity, as described above and in detail in Appendix D. Compensation will be satisfied by restoring, protecting, or otherwise improving habitat such that the carrying capacity or productivity is increased to offset the impacts resulting from the activity. Compensation may also be satisfied by non-restoration actions that reduce mortality risks to birds and bats (e.g., increased predator control and protection of roosting sites from human disturbance). Compensation will be consistent with the most up to date DOI mitigation policy.	X				X	
				BLM, USFWS, and Applicant will address the need for compensation through the BBCS.		
	Yes	No	Partial	Yes	No	Partial
LUPA-BIO-COMP-3: Golden eagle – BLM and third-party initiated activities, will provide specific golden eagle compensation in accordance with the most up to date BLM or USFWS policies, including applicable USFWS Eagle Conservation Plan Guidance.	X			X		
	The project will impact foraging habitat for golden eagles.			BLM, USFWS, and Applicant will address compensation for impacts to golden eagles through the BBCS.		
	Yes	No	Partial	Yes	No	Partial
LUPA-BIO-COMP-4: Golden eagle – Third-party applicant/activity proponents are required to contribute to a DRECP-wide golden eagle monitoring program, if the activity/project(s) has been determined, through the environmental analysis, to likely impact golden eagles.	X			X		
	The project will impact foraging habitat for golden eagles.			BLM, USFWS, and Applicant will address compensation for impacts to golden eagles through the BBCS.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-AIR-1: All activities must meet the following requirements: • Applicable National Ambient Air Quality Standards (Section 109) • State Implementation Plans (Section 110) • Control of Pollution from Federal Facilities (Section 118) including non-point source • Prevention of Significant Deterioration, including visibility impacts to mandatory Federal Class I Areas (Section 160 et seq.) • Conformity Analyses and Determinations (Section 176[c]) • Apply best management practices on a case by case basis • Applicable local Air Quality Management Jurisdictions (e.g., 403 SCAQMD)	Yes	No	Partial	Yes	No	Partial
			X	X		
	Section 4.2.1 states that the study area has no nonattainment or maintenance designations for any Federal AAQS. Consequently, there is no applicable State Implementation Plan, and formal CAA conformity requirements do not apply to Federal agency actions related to the Proposed Action or Alternatives. However, for the purposes of this analysis, the CAA conformity de minimis levels were used to gauge the potential for the Project and alternatives to result in an exceedance of Federal AAQS. The Project is not expected to have any stationary sources of emissions during the operational phase and will not store or handle substantive quantities hazardous materials during its construction and operation. Therefore, the Project will not be subject to the Federal stationary source regulations and requirements, such as Prevention of Significant Deterioration (PSD), New Source Review (NSR), New Source Performance Standards (NSPS), Maximum Achievable Control Technology (MACT), Federally Mandated Operating Permits, and Risk Management Plan (RMP).			Conformance with the specified requirements is addressed throughout Section 4.2.3.1. Compliance with NAAQSs (*de minimis* levels) is shown in Tables 4.2-3 and 4.2-4. Compliance with local MDAQMD CEQA thresholds is shown in Tables 4.2-2, 4.2-3, and 4.2-4. Best management practices to be followed by the Project are described in Section 2.3.7.6, Section 4.2.2, and Mitigation Measure AQ-1.		
LUPA-AIR-2: Because project authorizations are a federal undertaking, air quality standards for fugitive dust may not exceed local standards and requirements.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Tables 4.2-2 and 4.2-3 show that local standards for fugitive dust (PM10 and PM2.5) would be exceeded during Project construction. Although mitigation of fugitive dust emissions is required in Mitigation Measure AQ-1, such mitigation would not keep emissions below the MDAQMD thresholds. The emissions would be temporary, occurring only during construction. The local agencies will determine whether this conforms with their requirements.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
	Yes	No	Partial	Yes	No	Partial
LUPA-AIR-3: Where impacts to air quality may be significant under NEPA, requiring analysis through an Environmental Impact Statement, require documentation for activities to include a detailed discussion and analysis of Ambient Air Quality conditions (baseline or existing), National Ambient Air Quality Standards, criteria pollutant nonattainment areas, and potential air quality impacts of the proposed project (including cumulative and indirect impacts and greenhouse gas emissions). This content is necessary to disclose the potential impacts from temporary or cumulative degradation of air quality. The discussion will include a description and estimate of air emissions from potential construction and maintenance activities, and proposed mitigation measures to minimize net PM10 and PM2.5 emissions. The documentation will specify the emission sources by pollutant from mobile sources, stationary sources, and ground disturbance. A Construction Emissions Mitigation Plan will be developed.	X			X		
				• Baseline ambient air quality conditions are discussed in Section 3.2.1.2, and Table 3.2-3. • Federal and state ambient air quality standards are defined in Table 3.2-2. • Criteria pollutant nonattainment status is defined in Table 3.2-4. • The direct and indirect air quality impacts of the Project are quantified and described in Section 4.2.3.1. • Cumulative impacts to air quality are discussed in Section 4.2.6. • Greenhouse gas emissions are quantified and described in Section 4.8.3.1. • Best management practices to be followed by the Project are described in Section 2.3.7.6, Section 4.2.2, and Mitigation Measure AQ-1. These include a requirement for a Dust Control Plan.		
	Yes	No	Partial	Yes	No	Partial
LUPA-AIR-4: Because fugitive dust is the number one source of PM10 and PM2.5 emissions in the Mojave and Sonoran Deserts, fugitive dust impacts to air quality must be analyzed for all activities/projects requiring an Environmental Impact Statement and Environmental Assessment. The NEPA air quality analysis may include modelling of the sources of PM10 and PM2.5 that occur prior to construction and/or ground disturbance from the activity/project, and show the timing, duration and transport of emissions off site. When utilized, the modeling will also identify how the generation and movement of PM10 and PM2.5 will change during and after construction and/or ground disturbance of the activity/project under all activity/project specific NEPA alternatives. The BLM air resource specialist and Authorizing Officer will determine if modelling is required as part of the NEPA analysis based on estimated types and amounts of emissions.	X			X		
				Section 4.2.1 discusses the methodology that was used to model the fugitive dust emissions. The modeling report is provided in Appendix W. Section 4.2.3.1 describes the results, including a discussion of the timing with respect to construction versus operations. BLM has determined that the modeling provides sufficient information to support a NEPA analysis.		
	Yes	No	Partial	Yes	No	Partial
LUPA-AIR-5: A fugitive Dust Control Plan will be developed for all projects where the NEPA analysis shows an impact on air quality from fugitive dust	X			X		
				Best management practices to be followed by the Project are described in Section 2.3.7.6, Section 4.2.2, and Mitigation Measure AQ-1. These include a requirement for a Dust Control Plan.		
	Yes	No	Partial	Yes	No	Partial
LUPA-CTTM-1: Maintain and manage adequate Road, Primitive Road, and Trail Access to and within SRMAs, ERMAs, OHV Open Areas, and Level 1, 2, and 3 Recreation Facilities.	X			X		
				The Project would affect access roads to the Mule Mountains ACEC, which is a Level 3 recreation facility. The Applicant has identified alternative access routes, and Mitigation Measure REC-1 specifies measures to ensure that this access remains open.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-CTTM-2: Avoid activities that would have a significant adverse impact on use and enjoyment within 0.5 mile from centerline of tier 2 Roads/Primitive Roads, and 300 feet from centerline of tier 3 primitive roads/trails. If avoidance of Tier 2 and 3 roads, primitive roads and trails is not practicable, relocate access to the same or higher standard and maintain the setting characteristics and access to recreation activities, facilities, and destinations.	Yes	No	Partial	Yes	No	Partial
	X			X		
				The Project would eliminate access to Tier 2 and 3 routes within the Project boundaries. The Applicant has identified alternative access routes, and Mitigation Measure REC-1 specifies measures to ensure that this access remains open.		
LUPA-CTTM-3: Manage other significant linear features such as Mojave Road, Bradshaw Trail, or other recognized linear features to protect their important recreation activities, experiences and benefits. Prohibit activities that have a significant adverse impact on use and enjoyment within 0.5 mile (from centerline) of such linear features.	Yes	No	Partial	Yes	No	Partial
		X				
	The Project is not located near the Mojave Trail. The EIS/EIR assesses the Bradshaw Trail, and shows that it terminates 4 miles from the Project area. There are no National Scenic and Historic Trails shown near the Project site on DRECP Figure D-27.					
LUPA-CTTM-4: If residual impacts to Tier 1 and Tier 2 roads/primitive roads, Back Country Byways, or significant linear features occur from adjacent DFAs or other activities, commensurate compensation in the form of enhanced recreation operations, access, recreation facilities or opportunities will be required.	Yes	No	Partial	Yes	No	Partial
	X			X		
				The Project would eliminate access to Tier 2 routes within the Project boundaries. The Applicant has identified alternative access routes, and Mitigation Measure REC-1 specifies compensation in the form of signage and provision of a kiosk.		
LUPA-CTTM-5: Manage OHV use per the appropriate Transportation and Travel Management Plan/RMP and/or the SRMA Objectives as outlined in Appendix C as Open, Limited or Closed.	Yes	No	Partial	Yes	No	Partial
		X				
	The CMA refers to an internal BLM activity or action (management of OHV use) which is not related to authorization of the Project.					
LUPA-CTTM-6: Manage Back Country Byways as a component of BLM Recreation and Travel and Transportation Management program.	Yes	No	Partial	Yes	No	Partial
		X				
	The CMA refers to an internal BLM activity or action (management of Back Country Byways) which is not related to authorization of the Project.					
LUPA-CTTM-7: Manage Recreation Facilities consistent with the objectives for the recreation management areas and facilities (see also Section II.4.2.1.10).	Yes	No	Partial	Yes	No	Partial
		X				
	The CMA refers to an internal BLM activity or action (management of recreation facilities) which is not related to authorization of the Project.					
LUPA-CUL-1: Continue working with the California Office of Historic Preservation (OHP) to develop and implement a program for record keeping and tracking agency actions that meets the needs of BLM and OHP organizations pursuant to existing State and National agreements and regulation (BLM State Protocol Agreement; BLM National Programmatic Agreement).	Yes	No	Partial	Yes	No	Partial
		X				
	The CMA refers to an internal BLM activity or action (tracking agency actions) which is not related to authorization of the Project.					

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-CUL-2: Using relevant archaeological and environmental data, identify priority geographic areas for new field inventory, based upon a probability for unrecorded significant resources and other considerations.	Yes	No	Partial	Yes	No	Partial
		X				
	The CMA refers to an internal BLM activity or action (identifying areas for new field inventory) which is not related to authorization of the Project.					
LUPA-CUL-3: Identify places of traditional cultural and religious importance to federally recognized Tribes and maintain access to these locations for traditional use.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Section 3.5.1.6.5 describes how tribes were contacted, at the direction of Native American Heritage Commission and BLM, in order to identify information on Traditional Cultural Places (TCPs). The contact did not result in the identification of any previously unknown TCPs.		
LUPA-CUL-4: Design activities to minimize impacts on cultural resources including places of traditional cultural and religious importance to federally recognized Tribes.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Sections 4.5.3.2 and 4.5.3.3 describe how re-configuration of the Project footprint in Alternatives 2 and 3 (respectively) is designed to minimize impacts to cultural resources.		
LUPA-CUL-5: Develop interpretive material to correspond with recreational uses to educate the public about protecting cultural resources and avoiding disturbance of archaeological sites.	Yes	No	Partial	Yes	No	Partial
		X				
	The CMA refers to an internal BLM activity or action (educating recreational users about cultural resources) which is not related to authorization of the Project.					
LUPA-CUL-6: Develop partnerships to assist in the training of groups and individuals to participate in site stewardship programs.	Yes	No	Partial	Yes	No	Partial
		X				
	The CMA refers to an internal BLM activity or action (developing partnerships) which is not related to authorization of the Project.					
LUPA-CUL-7: Coordinate with visual resources staff to ensure VRM Classes consider cultural resources and tribal consultation to include landmarks of cultural significance to Native Americans (TCPs, trails, etc.).	Yes	No	Partial	Yes	No	Partial
		X				
	The CMA refers to an internal BLM activity or action (establishing VRM classes) which is not related to authorization of the Project.					
LUPA-CUL-8: Conduct regular contact and consultation with federally recognized Tribes and individuals, consistent with statute, regulation and policy.	Yes	No	Partial	Yes	No	Partial
	X			X		
				The status of ongoing government-to-government consultation with Federally recognized tribes is discussed in Sections 1.9.1, 4.5.3.1, and 6.3.3.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-CUL-9: Promote DRECP desert vegetation types/communities by avoiding them where possible, then use required compensatory mitigation, off-site mitigation, and other means to ensure Native American vegetation collection areas and practices are maintained.	Yes	No	Partial	Yes	No	Partial
	X			X		
				All alternatives avoid special desert vegetation types to the extent possible. No Native American collection areas are present.		
LUPA-CUL-10: Promote and protect desert fan palm oasis vegetation type/communities by avoiding where possible, then use required compensatory mitigation, off-site mitigation, and other means to ensure Native American cultural values are maintained.	Yes	No	Partial	Yes	No	Partial
		X				
	The desert fan palm oasis vegetation type/community is not present at the project site.					
LUPA-CUL-11: Promote and protect desert microphyll woodland vegetation type/communities to ensure Native American cultural values are maintained.	Yes	No	Partial	Yes	No	Partial
	X			X		
				All alternatives would avoid the microphyll woodland.		
LUPA-LANDS-1: Identify acquired lands as right-of-way exclusion areas when development is incompatible with the purpose of the acquisition.	Yes	No	Partial	Yes	No	Partial
		X				
	The Project site is not acquired lands.					
LUPA-LANDS-2: Prioritize acquisition of land within and adjacent to conservation designation allocations. Acquired land in any land use allocation in this Plan will be managed according to the applicable allocation requirements and/or for the purposes of the acquisition. Management boundaries for the allocation may be adjusted to include the acquired land if the acquisition lies outside the allocation area through a future land use plan amendment process.	Yes	No	Partial	Yes	No	Partial
		X				
	The CMA refers to an internal BLM activity or action (acquiring land) which is not related to authorization of the Project.					
LUPA-LANDS-3: Within land use allocations where renewable energy and ancillary facilities are not allowed, an exception exists for geothermal development. Geothermal development will be an allowable use if a geothermal-only DFA overlays the allocation and the lease includes a no surface occupancy stipulation with exception of three specific parcels in the Ocotillo Wells SRMA (refer to the Ocotillo Wells SRMA Special Unit Management Plan in Appendix C).	Yes	No	Partial	Yes	No	Partial
		X				
	The project is not within a land use allocation where renewable energy is not allowed.					
LUPA-LANDS-4: Nonfederal lands within the boundaries of BLM LUPA land use allocations are not affected by the LUPA.	Yes	No	Partial	Yes	No	Partial
		X				
	The Project does not involve non Federal lands within the boundaries of BLM land use allocations. The private land parcel is non Federal land. Although it is surrounded on all sides by Federal land, it would not be considered to be within the boundaries of a BLM LUPA land use allocation.					
LUPA-LANDS-5: The MUCs used to determine land tenure in the CDCA Plan will be replaced by areas listed in the CMAs below.	Yes	No	Partial	Yes	No	Partial
		X				
	The CMA applies to BLM internal land acquisition, which is not associated with the project.					

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-LANDS-6: Any activities on Catellus Agreement lands will be consistent with deed restrictions.	Yes	No	Partial	Yes	No	Partial
		X				
	The Project site is not associated with the Catellus lands.					
LUPA-LANDS-7: Any activities on Catellus Agreement lands will be subject to the approval of the California State Director.	Yes	No	Partial	Yes	No	Partial
		X				
	The Project site is not associated with the Catellus lands.					
LUPA-LANDS-8: The CDCA Plan requirement that new transmission lines of 161kV or above, pipelines with diameters greater than 12 inches, coaxial cables for interstate communications, and major aqueducts or canals for interbasin transfers of water will be located in designated utility corridors, or considered through the plan amendment process outside of designated utility corridors, remains unchanged. The only exception is that transmission facilities may be located outside of designated corridors within DFAs without a plan amendment. This CMA does not apply the Bishop and Bakersfield RMPs.	Yes	No	Partial	Yes	No	Partial
		X				
	The project is located within a DFA.					
LUPA-LANDS-9: Enter into land exchanges with the California State Lands Commission (CSLC) which convey BLM lands suitable for, or developed as, large-scale renewable energy related projects in exchange for CSLC school lands located in and adjacent to designated conservation areas. These exchanges will follow the procedures outlined in Memorandum of Agreement Relating to Land Exchanges to Consolidate Land Parcels signed by the BLM and CSLC on May 21, 2012.	Yes	No	Partial	Yes	No	Partial
		X				
	The CMA refers to an internal BLM activity or action (land exchanges) which is not related to authorization of the Project.					
LUPA-LANDS-10: Prioritize land exchange proposals from the CSLC on available lands if there are competing land tenure proposals (e.g., land sale or exchange), CSLC proposals that enhance revenues for schools will generally be given priority.	Yes	No	Partial	Yes	No	Partial
		X				
	The CMA refers to an internal BLM activity or action (land exchanges) which is not related to authorization of the Project.					
LUPA-LIVE-1: Adopt the Standards of Rangeland Health and Guidelines for Grazing Management, as detailed below, for the CDCA. This CMA does not apply in the Bishop and Bakersfield RMPs.	Yes	No	Partial	Yes	No	Partial
		X				
	The CMA refers to an internal BLM activity or action (establishing Standards of Rangeland Health) which is not related to authorization of the Project.					
LUPA-LIVE-2: In the CDCA only, accept grazing permit/lease donations in accordance with legislation in the Fiscal Year 2012 Appropriations Act (Public Law 112-74).	Yes	No	Partial	Yes	No	Partial
		X				
	The Project does not involve grazing permit/lease donations.					
LUPA-LIVE-3: In the Bishop and Bakersfield RMPs, determine whether continued livestock grazing would be compatible with achieving land use plan management goals and objectives in the event that the permit/lease is relinquished.	Yes	No	Partial	Yes	No	Partial
		X				
	The Project is not located in the Bishop or Bakersfield RMPs.					

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
	Yes	No	Partial	Yes	No	Partial
LUPA-LIVE-4: If the BLM determines that the grazing allotment is to be put to a different public purpose than grazing, follow the notification requirements outline in the Grazing Regulations at 43 CFR 4110.4-2(b) and BLM Instruction Memorandum (IM) 2011-181 (BLM 2011), or future policy replacing IM 2011-181.		X				
	Project is not within a grazing allotment, as shown on DRECP Figure D-21.					
LUPA-LIVE-5: For grazing allotments within the CDCA that BLM has received a voluntary request for relinquishment prior to fiscal year 2012, continue the planning process for making these allotments unavailable for grazing.		X				
	Project is not within a grazing allotment, as shown on DRECP Figure D-21.					
LUPA-LIVE-6: Complete the process for approving rangeland health standards and guidelines for the CDCA Plan (NEMO, WEMO, NECO and PSSCRMP).		X				
	The CMA refers to an internal BLM activity or action (establishing Standards of Rangeland Health) which is not related to authorization of the Project.					
LUPA-LIVE-7: Make Pilot Knob, Valley View, Cady Mountain, Cronese Lake, and Harper Lake allotments, allocations unavailable for livestock grazing and change to management for wildlife conservation and ecosystem function. Reallocate the forage previously allocated to grazing use in these allotments to wildlife and ecosystem functions. Pilot Knob was closed in the WEMO plan amendment. The Cronese Lake, Harper Lake, and Cady Mountain allotments were closed as mitigation for the impacts to the Agassiz's desert tortoise resulting from the Fort Irwin expansion. All forage allocated to livestock grazing in these allotments will be reallocated to wildlife use and ecosystem function.		X				
	The Project site is not associated with any of the referenced grazing allotments.					
LUPA-LIVE-8: The following vacant grazing allotments within the CDCA will have all vegetation previously allocated to grazing use reallocated to wildlife use and ecosystem functions and will be closed and unavailable to future livestock grazing: Buckhorn Canyon, Crescent Peak, Double Mountain, Jean Lake, Johnson Valley, Kessler Springs, Oak Creek, Chemehuevi Valley, and Piute Valley.		X				
	The Project site is not associated with any of the referenced grazing allotments.					
LUPA-LIVE-9: Allocate the forage that was allocated to livestock use in the Lava Mountain and Walker Pass Desert allotments (which have already been relinquished under the 2012 Appropriations Act) to wildlife use and ecosystem function and permanently eliminate livestock grazing on the allotments.		X				
	The Project site is not associated with any of the referenced grazing allotments.					
LUPA-MIN-1: High Potential Mineral Areas (identified in CA GEM data) • These areas have been identified as mineral lands having existing and/or historic mining activity and a reasonable probability of future mineral resource development. These identified areas will be designated as mineral land polygons on DRECP maps, recognized as probable future development areas for planning purposes and allowable use areas. • If an activity is proposed in a High Potential Mineral Area, analyze and consider the mineral resource value in the NEPA analysis.		X				
	The Project site is not located in a High Potential Mineral Area, as shown on DRECP Figure D-22.					

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-MIN-2: Existing Mineral/Energy Operations Existing authorized mineral/energy operations, including existing authorizations, modifications, extensions and amendments and their required terms and conditions, are designated as an allowable use within all BLM lands in the LUPA Decision Area, and unpatented mining claims subject to valid existing rights. Amendments and expansions authorized after the signing of the DRECP LUPA ROD are subject to applicable CMAs, including ground disturbance caps within Ecological and Cultural Conservation Areas, subject to valid existing rights, subject to governing laws and regulations.	Yes	No	Partial	Yes	No	Partial
		X				
	The Project site is not associated with existing authorized mineral/energy operations.					
LUPA-MIN-3: Existing High Priority Mineral/Energy Operations Exclusion Areas • Existing high-priority operation footprints and their identified expansion areas are excluded from DFA and conservation CMAs, but must comply with LUPA-wide CMAs subject to the governing laws and regulations. • High priority operation exclusions are referenced by name with their respective footprint (acreage) below. MolyCorp REE (General Legal Description: 35º 26'N; 115º 29'W)—10,490.9 surface acres Briggs Au, Etna (General Legal Description: 35º 56'N; 117º 11'W)—3,216.9 surface acres Cadiz Evaporites (General Legal Description: 34º 17'N; 115º 23'W)—2,591.5 surface acres Searles Dry Lake (Evaporate) Operation (General Legal Description: 35º 43'N; 117º 19'W)—72,000 surface acres Bristol Dry Lake (Evaporate) Operation (General Legal Description: 34º 29'N; 115º 43'W)—3,500 surface acres Mesquite Gold Mine (General Legal Description: 33º 04'N; 114º 59'W)—4,500 surface acres Hector Mine (Hectorite Clay) (General Legal Description: 34º 45'N; 116º 25'W)— 1,500 surface acres Castle Mountain/Viceroy Mine (Gold) (General Legal Description: 35º 17'N; 115º 3'W)—5,000 surface acres	Yes	No	Partial	Yes	No	Partial
		X				
	The Project site is not associated with any of the referenced High Priority Mineral/Energy Operations Exclusion Areas,					
LUPA-MIN-4: Access to Existing Operations • Established designated, approved, or authorized access routes to the aforementioned existing authorized operations and areas will be designated as allowable uses. • Access routes to Plans of Operations and Notices approved under 43 CFR 3809 will be granted subject to valid existing rights listed in 43 CFR 3809.100.	Yes	No	Partial	Yes	No	Partial
		X				
	The Project site is not associated with any of the aforementioned existing authorized operations and areas.					
LUPA-MIN-5: Areas Located Outside Identified Mineral Areas • Areas which could not be characterized due to insufficient data and mineral potential may fluctuate dependent on market economy, extraction technology, and other geologic information- requiring periodic updating. Authorizations are subject to the governing laws and regulations and LUPA requirements.	Yes	No	Partial	Yes	No	Partial
		X				
	The Project does not involve new or expanded mineral operations or geothermal energy.					
LUPA-MIN-6: New or expanded mineral operations will be evaluated on a case-by-case basis, and authorizations are subject to LUPA requirements, and the governing laws and regulations.	Yes	No	Partial	Yes	No	Partial
		X				
	The Project does not involve new or expanded mineral operations.					

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-NRT-1: The Nadeau Road NRT was designated by the Secretary of the Interior in June 2013. The California Desert District nominates the Sperry Wash Road, El Mirage Interpretive Trail East, and El Mirage Interpretive Trail West for NRT designation.	Yes	No	Partial	Yes	No	Partial
		X				
	The CMA refers to an internal BLM activity or action (designating National Recreational Trails) which is not related to authorization of the Project.					
LUPA-NRT-2: The Nadeau NRT Management Corridor will be protected and activities impacting use and enjoyment of the trail will be avoided within 0.5 mile from centerline of the route.	Yes	No	Partial	Yes	No	Partial
		X				
	The Project site is not associated with the Nadeau NRT.					
LUPA-PALEO-1: If not previously available, prepare paleontological sensitivity maps consistent with the Potential Fossil Yield Classification for activities prior to NEPA analysis.	Yes	No	Partial	Yes	No	Partial
	X			X		
				A map showing the potential for paleontological resources, with respect to the Potential Fossil Yield Classification (PFYC), is provided in the Paleontological Resources Technical report in Appendix T.		
LUPA-PALEO-2: Incorporate all guidance provided by the Paleontological Resources Protection Act.	Yes	No	Partial	Yes	No	Partial
	X			X		
				The requirements of the Paleontological Resources Preservation Act are presented in Appendix D.13. These requirements are incorporated into Applicant-Proposed Measures Paleo-1 and Paleo-2.		
LUPA-PALEO-3: Ensure proper data recovery of significant paleontological resources where adverse impacts cannot be avoided or otherwise mitigated.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Applicant-Proposed Measure Paleo-2 requires data recovery.		
LUPA-PALEO-4: Paleontological surveys and construction monitors are required for ground disturbing activities that require an EIS.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Applicant-Proposed Measure Paleo-1 requires pre-construction surveys. As discussed in Applicant-Proposed Measure Paleo-2, the results of the survey will be used to determine which areas require monitoring.		
LUPA-REC-1: Maintain, and where possible enhance, the recreation setting characteristics – physical components of remoteness, naturalness and facilities; social components of contact, group size and evidence of use; and operational components of access, visitor services and management controls.	Yes	No	Partial	Yes	No	Partial
	X			X		
				The impact of the Project on the recreation setting is discussed in Sections 4.10.3.1 (associated with land use impacts), 4.14.3.1 (associated with impacts to recreational uses), and 4.19.3.1 (associated with impacts to visual character).		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-REC-2: Cooperate with the network of communities and recreation service providers active within the planning area to protect the principal recreation activities and opportunities, and the associated conditions for quality recreation, by enhancing appropriate visitor services, and by identifying and mitigating impacts from development, inconsistent land uses and unsustainable recreation practices such as minimizing impacts to known rockhounding gathering areas.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Section 4.14 of the EIS discusses impacts to recreation facilities, including those managed by BLM and those managed by other local communities and agencies. BLM has worked with local tribes to ensure that access is maintained to areas of interest. The EIS/EIR includes community outreach efforts and the ability of local communities and recreation service providers to review and comment regarding impacts to recreation.		
LUPA-REC-3: Manage lands not designated as SRMAs or ERMAs to meet recreation and visitor services and resource stewardship needs as described in Resource Management Plans (RMPs).	Yes	No	Partial	Yes	No	Partial
	X			X		
				The impact of the Project on the recreation setting is discussed in Sections 4.10.3.1 (associated with land use impacts), 4.14.3.1 (associated with impacts to recreational uses), and 4.19.3.1 (associated with impacts to visual character).		
LUPA-REC-4: Prohibit activities that have a significant adverse impact and that do not enhance conservation or recreation values within one mile of Level 1 and Level 2 Recreation facility footprint.	Yes	No	Partial	Yes	No	Partial
		X				
	There are no Level 1 or 2 recreation facilities within one mile.					
LUPA-REC-5: Avoid activities that have a significant adverse impact and that do not enhance conservation or recreation values within one-half mile of Level 3 Recreation facility footprint including route access and staging areas. If avoidance is not practicable, the facility must be relocated to the same or higher recreation standard and maintain recreation objectives and setting characteristics.	Yes	No	Partial	Yes	No	Partial
		X				
	There are no Level 3 recreation facilities within one-half mile.					
LUPA-REC-6: Limit signage to that necessary for recreation facility/area identification, interpretation, education and safety/regulatory enforcement.	Yes	No	Partial	Yes	No	Partial
		X				
	The CMA refers to an internal BLM activity or action (providing signage at recreation facilities) which is not related to authorization of the Project.					
LUPA-REC-7: Refer to local RMPs, RMP amendments, and activity level planning for specially designated areas for Vehicular Stopping, Parking, and Camping limitations.	Yes	No	Partial	Yes	No	Partial
		X				
	The CMA refers to an internal BLM activity or action (establishing Vehicular Stopping, Parking, and Camping limitations) which is not related to authorization of the Project.					
LUPA-REC-8: Provide on-going maintenance of recreation and conservation facilities, interpretive and regulatory signs, roads, and trails.	Yes	No	Partial	Yes	No	Partial
		X				
	The CMA refers to an internal BLM activity or action (maintaining recreation and conservation facilities, interpretive and regulatory signs, roads, and trails) which is not related to authorization of the Project.					

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-SW-1: Stipulations or conditions of approval for any activity will be imposed that provide appropriate protective measures to protect the quantity and quality of all water resources (including ephemeral, intermittent, and perennial water bodies) and any associated riparian habitat (see biological CMAs for specific riparian habitat CMAs). The water resources to which this CMA applies will be identified through the activity-specific NEPA analysis.	Yes	No	Partial	Yes	No	Partial
	X			X		
				The water resources to which the CMA applies are identified in Sections 3.20.1.1 (groundwater) and 3.20.1.2 (surface water). Section 3.20.1.2 includes ephemeral washes. Impacts to these resources are evaluated in Section 4.20.3. Applicant-Proposed Measures to protect water resources are discussed in Section 4.20.2, and mitigation measures are specified in Appendix G.20. Specific impacts and associated mitigation are addressed in the applicable CMAs below.		
LUPA-SW-2: Buffer zones, setbacks, and activity limitations specifically for soil and water (ground and surface) resources will be determined on an activity/site-specific basis through the environmental review process, and will be consistent with the soil and water resource goals and objectives to protect these resources. Specific requirements, such as buffer zones and setbacks, may be based, in part, on the results of the Water Supply Assessment defined below. In general, placement of long-term facilities within buffers or protected zones for soil and water resources is discouraged, but may be permitted if soil and water resource management objectives can be maintained.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Setbacks and activity limitations are defined for a variety of activities in order to protect soil and water resources. Applicant-Proposed activity limitations for protecting water resources are addressed in Section 4.9.2 for managing hazardous materials, and in Section 4.20.2 for construction activities. Section 4.9.2 establishes a buffer, prohibiting the storage of hazardous materials or re-fueling of vehicles within 100 feet of a wetland, water body, or water supply well. Mitigation Measure VEG-10.5 specifies that spoil sites shall not be located at least 30 feet from the boundaries and drainages or in locations that may be subjected to high storm flows, where spoils might be washed back into drainages.		
LUPA-SW-3: Where a seeming conflict between CMAs within or between resources arises, the CMA(s) resulting in the most resource protection apply.	Yes	No	Partial	Yes	No	Partial
	X			X		
				There is a conflict between CMAs that require avoidance of sand dunes and certain habitat (LUPA-BIO-3, BIO-13, BIO-DUNE-2, BIO-DUNE-4, BIO-PLANT-2, BIO-PLANT 3, and TRANS-BIO-4) and those CMAs that require that transmission lines be placed within CDCA Plan-approved utility corridors (LUPA-BIO-13, LANDS-9, and TRANS-BIO-4). This is because the approved utility corridor adjacent to the Project is coincident with an active sand dune area that supports habitat for Harwood's eriastrum and Mojave fringe-toed lizard. BLM has determined that use of the approved corridor, in combination with species avoidance and compensation measures, provides the most resource protection.		
LUPA-SW-4: Nothing in the "Exceptions" below applies to or takes precedence over any of the CMAs for biological resources.	Yes	No	Partial	Yes	No	Partial
	X			X		
				BLM has considered this CMA, and determined that none of the exceptions takes precedence over CMAs for biological resources.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-SW-5: Exceptions to any of the specific soil and water stipulations contained in this section, as well as those listed below under the subheadings "Soil Resources," "Surface Water," and "Groundwater Resources," may be granted by the authorized officer if the applicant submits a plan, or, for BLM-initiated actions, the BLM provides documentation, that demonstrates: The impacts are minimal (e.g., no predicted aquifer drawdown beyond existing annual variability in basins where cumulative groundwater use is not above perennial yield and water tables are not currently trending downward) or can be adequately mitigated.	Yes	No	Partial	Yes	No	Partial
	X			X		
				The Applicant has not requested any exceptions to the stipulations, at this time.		
LUPA-SW-6: In addition to the applicable required governmental safeguards, third party activities will implement up-to-date standard industry construction practices to prevent toxic substances from leaching into the soil.	Yes	No	Partial	Yes	No	Partial
	X			X		
				• Section 2.3.7.1 describes Hazardous Material and Waste Management procedures which are part of the Proposed Action, and Section 2.3.7.9 describes the Stormwater Management procedures. • Section 4.20.2 describes the Applicant's proposed Construction Stormwater Pollution Prevention Plan (SWPPP). • Applicant-Proposed Measure BIO-2 specifies the construction related plans to be followed. These include plans to prevent toxic chemicals, hazardous materials, and other fluids from entering vegetation-type streams (Waste Management Plan, Spill Prevention Control and Countermeasures Plan, and Hazardous Materials Plan), and plans to address drainage, erosion, and sedimentation control (SWPPP). • Applicant-Proposed Measure BIO-3 describes construction BMPs which address these topics. • Mitigation Measure WATER-1 provides further specification of the requirements for the Construction SWPPP. Mitigation Measures WATER-2 describes further requirements of the Comprehensive Drainage, Stormwater, and Sedimentation Control Plan.		
LUPA-SW-7: Prepare an emergency response plan, approved by the BLM contaminant remediation specialist, that ensures rapid response in the event of spills of toxic substances over soils.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Sections 2.3.7.1, 4.9.1, and 4.9.2 describe the Applicant's Preliminary Hazardous Materials Management and Emergency Response Plan. Additional requirements for the Plan are provided in Mitigation Measures HAZ-1 and Fire-1.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-SW-8: As determined necessary on an activity specific basis, prepare a site plan specific to major soil types present (≥5% of footprint or laydown surfaces) in Wind Erodibility Groups 1 and 2 and in Hydrology Soil Class D as defined by the USDA Natural Resource Conservation Service to minimize water and air erosion from disturbed soils on activity sites.	Yes	No	Partial	Yes	No	Partial
	X			X		
	The project is not situated in Hydrology Soil Class D, but is located in Wind Erodibility Groups 1 and 2.			The potential for wind erosion is evaluated in EIS/EIR Section 4.7.3.1. The Applicant proposes to prepare a SWPPP which would address erosion control. In addition, mitigation measures AIR-1 specifies the requirements for controlling fugitive dust emissions through a Dust Control Plan.		
LUPA-SW-9: The extent of desert pavement within the proposed boundary of an activity shall be mapped if it is anticipated that the activity may create erosional or ecologic impacts. Mapping will use the best available data and standards, as determined by BLM. Disturbance of desert pavement within the boundary of an activity shall be limited to the extent possible. If disturbance from an activity is likely to exceed 10% of the desert pavement mapped within the activity boundary, the BLM will determine whether the erosional and ecologic impacts of exceeding the 10% cap by the proposed amount would be insignificant and/or whether the activity should be redesigned to minimize desert pavement disturbance.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Figure 3 of the BRTR shows that desert pavement was mapped, but is not present within the Project footprint. Mitigation Measure AIR-2 specifies requirements for stabilizing desert pavement, if it is found and disturbed.		
LUPA-SW-10: The extent of additional sensitive soil areas (cryptobiotic soil crusts, hydric soils, highly corrosive soils, expansive soils, and soils at severe risk of erosion) shall be mapped if it is anticipated that an activity will impact these resources. To the extent possible, avoid disturbance of desert biologically intact soil crusts, and soils highly susceptible to wind and water erosion.	Yes	No	Partial	Yes	No	Partial
			X	X		
	Hydric soils are not present in the area, as discussed in Section 4.2 of the Federal Jurisdictional Delineation Report, provided in Appendix I. As discussed in Table 3 of the Federal Jurisdictional Delineation Report (Appendix I), biotic crusts were evaluated as a part of the jurisdictional delineation. No biotic crusts were identified. Mitigation Measure VEG-8.17 requires that revegetation include inoculation of microbial organisms for plant mycorrhizae and for biotic soil crust formation.			Sections 3.7.1.2 and 3.7.1.3 discuss expansive, corrosive, and erodible soils.		
LUPA-SW-11: Where possible, side casting shall be avoided where road construction requires cut- and-fill procedures.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Road construction using cut-and-fill procedures is not proposed as part of the Project.		
LUPA-SW-12: Except in DFAs, exclude long-term structures in, playas (dry lake beds), and Wild and Scenic River corridors, except as allowed with minor incursions (see definition in the Glossary of Terms).	Yes	No	Partial	Yes	No	Partial
		X				
	The Project site is located in a DFA.					
LUPA-SW-13: BLM will manage all riparian areas to be maintained at, or brought to, proper functioning condition.	Yes	No	Partial	Yes	No	Partial
		X				
	The project site does not include any riparian areas.					

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-SW-14: All relevant requirements of Executive Orders 11988 (Floodplain Management) and 11990 (Protection of Wetlands) will be complied with.	Yes	No	Partial	Yes	No	Partial
		X				
	Section 3.3.1.3 discusses the results of the jurisdictional delineation, and shows that no wetlands are present on the Project site. A more detailed discussion of the investigation of wetlands, and conclusion that wetland vegetation is not present, is provided in Section 4.1 of the Federal Jurisdictional Delineation Report, provided in Appendix I. The Project site is not located within a 100-year floodplain.					
LUPA-SW-15: Surface water diversion for beneficial use will not occur absent a state water right.	Yes	No	Partial	Yes	No	Partial
		X				
	The Project does not include diversion of surface water for beneficial use.					
LUPA-SW-16: The 100-year floodplain boundaries for any surface water feature in the vicinity of the project will be identified. If maps are not available from the Federal Emergency Management Agency (FEMA), these boundaries will be determined via hydrologic modeling and analysis as part of the environmental review process. Construction within, or alteration of, 100-year floodplains will be avoided where possible, and permitted only when all required permits from other agencies are obtained.	Yes	No	Partial	Yes	No	Partial
	X			X		
				As discussed in Section 1.5.8 of the Federal Jurisdictional Delineation Report (Appendix I), FEMA has not conducted a flood hazard analysis of the Project area, so no FEMA flood zone designation exists. The impact of a 100-year flood on surface water flow has been modeled, to support the environmental review process. The modeling effort and results are described in the Drainage Report (Appendix V), and discussed in the EIS/EIR in Sections 3.20.1.2 and 4.20.3.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability^{1,2}			Conformance^{3}		
LUPA-SW-17: An activity's groundwater extraction shall not contribute to exceeding the estimated perennial yield for the basin in which the extraction is taking place. Perennial yield is that quantity of groundwater that can be withdrawn from the groundwater basin without exceeding the long-term recharge of the basin or unreasonably affecting the basin's physical, chemical, or biological integrity. It is further clarified arithmetically below.	Yes	No	Partial	Yes	No	Partial
	X			X		
				The perennial yield in the ground water basin has not been specifically calculated. The Applicant's Proposed Groundwater Use – Numerical Groundwater Modeling Report (Appendix X) presents the methodology and results from the analysis of proposed groundwater withdrawal. The groundwater budget presented in Table 3.20-1 is a variation of the formula for calculating change in storage and perennial yield in the CMA. However, the analysis uses different terminology, and does not specifically refer to perennial yield. The end product of the analysis is a calculation of the total cone of depression, based on a cumulative analysis of all known water uses in the basin. The methodology used was approved by BLM staff in conference calls and technical reviews before the modeling effort was done. The resulting Groundwater Modeling Report was also reviewed and approved by BLM staff. The estimated groundwater balance from the basin is presented in Table 3.20-1, and discussed in Section 3.20.1.1. The analysis in Section 4.20.3 is based on estimated amount of drawdown, and concludes that the drawdown would be negligible compared to the thickness of the aquifer. To ensure that the actual groundwater drawdown does not exceed the predicted drawdown, Mitigation Measure Water-4 requires that the Applicant develop and implement a Groundwater Monitoring and Mitigation Plan prior to construction.		
LUPA-SW-18: Water extracted or consumptively used for the construction, operation, maintenance, or remediation of the project shall be solely for the beneficial use of the project or its associated mitigation and remediation measures, as specified in approved plans and permits.	Yes	No	Partial	Yes	No	Partial
	X			X		
				There are no other uses proposed for the extracted groundwater, other than to support construction, operation, and decommissioning of the Project.		
LUPA-SW-19: Water flow meters shall be installed on all extraction wells permitted by BLM.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Mitigation Measure Water-4 specifies the groundwater monitoring requirements for the Project, including installation of flow meters.		
LUPA-SW-20: After application of applicable avoidance and minimization measures, all remaining unavoidable residual impacts to surface waters from the proposed activity shall be mitigated to ensure no net loss of function and value, as determined by the BLM.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Section 4.20.7 discusses residual impacts to water resources, and concludes that changes to stormwater flow characteristics would be minor, even with implementation of mitigation measures.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

<table>
<tr><th>CMA</th><th colspan="3">Applicability[1,2]</th><th colspan="3">Conformance[3]</th></tr>
<tr><td rowspan="3">LUPA-SW-21: Consideration shall be given to design alternatives that maintain the existing hydrology of the site or redirect excess flows created by hardscapes and reduced permeability from surface waters to areas where they will dissipate by percolation into the landscape.</td><td>Yes</td><td>No</td><td>Partial</td><td>Yes</td><td>No</td><td>Partial</td></tr>
<tr><td>X</td><td></td><td></td><td>X</td><td></td><td></td></tr>
<tr><td colspan="3"></td><td colspan="3">Impacts to existing hydrology are discussed in Section 4.20.3, which concludes that hydrology would likely be altered for the duration of ROW operation. The compacted and developed site could increase the rate, volume, and sediment load of storm water runoff traveling offsite. As discussed in Section 2.3.4.3, the site preparation components of the Project design were limited to minimize modification of surface water hydrology. As discussed in Sections 2.5 and 2.6, Alternatives 2 and 3 were specifically developed to avoid the locations of watercourses and drainages.</td></tr>
<tr><td rowspan="3">LUPA-SW-22: All hydrologic alterations shall be avoided that could reduce water quality or quantity for all applicable beneficial uses associated with the hydrologic unit in the project area, or specific mitigation measures shall be implemented that will minimize unavoidable water quality or quantity impacts, as determined by BLM in coordination with USFWS, CDFW, and other agencies, as appropriate. These beneficial uses may include municipal, domestic, or agricultural water supply; groundwater recharge; surface water replenishment; recreation; water quality enhancement; flood peak attenuation or flood water storage; and wildlife habitat.</td><td>Yes</td><td>No</td><td>Partial</td><td>Yes</td><td>No</td><td>Partial</td></tr>
<tr><td>X</td><td></td><td></td><td>X</td><td></td><td></td></tr>
<tr><td colspan="3"></td><td colspan="3">Table 3.20-9 discusses the beneficial uses of the intermittent washes on the Project site. These include intermittent groundwater recharge, non-contact water recreation, and wildlife habitat. Section 4.20.3 evaluates impacts to surface water drainage patterns and water quality. The Applicant's proposed site preparation techniques (described in Section 2.3.4.3) and Mitigation Measures WATER-1 and WATER-2 are intended to minimize modifications to drainage patterns and water quality.</td></tr>
<tr><td rowspan="3">LUPA-SW-23: A Water (Groundwater) Supply Assessment shall be prepared in conjunction with the activity's NEPA analysis and prior to an approval or authorization. This assessment must be approved by the BLM in coordination with USFWS, CDFW, and other agencies, as appropriate, prior to the development, extraction, injection, or consumptive use of any water resource.
Note – the text of the CMA is too lengthy to provide in full within this table. Please see the full text in Pages 142-145 of the DRECP.</td><td>Yes</td><td>No</td><td>Partial</td><td>Yes</td><td>No</td><td>Partial</td></tr>
<tr><td>X</td><td></td><td></td><td>X</td><td></td><td></td></tr>
<tr><td colspan="3"></td><td colspan="3">The Applicant's Proposed Groundwater Use – Numerical Groundwater Modeling Report (Appendix X) presents the methodology and results from the analysis of proposed groundwater withdrawal.
The groundwater budget presented in Table 3.20-1 is a variation of the formula for calculating change in storage and perennial yield in the CMA. However, the analysis uses different terminology, and does not specifically refer to perennial yield. The end product of the analysis is a calculation of the total cone of depression, based on a cumulative analysis of all known water uses in the basin. The methodology used was approved by BLM staff in conference calls and technical reviews before the modeling effort was done. The resulting Groundwater Modeling Report was also reviewed and approved by BLM staff.
To ensure that the actual groundwater drawdown does not exceed the predicted drawdown, Mitigation Measure Water-4 requires that the Applicant develop and implement a Groundwater Monitoring and Mitigation Plan prior to construction.</td></tr>
</table>

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-SW-24: A Groundwater Monitoring and Reporting Plan, and Mitigation Action Plan shall be prepared to verify the Water Supply Assessment and adaptively manage water use as part of project operations. This plan shall be approved by BLM, in coordination with USFWS, CDFW, and other agencies as appropriate, prior to the development, extraction, injection, or consumptive use of any water resource. The quality and quantity of all surface water and groundwater used for the project shall be monitored and reported using this plan. Groundwater monitoring includes measuring the effects of a project's groundwater extraction on groundwater surface elevations, groundwater flow paths, changes to groundwater-dependent vegetation, and of aquifer recovery after project decommissioning. Surface water monitoring, if applicable, shall monitor for changes in the flows, water volumes, channel characteristics, and water quality as a result of a project's surface water use. Monitoring frequency and geographic scope and reporting frequency shall be decided on a project and site-specific basis and in coordination with the appropriate agencies that manage the water and land resources of the region. The geographic scope may include at the very least, all basins/sub-basins that potentially receive inflow from the basin where the proposed project may be sited, and all basins/sub-basins that may potentially contribute inflow to the basin where the proposed project is located. The plan shall also detail any mitigation measures that may be required as a result of the project. This plan and all monitoring results shall be made available to BLM. BLM will make the plan and results available to USFWS, CDFW, and other applicable agencies.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Mitigation Measure Water-4 requires that the Applicant develop and implement a Groundwater Monitoring and Mitigation Plan prior to construction.		
LUPA-SW-25: Where groundwater extraction, in conjunction with other cumulative impacts in the basin, has potential to exceed the basin's perennial yield or to impact water resources, one or more "trigger points," or specified groundwater elevations in specific wells or surface water bodies, shall be established by BLM. If the groundwater elevation at the designated monitoring wells falls below the trigger point(s)(or exceeds the trigger pumping rate), additional mitigation measures, potentially including cessation of pumping, will be imposed.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Mitigation Measure Water-4 (Groundwater Monitoring and Mitigation Plan) requires that, if significant drawdown occurs at offsite wells, the Applicant shall immediately reduce groundwater pumping until water levels stabilize or recover.		
LUPA-SW-26: Groundwater pumping mitigation shall be imposed if groundwater monitoring data indicate impacts on water-dependent resources that exceed those anticipated and otherwise mitigated for in the NEPA analysis and ROD, even if the basin's perennial yield is not exceeded. Water-dependent resources include riparian or phreatophytic vegetation, springs, seeps, streams, and other approved domestic or industrial uses of groundwater. Mitigation measures may include changes to pumping rates, volume, or timing of water withdrawals; coordinating and scheduling groundwater pumping activities in conjunction with other users in the basin; acquisition of project waterfrom outside the basin; and/or replenishing the groundwater resource over a reasonably short timeframe. For permitted activities, permittees may also be required to contribute funds to basin-wide groundwater monitoring networks in basins such as those encompassed by the East Riverside DFA or in the Calvada Springs/South Pahrump Valley area, and to cooperate in the compilation and analysis of groundwater data.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Mitigation Measure Water-4 (Groundwater Monitoring and Mitigation Plan) requires that, if significant drawdown occurs at offsite wells, the Applicant shall immediately reduce groundwater pumping until water levels stabilize or recover.		
LUPA-SW-27: Water-conservation measures shall be required in basins where current groundwater demand is high and has the future potential to rise above the estimated perennial yield (e.g., Pahrump Valley). These measures may include the use of specific technology, management practices, or both. A detailed discussion and analysis of the effectiveness of mitigation measures must be included. Application of these measures shall be detailed in the Groundwater Water Monitoring and Mitigation Plan.	Yes	No	Partial	Yes	No	Partial
	X			X		
				The Applicant proposes to develop a ground water monitoring and mitigation plan approved by the BLM.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-SW-28: Groundwater extractions from adjudicated basins, such as the Mojave River Basin, may be subject to additional restrictions imposed by the designated authority; examples include the Mojave Water Agency and San Bernardino County (see County Ordinance 3872). Where provisions of the adjudication allow for acquisition of water rights, project developers could be required to retire water rights at least equal in volume to those necessary for project operation or propose an alternative offset based on the conditions unique to the adjudicated basin.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Section 4.20.3 discusses the groundwater withdrawal with respect to the Accounting Surface methodology, including whether the Applicant would be required to obtain an allocation of water from the Colorado River. BLM has determined that the existing groundwater and technical report conforms to this CMA.		
LUPA-SW-29: Groundwater pumping mitigation may be imposed if monitoring data indicate impacts on groundwater or groundwater-dependent habitats outside the DRECP area, including those across the border in Nevada. See **LUPA-SW-26** for potential mitigation measures.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Mitigation Measure Water-4 (Groundwater Monitoring and Mitigation Plan) requires that, if significant drawdown occurs at offsite wells, the Applicant shall immediately reduce groundwater pumping until water levels stabilize or recover. The wells to be monitored, including whether it would include wells outside of the DRECP (i.e., in Arizona), are not specified. However, as discussed in Section 4.20.3, the modeled drawdown is expected to be negligible at the Project boundary. Therefore, it is highly unlikely that effects would extend several miles offsite.		
LUPA-SW-30: Activities shall comply with local requirements for any long term or short term domestic water use and wastewater treatment.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Appendix D.20 discusses local permitting requirements for drinking and sanitary water supplies. Section 2.3.3.9 discusses the local (county) permits that would be obtained to address sanitary waste disposal.		
LUPA-SW-31: The siting, construction, operation, maintenance, remediation, and abandonment of all wells shall conform to specifications contained in the California Department of Water Resources Bulletins #74-81 and #74-90 and their updates.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Appendix D.20 specifies these requirements as applicable to the Project.		
LUPA-SW-32: Colorado River hydrologic basin - The concepts, principles and general methodology used in the Colorado River Accounting Surface Method, as defined in U.S. Geological Survey Scientific Investigations Report 2008-5113 (USGS 2009), and existing and future updates or a similar methodology, are considered the best available data for assessing activity/project related ground water impacts in the Colorado River hydrologic basin. The best available data and methodology shall be used to determine whether activity/project-related pumping would result in the extracted water being replaced by water drawn from the Colorado River. If activity/project-related groundwater pumping results in the static groundwater level at the well being near (within 1 foot), equal to, or below the Accounting Surface in a basin hydrologically connected to the Colorado River, that consumption shall be considered subject to the Law of the River (Colorado River Compact of 1922 and amendments). In such circumstances, BLM shall require the applicant to offset or otherwise mitigate the volume of water causing drawdown below the Accounting Surface. Details of such mitigation measures and the right to the use of water shall be described in the Groundwater Water Monitoring and Mitigation Plan.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Section 4.20.3 discusses the groundwater withdrawal with respect to the Accounting Surface methodology, including whether the Applicant would be required to obtain an allocation of water from the Colorado River. BLM has determined that the existing groundwater and technical report conforms to this CMA.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
	Yes	No	Partial	Yes	No	Partial
LUPA-SW-33: Stipulations for groundwater development in the proximity of Devils Hole: Any development scenario for an activity within 25 miles of Devils Hole shall include a plan to achieve zero-net or net-reduced groundwater pumping to reduce the risk of adversely affecting senior federal reserved water rights, the designated critical habitat of the endangered Devils Hole pupfish, and the free-flowing requirements of the Wild and Scenic Amargosa River. This plan will require operators to acquire one or more minimization water rights (MWRs) in the over-appropriated, over-pumped, and hydraulically connected Amargosa Desert Hydrographic Basin in Nevada. The MWR(s) shall be: (1) an amount equal (at minimum) to that which is needed for construction and operations; (2) historically fully utilized, preferably for agricultural use; and (3) senior and closer to Devils Hole than the proposed point of diversion.		X				
	The project site is not located within 25 miles of Devils Hole.					
LUPA-SW-34: Stipulations for groundwater development in the Calvada Springs/South Pahrump Valley area: Activities in this area shall be required to acquire one or more MWRs in the Pahrump Valley Hydrographic Basin in Nevada. The acquired MWR(s) must: (1) be at least equal to the amount proposed to be required and actually used for project construction and operations; and (2) be fully utilized for at least the prior ten years.		X				
	The Project site is not located in the Calvada Springs/South Pahrump Valley area.					
LUPA-SW-35: Stipulations for activities in the vicinity of Death Valley National Park, Joshua Tree National Park, or Mojave National Preserve: The NEPA for activities involving groundwater extraction that are in the vicinity of Death Valley National Park, Joshua Tree National Park, or the Mojave National Preserve shall analyze and address any potential impacts of groundwater extraction on Death Valley National Park, Joshua Tree National Park, or Mojave National Preserve. BLM will consult with the National Park Service on this process. The analysis or analyses shall include: • Potential impacts on the water balances of groundwater basins within these parks and preserves • A map identifying all potentially impacted surface water resources in the vicinity of the project, including a narrative discussion of the delineation methods used to discern those surface waters in the field • Any project-related modifications to surface water resources, both temporary and permanent • Analysis of any potential impacts on perennial streams, intermittent streams, and ephemeral drainages that could negatively impact natural riparian buffers • Impacts of any project proposed truncation, realignment, channelization, lining, or filling of surface water resources that could change drainage patterns, reduce available riparian habitat, decrease water storage capacity, or increase water flow velocity or sediment deposition, in particular where stormwater diverted around or through the project site is returned to natural drainage systems downslope of the project • Any potential indirect project-related causes of hydrologic changes that could exacerbate flooding, erosion, scouring, or sedimentation in stream channels • Alternatives and mitigation measures proposed to reduce or eliminate such impacts		X				
	The Project site is not in the vicinity of Death Valley, Joshua Tree, or Mojave National Preserve.					
LUPA-VRM-1: Manage Visual Resources in accordance with the VRM classes shown on Figure 9.		X				
	This CMA is overridden by DFA-VRM-1.					
LUPA-VRM-2: Ensure that activities within each of the VRM Class polygons meets the VRM objectives described above, as measured through a visual contrast rating process.	X			X		
				Section 4.19.1.1 describes the Visual Contrast Rating process used to evaluate the Project with respect to the applicable VRM Class.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-VRM-3: Ensure that transmission facilities are designed and located to meet the VRM Class objectives for the area in which they are located. New transmission lines routed through designated corridors where they do not meet VRM Class Objectives will require RMP amendments to establish a conforming VRM Objective. All reasonable effort must be made to reduce visual contrast of these facilities in order to meet the VRM Class before pursing RMP amendments. This includes changes in routing, using lattice towers (vs. monopole), color treating facilities using an approved color from the BLM Environmental Color Chart CC-001 (dated June 2008, as updated on April 2014, or the most recent version) (vs. galvanized) on towers and support facilities, and employing other BMPs to reduce contrast. Such efforts will be retained even if an RMP amendment is determined to be needed. Visual Resource BMPs that reduce adverse visual contrast will be applied in VRM Class conforming situations. For a reference of BMPs for reducing visual impacts see the "*Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands",* available at http://www.blm.gov/style/medialib/blm/wo/MINERALS_REALTY_AND_RESOURCE_PROTECTION_/energy/renewable_references.Par.1568.File.dat/RenewableEnergy VisualImpacts_BMPs.pdf, or the most recent version of the document or BMPs for VRM, as determined by BLM.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Mitigation Measure VIS-1 describes design elements, including structure and color requirements, as well as additional lighting requirements, which will be required to reduce visual impacts. The measure includes requirements for the gen-tie line, and references the Best Management Practices document.		
LUPA-WC-1: Complete an inventory of areas for proposed activities that may impact wilderness characteristics if an updated wilderness characteristics inventory is not available.	Yes	No	Partial	Yes	No	Partial
		X				
	Section 3.16.1.3 discusses the recent inventory, conducted in 2016.					
LUPA-WC-2: Employ avoidance measures as described under DFAs and approved transmission corridors.	Yes	No	Partial	Yes	No	Partial
		X				
	Section 4.16.3.1 discusses the closest land with wilderness characteristics, which are more than 10 miles away.					
LUPA-WC-3: For inventoried lands found to have wilderness characteristics but not managed for those characteristics compensatory mitigation is required if wilderness characteristics are directly impacted. The compensation will be: • 2:1 ratio for impacts from any activities that impact those wilderness characteristics, except in DFAs and transmission corridors • 1:1 ratio for impact from any activities that impact the wilderness characteristics in DFAs and transmission corridors Wilderness compensatory mitigation may be accomplished through acquisition and donation, by willing landowners, to the federal government of (a) wilderness inholdings, (b) wilderness edge holdings that have inventoried wilderness characteristics, or (c) other areas within the LUPA Decision Area that are managed to protect wilderness characteristics. Restoration of impaired wilderness characteristics in Wilderness, Wilderness Study Area, and lands managed to protect wilderness characteristics could be substituted for acquisition.	Yes	No	Partial	Yes	No	Partial
		X				
	Section 4.16.3.1 discusses the closest land with wilderness characteristics, which are more than 10 miles away.					

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-WC-4: For areas identified to be managed to protect wilderness characteristics, identified in Figure 7, the following CMAs are required: • Include a no surface occupancy stipulation for any leasable minerals with no exceptions, waivers, or modifications. • Exclude these areas from land use authorizations, including transmission. • Close areas to construction of new roads and routes. Vehicles will continue to be permitted on existing designated routes. • Close areas to mineral material sales. • Prohibit commercial or personal-use permits for extraction of materials (e. g. no wood-cutting permits). • Manage the area as VRM II. • Require that new structures and facilities are related to the protection or enhancement of wilderness characteristics or are necessary for the management of uses allowed under the land use plan. • Make lands unavailable for disposal from federal ownership.	Yes	No	Partial	Yes	No	Partial
		X				
	The Project site is not located in an area managed to protect wilderness characteristics, as shown in DRECP Figure 7.					
LUPA-WC-5: Manage the following Wilderness Inventory Units to protect wilderness characteristics: (see list on Pages 152 to 153 of the DRECP)	Yes	No	Partial	Yes	No	Partial
		X				
	The Wilderness Inventory Units associated with the Project site (1351 and 1351A-1, see Section 4.16.3.1) are not among the units listed within this CMA.					
LUPA-TRANS-BIO-1: Where feasible and appropriate for resource protection, site transmission activities along roads or other previously disturbed areas to minimize new surface disturbance, reduce perching opportunities for the Common Raven, and minimize collision risks for birds and bats.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Section 2.3.3.2 describes the location of the proposed gen-tie line which is in an existing, previously disturbed utility corridor, with existing access roads.		
LUPA-TRANS-BIO-2: Flight diverters will be installed on all transmission activities spanning or within 1,000 feet of stream and wash channels, canals, ponds, and any other natural or artificial body of water. The type of flight diverter selected will be subject to approval by BLM, in coordination with USFWS and CDFW as appropriate, and will be based on the best available scientific and commercial data regarding the prevention of bird collisions with transmission and guy wires.	Yes	No	Partial	Yes	No	Partial
		X				
	The Project site does not include any water bodies.					
LUPA-TRANS-BIO-3: When siting transmission activities, the alignment should avoid, to the maximum extent practicable, being located across canyons or on ridgelines. Site and design sufficient distance between transmission lines to prevent electrocution of condors.	Yes	No	Partial	Yes	No	Partial
	X			X		
				The gen-tie alignment does not cross any canyons or ridgelines.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
LUPA-TRANS-BIO-4: Siting of transmission activities will be prioritized within designated utility corridors, where possible, and designed to avoid, where possible, and otherwise minimize and offset impacts to sand transport processes in Aeolian corridors, rare vegetation alliances and Focus and BLM Special Status Species. Transmission substations will be sited to avoid Aeolian corridors, rare vegetation alliances, and sand-dependent Focus and BLM Special Status Species habitats.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Section 2.3.3.2 describes the location of the proposed gen-tie line which is in an existing, previously disturbed utility corridor. Table 4.3-3 evaluates the impact of the gen-tie line on special status plants, and shows that impacts would occur to Harwood's eriastrum under the Proposed Action, but not under Alternatives 2 or 3. Table 4.4.3 evaluates the impact of the gen-tie line on special status wildlife, and shows that impacts would occur to Mojave fringe-toed lizard under all alternatives.		
LUPA-TRANS-CUL-1: For transmission (and renewable energy) activities, require the applicant to pay all appropriate costs associated with the following processes, through the appropriate BLM funding mechanism: • All appropriate costs associated with the BLM's analysis of the DRECP geodatabase and other sources for cultural resources sensitivity. • All appropriate costs associated with preliminary sensitivity analysis. • All appropriate costs associated with the Section 106 process including the identification and defining of cultural resources. These costs may also include logistical, travel, and other support costs incurred by tribes in the consultation process. • All appropriate costs associated with updating the DRECP cultural resources geodatabase with project specific results.	Yes	No	Partial	Yes	No	Partial
		X				
	BLM will address costs and fees associated with cultural resources through the Section 106 process.					
LUPA-TRANS-CUL-2: Consistent and in compliance with the NHPA Programmatic Agreement, signed February 5, 2016, or the most up to date signed version – for transmission (and renewable energy) activities, a compensatory mitigation fee will be required within the LUPA Decision Area to address cumulative and some indirect adverse effects to historic properties. The mitigation fee will be calculated in a manner that is commensurate to the size and regional impacts of the project. Refer to the NHPA Programmatic Agreement for details regarding the mitigation fee.	Yes	No	Partial	Yes	No	Partial
		X				
	BLM will address costs and fees associated with cultural resources through the Section 106 process.					
LUPA-TRANS-CUL-3: For transmission (and renewable energy) activities, the management fee rate will be determined through the NHPA programmatic Section 106 consultation process that will be completed as part of the DRECP land use plan amendment.	Yes	No	Partial	Yes	No	Partial
		X				
	BLM will address costs and fees associated with cultural resources through the Section 106 process.					
LUPA-TRANS-CUL-4: For transmission (and renewable energy) activities, demonstrate that results of cultural resources sensitivity, based on the DRECP geodatabase, and other sources, are used as part of the initial planning pre-application process and to select of specific footprints for further consideration.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Section 4.5 discusses how the footprints of alternatives were developed specifically to avoid cultural resources. All surveys were conducted in accordance with protocols in place at the time of the NOI, under the direction of BLM cultural staff assigned to the Project.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
	Yes	No	Partial	Yes	No	Partial
LUPA-TRANS-CUL-5: For transmission (and renewable energy) activities, provide a statistically significant sample survey as part of the pre-application process, unless the BLM determines the DRECP geodatabase and other sources are adequate to assess cultural resources sensitivity of specific footprints.	X			X		
				Section 3.5.1.6.6 discusses the protocols used for the field inventory investigations.		
LUPA-TRANS-CUL-6: For transmission (and renewable energy) activities, provide justification in the application why the project considerations merit moving forward if the specific footprint lies within an area identified or forecast as sensitive for cultural resources by the BLM.	X			X		
				The POD and Chapter 1of the EIS/EIR identity the Purpose and Need of the project, which provides the justification.		
LUPA-TRANS-CUL-7: For transmission (and renewable energy) activities, complete the NHPA Section 106 Process as specified in 36 CFR Part 800, or via an alternate procedure, allowed for under 36 CFR Part 800.14 prior to issuing a ROD or ROW grant on any utility- scale renewable energy or transmission project. For utility-scale solar energy developments, the BLM may follow the Solar Programmatic Agreement.	X			X		
				Section 4.5.3.1 evaluates the Project with respect to the NHPA Section 106 Process.		
LUPA-TRANS-WC-1: Allow transmission activities in areas inventoried and identified as lands with wilderness characteristics.		X				
	Section 4.16.3.1 discusses the closest land with wilderness characteristics, which are more than 10 miles away.					
LUPA-TRANS-WC-2: For inventoried lands found to have wilderness characteristics impacted by transmission activities, compensatory mitigation is required at a 1:1 ratio if wilderness characteristics are directly impacted. This may be accomplished through acquisition and donation, from willing landowners, to the federal government of (a) wilderness inholdings, (b) wilderness edge holdings that have inventoried wilderness characteristics, or (c) other areas within the LUPA Decision Area that are managed to protect wilderness characteristics. Restoration of impaired wilderness characteristics in Wilderness, Wilderness Study Area, and lands managed to protect wilderness characteristics could be substituted for acquisition.		X				
	Section 4.16.3.1 discusses the closest land with wilderness characteristics, which are more than 10 miles away.					
LUPA-COMP-1: For third party actions, compensation activities must be initiated or completed within 12 months from the time the resource impact occurs (e.g. ground disturbance, habitat removal, route obliteration, etc. for construction activities; wildlife mortality, visual impacts, etc. due to operations). • BLM will determine, in the environmental analysis, the activity/project-level timing of the compensation (i.e. initiated, completed or a combination) based on the specific resources being impacted, and scope and content of the activity. • A 6 month extension may be authorized, subject to approval by the authorizing officer, dependent on the resources impacted and compensation due diligence of the project developer.	X			X		
				The mitigation measures which require compensatory mitigation (Mitigation Measure VEG-9C, WIL-4, WIL-9.3, and WIL-10) each specify a timeframe in which compensatory mitigation must be completed.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]				Conformance[3]			
	Yes	No	Partial		Yes	No	Partial	
LUPA-COMP-2: For BLM initiated activities, compensation activities will be initiated or completed within 12 months from the time the resource impact occurs (e.g. ground disturbance, habitat removal, route obliteration, etc. for construction activities; wildlife mortality, visual impacts, etc. due to operations), subject to federal budget appropriations. • BLM will determine, in the environmental analysis, the activity/project-level timing of its compensation (i.e. initiated, completed or a combination) based on the specific resources being impacted, and scope and content of its activity. -The estimated costs and 12 month timing of required compensation will be built into the activity/project design and environmental analysis.		X		The Project is not a BLM initiated activity.				
DFA-VPL-BIO-DUNE-1: Activities in DFAs and VPLs, including transmission substations, will be sited to avoid dune vegetation (i.e., North American Warm Desert Dune and Sand Flats). Unavoidable impacts (see “unavoidable impacts to resources” in the Glossary of Terms) to dune vegetation will be limited to transmission projects, except transmission substations, and access roads that will be sited to minimize unavoidable impacts. • For unavoidable impacts (see “unavoidable impacts to resources” in the Glossary of Terms) to dune vegetation, the following will be required: • Access roads will be unpaved. • Access roads will be designed and constructed to be at grade with the ground surface to avoid inhibiting sand transportation.	X						X	None of the alternatives would completely avoid the sand dunes. All alternatives would have unavoidable impacts to sand deposits, and not just for the transmission component of the Project. Section 2.3.4.3 discusses the access roads, which would be unpaved. However, the description of the access roads does not specify that they will be at-grade, and there is no mitigation measure requiring that they be at-grade.
DFA-VPL-BIO-DUNE-2: Within Aeolian corridors that transport sand to dune formations and vegetation types downwind inside and outside of the DFAs, all activities will be designed and operated to facilitate the flow of sand across activity sites, and avoid the trapping or diverting of sand from the Aeolian corridor. Buildings and structures within the site will take into account the direction of sand flow and, to the extent feasible, build and align structures to allow sand to flow through the site unimpeded. Fences will be designed to allow sand to flow through and not be trapped.		X		The Project site is located within the mapped Dune/Sand area on DRECP Figure D-15, which is also shown on Figure 3.3-2 of the EIS/EIR. Appendix D of DRECP does not provide a specific definition of whether that specific corridor is one that transports “sand to dune formations and vegetation types downwind inside and outside of the DFAs”. The analysis in Section 3.3.1.1 shows that the sand dunes on the Project area do not transport sand to dunes or habitat downwind (east) of the Project site.				
DFA-VPL-BIO-IFS-1: To the maximum extent practicable (see Glossary of Terms), activities will be sited in previously disturbed areas, areas of low quality habitat, and areas with low habitat intactness in desert tortoise linkages and the Ord-Rodman TCA, identified in Appendix D.	X				X			As discussed in Section 3.4.1.1, the Project is sited in an area of low quality habitat.
DFA-VPL-BIO-IFS-2: Within the Mohave ground squirrel range configure solar panel and wind turbine arrays to allow areas of native vegetation that will facilitate Mohave ground squirrel movement through the project site. This may include raised and/or rotating solar panels or open space between rows of panels or turbines. Fences surrounding sites should be permeable for Mohave ground squirrels.		X		Mohave ground squirrel habitat is not present in the Project area, per DRECP Figure D-18.				

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
	Yes	No	Partial	Yes	No	Partial
DFA-VPL-BIO-BAT-1: Wind projects will not be sited within 0.5 mile of any occupied or presumed occupied maternity roost.		X				
	Project is not a wind project.					
DFA-VPL-BIO-FIRE-1: Implement the following standard practice for fire prevention/protection: • Implement site-specific fire prevention/protection actions particular to the construction and operation of renewable energy and transmission project that include procedures for reducing fires while minimizing the necessary amount of vegetation clearing, fuel modification, and other construction-related activities. At a minimum these actions will include designating site fire coordinators, providing adequate fire suppression equipment (including in vehicles), and establishing emergency response information relevant to the construction site.	X			X		
				The Project's fire prevention actions are discussed in Section 4.21.3.1.		
DFA-VPL-BIO-COMP-1: Impacts to biological resources from all activities in DFAs and VPLs will be compensated using the same ratios and strategies as LUPA-BIO-COMP-1 through 4, with the exception identified below in DFA-VPL-BIO-COMP-2.	X			X		
				Mitigation Measure VEG-9D specifies compensatory mitigation requirements for state and Federally protected plant species, if necessary. Mitigation Measure VEG-10 specifies compensatory mitigation for riparian areas and state waters. Mitigation Measure WIL-4 specifies compensatory mitigation requirements for desert tortoise. Mitigation Measure WIL-9.3 specifies compensatory mitigation requirements for burrowing owl. Mitigation Measure WIL-10 specifies compensatory mitigation requirements for Mojave fringe-toed lizard.		
DFA-VPL-BIO-COMP-2: Exception to the biological resources standard compensation ratio of 1:1 - desert tortoise intact linkage habitat compensation ratio of 2:1 applies to the identified modeled intact linkage habitat (Appendix D) in two linkages—Ord-Rodman critical habitat unit to Joshua Tree National Park, and Fremont-Kramer critical habitat unit to the Ord-Rodman critical habitat unit, as identified in Appendix D. Maintenance and enhancement of the function of these two linkages is essential to the function of the Ord-Rodman critical habitat unit.		X				
	Project is not located in any of the referenced linkages or critical habitat units.					
DFA-VPL-CTTM-1: Avoid Tier 1, Tier 2, Tier 3 roads/primitive roads/trails, Backcountry Byways, and other significant linear features (as defined in the LUPA-wide CMAs). If avoidance is not practicable, relocate access to the same or higher standard and maintain the recreation setting characteristics and access to recreation activities, facilities, and destination.	X			X		
				The Project would eliminate access to Tier 2 and 3 routes within the Project boundaries. The Applicant has identified alternative access routes, and Mitigation Measure REC-1 specifies measures to ensure that this access remains open.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
	Yes	No	Partial	Yes	No	Partial
DFA-VPL-CTTM-2: If residual impacts to Tier 1 and Tier 2 roads/primitive roads/trails, Backcountry Byways, or other significant linear features cannot be protected and maintained, commensurate compensation in the form of an enhanced recreation operations, recreation facilities or opportunities will be required.	X			X		
				The Project would eliminate access to Tier 2 routes within the Project boundaries. The Applicant has identified alternative access routes, and Mitigation Measure REC-1 specifies compensation in the form of signage and provision of a kiosk.		
DFA-VPL-CUL-1: For renewable energy activities and transmission, require the applicant to pay all appropriate costs associated with the following processes, through the appropriate BLM funding mechanism: • All appropriate costs associated with the BLM's analysis of the DRECP geodatabase and other sources for cultural resources sensitivity. • All appropriate costs associated with preliminary sensitivity analysis. • All appropriate costs associated with the Section 106 process including the identification and defining of cultural resources. These costs may also include logistical, travel, and other support costs incurred by tribes in the consultation process. • All appropriate costs associated with updating the DRECP cultural resources geodatabase with project specific results.		X				
	BLM will address costs and fees associated with cultural resources through the Section 106 process.					
DFA-VPL-CUL-2: Consistent and in compliance with the NHPA Programmatic Agreement, signed February 5, 2016, or the most up to date signed version -for renewable energy activities and transmission, a compensatory mitigation fee will be required within the LUPA Decision Area to address cumulative and some indirect adverse effects to historic properties. The mitigation fee will be calculated in a manner that is commensurate to the size and regional impacts of the project. Refer to the Programmatic Agreement for details regarding the mitigation fee.		X				
	BLM will address costs and fees associated with cultural resources through the Section 106 process.					
DFA-VPL-CUL-3: For renewable energy activities and transmission, the management fee rate will be determined through the NHPA programmatic Section 106 consultation process that will be completed as part of the DRECP land use plan amendment.		X				
	BLM will address costs and fees associated with cultural resources through the Section 106 process.					
DFA-VPL-CUL-4: For renewable energy activities and transmission, demonstrate that results of cultural resources sensitivity, based on the DRECP geodatabase, and other sources, are used as part of the initial planning pre-application process and to select of specific footprints for further consideration.	X			X		
				Section 4.5 discusses how the footprints of alternatives were developed specifically to avoid cultural resources. All surveys were conducted in accordance with protocols in place at the time of the NOI, under the direction of BLM cultural staff assigned to the Project.		
DFA-VPL-CUL-5: For renewable energy activities and transmission, provide a statistically significant sample survey as part of the pre-application process, unless the BLM determines the DRECP geodatabase and other sources are adequate to assess cultural resources sensitivity of specific footprints.	X			X		
				Section 3.5.1.6.6 discusses the protocols used for the field inventory investigations.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
DFA-VPL-CUL-6: For renewable energy activities and transmission, provide justification in the application why the project considerations merit moving forward if the specific footprint lies within an area identified or forecast as sensitive for cultural resources by the BLM.	Yes	No	Partial	Yes	No	Partial
	X			X		
				The POD and Chapter 1of the EIS/EIR identity the Purpose and Need of the project, which provides the justification.		
DFA-VPL-CUL-7: For renewable energy activities and transmission, complete the NHPA Section 106 Process as specified in 36 CFR Part 800, or via an alternate procedure, allowed for under 36 CFR Part 800.14 prior to issuing a ROD or ROW grant on any utility-scale renewable energy or transmission project. For utility-scale solar energy developments, the BLM may follow the Solar Programmatic Agreement.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Section 4.5.3.1 evaluates the Project with respect to the NHPA Section 106 Process.		
DFA-VPL-LIVE-1: Avoid siting solar developments in active livestock grazing allotments. If a ROW is granted for solar development in an active livestock grazing allotment, prior to solar projects being constructed in active livestock allotments, an agreement must be reached with the grazing permittee/lessee on the 2-year notification requirements. If any rangeland improvements such as, but not limited to, fences, corrals, or water storage projects, are to be impacted by energy projects, reach agreement with the BLM and the grazing permittee/lessee on moving or replacing the range improvement. This may include the costs for NEPA, clearances, and materials.	Yes	No	Partial	Yes	No	Partial
		X				
	Project is not within a grazing allotment, as shown on DRECP Figure D-21.					
DFA-VPL-LIVE-2: In California Condor use areas, wind energy ROWs will include a term and condition requiring the permittee and wind operator to eliminate grazing of livestock.	Yes	No	Partial	Yes	No	Partial
		X				
	Project is not a wind project, and is not in a condor use area.					
DFA-VPL-LIVE-3: Include no surface occupancy stipulation on geothermal leases in active grazing allotments.	Yes	No	Partial	Yes	No	Partial
		X				
	Project is not within a grazing allotment, as shown on DRECP Figure D-21.					
DFA-VPL-VEG-1: Vegetative Use Authorizations: Commercial collection of seed in DFAs and VPLs is an allowable use. CMA's within these areas apply to this kind of activity.	Yes	No	Partial	Yes	No	Partial
		X				
	Project does not include commercial collection of seeds.					
DFA-VPL-VRM-1: Encourage development in a planned fashion within DFAs (e.g., similar to the planned unit development concept used for urban design—i.e., in-fill vs. scattered development, use of common road networks, Generator Tie Lines etc., use of similar support facility designs materials and colors etc.) to avoid industrial sprawl.	Yes	No	Partial	Yes	No	Partial
	X			X		
				As discussed in Sections 2.3.3, the Project uses existing roadways and transmission corridors.		
DFA-VPL-VRM-2: Development in DFAs and VPLs are required to incorporate visual design standards and include the best available, most recent BMPs, as determined by BLM (e.g. Solar, Wind, West Wide Energy Corridor, and Geothermal PEISs, the "*Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands*", and other programmatic BMP documents).	Yes	No	Partial	Yes	No	Partial
	X			X		
				Mitigation Measure VIS-1 describes design elements, including structure and color requirements, which will be required to reduce visual impacts. This measure references the requirements of the "*Best Management Practices*" document.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
DFA-VPL-VRM-3: Required Visual Resource BMPs. All development within the DFAs and VPLs will abide by the BMPs addressed in the most recent version of the document "*Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands*", or its replacement, including, but not limited to the following: ● Transmission: • Color-treat monopoles Shadow Gray per the BLM Environmental Color Chart CC001 unless a more effective color choice is selected by the local Field Office VRM specialist. • Lattice towers and conductors will have non-specular qualities. • Lattice Towers will be located a minimum of 3/4 miles away from Key Observation Points such as roads, scenic overlooks, trails, campgrounds, navigable rivers and other areas people tend to congregate and located against a landscape backdrop when topography allows. ● Solar – Color treat all facilities Shadow Gray from the BLM Environmental Color Chart CC001 unless a more effective color is selected by the Field Office VRM specialist, including but not limited to: • Concentrated solar thermal parabolic trough panel backs • Solar power tower heliostats • Solar power towers • Cooling towers • Power blocks ● Wind – Color treat all facilities Shadow Gray with the exception of the wind turbine and towers 200 vertical feet or more. ● Night Sky – BMPs to minimize impacts to night sky including light shielding will be employed.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Applicant-Proposed Measures described in Section 4.19.2 address BMPs to minimize lighting impacts. Mitigation Measure VIS-1 describes design elements, including structure and color requirements, as well as additional lighting requirements, which will be required to reduce visual impacts. This measure references the requirements of the "*Best Management Practices*" document.		
DFA-RE-1: In order to use the DRECP's BLM LUPA streamlined process for renewable energy in DFAs and transmission, project proponents must first consult with appropriate representatives of the Department of Defense to ensure the proposed renewable energy and/or transmission activity will not cause an unacceptable risk to national security. Refer to additional detail in LUPA Section IV.4 and Appendix E. Specifically, the following process will be implemented: ● For renewable energy and transmission activities proposed in red areas (see Appendix E), the DRECP BLM LUPA streamlined process will not be available unless a letter is obtained from the Department of Defense Siting Clearinghouse stating that military impacts have been mitigated. ● For renewable energy and transmission activities proposed in orange or yellow areas (see Appendix E), the DRECP BLM LUPA streamlined process will be not be available until Department of Defense representatives at the regional level have been consulted and have been provided a minimum of 30 days to assess potential mission impacts. If the regional representatives conclude within the 30 day period that there is a significant possibility that a proposed activity presents an unacceptable risk to national security, the BLM will not streamline the proposed activity process and will require additional environmental analysis regarding Department of Defense impacts, unless a letter is obtained from the Department of Defense Siting Clearinghouse stating that military impacts have been mitigated.	Yes	No	Partial	Yes	No	Partial
		X				
	DRECP Appendix E states that the only renewable technologies which present a significant mission compatibility issue with DoD operations in this region are wind and solar power tower.					

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

<table>
<tr><th rowspan="3">CMA</th><th colspan="3">Applicability[1,2]</th><th colspan="3">Conformance[3]</th></tr>
<tr><td colspan="6"></td></tr>
<tr><td colspan="6"></td></tr>
<tr><td rowspan="3">DFA-BIO-IFS-1: Conduct the following surveys as applicable in the DFAs as shown in Table 21.
• Desert tortoise - Protocol surveys in the desert tortoise habitat areas indicated in Appendix D.
• Flat-tailed horned lizard - Protocol surveys as specified in the Rangewide Management Strategy (RMS).
• Bendire’s thrasher - Pre-construction nesting bird survey during breeding season (March 1 through September 30) in suitable habitat on and within 500 feet of construction zone.
• Burrowing owl - Breeding season surveys (February 1 through August 31) per Burrowing Owl Guidelines (CDFG 2012). Clearance surveys (for direct take avoidance) no less than 14 days prior to ground disturbance per Burrowing Owl Guidelines.
• Golden eagle - Pre-project golden eagle surveys and pre-construction risk assessment surveys in LUPA-BIO-IFS-28, if applicable as described in golden eagle CMAs below.
• Swainson’s hawk - Protocol surveys in the Antelope and Owens Valleys.
• Mohave ground squirrel - Clearance surveys in the Mohave ground squirrel habitat areas indicated in Appendix D. Protocol surveys in key population centers and linkages as identified on the map in Appendix D</td><td>Yes</td><td>No</td><td>Partial</td><td>Yes</td><td>No</td><td>Partial</td></tr>
<tr><td></td><td></td><td>X</td><td>X</td><td></td><td></td></tr>
<tr><td colspan="3">• Applicable for Desert tortoise, Bendire’s thrasher, Burrowing owl, and Golden eagle.
• Not applicable for Swainson’s hawk, as Project is not located in Antelope or Owens Valleys.
• Not applicable for Flat-tailed horned lizard or Mohave ground squirrel, because Project is not within the range of these species.</td><td colspan="3">• Desert Tortoise – conforms. Protocol surveys were performed, as discussed in Section 3.4.1.1, even though DRECP Appendix D-17 only requires clearance surveys.
• Bendire’s thrasher – conforms. Table 3.4-1 lists the species as Low Potential, with nesting habitat present. Mitigation Measure WIL-7 specifies requirements for pre-construction surveys, with dates of March 1 through September 30.
• Burrowing owl – conforms. Mitigation measure WIL-9 specifies requirements for pre-construction surveys no more than 30 days, and no less than 14 days, in advance.
• Golden eagle – conforms. Section 3.4.1.1 describes the pre-project golden eagle surveys.</td></tr>
<tr><td rowspan="3">DFA-BIO-IFS-2: Implement the following setbacks shown below in Table 22 as applicable in the DFAs.
• Bendire’s thrasher - Setback pre-construction, construction, and decommissioning, and other activities 500 feet from active nests.
• Burrowing owl - 656 feet (200 meters) from active nesting sites.
• California condor - Setback wind and transmission projects 5 miles from nest sites. Setback solar, geothermal, and other activities than may impact condors 1.5 miles from nest sites and out of direct line of site from nest sites.
• Gila woodpecker - Setback pre-construction, construction, and decommissioning, and other activities that may impact the species 0.25 mile from suitable habitat during the breeding season (April 1 through July 31).
• Golden eagle - Setback activities 1 mile from active or alternative nests within an active territory as described in LUPA-BIO-IFS-24.
• Swainson’s hawk - 0.5 mile from active nests.</td><td>Yes</td><td>No</td><td>Partial</td><td>Yes</td><td>No</td><td>Partial</td></tr>
<tr><td></td><td></td><td>X</td><td>X</td><td></td><td></td></tr>
<tr><td colspan="3">• Applicable for Bendire’s thrasher, Burrowing owl, Golden eagle, and Swainson’s hawk.
• Not applicable for California condor or Gila woodpecker, because Project is not within the range of these species.</td><td colspan="3">• Bendire’s thrasher – conforms. Mitigation measure WIL-7 specifies that the Qualified Biologist shall determine the size of the buffer zone.
• Burrowing owl – conforms. Mitigation measure WIL-9 specifies a setback of 656 feet from active nests.
• Golden eagle – conforms. The EIS/EIR reports that surveys identified no nests within 1 mile.
• Swainson’s hawk – conforms. Mitigation measure WIL-7 specifies that the Qualified Biologist shall determine the size of the buffer zone.</td></tr>
</table>

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
DFA-BIO-IFS-3: Protocol surveys, as described in **DFA-BIO-IFS-1** and shown in Table 21, are required for development in the desert tortoise survey areas (see Appendix D). Based on the results of the protocol surveys the identified desert tortoises will be translocated, or the activity will be redesigned/relocated as described below: • If protocol surveys identify 35 or fewer desert tortoises in potential impact areas on an activity site, the USFWS and CDFW (for third party activities) will be contacted and provided with the protocol survey results and information necessary for the translocation of identified desert tortoises. Pre-construction and construction, and other activities will not begin until the clearance surveys for the site have been completed and the desert tortoises have been translocated. Translocation will be conducted in coordination with the USFWS and CDFW, as appropriate, per the protocols in the Desert Tortoise Field Manual (USFWS 2009) and the most up-to-date USFWS protocol. • If protocol surveys identify an adult desert tortoise density (i.e., individuals 160 millimeters or more) of more than 5 per square mile or more than 35 individuals total on a project site, the project will be required to be redesigned, re-sited, or relocated to avoid and minimize the impacts of the activity on desert tortoise.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Protocol surveys were performed, as discussed in Section 3.4.1.1, even though DRECP Appendix D-17 only requires clearance surveys.		
DFA-BIO-IFS-4: The DFA in the "North of Edwards" Mohave ground squirrel key population center is closed to renewable energy applications and any activity that is likely to result in the mortality (killing) of a Mohave ground squirrel until Kern and San Bernardino counties complete county General Plan amendments/updates that include renewable energy development and Mohave ground squirrel conservation on nonfederal land in the West Mojave ecoregion and the CDFW releases a final Mohave Ground Squirrel Conservation Strategy, or for a period of 5 years after the signing of the DRECP LUPA ROD, whichever comes first. If Kern and San Bernardino counties and CDFW do not complete their respective plans within the 5-year period, prior to opening the DFA to renewable energy applications and other impacting activities, BLM will assess new Mohave ground squirrel information, in coordination with the CDFW, to determine if modifications to the DFA or CMAs are warranted based on new Mohave ground squirrel information.	Yes	No	Partial	Yes	No	Partial
		X				
	Mohave ground squirrel habitat is not present in the Project area, per DRECP Figure D-18.					
DFA-BIO-IFS-5: Once the planning criteria in CMA DFA-BIO-IFS-4, are met, the DFA in the "North of Edwards" Mohave ground squirrel key population center will be reevaluated. If Kern and San Bernardino counties receive Mohave ground squirrel take authorizations from the CDFW through completed Natural Community Conservation Plans or county-wide conservation strategies that address Mohave ground squirrel conservation at a landscape level and include renewable energy development areas on nonfederal land in the West Mojave ecoregion, the "North of Edwards" key population center DFA will be eliminated and the management changed to General Public Lands, as part of adaptive management.	Yes	No	Partial	Yes	No	Partial
		X				
	Mohave ground squirrel habitat is not present in the Project area, per DRECP Figure D-18.					

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
	Yes	No	Partial	Yes	No	Partial
DFA-BIO-PLANT-1: Impact to suitable habitat (see Glossary of Terms) for the following plant Focus Species within the DRECP Plan Area will be capped (see "DFA Suitable Habitat Impacts Cap" in the Glossary of Terms) in the DFAs as described below and in Table 23.The suitable habitat impact cap for these plant species is to be measured in DFAs as a group, not individually. Triple-ribbed milk-vetch is an avoidance species in DFAs, therefore none of its suitable habitat is to be impacted. • Alkali mariposa lily - 10% • Barstow wooly sunflower – 20% • Desert cymopterus – 20% • Little San Bernardino Mountains linanthus – 20% • Mojave monkeyflower – 20% • Mojave tarplant – 20% • Owens Valley checkerbloom – 20% • Parish's daisy – 20%		X				
	None of the referenced species are present in the Project area.					
DFA-REC-1: Retain, to the extent possible, the identified recreation setting characteristics: physical components of remoteness, naturalness and facilities; social components of contact, group size and evidence of use; and operational components of access, visitor services and management controls (see recreation setting characteristics matrix).	X			X		
				Section 4.14.3.1 evaluates the impact of the Project on the recreation setting, and proposes mitigation to minimize impacts.		
DFA-REC-2: Avoid large-scale ground disturbance within one-half mile of Level 3 Recreation facility footprint including route access and staging areas. If avoidance isn't practicable, the facility must be relocated to the same or higher standard and maintain recreation objectives and setting characteristics.		X				
	There are no Level 3 recreation facilities within one-half mile.					
DFA-REC-3: SRMAs are exclusion areas for renewable energy development due to the incompatibility with the values of SRMAs. Two exceptions to this management action are: 1. geothermal development is an allowable use in the few instances in Imperial County where a geothermal-only DFA overlays the SRMA designation and the lease includes a "no surface occupancy" stipulation, with exception of three specific parcels in the Ocotillo Wells SRMA (the Special Unit Management Plan in Appendix C) 2. the VPL at Antimony Flat in Kern County overlaying the SRMA, renewable energy may be allowed on a case-by-case basis if the proposed project is found to be compatible with the specific SRMA values.		X				
	Project is not located in a SRMA.					
DFA-REC-4: When considering large-scale development in DFAs, retain to the extent possible existing, approved recreation activities.	X			X		
				Section 4.14.3.1 evaluates the impact of the Project on recreational use of the site, and proposes mitigation to minimize impacts.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
DFA-REC-5: For displacement of dispersed recreation opportunities, commensurate compensation in the form of enhanced recreation operations, recreation facilities or opportunities will be required. If recreation displacement results in resource damage due to increased use in other areas, mitigate that damage through whatever measures are most appropriate as determined by the Authorized Officer.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Mitigation Measure REC-1 specifies compensation for impacts to dispersed recreation. BLM needs to review and approve that mitigation measure.		
DFA-REC-6: Where activities in DFAs displace authorized facilities, similar new recreation facilities/campgrounds (including but not limited to the installation of new structures including pit toilets, shade structures, picnic tables, installing interpretive panels, etc.), will be provided.	Yes	No	Partial	Yes	No	Partial
		X				
	Project would not displace authorized facilities.					
DFA-REC-7: If designated vehicle routes are directly impacted by activities (includes modification of existing route to accommodate industrial equipment, restricted access or full closure of designated route, pull outs, and staging area's to the public, etc.), mitigation will include the development of alternative routes to allow for continued vehicular access with proper signage, with a similar recreation experience. In addition, mitigation will also include the construction of an "OHV touring route" which circumvents the activity area and allows for interpretive signing materials to be placed at strategic locations along the new touring route, if determined to be appropriate by BLM.	Yes	No	Partial	Yes	No	Partial
	X			X		
				Section 3.14.1.3 discusses how access to nearby recreation areas is to be maintained, Mitigation Measure REC-1 specifies compensation for impacts to dispersed recreation, and Mitigation Measure REC-2 specifies requirements for signage directing users to alternative routes.		
DFA-REC-8: Impacts from activities in a DFA to Special Recreation Permit activities will be mitigated by providing necessary planning and NEPA compliance documentation for Special Recreation Permit replacement activities, as determined appropriate on a case-by case basis.	Yes	No	Partial	Yes	No	Partial
		X				
	There are no known Special Recreation Permit activities that would be affected by the Project.					
DFA-REC-9: If residual impacts to SRMAs occur from activity impacts in a DFA, commensurate mitigation through relocation or replacement of facilities or compensation (in the form of a recreation operations and enhancement fund) will be required.	Yes	No	Partial	Yes	No	Partial
		X				
	Project is not located in a SRMA.					
DFA-REC-10: Within ERMAs, impacts from development projects that do not enhance conservation or recreation goals will require commensurate mitigation through relocation or replacement of facilities.	Yes	No	Partial	Yes	No	Partial
		X				
	Project is not located in an ERMA.					
DFA-LANDS-1: Lands within DFAs are available for disposal.	Yes	No	Partial	Yes	No	Partial
		X				
	The CMA refers to an internal BLM activity or action (land transaction) which is not related to authorization of the Project.					
DFA-LANDS-2: Development of acquired lands within DFAs is allowed, at the discretion of the BLM California State Director, unless development is incompatible with the purposes of the acquisition and any applicable deed restrictions.	Yes	No	Partial	Yes	No	Partial
		X				
	The Project site is not acquired lands.					

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
	Yes	No	Partial	Yes	No	Partial
DFA-LANDS-3: Lands proposed for exchange in DFAs will be segregated from the public land laws for 5 years, but wind, solar, geothermal and transmission applications and their associated facilities are allowed.		X				
	The CMA refers to an internal BLM activity or action (land exchange) which is not related to authorization of the Project.					
DFA-LANDS-4: Review withdrawn lands in DFAs upon receipt of a ROW application and if appropriate modify to allow for issuance of ROW grants.		X				
	The Project area does not involve withdrawn lands.					
DFA-LANDS-5: Cost recovery funding used to process a ROW application may be used to adjudicate and remedy any conflicting land withdrawals, if necessary.		X				
	Project is not known to require any land withdrawals.					
DFA-LANDS-6: Make public lands in DFAs available for selection by the CSLC in lieu of base lands within DFAs. Base lands are School Lands the State of California was entitled to but did not receive title to due to prior existing encumbrances.		X				
	The CMA refers to an internal BLM activity or action (land exchange) which is not related to authorization of the Project.					
DFA-LANDS-7: Transmission facilities are an allowable use and will not require a plan amendment within DFAs.		X				
	Desert Quartzite follows the land use planning decision in the CDCA amended by the NECO plan.					
DFA-VRM-1: Manage all DFAs as VRM Class IV to allow for industrial scale development. Employ best management practices to reduce visual contrast of facilities.		X				
	Desert Quartzite follows the land use planning decision in the CDCA amended by the NECO plan.					
DFA-VRM-2: Regional mitigation for visual impacts is required in DFAs. Mitigation is be based on the VRI class and the underlying visual values (scenic quality, sensitivity, and distance zone) for the activity area as it stands at the time the ROD is signed for the DRECP LUPA. Compensatory mitigation may take the form of reclamation of other BLM lands to maintain (neutral) or enhance (beneficial) visual values on VRI Class II and III lands. Other considerations may include acquisition of conservation easements to protect and sustain visual quality within the viewshed of BLM lands. The following mitigation ratios will be applied in DFAs: • VRI Class II 1:1 ratio • VRI Class III ½ (0.5) : 1 ratio • VRI Class IV, no mitigation required Additional mitigation will be required where activities affect viewsheds of specially designated areas (e.g., National Scenic and Historic Trails).	X				X	
				Section 3.19.1.6 of the EIS/EIR specifies that the project site was designated as VRI Class II at the time of the DRECP ROD. However, no compensatory mitigation is proposed for visual impacts.		

Table F-1. Evaluation of DRECP CMAs with respect to the Desert Quartzite Solar Project

CMA	Applicability[1,2]			Conformance[3]		
	Yes	No	Partial	Yes	No	Partial
DFA-WHB-1: Incorporate all guidance provided by the Wild Free-Roaming Horses and Burros Act of 1971, its amendments, associated regulations, and any pertinent court rulings into the project/activity proposal, as appropriate.		X				
	As discussed in Section 4.1.4, the Project area does not support wild horses or burros.					
DFA-WHB-2: Development that would reduce burros' access to forage, water, shelter, or space or impede their wild, free-roaming behavior in Herd Management Area is not allowed.		X				
	As discussed in Section 4.1.4, the Project area does not support wild horses or burros.					
DFA-WHB-3: Mitigation can only occur on lands that the animals were found at the passage of the Wild Free-Roaming Horses and Burros Act of 1971. Expansion of the boundaries of a Herd Management Area back into the Herd Areas would require a land use plan amendment, the cost of which would be incurred by the applicant proposing to develop in the Herd Management Area, if part of the proposed mitigation package.		X				
	As discussed in Section 4.1.4, the Project area does not support wild horses or burros.					
DFA-WC-1: Renewable energy activities are allowed in DFAs that have been inventoried and identified as lands with wilderness characteristics.		X				
	Project site is not located in lands with wilderness characteristics.					
DFA-WC-2: For inventoried lands found to have wilderness characteristics in DFAs, compensatory mitigation is required at a 1:1 ratio if wilderness characteristics are directly impacted. This may be accomplished through acquisition and donation, from willing landowners, to the federal government of (a) wilderness inholdings, (b) wilderness edge holdings that have inventoried wilderness characteristics, or (c) other areas within the LUPA Decision Area that are managed to protect wilderness characteristics. Restoration of impaired wilderness characteristics in Wilderness, Wilderness Study Area, and lands managed to protect wilderness characteristics could be substituted for acquisition.		X				
	Project site is not located in lands with wilderness characteristics.					

1 – The applicability was evaluated by considering:

- Is the measure applicable to BLM's authorization of a third-party project, or is it specific to BLM-constructed projects or BLM's management policies?
- Is the site within the geographic area specified in the CMA?
- Are the specific resources addressed by the CMA present at DRECP?
- Is the technology subject to the CMA solar PV?
- Is the land use classification or designation subject to the CMA present at the site, or likely to be impacted by the project?

2 – The assessment of applicability is unrelated to the question of how the requirements of the DRECP apply to Desert Quartzite, which is a grandfathered project which is exempt from DRECP. The assessment is only a look at the environmental setting and impacts of the project, and an assessment of whether the CMA would apply to the Proposed Action and Alternatives 2 and 3 *if* the project were being done under DRECP. "Partial" generally means that the CMA has multiple parts, some of which are applicable to the Project, and some of which are not.

3 – In almost all cases where conformance is marked "Yes", this determination only means that all of the topics raised in the CMA, and their general goals and objectives, are addressed somewhere in the EIS/EIR. However, in 100% of cases, the language in the EIS/EIR does not exactly match the language in the CMA.

4 - Figure 17 in the BRTR shows a feature identified as "Desert Dry Wash woodland (microphyll woodland)". This feature is mapped and discussed in the EIS/EIR as "desert dry wash woodland", but is interpreted to be equivalent to "microphyll woodland" wherever microphyll woodland is specified in a CMA.

APPENDIX F

CDCA PLAN, SECTION 368, AND LOCAL PLAN

APPENDIX F - CDCA PLAN, SECTION 368 AND LOCAL PLAN

F.1. CDCA PLAN CONSISTENCY

The Proposed Action site is within the BLM's California Desert District and within the planning boundaries of the California Desert Conservation Area (CDCA) Plan. The Project site is currently classified as Multiple-Use Class (MUC) Moderate (M) in the CDCA Plan. As discussed in Section 2.2.3, the Western Solar Plan and ROD recognize the DQSP as a "pending" right-of-way (ROW) application (Western Solar Plan Section 9.4.22.2, p. 9.4-133). Pending applications like the Desert Quartzite Solar Project (DQSP) are not subject to the Western Solar Plan (Western Solar Plan ROD Section B.1.2) or to the CDCA plan amendments (PAs) made in that decision. Therefore, if the BLM elects to approve the ROW grant application for the DQSP, a Project-specific PA to identify the development footprint as suitable for the proposed type of solar energy use would be required. The CDCA Plan would also need to be amended to authorize the portion of the gen-tie corridor which is located outside of BLM's Utility Corridor K and Section 368 Federal Energy Corridor 30-52.

The process for considering amendments to BLM land use plans is described in the agency's *Land Use Planning Handbook* (BLM 2005). The general process for amending a BLM Land Use Plan is as follows:

1. The plan amendment process would be completed in compliance with FLPMA, NEPA, and all other relevant Federal law, executive orders, and BLM management policies.
2. The plan amendment process would include an EIS to comply with NEPA.
3. Where existing planning decisions remain valid, those decisions may remain unchanged and would be incorporated into the new plan amendment.
4. The plan amendment would recognize valid existing rights.
5. Native American tribal consultations would be conducted in accordance with policy, and tribal concerns would be given due consideration.
6. Consultation with other agencies with jurisdiction would be conducted throughout the plan amendment process.

The PA process is outlined in Chapter 7 of the CDCA Plan. The amendment would be a Category 3 amendment, because it requests a specific use or activity, which is not currently authorized by an existing plan element. In analyzing an applicant's request for amending or changing the CDCA Plan, the BLM District Manager will:

1. Determine if the request has been properly submitted and if any law or regulation prohibits granting the requested amendment.
2. Determine if alternative locations within the CDCA are available which would meet the applicant's needs without requiring a change in the Plan's classification, or an amendment to any Plan element.
3. Determine the environmental effects of granting and/or implementing the applicant's request.

4. Consider the economic and social impacts of granting and/or implementing the applicant's request.
5. Provide opportunities for and consideration of public comment on the proposed amendment, including input from the public and from Federal, state, and local government agencies.
6. Evaluate the effect of the proposed amendment on BLM management's desert-wide obligation to achieve and maintain a balance between resource use and resource protection.

Details concerning the proposed PA for the Proposed Action or one of the other action alternatives are provided in Section 2.2.3. This Draft PA/EIS/EIR acts as the mechanism for satisfying NEPA requirements for the PA process, and provides the analysis required to support a PA to identify the proposed site as suitable or unsuitable for solar development within the Plan, and to authorize the portion of the gen-tie corridor which is located outside of BLM's Utility Corridor K and Section 368 Federal Energy Corridor 30-52.

As analyzed above, all of the BLM-administered lands proposed for use by the Project and alternatives are classified in the CDCA Plan as Class M. MUC designations govern the type and degree of land uses allowed within the classification area. All land use actions and resource-management activities on BLM-administered lands within a MUC delineation must meet the guidelines for that class. These guidelines are provided in Table 1, Multiple-Use Class Guidelines, of the CDCA Plan.

The MUC-M designation allows electric generation plants for solar facilities to be developed in accordance with Federal, state, and local regulations after NEPA requirements are met. The specific application of the MUC designations and resource management guidelines for a specific resource or activity are further discussed in the plan elements section of the CDCA Plan. MUC-M designations are based upon a controlled balance between higher intensity use and protection of public lands. This class provides for a wide variety or present and future uses such as mining, livestock grazing, recreation, energy, and utility development. Class M management is also designed to conserve desert resources and to mitigate damage to those resources which permitted uses may cause.

For purposes of this discussion, the terminology "Proposed Action and Alternatives" is used herein since the classification of the BLM-administered portion of the site of the Proposed Action and Alternatives 2 and 3 would be the same (MUC-M).

F.1.1 Agriculture

Agricultural uses of MUC-M lands are not allowed, with the exception of livestock grazing. The BLM lands associated with the Project are not currently used for agriculture, and the Project would not involve use of the site for agriculture.

F.1.2 Air Quality

MUC-M lands are to be managed to protect air quality and visibility in accordance with Class II objectives of Title I, Part C of the CAA as amended. The anticipated maximum annual and daily construction emissions that would be associated with the Proposed Action and Alternatives are provided in Tables 4.2-2 and 4.2-3 in Section 4.2, *Air Resources*. The analysis indicates that the annual emissions for all pollutants would be below the respective *de minimis* levels (below 100 tons/year), except for PM_{10}, which would exceed the *de minimis* level. The projected exceedance of the PM_{10} MDAQMD emissions threshold would also contribute to the non-attainment for PM_{10} in the area under CAAQS. The emission estimates in Table 4.2-4 show that emissions from operation of the Project would all be below MDAQMD thresholds and *de minimis* levels. Impacts associated with operation and maintenance of the Project would not be expected to result in or contribute to an exceedance of a NAAQS or CAAQS. The magnitude of the impacts of decommissioning emissions are expected to be significantly less than those estimated for Project construction, since decommissioning would occur after at least 30 years of operation, and it is expected that on-road and off-road equipment engine technology would be far more advanced and cleaner than is currently the case. Therefore, the Project would conform to the CAA Class II objectives referenced in the CDCA Plan MUC guidelines.

F.1.3 Water Quality

The CDCA Plan states that MUC-M lands are to be managed “to minimize degradation of water resources”. Best Management Practices will be used to keep impacts on water quality minimal, and to comply with Executive Order 12088, both of which address Federal compliance with pollution control standards (BLM 1980, p. 15). The BMPs that are relevant to the Project would be applied during implementation of Appendix G, Mitigation Measures WATER-1, WATER-2, and WATER-4. With implementation of these surface and groundwater quality BMPs, impacts to water resources and water quality would be minimal, and the Project would conform to the CDCA Plan guidelines for MUC-M lands.

F.1.4 Cultural and Paleontological Resources

Cultural and paleontological resources are to be preserved and protected within MUC-M lands, and procedures described in 36 CFR 800 are to be observed where applicable. As described in detail in Sections 4.5, *Cultural Resources*, and 4.13, *Paleontological Resources*, impacts on cultural and paleontological resources resulting from the construction, operation and maintenance, and decommissioning of the Project would be mitigated and would conform to the MUC Guidelines. Adverse effects on cultural resources listed in or determined eligible for the NRHP would be resolved in accordance with a MOA being prepared for the Project in consultation with the California SHPO, Indian tribes, and other interested parties in accordance with NHPA §106.

F.1.5 Native American Values

Under the MUC-M Guidelines, Native American cultural and religious values are to be protected and preserved, and the appropriate Indian tribes are to be consulted. Consultation with Indian tribes was initiated during planning phase of the Project and will continue during the NEPA process (Section 4.5, *Cultural Resources*, and Chapter 6, *Consultation, Coordination, and Public Involvement*, describe the Native American consultation processes). Opportunities have been provided to allow Indian tribes to identify places and resources of importance to them and to express concerns regarding cultural and religious values that could be affected by the Project.

Adverse effects on any places of traditional cultural or religious importance that are identified by tribes would be resolved in accordance with the MOA being developed for the Project with tribal participation. Potential impacts to and protection of cultural resources are discussed in more detail in Section 4.5, *Cultural Resources*. Collectively, these measures ensure that preservation and protection of Native American cultural and religious values associated with cultural resources is accomplished in accordance with the CDCA Plan MUC-M Guidelines.

F.1.6 Electrical Generation Facilities

Solar generation may be allowed on MUC-M lands after NEPA requirements are met. This Draft PA/EIS/EIR represents the mechanism for complying with the NEPA requirements.

F.1.7 Transmission Facilities

MUC-M guidelines allow electric transmission to occur in designated ROW corridors. The gen-tie line associated with the Proposed Action would be sited almost entirely within BLM's Utility Corridor K/30-52. Because the CRSS is sited approximately 1,500 feet south of the southern boundary of Corridor K/30-52, the portion of the gen-tie corridor between Corridor K/30-52 and the CRSS would be located outside of the utility corridor. In addition, under Alternatives 2 and 3, a short segment of the gen-tie line extending north from the On-Site Substation to the corridor would be located outside of the corridor. The CDCA Plan requires that all sites associated with power generation or transmission not identified in the Plan be considered through the PA process. Therefore, the BLM would undertake a Project-specific CDCA PA along with the ROW grant for the Project. Upon BLM's amendment of the CDCA plan for the Project, the Project would be fully compliant with the CDCA Plan. This Draft PA/EIS/EIR acts as the mechanism for meeting NEPA requirements, and also provides the analysis required to support a PA identifying the facility within the Plan.

F.1.8 Communication Sites

Communication sites may be allowed on MUC-M lands after NEPA requirements are met. The Project would not involve installation of communications sites, and therefore would not be affected by the MUC-M guidelines for this land use activity.

F.1.9 Fire Management

The Project site is located in a Federal Responsibility Area (FRA) under the jurisdiction of BLM, and the site is within a moderate Fire Hazard Severity Zone (FHSZ). As part of the Project, the Applicant would implement the fire prevention and suppression measures described in Section 2.3.7.3. Additionally, as described in Appendix G, *Wildland Fire*, Mitigation Measure FIRE-1 requires the Applicant to prepare and implement a Fire Safety Plan to ensure the safety of workers and the public during Project construction, operation and maintenance, and decommissioning activities. This plan shall complement or supplement provisions of the Applicant's proposed Hazardous Materials Management and Emergency Response Plan. The Fire Safety Plan would be provided to the BLM and RCFD for approval before the Applicant receives a Notice to Proceed (NTP). Should a fire occur in the area that is not specific to the facility, it would be addressed by BLM or RCFD, not by the Applicant, and it would be addressed in conformance with the Fire Safety Plan and, therefore, would conform to the MUC guidelines for Fire Management for Class M lands.

F.1.10 Vegetation

Table 1 of the CDCA Plan includes a variety of guidelines associated with vegetation as follows:

Vegetation Harvesting

Native Plants

Commercial or non-commercial removal of native plants in MUC-M areas may be allowed only by permit after NEPA requirements are met, and after development of necessary stipulation. Approval of a ROW grant for the Project would constitute the permit for such removal. The conditions of approval that would be required in a Record of Decision would constitute the stipulations to avoid or minimize impacts from removal of native plants.

Harvesting by Mechanical Means

Harvesting by mechanical means may be allowed by permit only. Although the Project may include the collection of seeds to assist with reclamation, the removal of these items would not be done for distribution to the public. Also, the guidelines for vegetation harvesting include encouragement of such harvesting in areas where the vegetation would be destroyed by other actions, which would be the case with the Project. Therefore, the Project would be in conformance with this MUC guideline.

Rare, Threatened, and Endangered Species, State and Federal

In all MUC areas, all Federal and state-listed species are to be fully protected. In addition, actions that may jeopardize the continued existence of Federally-listed species require consultation with the USFWS. As evaluated in Section 4.3, *Biological Resources – Vegetation*, no Federal or state-listed plants would be affected by the Project.

Sensitive Plant Species

Identified sensitive plant species would be given protection in management decisions consistent with BLM's policy for sensitive species management, BLM Manual 6840 (BLM 2008). The objective of this policy is to conserve and/or recover listed species, and to initiate conservation measures to reduce or eliminate threats to BLM sensitive species to minimize the likelihood of and need for listing. Six special-status plants were identified on the Project site, of which one, Harwood's eriastrum (*Eriastrum harwoodii*), is considered a BLM-sensitive plant. Impacts and mitigation measures associated with this species and other special-status plant species are discussed in Section 4.3, *Biological Resources - Vegetation*. Mitigation measures included in this Draft PA/EIS/EIR would reduce the number of individuals of the species that would be affected. Because these measures are intended to reduce threats to these species to minimize the likelihood of listing, these measures are in conformance with the MUC guidance in the CDCA Plan.

Unusual Plant Assemblages

No unusual plant assemblages are designated on the Project site.

Vegetation Manipulation

Mechanical Control

Mechanical control may be allowed on MUC-M lands after consideration of possible impacts. Vegetation manipulation is defined in the CDCA Plan as removing noxious or poisonous plants from rangelands; increasing forage production; creating open areas within dense brush communities to favor certain wildlife species; or eliminating introduced plant species.

During construction, operations, and decommissioning phases, the Applicant would abide by noxious weed control procedures as developed in cooperation with the BLM. The establishment of noxious/invasive vegetation can be limited by early detection and eradication. The Applicant would finalize the site-specific VRMP, described in Section 2.3.7.2, *Vegetation Management*, prior to a ROW grant being issued. Such actions would be conducted as part of the Project. Vegetation management under the VRMP would conform to Federal, state, and local regulations.

Chemical Control

Aerial broadcasting application of chemical controls is not allowed on MUC-M lands. Noxious weed eradication may be allowed after site-specific planning. The Project would not include aerial broadcasting. As described in Section 2.3.7.2, *Vegetation Management*, the VRMP would include an Integrated Weed Management Plan to control invasive and exotic weeds.

Exclosures

Exclosures may be allowed on MUC-M lands. Exclosure is a manipulation technique where livestock and certain wildlife species can be excluded from fenced areas. This procedure provides comparison data and is valuable in the determination of grazing effects of vegetation. The Project would not include exclosures.

Prescribed Burning

Prescribed burning may be allowed on MUC-M lands after development of a site-specific management plan. The Project would not include prescribed burning.

F.1.11 Land Tenure Adjustment

MUC-M land may be sold in accordance with FLPMA and other applicable Federal laws and regulations. The Project would not involve the sale of any BLM-administered lands.

F.1.12 Livestock Grazing

Livestock grazing is allowed on MUC-M lands subject to the protection of sensitive resources. The Project would not involve livestock grazing.

F.1.13 Minerals

The Project would not involve the development of minerals on MUC-M lands.

F.1.14 Motorized Vehicle Access/Transportation

Pursuant to the CDCA MUC guidelines for MUC-M areas, new roads and routes may be developed under ROW grants or approved plans of operation, and periodic or seasonal closures or limitations of routes of travel may be required. When construction begins, the Project area will be fenced off and thus several open OHV routes will be closed to public use for the duration of the ROW. These routes include all or portions of routes 660862, 660863, 660866, 661092, 661102, and 661501. Three of these routes provide access to the private property inholding (660862, 660866, and 661501) within the Project area and three routes provide access to the Mule Mountains (660863, 661092, and 661102). Operation and maintenance of the Project would result in long-term closures of portions of these OHV routes as described in Section 4.14, *Recreation and Public Access*. With the closure of the three routes that access the Mule Mountains, alternative access to the Mule Mountains would occur by traveling west on 22nd Avenue to Gravel Pit Road, southwest along Gravel Pit Road, and then west on an unpaved extension of 24th Avenue to BLM Routes 660863 and 661093.

F.1.15 Recreation

The Project would not involve use of the Project site for recreational uses.

F.1.16 Waste Disposal

The Project would not involve the development of waste disposal sites.

F.1.17 Wildlife Species and Habitat

Table 1 of the CDCA Plan includes a variety of guidelines associated with wildlife as follows:

Rare, Threatened, and Endangered Species, State and Federal

In all MUC areas, all state and Federally listed species and their critical habitat are to be fully protected. In addition, actions that may impact or jeopardize the continued existence of Federally listed species require consultation with the USFWS in accordance with FESA §7. As evaluated in Section 4.4, *Biological Resources - Wildlife*, the Mojave desert tortoise is the only Federally listed species potentially affected by the Project. The only state listed species potentially affected by the Project is the Swainson’s hawk. Mitigation Measures developed as part of the Project would avoid, minimize, and/or compensate for potential effects to these species.

As specified in the guideline, BLM will initiate formal consultation with the USFWS in accordance with FESA §7. BLM has worked with USFWS, CDFW, and the Applicant to develop protection and compensation measures for the Mojave desert tortoise. Therefore, the Project would comply with the guideline to provide full protection to the species.

Sensitive Species

On MUC-M lands, identified species are to be given protection in management decisions consistent with BLM’s policy for sensitive species management, BLM Manual 6840. The objective of this policy is to conserve and/or recover listed species, and to initiate conservation measures to reduce or eliminate threats to BLM sensitive species to minimize the likelihood of and need for listing. Several BLM-sensitive wildlife species present or likely to occur on habitat associated with the Project include, but are not limited to Mojave fringe-toed lizard, burrowing owl, Le Conte's thrasher, Golden Eagles, and migratory birds and bats. Those species that are likely to occur on the Project site would be protected under a number of mitigation measures meant to avoid, minimize, or compensate for impacts from the Project as discussed in detail in Section 4.4, *Biological Resources - Wildlife*.

Predator and Pest Control

Control of depredation wildlife and pests is to be allowed on MUC-M lands in accordance with existing state and Federal laws. As part of the Project, the Applicant would develop a litter control program that would be enforced during construction and operation and maintenance phases to reduce the likelihood that litter would attract predators (e.g., common raven) to the area and consequently increase the likelihood of predation on special status species (e.g., Mojave desert tortoise).

Therefore, this guideline is applicable to these actions but is allowed subject to conformance with state and Federal laws.

Habitat Manipulation

The Project would not include habitat manipulation.

Reintroduction or Introduction of Established Exotic Species

The Project would not include the reintroduction or introduction of exotic species.

F.1.18 Wetland/Riparian Areas

No wetlands or riparian areas are present on the Project site.

F.1.19 Wild Horses and Burros

No wild and free-roaming horses or burros are present on the Project site.

F.2. CONFORMANCE WITH IOPS FOR SECTION 368 CORRIDOR

Appendix B to the ROD for the Designation of Energy Corridors on Bureau of Land Management-Administered Lands in the 11 Western States (BLM 2009) specifies Interagency Operating Procedures (IOPs) to meet the Section 368 requirement to improve the ROW application process and to meet NEPA requirements to provide practicable means to avoid or minimize environmental harm which may result from future ROW grants within the designated corridors. The IOPs specify regulatory compliance, agency coordination, government-to-government consultation, project design, and resource-specific considerations that must be addressed through NEPA analysis of the proposed use of the corridor. The manner in which the Project and the PA/EIS/EIR conforms to the IOPs is presented below in Table F-1.

Table F-1. Conformance with IOPs for Use of Section 368 Corridor

Summary of IOP$^{1, 2}$	Manner of Addressing IOP in the PA/EIS/EIR
Project Planning	
Conduct project-specific NEPA analysis	This PA/EIS/EIR acts as the NEPA analysis for portion of the Project within the Section 368 corridor.
Comply with Section 106 of the NHPA	Compliance with the NHPA is discussed in Sections 3.5.1.6, 4.5.1.1, 4.5.1.2, and 6.3.2.
Consult with USFWS as required by Section 107 of the ESA	Compliance with Section 107 of the ESA is discussed in Sections 3.4.1.1 and 6.3.1.
Notify FAA to identify appropriate aircraft safety requirements.	Notification to and coordination with the FAA and the RCALUC are discussed in Sections 3.9.1.5, 4.9.3, and Appendix G, Mitigation Measure HAZ-3.
Reflect findings, mitigation, and/or standards contained in regional land management plans.	Conformance with the CDCA Plan and Riverside County General Plan are addressed in Appendix F, Section F.1 and F.3.
Initiate and continue government-to-government consultation with affected tribes.	Government-to-government consultation is discussed in Sections 4.5.3.1 and 6.3.3.
Prepare an ethnographic study, if the agency POC determines it is needed, based on tribal consultation.	At this time, the agency has not determined a need for an ethnographic study
Prepare a project-specific Plan of Development	The Applicant's Plan of Development is discussed in Section 1.1 and 2.3.1.
Design project to comply with all appropriate and applicable agency policies and guidance	Applicable agency policies, guidance, and regulations are identified for each resource in Appendix D.
Plan project based on current state of knowledge.	All analysis is based on the most recent, applicable data sources.
Follow best management practices for project siting, construction, and operations.	Best management practices for various resources, including stormwater management, management of hazardous materials, transportation management visual resources management, and vegetation avoidance, are discussed where applicable throughout the document.
Use the corridor efficiently.	As shown in Figure 3.10-2, the placement of the gen-tie line in the corridor has been designed to minimize the intrusion on the corridor. The gen-tie line enters the corridor from the south, travels through the corridor along its southern boundary, and then exits the corridor on the south.
Coordinate with other concurrent projects proposed in the corridor.	Coordination with other operators within the corridor is discussed in Section 4.10.3.
Prepare a monitoring plan for all mitigation activities.	The requirement for a comprehensive Environmental Inspection and Compliance Monitoring Program and Plan (EICMPP)/Mitigation Monitoring, Reporting, and Compliance Program (MMRCP) is discussed in APM BIO-1 in Section 4.3.2.
Locate projects within energy corridors to promote effective use of the corridor by subsequent applicants.	As shown in Figure 3.10-2, the placement of the gen-tie line in the corridor has been designed to minimize the intrusion on the corridor.

Table F-1. Conformance with IOPs for Use of Section 368 Corridor

Summary of IOP[1, 2]	Manner of Addressing IOP in the PA/EIS/EIR
Identify and delineate existing underground metallic pipelines to avoid accelerating corrosion.	There are no pipelines reported in the corridor.
Prepare an access road siting and management plan.	The requirement for an access road siting and management plan is incorporated into Appendix G, Mitigation Measure TRN-2.
Prepare a comprehensive transportation plan for transport of transmission tower components and equipment.	The requirement for a comprehensive transportation plan is incorporated into Appendix G, Mitigation Measure TRN-2.
Consult with local planning authorities regarding increased traffic during construction.	Coordination with local authorities is addressed in Section 4.17.2 as part of APM TRA-2.
Conduct an initial scoping assessment to determine whether construction activities would disturb formations that may contain important paleontological resources.	The Applicant's Preliminary Paleontological Resources Assessment Technical Report is discussed in Section 3.13.1.1.
If areas with high potential to contain paleontological material have been identified, prepare a paleontological resources management and mitigation plan.	The components of the Applicant's Paleontological Resource Impact Mitigation Plan are discussed in Section 4.13.2 as part of APM Paleo-2.
Develop a protocol for unexpected discoveries of significant paleontological resources.	The components of the Applicant's Paleontological Resource Impact Mitigation Plan are discussed in Section 4.13.2 as part of APM Paleo-2.
Identify important, sensitive, or unique habitats and BLM special status species.	The results of vegetation surveys are discussed in Section 3.3.1, and the results of wildlife surveys are discussed in Section 3.4.1.1.
Prepare a habitat restoration plan.	The requirements for a Habitat Enhancement/Restoration Plan are discussed as part of Appendix G, Mitigation Measures VEG-9.C and VIS-4.
Identify wetlands, riparian habitats, streams, and other aquatic habitats.	The results of the Applicant's surveys for wetlands and other jurisdictional waters are discussed in Sections 3.3.1.4 and 4.3.3.1.
Develop an integrated vegetation management plan.	The components of the Applicant's Vegetation Resources Management Plan are discussed in Section 2.3.7.2 and APM BIO-4. The components of the Applicant's Integrated Weed Management Plan are discussed in Section 2.3.7.2 and APM BIO-5.
Cultural resources management services and individuals providing those services shall meet the Secretary of the Interior's Standards for Archeology and Historic Preservation.	The qualifications for cultural resource management services are specified in Appendix G, Mitigation Measure CULTURAL-5.
Identify and evaluate all historic properties within the APE.	The results of field investigations to identify historic properties are presented in Section 3.5.1.6.6.
Develop a cultural resources management plan.	The requirements for a Plan for Archaeological Monitoring Post-Review, Discovery, and Unanticipated Effects are discussed in Appendix G, Mitigation Measure CULTURAL-1.
Provide cultural resources training for project personnel.	The requirements for cultural/historical sensitivity training for the construction staff are presented in Appendix G, Mitigation Measure CULTURAL-7.

Table F-1. Conformance with IOPs for Use of Section 368 Corridor

Summary of IOP[1, 2]	Manner of Addressing IOP in the PA/EIS/EIR
If adverse effects to historic properties will result from a project, develop a Historic Property Treatment Plan in consultation with the SHPO.	The requirements for the Historic Properties Treatment Plan are discussed in Section 4.5.1.2.
Cultural resources inventory, evaluation, and mitigation practices should incorporate modeling and sampling strategies to the extent practicable.	The incorporation of modeling into the cultural resources inventory is discussed in Chapter 4 of the Class III Archaeological Survey Report (Appendix P).
Provide cultural resources reports and data in an electronic format that is approved by the agency POC.	The reports were provided in electronic format, which was accepted by the agencies.
Include development of historical contexts in cultural resources inventory procedures.	The use of historical contexts in making NRHP-eligibility evaluations and recommendations is discussed in Chapter 5 of the Class III Archaeological Survey Report (Appendix P).
Comply with all laws, policies, and regulations pertaining to government-to-government consultation with Federally recognized tribes.	Government-to-government consultation is discussed in Sections 4.5.3.1 and 6.3.3.
Comply with all pertinent laws, policies, and regulations addressing cultural and other resources important to Tribes, including the NHPA, ARPA, and NAGPRA.	The applicable laws, policies, and regulations, including NHPA, ARPA, and NAGPRA, are discussed in Appendix D, Section D.5.
Recognize the significance to many tribes of traditional cultural places.	Section 3.5.1.6.5 discusses the results of the search for Native American Traditional Cultural Places (TCPs).
Develop protocol for inadvertent discovery of Native American remains and funerary items.	Procedures for inadvertent discovery of human remains are addressed in Appendix G, Mitigation Measure CULTURAL-3.
Identify and consider visual resource management issues.	Visual Resource Management impacts are evaluated in Section 4.19.3.
Prepare a VRM plan.	The Applicant's Visual Resources Technical Report (Appendix U) provides the existing VRM management class information specified in the IOP. This information is discussed in Section 3.19.1.5 and 4.19.1.
Perform visual and scenic mitigation through integrated field assessment, field photo documentation, and visual simulation software.	The procedures used and results of the field assessment and simulation is provided in the Applicant's Visual Resources Technical Report (Appendix U). This information is discussed in Section 4.19.1.
Develop adequate terrain mapping on a landscape/viewshed scale.	Section 3.2 of the Applicant's Visual Resources Technical Report (Appendix U) describes how scale was considered in the visual analysis. The approach evaluated baseline conditions at two spatial scales: Landscape-level scale, in which the regional landscape setting and scenic values are defined; and Project-scale, in which the Project site was assessed from Key Observation Points (KOPs).

Table F-1. Conformance with IOPs for Use of Section 368 Corridor

Summary of IOP[1, 2]	Manner of Addressing IOP in the PA/EIS/EIR
Consider and incorporate best management practices for visual resources.	The incorporation of BMPs related to lighting into the Project is discussed in Section 4.19.2. Section 4.19.2 also addresses BMPs related to materials and screening of facilities. BMPs associated with site disturbance, maintenance of existing vegetation, reclamation, and general housekeeping are addressed in the discussions of those specific resources.
Comply with VRM objectives through the use of the BLM contrast rating procedures.	The methodology for the visual analysis, including use of the Visual Contrast Rating analysis, is discussed in Section 4.19.1. Conformance with the VRM objectives is discussed in Section 4.19.3.
Comply with FAA regulations to avoid potential safety issues related to proximity to airports.	Compliance with FAA regulations is discussed in Section 4.9.3.
Develop a health and safety program to protect workers and the general public.	The Applicant's intention to develop an Environmental Health and Safety Plan is discussed in Section 2.3.7.4.
Establish a setback from roads and other public access areas to prevent accidents resulting from various hazards.	An existing public road is located within the corridor, along the northern side of the existing transmission lines. The Project's gen-tie line would be located on the southern side of the existing transmission lines, and is therefore setback further from the public road than are the existing lines.
Develop a comprehensive emergency plan that considers the vulnerabilities of the system to all credible events.	Section 2.3.7.1 discusses the components of the Applicant's Hazardous Materials Management and Emergency Response Plan.
Identify all Federal, state, and local regulations pertaining to environmental protection, worker safety and health, public safety, and system reliability.	Regulations pertaining to environmental protection, worker safety and health, public safety, and system reliability are identified in Appendix D, Section D.9.
Develop a fire management strategy to minimize the potential for a human-caused fire.	The requirements for a Fire Safety Plan are specified in Appendix G, Mitigation Measure Fire-1.
Work with the local land management agency to identify project areas that may incur heavy fuel build-ups.	The requirements for a Fire Safety Plan are specified in Appendix G, Mitigation Measure Fire-1. The Plan includes requirements for vegetation management to address invasive plants and fuel buildup.
Project Construction	
Be aware of liabilities pertaining to environmental hazards, safety standards, and military flying areas.	Regulations pertaining to environmental protection, worker safety and health and public safety are identified in Appendix D, Section D.9. There are no military flying areas near the Project.
Locate all stationary construction equipment as far as practicable from nearby residences.	The nearest residence is located approximately 3700 feet north of the Project. The locations of sensitive receptors are discussed in Section 3.2.1.5 (for air quality), 3.9.1.1 (for hazardous materials), and 3.12.1.2 (for noise).
Salvage, safeguard, and re-apply topsoil from all excavations.	Requirements for stockpiling of topsoil are specified in Section 2.3.4.3 and Appendix G, Mitigation Measure VEG-8.

Table F-1. Conformance with IOPs for Use of Section 368 Corridor

Summary of IOP[1, 2]	Manner of Addressing IOP in the PA/EIS/EIR
Restore all areas of disturbed soil.	Requirements for restoration of areas of disturbed soil are specified in Sections 2.3.5, 2.3.6, 2.3.7.5, APM BIO-2, and Appendix G, Mitigation Measure VEG-7.
Do not create excessive slopes during excavation.	No excavation would be required for construction of the gen-tie line.
Backfill foundations and trenches with originally excavated material.	No excavation would be required for construction of the gen-tie line.
Borrow fill material only from authorized sites.	No borrow material would be required for construction of the gen-tie line.
Implement erosion controls complying with county, state, and Federal standards.	Erosion controls and stormwater management are addressed in Sections 2.3.7.1, 2.3.7.9, and Appendix G, Mitigation Measure WATER-1.
Minimize intermittent stream crossings to the extent practicable.	The route of the gen-tie follows the shortest route possible between the On-Site Substation and the CRSS, and minimizes the crossing of intermittent drainages.
Avoid alteration of existing drainage systems.	No alteration of existing drainage systems would be required for construction of the gen-tie line.
Construction activities shall follow the protective measures and protocols identified in the paleontological resources mitigation plan.	The Applicant's Preliminary Paleontological Resources Assessment Technical Report is discussed in Section 3.13.1.1.
All paleontological specimens found remain the property of the U.S. government.	APM Paleo-1 specifies procedures for sending specimens to a designated museum repository.
Identify and mark, with flagging, areas known to support ESA-listed species and BLM special status species.	Requirements for flagging protected areas are specified in Section 2.3.7.5, APM BIO-4, and Appendix G, Mitigation Measure VEG-8.
Conduct pre-construction meeting with BLM landscape architects or other visual resource specialist to coordinate on VRM mitigation strategy.	Requirements for a pre-construction meeting are specified in Appendix G, Mitigation Measure VIS-2.
For areas having a high potential for cultural resources, but for which no such resources are found during pre-construction field surveys, monitor ground-disturbing activities by a professionally qualified cultural resources specialist.	Requirements for monitoring ground-disturbing activities are specified in Appendix G, Mitigation Measure CULTURAL-1.
When human remains, funerary objects, sacred objects, or other objects of cultural patrimony are discovered, follow the provisions of NAGPRA.	Procedures for inadvertent discovery of human remains, in compliance with NAGPRA, are addressed in Appendix G, Mitigation Measure CULTURAL-3.
Use a licensed hauler to periodically remove wastewater generated by temporary, portable sanitary facilities.	The Applicant's proposed procedures for management of sanitary facilities are addressed in Section 2.3.3.9.
Store all hazardous materials brought to the site in appropriate containers.	The Applicant's proposed procedures for management of hazardous materials are addressed in Section 2.3.7.1.
Cover construction materials and stockpiled soils if these materials are sources of fugitive dust.	The Applicant's proposed procedures for covering stockpiles to minimize fugitive dust are addressed in Section 2.3.7.6.

Table F-1. Conformance with IOPs for Use of Section 368 Corridor

Summary of IOP[1, 2]	Manner of Addressing IOP in the PA/EIS/EIR
Water land before and after clearing activities to minimize fugitive dust.	The Applicant's proposed procedures for the use of water for dust control are addressed in Section 2.3.7.6.
Limit noisy construction activities to daytime, on weekdays.	Section 2.3.4.7 discusses the Applicant's proposed construction schedule, which may include work at night. The discussion specifies that work taking place outside of typical hours would comply with Riverside County standards for construction noise levels
Ensure that all construction equipment is adequately muffled and maintained during periods of high fire danger.	The requirement for maintaining mufflers in good working order are specified in Appendix G, Mitigation Measure FIRE-1.
Store flammable materials in appropriate containers.	The Applicant's proposed procedure for storing hazardous materials, including flammable fuels, in appropriate containers is specified in Section 2.3.7.1.
Project Operation	
Review existing information regarding plant and animal species and their habitats, and identify impacts to the appropriate agencies.	The results of vegetation surveys are discussed in Section 3.3.1, and the results of wildlife surveys are discussed in Section 3.4.1.1.
Avoid harassment or disturbance of wildlife.	The training to be provided to staff regarding harassment or disturbance of wildlife is discussed in Appendix G, Mitigation Measure VEG-6.
Report observations of potential wildlife problems, including wildlife mortality.	The requirement to report observations of dead or injured wildlife is specified in Appendix G, Mitigation Measure VEG-2.
Use pesticides as specified in the integrated vegetation management plan.	The Applicant's proposed procedure for using pesticides, as part of their IWMP, is discussed in Section 2.3.7.2.
Provide secondary containment for all onsite hazardous materials.	The Applicant's proposed procedure for providing secondary containment for hazardous materials is discussed in Sections 2.3.7.1 and 4.9.1.
Ensure that wastes are properly containerized and removed for disposal periodically at appropriate offsite disposal facilities.	The Applicant's proposed procedure for offsite disposal of solid wastes is discussed in Section 2.3.7.1.
In the event of an accidental release, initiate spill cleanup procedures.	The Applicant's proposed procedure for responding to accidental releases is addressed in Section 2.3.7.1.
Use dust abatement techniques on unpaved, unvegetated surfaces. Do not use used oil for dust abatement.	The Applicant's proposed procedures for the use of water for dust control are addressed in Section 2.3.7.6.
Ensure that all operational equipment has sound-control devices that are no less effective than those provided on the original equipment.	Operation of the gen-tie line would not involve equipment that generates noise.
Project Decommissioning	
Perform decommissioning in conformance with agency standards.	Components of the Applicant's Draft Decommissioning and Site Reclamation Plan are discussed in Section 2.3.6.

Table F-1. Conformance with IOPs for Use of Section 368 Corridor

Summary of IOP[1, 2]	Manner of Addressing IOP in the PA/EIS/EIR
Remove gravel work pads and other borrow material.	No gravel or other borrow materials are proposed for use during construction of the gen-tie line.
Remove and properly close wells constructed to support operations.	No wells would be installed within the utility corridor.
Remove all equipment, components, and above-ground structures to a depth of 3 feet.	Requirements for decommissioning of the gen-tie line are addressed in Appendix G, Mitigation Measure VIS-4.
Remove dismantled and cleaned components promptly.	Requirements for decommissioning of the gen-tie line are addressed in Appendix G, Mitigation Measure VIS-4.
At the close of decommissioning, provide the Federal land manager survey data showing the locations of all below-grade components left in place.	Requirements for decommissioning of the gen-tie line are addressed in Appendix G, Mitigation Measure VIS-4.
Obtain and implement a SWPPP prior to beginning decommissioning.	Components of the Applicant's Draft Decommissioning and Site Reclamation Plan, including implementation of a decommissioning SWPPP, are discussed in Section 2.3.6.
Access roads to be used for decommissioning shall follow the paths of access roads established during construction to the greatest extent possible.	Requirements for decommissioning of the gen-tie line are addressed in Appendix G, Mitigation Measure VIS-4.
Topsoil removed during decommissioning shall be salvaged and reapplied during final reclamation.	Requirements for decommissioning, including salvage and reapplying topsoil, are addressed in Appendix G, Mitigation Measure VIS-4.
Vegetation cover, composition, and diversity shall be restored to values commensurate with the ecological setting.	Specifications for revegetation activities, including cover, composition, and diversity, are discussed in Appendix G, Mitigation Measure VEG-8.19.
All fuels, hazardous materials, and other chemicals shall be removed from the site and properly disposed of.	The Applicant's proposed procedure for decommissioning, including removal of hazardous materials, is discussed in Section 2.3.6.
Incidental spills of petroleum products and other chemicals shall be removed and the affected area cleaned to applicable standards.	The Applicant's proposed procedure for responding to accidental releases is addressed in Section 2.3.7.1.
Solid wastes generated during decommissioning shall be accumulated, transported, and disposed in permitted offsite facilities. No solid wastes shall be disposed within the footprint of the corridor.	The Applicant's proposed procedure for decommissioning, including offsite disposal of solid wastes, is discussed in Section 2.3.6.
Hazardous wastes generated as a result of cleaning of components shall be containerized and disposed of in permitted facilities.	The Applicant's proposed procedure for decommissioning, including management of waste liquid from cleaning activities, is discussed in Section 2.3.6.

Notes:

1 – Only IOPs which are relevant to electrical transmission and to resources present at the Project area, are evaluated. All other IOPs are not applicable to the Project.

2 – IOPs are applicable to the portion of the ROW within the gen-tie corridor.

F.3. LOCAL PLAN CONSISTENCY

The privately owned parcel under Riverside County jurisdiction is designated as Open Space-Rural in the Riverside County General Plan (Riverside County 2015a). The policies that are relevant to the Project are presented in Appendix D by resource. The conformance of the Project with these policies is evaluated throughout Chapter 4, and is summarized below in Table F-2.

Table F-2. Conformance with Regional/Local Land Use Plans, Policies, and Regulations

Policy/Regulation/Goals	Conformance
Riverside County General Plan	
Policy AQ 2.1. The County land use planning efforts shall assure that sensitive receptors are separated and protected from polluting point sources to the greatest extent possible.	Conforms: The distance of the Project from sensitive receptors, and the resulting impacts, are evaluated in Sections 4.2, 4.9, and 4.12. No impacts were identified.
Policy AQ 2.2. Require site plan designs to protect people and land uses sensitive to air pollution through the use of barriers and/or distance from emissions sources when possible.	Conforms: The distance of the Project from sensitive receptors, and the resulting impacts, are evaluated in Sections 4.2, 4.9, and 4.12. No impacts were identified.
Policy AQ 4.7. To the greatest extent possible, require every project to mitigate any of its anticipated emissions which exceed allowable emissions as established by the SCAQMD, MDAQMD, SOCAB [South Coast Air Basin], the Environmental Protection Agency and the California Air Resources Board.	Conforms: Section 4.2.2 discusses APMs to mitigate emissions. Additional measures are required, as discussed in Appendix G, Section U.2.
Policy AQ 4.10. Coordinate with the SCAQMD and MDAQMD to create a communications plan to alert those conducting grading operations in the County of first, second, and third stage smog alerts, and when wind speeds exceed 25 miles per hour. During these instances all grading operations should be suspended.	Conforms: Appendix G, Mitigation Measure AQ-1 requires that ground disturbing activities be suspended when wind speeds reach 25 miles per hour.

Table F-2. Conformance with Regional/Local Land Use Plans, Policies, and Regulations

Policy/Regulation/Goals	Conformance
Policy C 2.1. The following minimum target levels of service have been designated for the review of development proposals in the unincorporated areas of Riverside County with respect to transportation impacts on roadways designated in the Riverside County Circulation Plan (Figure-1) which are currently County maintained, or are intended to be accepted into the County maintained roadway system: LOS C shall apply to all development proposals in any area of the Riverside County not located within the boundaries of an Area Plan, as well those areas located within the following Area Plans: REMAP, Eastern Coachella Valley, Desert Center, Palo Verde Valley, and those non-Community Development areas of the Elsinore, Lake Mathews/Woodcrest, Mead Valley and Temescal Canyon Area Plans. LOS D shall apply to all development proposals located within any of the following Area Plans: Eastvale, Jurupa, Highgrove, Reche Canyon/Badlands, Lakeview/Nuevo, Sun City/Menifee Valley, Harvest Valley/Winchester, Southwest Area, The Pass, San Jacinto Valley, Western Coachella Valley and those Community Development Areas of the Elsinore, Lake Mathews/Woodcrest, Mead Valley and Temescal Canyon Area Plans. LOS E may be allowed by the Board of Supervisors within designated areas where transit- oriented development and walkable communities are proposed. Notwithstanding the forgoing minimum LOS targets, the Board of Supervisors may, on occasion by virtue of their discretionary powers, approve a project that fails to meet these LOS targets in order to balance congestion management considerations in relation to benefits, environmental impacts and costs, provided an Environmental Impact Report, or equivalent, has been completed to fully evaluate the impacts of such approval. Any such approval must incorporate all feasible mitigation measures, make specific findings to support the decision, and adopt a statement of overriding considerations.	Conforms: Section 4.17.3 shows that Project construction would result in operation of the intersection of SR-78 and 16th Avenue at a LOS F during peak PM hours. Even with implementation of APM TRA-1, the Project would result in LOS D, which would still not comply with the Riverside County General Plan target of LOS C along County-maintained roads and state highways. Mitigation Measure TRN-3 would require the Applicant to modify TRA-1 in order to ensure that the intersection operates at LOS C.
Policy C 2.2. Require that new development prepare a traffic impact analysis as warranted by the Riverside County Traffic Impact Analysis Preparation Guidelines or as approved by the Director of Transportation. Apply level of service targets to new development per the Riverside County Traffic Impact Analysis Preparation Guidelines to evaluate traffic impacts and identify appropriate mitigation measures for new development.	Conforms: The Applicant performed a Traffic Impact Analysis which identified impacts, and proposed mitigation to address impacts.

Table F-2. Conformance with Regional/Local Land Use Plans, Policies, and Regulations

Policy/Regulation/Goals	Conformance
Policy C 2.3. Traffic studies prepared for development entitlements (tracts, plot plans, public use permits, conditional use permits, etc.) shall identify project related traffic impacts and determine the "significance" of such impacts in compliance with CEQA and the Riverside County Congestion Management Program Requirements.	Conforms: The Applicant performed a Traffic Impact Analysis which identified impacts, and proposed mitigation to address impacts. The significance of the traffic impacts were evaluated in Section 4.17.3.
Policy C 20.6. Control dust and mitigate other environmental impacts during all stages of roadway construction.	Conforms: Appendix G, Mitigation Measure AQ-1 (*Dust Control Plan*) is required to control dust from the Project, including dust associated with road construction.
Policy C 20.15. Implement National Pollutant Discharge Elimination System Best Management Practices relating to construction of roadways to control runoff contamination from affecting the groundwater supply.	Conforms: As discussed in Section 4.20.3, the Project will conform to the California State Water Resource Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges (General Permit) for activities regarding runoff and erosion control, as well as applicable regional, county, and local requirements.
Policy C 25.2. Locate new and relocated utilities underground when possible. All remaining utilities shall be located or screened in a manner that minimizes their visibility by the public.	Conforms: In designing the Project, the Applicant has proposed locating all utilities underground, where feasible. As discussed Sections 2.3.4.5 and 2.3.4.6, the only above-ground utilities would be the internal distribution lines between the PVCSs and the On-Site Substation, and for the gen-tie.
Policy LU 1.8. As required by the Airport Land Use Law, submit certain proposed actions to the Riverside County Airport Land Use Commission for review. Such actions include proposed amendments to the general plan, area plans, or specific plans, as well as proposed revisions to the zoning ordinance and building codes.	Conforms: The Riverside County Airport Land Use Commission found the Project consistent with the Riverside County Airport Land Use Compatibility Plan.
Policy LU 5.1. Ensure that development does not exceed the ability to adequately provide supporting infrastructure and services, such as libraries, recreational facilities, educational and child day care centers (i.e. infant, toddlers, preschool and school age children), transportation systems, and fire/police/medical services.	Conforms: The Project would not create a permanent increase in population; therefore, existing infrastructure and services would be adequate.
Policy LU 9.2. Require that development protect environmental resources by compliance with the Multipurpose Open Space Element of the General Plan and Federal and state regulations such as CEQA, NEPA, the Clean Air Act, and the Clean Water Act.	Conforms: The Project would comply with NEPA and CEQA and all necessary compliance measures.
Policy LU 11.2. Ensure adequate separation between pollution producing activities and sensitive emission receptors, such as hospitals, residences, child care centers and schools.	Conforms: The distance of the Project from sensitive receptors, and the resulting impacts, are evaluated in Sections 4.2, 4.9, and 4.12. No impacts were identified.

Table F-2. Conformance with Regional/Local Land Use Plans, Policies, and Regulations

Policy/Regulation/Goals	Conformance
Policy LU 14.1. Preserve and protect outstanding scenic vistas and visual features for the enjoyment of the traveling public.	Conforms: The Project would be not be located in a designated scenic vista, and would be situated on lands that are adjacent to existing electrical facilities.
Policy LU 14.3. Ensure that the design and appearance of new landscaping, structures, equipment, signs or grading within Designated and Eligible State and County scenic highway corridors are compatible with the surrounding scenic setting or environment.	Conforms: Although the Project would be visible from an Eligible County Scenic Highway (I-10), the view would be compatible with the adjacent land uses, which include other solar facilities and transmission lines.
Policy LU 14.4. Maintain at least a 50-foot setback from the edge of the right-of-way for new development adjacent to Designated and Eligible State and County Scenic Highways.	Conforms: The Project would be not be located adjacent to a Designated and Eligible State and County Scenic Highway.
Policy LU 14.5. Require new or relocated electric or communication distribution lines, which would be visible from Designated and Eligible State and County Scenic Highways, to be placed underground.	Does not Conform: The Project proposes the use of above ground distribution lines within view of an Eligible Scenic Highway; however, they would be parallel to existing transmission and distribution lines.
Policy LU 15.9. Ensure that no structures or activities encroach upon or adversely affect the use of navigable airspace.	Conforms: As discussed in Section 4.9.3, the Project has obtained and ALUC review and approval, and the Project would be required to receive a “No Hazard to Air Navigation” determination from FAA.
Policy LU 17.2. Permit and encourage, in an environmentally and fiscally responsible manner, the development of renewable energy resources and related infrastructure, including but not limited to, the development of solar power plants in the County of Riverside.	Conforms: The Project would provide 450 MW of renewable solar energy.
Policy LU 29.6. Require that commercial projects abutting residential properties protect the residential use from the impacts of noise, light, fumes, odors, vehicular traffic, parking, and operational hazards.	Conforms: The Project would be not abut residential properties.
Policy LU 30.8. Require that industrial development be designed to consider their surroundings and visually enhance, not degrade, the character of the surrounding area.	Conforms: As discussed in Section 4.19.2, the Project was designed to minimize visual impacts.
Policy N 1.4. Determine if existing land uses will present noise compatibility issues with proposed projects by undertaking site surveys.	Conforms: As discussed in Section 4.12.1, the Applicant performed noise surveys in order to inform an analysis of noise impacts to existing land uses.
Policy N 1.5. Prevent and mitigate the adverse impacts of excessive noise exposure on the residents, employees, visitors, and noise-sensitive uses of Riverside County.	Conforms: As discussed in Section 4.12.2, the applicant has proposed APMs to address potential adverse noise impacts on residents.
Policy N 3.3. Ensure compatibility between industrial development and adjacent land uses. To achieve compatibility, industrial development projects may be required to include noise mitigation measures to avoid or minimize project impacts on adjacent uses.	Conforms: As discussed in Section 4.12.2, the applicant has proposed APMs to address potential adverse noise impacts on residents.

Table F-2. Conformance with Regional/Local Land Use Plans, Policies, and Regulations

Policy/Regulation/Goals	Conformance
Policy N 7.4. Check each development proposal to determine if it is located within an airport noise impact area as depicted in the applicable Area Plan's Policy Area section regarding Airport Influence Areas. Development proposals within a noise impact area shall comply with applicable airport land use noise compatibility criteria.	Conforms: A review of Map BL-3 of the RCALUCP shows that the airport noise compatibility contours do not extend south of I-10, so the Project is not located within the noise impact area.
Policy N 12.1. Minimize the impacts of construction noise on adjacent uses within acceptable practices.	Conforms: As discussed in Section 4.12.2, the applicant has proposed APMs to address potential adverse construction noise impacts on residents.
Policy N 12.2. Ensure that construction activities are regulated to establish hours of operation in order to prevent and/or mitigate the generation of excessive or adverse noise impacts on surrounding areas.	Conforms: As discussed in Section 2.3.4.7, the Applicant proposes to perform construction 7:00 a.m. to 5:00 p.m., except when necessary for safety reasons, such as making final electrical terminations after dark when no energy is being produced. In addition, Section 4.12.3.1 discusses that generators may be required to provide lighting and HVAC for offices and security personnel through nighttime hours. Noise modeling shows that no ambient noise changes over 10 dBA are expected at any of the three nearest noise sensitive receptors under any of the modeled meteorological conditions.
OS 19.3 - Review proposed development for the possibility of cultural resources and for compliance with the cultural resources program.	Conforms: Section 3.5.1 describes the cultural resources present in the APE, and Section 4.5.3 analyzes the potential for Project-related impacts.
OS 19.5 - Exercise sensitivity and respect for human remains form both prehistoric and historic time periods and comply with all applicable laws concerning such remains.	Conforms: Appendix D, Section D.5 describes the applicability of the Native American Graves Protection and Repatriation Act, and Appendix G, Mitigation Measure CULTURAL-3 specifies requirements should remains be encountered.
OS 19.6. Whenever existing information indicated that a site proposed for development has high paleontological sensitivity as shown on Figure OS-7, a paleontological resource impact mitigation program (PRIMP) shall be filed with the County Geologist. The PRIMP shall specify the steps to be taken to mitigate impacts to paleontological resources.	Conforms: APMs Paleo-1 and Paleo-2, in Section 4.13.2, specify the requirements for a PRIMP.
OS 19.7. Whenever existing information indicates that a site proposed for development has low paleontological sensitivity as shown in Figure OS-7, no direct mitigation is required unless a fossil is encountered during site development. Should a fossil be encountered, the County Geologist shall be notified and a paleontologist shall document the extent and potential significance of the paleontological resources on the site and establish appropriate mitigation measures for further site development.	Conforms: Applicant- APMs Paleo-1 and Paleo-2, in Section 4.13.2, specify the requirements for documenting the extent and potential significance should any fossils be encountered, including mitigation.

Table F-2. Conformance with Regional/Local Land Use Plans, Policies, and Regulations

Policy/Regulation/Goals	Conformance
OS 19.8. Whenever existing information indicates that a site proposed for development has undetermined paleontological sensitivity as shown on Figure OS-7, a report shall be filed with the County Geologist documenting the extent and potential significance of the paleontological resources on site and identifying mitigation measures for the fossil and for impacts to significant paleontological resources.	Conforms: APMs Paleo-1 and Paleo-2, in Section 4.13.2, specify the requirements for documenting the extent and potential significance should any fossils be encountered, including mitigation.
Policy OS 21.1. Identify and conserve the skylines, view corridors, and outstanding scenic vistas within Riverside County.	Conforms: The Project would be not be located in a designated scenic vista, and would be situated on lands that are adjacent to existing electrical facilities.
Policy OS 22.1. Design developments within designated scenic highway corridors to balance the objectives of maintaining scenic resources with accommodating compatible land uses.	Conforms: Although the Project would be visible from an Eligible County Scenic Highway (I-10), the view would be compatible with the adjacent land uses, which include other solar facilities and transmission lines.
Policy OS 22.4. Impose conditions on development within scenic highway corridors requiring dedication of scenic easements consistent with the Scenic Highways Plan, when it is necessary to preserve unique or special visual features.	Conforms: Although the Project would be visible from an Eligible County Scenic Highway (I-10), the view would be compatible with the adjacent land uses, which include other solar facilities and transmission lines.
Policy S 1.1. Mitigate hazard impacts through adoption and strict enforcement of current building codes, which will be amended as necessary when local deficiencies are identified.	Conforms: Appendix D, Section D.7 specifies the International Building Code and California Building Code requirements for the Project.
Policy S 5.1. Develop and enforce construction and design standards that ensure that proposed development incorporates fire prevention features.	Conforms: Section 2.3.7.3 describes elements of the Project proposed to address fire prevention, and Appendix D, Section D.21 describes the International Fire Code, California Fire Code, and Riverside County Fire Department requirements for the Project.
Policy S 7.3. Require commercial businesses, utilities, and industrial facilities that handle hazardous materials to: Install automatic fire and hazardous materials detection, reporting and shut -off devices; and Install an alternative communication system in the event power is out or telephone service is saturated following an earthquake.	Conforms: Section 2.3.3.6 describes the redundancy that would be incorporated into the communication system.
Palo Verde Valley Area Plan	

Table F-2. Conformance with Regional/Local Land Use Plans, Policies, and Regulations

Policy/Regulation/Goals	Conformance
Policy PVVAP 7.2. Maintain Riverside County's roadway Level of Service standards as described in the Level of Service section of the General Plan Circulation Element.	Does not conform: Section 4.17.3 shows that Project construction would result in operation of the intersection of SR-78 and 16th Avenue at a LOS F during peak PM hours. Even with implementation of APM TRA-1, the Project would result in LOS D, which would still not comply with the Riverside County General Plan target of LOS C along County-maintained roads and state highways.
PVVAP 10.1. Protect the scenic highways in the Palo Verde Valley planning area from change that would diminish the aesthetic value of adjacent properties in accordance with the Scenic Corridors sections of the General Plan Land Use, Multipurpose Open Space, and Circulation Elements.	Conforms: Although the Project would be visible from an Eligible County Scenic Highway (I-10), the view would be compatible with the adjacent land uses, which include other solar facilities and transmission lines.
PVVAP 15.1. Protect life and property from seismic related incidents through adherence to the Seismic Hazards section of the General Plan Safety Element.	Conforms: Section 4.7.3 evaluates potential impacts associated with seismic events. No threats to life or property were identified.
Riverside County Zoning Ordinance (Ordinance 348)	
Section 15.1.d. (32) Uses Permitted in W-2 Zone (Controlled Development Areas) - This zone permits a solar power plant on lot 10 acres or larger upon issuance of a CUP.	Conforms: With approval of a CUP, the Project would be an allowable use under this zone.
Riverside County Airport Land Use Compatibility Plan	
Policy 3.1.4. Nonresidential Development: The compatibility of nonresidential development shall be assessed primarily with respect to its usage intensity (the number of people per acre) and the noise-sensitivity of the use.	Conforms: Table 3.9-1 specifies the compatibility criteria for the Project, due to its location within Zone E. Zone E imposes no limits on usage intensity or noise sensitivity.
Policy 3.1.6. Other Development Conditions: All types of proposed development shall be required to meet the additional conditions listed in Table 2A for the respective compatibility zone where the development is to be located.	Conforms: Table 3.9-1 specifies the compatibility criteria for the Project, due to its location within Zone E. Zone E imposes no limits related to easement, deed notice, real estate disclosure, or noise level. With respect to airspace review, the Project has obtained and ALUC review and approval, and would be required to receive a "No Hazard to Air Navigation" determination from FAA.
Policy 4.1.1. Policy Objective: The purpose of noise compatibility policies is to avoid establishment of noise-sensitive land uses in the portions of airport environs that are exposed to significant levels of aircraft noise.	Conforms: Table 3.9-1 specifies the compatibility criteria for the Project, due to its location within Zone E. Zone E imposes no limits on noise sensitivity.

Table F-2. Conformance with Regional/Local Land Use Plans, Policies, and Regulations

Policy/Regulation/Goals	Conformance
Policy 4.1.5. Noise Exposure for Other Land Uses: Noise level compatibility standards for other types of land uses shall be applied in the same manner as the above residential noise level criteria. The extent of outdoor activity associated with a particular land use is an important factor to be considered in evaluating its compatibility with airport noise. Examples of acceptable noise levels for other land uses in an airport's vicinity are presented in Table 2B.	Conforms: Table 3.9-1 specifies the compatibility criteria for the Project, due to its location within Zone E. Zone E imposes no limits on noise sensitivity.
Policy 4.1.6. Interior Noise Levels: Land uses for which interior activities may be easily disrupted by noise shall be required to comply with specified interior noise level criteria.	Conforms: The Project does not include interior activities which may be disrupted by noise. Also, Table 3.9-1 specifies the compatibility criteria for the Project, due to its location within Zone E. Zone E imposes no limits on noise sensitivity.
Policy 4.3.7. New land uses that may cause visual, electronic, or increased bird strike hazards to aircraft in flight shall not be permitted within any airport's influence area.	Conforms: As discussed in Section 4.9.3, the ALUC performed a review of consistency with the RCALUCP, including electrical interference, lighting, glare, impaired visibility, and actions that have the potential to cause attraction of birds. The ALUC found the Project to be consistent with the RCALUCP.

APPENDIX G

MITIGATION MEASURES

APPENDIX G - MITIGATION MEASURES

G.1 INTRODUCTION

The impact analyses are based on the Applicant's description of their proposed Project, and that description includes, for some resources, Applicant-Proposed Measures (APMs). The impact analyses assume that APMs are to be implemented, and these measures are therefore requirements for approval of the Project.

For impacts identified in the following resource sections, measures have been developed to avoid or reduce potential environmental effects that would be implemented during all appropriate phases of the Project from initial ground breaking and construction, to operation and maintenance, and through closure and decommissioning. The measures include a combination of the following:

1. APMs, as specified in the Applicant's POD, management plans, and technical reports;
2. Regulatory requirements of other Federal, state, and local agencies;
3. USFWS terms and conditions identified in the BO; and
4. Additional BLM-proposed mitigation measures, ROW grant terms and conditions, and best management practices (BMPs).

These requirements generically are referred to as "mitigation measures" throughout this Draft PA/EIS/EIR. Because these mitigation measures are derived from a variety of sources, they also are required, and their implementation regulated, by the various agencies. The Applicant would prepare an Environmental Inspection and Compliance Monitoring Program and Plan (EICMPP)/Mitigation Monitoring, Reporting, and Compliance Program (MMRCP) ensuring the effective implementation of the mitigation measures identified to address Project impacts. All management and control plans that are to be developed under any APM or mitigation measure must be developed and approved by the applicable agency(ies) prior to issuance of a County grading permit. The timing, responsible agency, and methods for verification of each measure are provided in Table G-22-1.

Many of the other mitigation measures are required by agencies other than the BLM and their implementation would be enforced by those other agencies against the Applicant. For instance, USFWS's FESA §7 Reasonable and Prudent Measures will be included in the ROD, and the NHPA §106 Memorandum of Agreement (MOA), will include a number of obligations enforceable by signatories, including SHPO and ACHP, that also will be included in the ROD. The Applicant would be required by the ROD and the ROW grant to comply with the requirements of those other agencies (see, e.g., 43 CFR §2805.12(a) [Federal and state laws and regulations]; §2805.12(i)(6) [more stringent state standards for public health and safety, environmental protection and siting, constructing, operating, and maintaining any facilities and improvements on the ROW]). Any non-compliance with implementation of these other Federal or state requirements may impact the approval status of the ROD and ROW grant. In addition, the CUP and PUP to be issued by the County will require compliance with mitigation measures required by state or local laws. Any non-compliance with these requirements could likewise impact the status of state and local approvals.

G.2 AIR RESOURCES

The following Project-specific mitigation measures were developed to reduce and/or avoid potential air quality impacts associated with the Project and alternatives.

AQ-1: Dust Control Plan. The Applicant shall develop and implement their Dust Control Plan that describes the fugitive dust control measures that would be implemented and monitored at all locations of proposed facility construction. The plan shall be submitted to MDAQMD no less than 60 days prior to the start of construction. The plan shall be developed in conjunction with soil scientists engaged by the BLM, shall be designated as a Dust Control and Soil Stabilization Plan, and shall incorporate methods for soil stabilization. This plan shall comply with the mitigation measures described in the Fugitive Dust Control Rules enforced by Mojave Desert Air Quality Management District (MDAQMD) (Rule 403.2), as well as the existing State Implementation Plan (SIP) available for PM_{10} and $PM_{2.5}$, and the BLM Fugitive Dust/PM_{10} Emissions Control Strategy for the Mojave Desert Planning Area. The plan shall be incorporated into all contracts and contract specifications for construction work. The plan shall outline the steps to be taken to minimize fugitive dust generated by construction activities by:

- Describing each active operation that may result in the generation of fugitive dust;
- Identifying all sources of fugitive dust, e.g., earth moving, storage piles, vehicular traffic;
- Describing the control measures to be applied to each of the sources identified. The descriptions shall be sufficiently detailed to demonstrate that the best available control measures required by the MDAQMD for linear projects are used; and
- Providing the following control measures, in addition to or as listed in the applicable rules but not limited to:
    - Frequent watering or stabilization of excavation, spoils, access roads, storage piles, and other sources of fugitive dust (parking areas, staging areas, other) if construction activity causes persistent visible emissions of fugitive dust beyond the work area;
    - Use of street sweeping and trackout devices at the construction site. Sweep streets daily (with water sweepers) if visible soil material is carried into adjacent public streets;
    - Apply BLM-approved soil stabilizers or apply water to form and maintain a crust on inactive construction areas (disturbed lands that are unused for four consecutive days);
    - Suspend ground disturbing activities when winds exceed 25 miles per hour and stabilize stockpiles (e.g., by watering or covering);
    - Pre-watering of soils prior to clearing and trenching;
    - Cover stockpiled soils with sturdy durable tarps when soils are not in immediate use;
    - Pre-moisten, as necessary to control dust or cover prior to transport, import and export dirt, sand, or loose materials;
    - Installing temporary coverings or applying soil stabilizers on storage piles when not in use. Cover loads in haul trucks or maintain at least six inches of free-board when traveling on public roads;

- Dedicating water truck or high/capacity hose to any soil screening operations;
- Minimizing drop height of material through screening equipment;
- Reducing the amount of disturbed area where possible;
- Planting vegetative ground cover as soon as possible following construction activities, in areas where such re-vegetation is planned, or stabilize as necessary until revegetation is initiated; and
- Stabilizing disturbed soil surfaces left undeveloped for solar energy capture (e.g., temporary disturbance sites and other exposed soils onsite prone to saltation and aerosolization after construction concludes).

The Applicant or its designated representative shall obtain prior approval from the MDAQMD prior to any deviations from fugitive dust control measures specified in the Dust Control Plan.

The provisions of the Dust Control Plan shall also apply to Project decommissioning activities.

The Dust Control Plan shall be prepared and submitted to the BLM and County for approval prior to the start of ground disturbance and issuance of a County grading permit.

AQ-2: Protect the Stability of Desert Pavement Areas. The Applicant shall in general avoid disturbing desert pavement surfaces during construction. Where the BLM agrees that disturbance of the pavement is unavoidable, the Applicant shall ensure that all areas where desert pavement has been temporarily disturbed during construction of the Project shall be applied with a BLM-approved soil stabilizer where appropriate for stabilization based on soil characteristics prior to Project operation. The Applicant shall develop, for review and approval by the BLM, a plan that outlines the frequency of non-toxic soil stabilizer applications based on the specifications of the selected soil stabilizer. The Plan shall be developed in coordination with scientists engaged by the BLM to find the most efficient methods for stabilizing soil surfaces using diverse methods in addition to chemical stabilizers: e.g., development of soil biotic crusts, revegetation, construction of small netted fences, and other methods. The Plan shall be submitted to the BLM and County for approval prior to the start of ground disturbance and issuance of a County grading permit.

AQ-3: Construction Emissions Reduction. The Applicant shall implement the following measures to reduce emissions during construction:

- Off-road diesel-powered construction equipment fleets used on the project shall be composed in compliance with California Air Resources Board (CARB) In-Use Off-Road Vehicle Regulation rules. In addition, all retrofitted construction equipment shall be outfitted with Best Available Control Technology devices certified by the CARB;
- As feasible, reduce emissions of particulate matter and other pollutants by using alternative clean fuel technology such as electric, hydrogen fuel cells, and propane-powered equipment or compressed natural gas-powered equipment with oxidation catalysts instead of gasoline- or diesel-powered engines;
- Ensure that all construction equipment is properly tuned and maintained and shut off when not in direct use, i.e., “idling” no more than five minutes;
- Prohibit engine tampering to increase horsepower;

- Minimize use, trips, and unnecessary idling of heavy equipment;
- Reduce construction-related trips of workers and equipment, including trucks; and
- Require in model year 2010 and following years that on-road vehicles should meet, or exceed, the US EPA exhaust emissions standards for heavy-duty on-highway compression-ignition engines.

The Applicant shall prepare and maintain documentation that demonstrates implementation of the proposed emission reduction measures and required mitigation measures. The following documents and/or files shall be submitted to the agencies involved in the environmental review and permitting process for the proposed facility:

- Inventory of all equipment used during each construction activity. At a minimum, this inventory shall include an equipment description, equipment identification, identification of type of engine(s), and engine emission data; and
- The CARB Diesel Off-Road On-line Reporting System (DOORS) for registration shall be used to certify conformance with CARB In-Use Off-Road Vehicle Regulation rules.

G.3 BIOLOGICAL RESOURCES – VEGETATION

The following measures shall be implemented to reduce or avoid impacts to vegetation alliances and special-status plant species from construction, operation and maintenance, and decommissioning of the Project. Of these measures, only measures VEG-9 and VEG-10 are specific to vegetation resources. The other measures (VEG-1 through VEG-8, VEG-11, and VEG-12) are general biological mitigation measures applicable to both vegetation and wildlife.

VEG-1: Qualifications of Designated Biologist(s). Prior to the start of ground disturbance and issuance of a County grading permit, the Applicant shall assign at least one Designated Biologist(s) to the Project. The Applicant shall submit the resume of the proposed Designated Biologist(s), with at least three references and contact information, to the BLM AO for confirmation that applicant meets the minimum qualifications.

The Designated Biologist(s) must meet the following minimum qualifications:

1. Bachelor's degree in biological sciences, zoology, botany, ecology, or a closely related field;
2. Three years of experience in field biology or current certification of a nationally recognized biological society, such as The Ecological Society of America or The Wildlife Society;
3. Have at least one year of field experience with biological resources found in or near the Project area;
4. Meet the current USFWS Authorized Biologist qualifications criteria (http://www.fws.gov/carlsbad/PalmSprings/DesertTortoise/DT_Auth_Bio_qualifications_statement_10-20-08.pdf), demonstrate familiarity with protocols and guidelines for the Mojave desert tortoise, and be approved by the USFWS;
5. Possess a CESA Memorandum of Understanding pursuant to §2081(a) for Mojave desert tortoise.

The resume shall demonstrate to the satisfaction of the BLM AO, in consultation with CDFW and USFWS, that the proposed Designated Biologist(s) and alternate has the appropriate training and background to effectively implement the mitigation measures.

VEG-2: Duties of the Designated Biologist(s). The Applicant shall ensure that the Designated Biologist(s) performs the activities described below during any site mobilization activities and construction-related ground disturbance such as grading, boring or trenching activities. The Designated Biologist(s) may be assisted by the approved Biological Monitor(s) but remains the contact for the Applicant and the BLM AO. The Designated Biologist(s) or approved Biological Monitor(s) Duties shall include the following:

1. Advise the Applicant’s construction and operation managers on the implementation of the biological resources mitigation measures;
2. Be available to supervise, conduct and coordinate mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as special-status species or their habitat;
3. Clearly mark sensitive biological resource areas and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;
4. Periodically inspect active construction areas where animals may have become trapped. Monitor the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (e.g., parking lots) for animals in harm’s way;
5. Notify the Applicant of any non-compliance with any biological resources mitigation measure;
6. Respond as established in the EICMPP to inquiries of the BLM AO regarding biological resource issues;
7. Maintain written records of the tasks specified above and those included in the BRMIMP. Summaries of these records shall be submitted in the Monthly Compliance Report and the Annual Compliance Report;
8. Train the Biological Monitors as appropriate, and ensure their familiarity with the BRMIMP, Worker Environmental Awareness Program (WEAP) training, and USFWS guidelines on Mojave desert tortoise surveys and handling procedures; and
9. Maintain the ability to be in regular communication with representatives of CDFW, USFWS, and the BLM AO, including notifying these agencies of dead or injured listed species and reporting special-status species observations to the California Natural Diversity Data Base and BLM.

VEG-3: Identification of Biological Monitors. Prior to the start of ground disturbance and issuance of a County grading permit, the Designated Biologist(s) shall submit the resume, at least three references, and contact information of the proposed Biological Monitors to the BLM AO. The resume shall demonstrate, to the satisfaction of the BLM AO, the appropriate education and experience to accomplish the assigned biological resource tasks. The Biological Monitor is the equivalent of the USFWS-approved biologist (also “Service-approved biologist”).

Biological Monitor(s) training by the Designated Biologist(s) shall include familiarity with the mitigation measures, BRMIMP, WEAP, and USFWS guidelines on Mojave desert tortoise surveys and handling procedures.

VEG-4: Duties of Biological Monitors. The Biological Monitors shall assist the Designated Biologist(s) in conducting surveys and in monitoring of site mobilization activities and construction-related ground disturbance grading, boring or trenching. The Monitors shall report issues of concern to the Designated Biologist(s), who shall remain the contact for the Applicant.

VEG-5: Authority of the Designated Biologist(s) and Biological Monitors. The Applicant's construction/operation manager shall act on the advice of the Designated Biologist(s) and Biological Monitor(s) to ensure conformance with the biological resources mitigation measures. The Designated Biologist(s) shall have the authority to immediately stop any activity and/or order any reasonable measure to avoid take of an individual of a listed species. The Designated Biologist(s) shall:

1. Require a halt to activities in any area when determined that there would be a potential take of an individual of a listed species if the activities continued; and
2. Inform the Applicant and the construction/operation manager when to resume activities.

If the Designated Biologist(s) is unavailable for direct consultation, the Biological Monitor shall act on behalf of the Designated Biologist(s).

VEG-6: Worker Environmental Awareness Program. Prior to the Notice to Proceed, the Applicant shall develop and implement a Project-specific Worker Environmental Awareness Program (WEAP) and shall secure approval for the WEAP from the AO. The WEAP shall be administered to all on-site personnel including surveyors, construction engineers, employees, contractors, contractor's employees, supervisors, inspectors, and subcontractors. The WEAP shall be implemented during site preconstruction, construction, operation, and decommissioning. The WEAP shall:

1. Be developed by or in consultation with the Designated Biologist(s) and consist of presentation in which supporting written material and electronic media, including photographs of protected species, is made available to all participants;
2. Discuss the locations and types of sensitive biological resources on the Project site and adjacent areas, and explain the reasons for protecting these resources; provide information to participants that no special-status plants or wildlife shall be harmed, disturbed, or harassed;
3. Place special emphasis on Mojave desert tortoise, including information on physical characteristics, distribution, behavior, ecology, sensitivity to human activities, legal protection, penalties for violations, reporting requirements, and protection measures;
4. Include a discussion of fire prevention measures to be implemented by workers during Project activities; require workers dispose of cigarettes and cigars appropriately and not leave them on the ground or buried;
5. Describe the temporary and permanent habitat protection measures to be implemented at the Project site;

6. Review project guidelines regarding non-compliance issues and the consequences for non-compliance, including legal protections for resources and penalties for violation of Federal and state laws;
7. Describe reporting requirements for protected resources, including requirements for notifying the designated biologist;
8. Identify whom to contact if there are further comments and questions about the material discussed in the program; and
9. Include a training acknowledgment form to be signed by each worker indicating that they received training and shall abide by the guidelines.

The training shall be bilingual, and must be completed by all personnel prior to starting work on the project. The specific program can be administered by a competent individual(s). The WEAP shall be submitted to the BLM and County for approval prior to the start of ground disturbance and issuance of a County grading permit.

VEG-7: Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP). Prior to the start of ground disturbance and issuance of a County grading permit, the Applicant shall develop a BRMIMP, and shall submit copies of the proposed BRMIMP to the BLM AO and the County for review and approval. The Applicant shall implement the measures identified in the approved BRMIMP. The BRMIMP shall incorporate avoidance and minimization measures described in final versions of the Integrated Weed Management Plan (APM BIO-5), the Vegetation Resources Management Plan (APM BIO-4), the Desert Tortoise Translocation Plan (Mitigation Measure WIL-2), the Raven Monitoring and Control Plan (Mitigation Measure WIL-5), the Bird and Bat Conservation Strategy (Mitigation Measure WIL-6), the Burrowing Owl Protection and Mitigation Measures Plan (Mitigation Measure WIL-9), and all other biological mitigation and/or monitoring plans associated with the Project.

The BRMIMP shall include accurate and up-to-date maps depicting the location of sensitive biological resources that require temporary or permanent protection during construction, operation, and decommissioning. The BRMIMP shall include complete and detailed descriptions of the following:

1. Biological resources mitigation, including habitat restoration and soil stabilization, monitoring, and compliance measures proposed by the Applicant;
2. Biological resources mitigation measures identified by BLM and the County as necessary to avoid or mitigate impacts;
3. Biological resource mitigation, monitoring and compliance measures required in Federal agency terms and conditions, such as those provided in the USFWS Biological Opinion;
4. Sensitive biological resources to be impacted, avoided, or mitigated by Project construction, operation, and closure (see Tables 3.3-1, 3.3-3, and 3.4-1);
5. Required mitigation measures for each sensitive biological resource;
6. Measures that shall be taken to mitigate temporary disturbances from construction activities;
7. Duration for each type of monitoring and a description of monitoring methodologies and frequency;

8. Performance standards to be used to help decide if/when proposed mitigation is or is not successful;
9. Performance standards and remedial measures to be implemented if performance standards are not met;
10. Biological resources-related facility closure measures including a description of funding mechanism(s);
11. A process for proposing plan modifications to the BLM AO and appropriate agencies for review and approval; and
12. A requirement to submit any sightings of any special-status species that are observed on or in proximity to the Project site, or during Project surveys, to the BLM and to the CNDDB per CDFW requirements.

VEG-8: Avoidance of Biological Resources During Construction. The Applicant shall undertake the following measures to manage the construction site and related facilities in a manner to avoid or minimize impacts to biological resources:

1. Limit Area of Disturbance. The boundaries of all areas to be disturbed (including Project facilities, gen-tie structure locations, staging areas, access roads, sites for temporary placement of spoils) shall be delineated with stakes and flagging, and temporary construction fencing, prior to construction activities in consultation with the Designated Biologist(s).
2. Stockpiles. In areas where soil removal is required, soils removed up to 6” in depth, shall be removed and windrowed separately from spoils, to a depth not to exceed 24”. Spoils and topsoil shall be stockpiled separately in disturbed areas (or areas to be disturbed, either lacking or with minimal native vegetation). Windrowed topsoil shall be planted with container stock or seeded, with BLM approved genetically and ecologically appropriate native plant materials suitable for the site, within 30 days of initial disturbance in order to maintain biological soil viability. If stockpiles are to be maintained longer than 30 days, the Applicant shall establish native plants in the windrowed topsoil.
3. Parking and Staging. When possible, parking areas, staging and disposal site locations shall similarly be located in areas without native vegetation or special-status species habitat. All disturbances, Project vehicles and equipment shall be confined to the flagged and fenced areas.
4. Minimize Road Impacts. New and existing roads that are planned for construction, widening, or other improvements shall not extend beyond the flagged impact area as described above. All vehicles passing or turning around would do so within the planned impact area or in previously disturbed areas. Where new access is required outside of existing roads or the construction zone, the route shall be clearly marked (i.e., flagged and/or staked) prior to the onset of construction.
5. Minimize Traffic Impacts. Vehicular traffic during Project construction and operation shall be confined to existing routes of travel to and from the Project site, and cross country vehicle and equipment use outside designated work areas shall be prohibited.

6. Monitor During Construction. In areas that have not been fenced with Mojave desert tortoise exclusion fencing and cleared, a Designated Biologist or Biological Monitor shall be present at the construction site during all Project activities that have potential to disturb soil, vegetation, and wildlife. The Designated Biologist or Biological Monitor shall walk immediately ahead of equipment during brushing and grading activities.
7. Minimize Impacts of Transmission/Pipeline Alignments, Roads, Staging Areas. Staging areas for construction on the plant site shall be within the area that has been fenced with Mojave desert tortoise exclusion fencing and cleared. For construction activities outside of the plant site (transmission line, pipeline alignments) access roads, pulling sites, and storage and parking areas shall be designed, installed, and maintained with the goal of minimizing impacts to native plant alliances and sensitive biological resources. Transmission lines and all electrical components shall be designed, installed, and maintained in accordance with the Avian Power Line Interaction Committee's (APLIC's) Suggested Practices for Avian Protection on Power Lines (APLIC 2006) and Mitigating Bird Collisions with Power Lines (APLIC 1994) to reduce the likelihood of large bird electrocutions and collisions.
8. Avoid Use of Toxic Substances. Soil bonding (dust suppression) and weighting agents used on unpaved surfaces shall be non-toxic to wildlife and plants.
9. Minimize Lighting Impacts. Facility lighting shall be designed, installed, and maintained to prevent side casting of light towards wildlife habitat.
10. Monitor Active Nests: The monitoring shall be conducted in accordance with Nesting Bird Monitoring and Management Plan approved by the BLM AO. The Plan shall include management measures to prevent disturbance to all nesting birds from construction related activities. Triggers for management shall be evidence of Project-related disturbance to nesting birds such as: agitation behavior (displacement, avoidance, and defense); increased vigilance behavior at nest sites; changes in foraging and feeding behavior, or nest site abandonment. The Bird Monitoring and Management Plan shall include a description of management actions, which shall include, but not be limited to, limiting construction activities in an appropriate sized no-disturbance buffer that are deemed by the biologist to be the source of disturbance to the nesting bird.
11. Avoid Vehicle Impacts to Mojave desert tortoise. Parking and storage shall occur within the area enclosed by Mojave desert tortoise exclusion fencing to the extent feasible. No vehicles or construction equipment parked outside the fenced area shall be moved prior to an inspection of the ground beneath the vehicle for the presence of Mojave desert tortoise. If a Mojave desert tortoise is observed, it would be left to move on its own. If it does not move within 15 minutes, a Designated Biologist or Biological Monitor under the Designated Biologist's direct supervision may remove and relocate the animal to a safe location if temperatures are within the range described in the USFWS 2009 Desert Tortoise Field Manual.
12. Avoid Wildlife Pitfalls:
    a. Backfill Trenches. At the end of each work day, ensure that all potential wildlife pitfalls (trenches, bores, and other excavations) outside the area fenced with Mojave desert tortoise exclusion fencing have been backfilled. If backfilling is not feasible,

all trenches, bores, and other excavations shall be sloped at a 3:1 ratio at the ends to provide wildlife escape ramps, or covered completely to prevent wildlife access, or fully enclosed with Mojave desert tortoise -exclusion fencing. All trenches, bores, and other excavations outside the areas fenced with Mojave desert tortoise exclusion fencing shall be inspected periodically throughout the day, at the end of each workday and at the beginning of each workday by the Designated Biologist or a Biological Monitor. Should a tortoise or other wildlife become trapped, the Designated Biologist or Biological Monitor shall remove and relocate the individual as described in the Desert Tortoise Translocation Plan. Any wildlife encountered during the course of construction shall be allowed to leave the construction area unharmed.

b. Avoid Entrapment of Mojave desert tortoise. Any construction pipe, culvert, or similar structure with a diameter greater than 3 inches, stored less than 8 inches aboveground and within Mojave desert tortoise habitat (i.e., outside the fenced area) for one or more nights, shall be inspected for tortoises before the material is moved, buried or capped. As an alternative, all such structures may be capped before being stored outside the fenced area, or placed on pipe racks. These materials would not need to be inspected or capped if they are stored within the fenced area after the clearance surveys have been completed.

13. Minimize Standing Water. Water applied to dirt roads and construction areas (trenches or spoil piles) for dust abatement shall use the minimal amount needed to meet safety and air quality standards and to prevent the formation of puddles, which could attract Mojave desert tortoises and common ravens to construction sites. The Biological Monitor shall patrol these areas to ensure that water does not puddle and shall take appropriate action (e.g., coordinating with the contractor to reduce watering frequency) to reduce water application where necessary. The Biological Monitor shall take appropriate action (e.g., coordinating with the contractor to reduce watering frequency) to reduce water application where standing water occurs.

14. Dispose of Road-killed Animals. Road-killed animals or other carcasses detected on roads within the Project area or access road shall be immediately reported to the Designated Biologist and picked up immediately. The contractor and Designated Biologist shall be responsible for securing any appropriate Federal or state permits to handle and dispose of collected animals, including handling and disposal for scientific use. For special-status species roadkill, the Biological Monitor shall contact CDFW and USFWS within 1 working day of receipt of the carcass for guidance on disposal or storage of the carcass. The Biological Monitor shall maintain and report protected species records as described in Mitigation Measure WIL-3 (Project Notification and Reporting).

15. Minimize Spills of Hazardous Materials. All vehicles and equipment shall be maintained in proper working condition to minimize the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. The site environmental compliance lead shall be informed of any hazardous spills immediately as directed in the Project Hazardous Materials Plan. Hazardous spills shall be immediately cleaned up and the contaminated soil properly disposed of at a licensed facility. Servicing of construction equipment shall take place only at a designated area. Service/maintenance vehicles shall carry a bucket and pads to absorb leaks or spills.

16. Worker Guidelines. During construction all trash and food-related waste shall be placed in wildlife-proof containers and removed weekly from the site. Workers shall not feed wildlife or bring pets to the Project site. Except for law enforcement personnel, no workers or visitors to the site shall bring firearms or weapons. Vehicular traffic shall be confined to existing routes of travel to and from the Project site, and cross country vehicle and equipment use outside designated work areas shall be prohibited. The speed limit when traveling on dirt access routes within areas not cleared by protocol level surveys where Mojave desert tortoise may be impacted shall not exceed 15 miles per hour.

17. Implement Erosion Control Measures. Standard erosion control measures shall be implemented for all phases of construction and operation where sediment run-off from exposed slopes threatens to enter “Waters of the State”. Sediment and other flow-restricting materials shall be moved to a location where they shall not be washed back into the stream. All disturbed soils and roads within the Project site shall be stabilized to reduce erosion potential, both during and following construction. Areas of disturbed soils (access and staging areas) with slopes toward a drainage shall be stabilized to reduce erosion potential.

18. Monitor Ground Disturbing Activities Prior to Pre-Construction Site Mobilization. If pre-construction site mobilization requires ground-disturbing activities such as for geotechnical borings or hazardous waste evaluations, a Designated Biologist or Biological Monitor shall be present to monitor any actions that could disturb soil, vegetation, or wildlife.

19. Revegetation of Temporarily Disturbed Areas. Disturbed sites shall be restored using methods approved by BLM vegetation restoration ecologists. Restoration design shall incorporate a replicated experimental design to test methods for improved and accelerated restoration of native vegetation, desert habitat, and ecosystem processes disturbed in the course of Project construction. Only BLM approved genetically and ecologically appropriate native plant materials suitable for the site shall be used for restoration.

    Desert soil and vegetation ecologists designated by the BLM shall collaborate with the Applicant to prepare and implement a Revegetation Plan that restores all areas subject to temporary disturbance to pre-Project grade and conditions. This plan shall be submitted to the BLM for approval, and must be approved by the BLM prior to initiation of disturbance. In review of the plan, BLM will consider the ability of the proposed activities to support BLM’s Long Term Monitoring Strategy for the Riverside East SEZ (BLM 2016), and BLM ecologists shall design experimental treatments that refine or introduce restoration treatments so that knowledge about the practice of accelerating soil stabilization and vegetation restoration increases and methods become more efficient. Temporarily disturbed areas within the Project area include, but are not limited to: all proposed locations for linear facilities, temporary access roads, berms, areas surrounding the drainage diffusers, construction work temporary lay-down areas not converted to part of the solar field, and construction equipment staging areas. The Applicant shall be responsible for preparing an accurate map of temporarily disturbed areas so that the soil and restoration ecologists will be able to begin restoring temporary disturbance areas once the operational phase of the solar facility begins.

The Revegetation Plan shall include a description of any required topsoil salvage, plant salvage, seeding techniques, inoculation of microbial organisms for plant mycorrhizae and for biotic soil crust formation, methods to stabilize and shape soil surface to reduce soil erosivity, and techniques to increase soil fertility and water holding capacity.

Restoration, including seeding of temporarily disturbed areas shall be implemented within 30 days following completion of construction. If seeding is used for reclamation, the seed shall contain no prohibited or restricted noxious weed seeds and shall be certified weed free. Seed may contain no more than 2.0 percent of “other crop” seed by weight, unless inclusion of sterile cereal grain seeds are specifically approved by the BLM as decoy seeding. Seed tags shall be submitted to the BLM at least 14 days before the date of proposed seeding for acceptance. Seed that does not meet the above criteria shall not be applied to public lands. Only native plant species which would naturally occur within the disturbed habitats shall be used for revegetation. Seed/container stock sources for revegetation shall be from within appropriate provisional or empirical seed transfer zones.

A monitoring and reporting protocol shall be a requisite part of the Plan, and the following performance standards shall be met by the end of monitoring year 2:

a. at least 80 percent of the species observed within the temporarily disturbed areas shall be native species that naturally occur in desert scrub habitats; and

b. relative cover and density of plant species within the temporarily disturbed areas shall be equal to or greater than 60 percent of native background density.

If these standards are not met, remedial revegetation measures shall be prepared and submitted to the BLM for approval prior to implementation.

VEG-9: Special-Status Plant Species Impact Avoidance and Minimization, and Compensation. Prior to the start of ground disturbance and issuance of a County grading permit, the Applicant shall prepare and implement a VRMP that meets the approval of BLM AO and Riverside County. The Plan shall ensure adequate special-status plant surveys and reporting, avoidance of and mitigation for impacts to special-status plants, and funding or support of a compensatory mitigation program for state or Federally listed species through land acquisition, restoration/enhancement, or a combination of acquisition and restoration/ enhancement.

The Applicant shall implement measures VEG-1 through VEG-8 to avoid, minimize, and compensate for impacts to special status plant species, and shall implement APM BIO-4, including its requirements for salvage of plants meeting the criteria described in the VRMP prior to disturbance, using BLM-approved protocols. In this discussion the term “Project Disturbance Area” encompasses all areas to be temporarily and permanently disturbed by the Project, including the plant site, linear facilities, and areas disturbed by temporary access roads, fence installation, construction work lay-down and staging areas, parking, storage, or by any other activities resulting in disturbance to soil or vegetation.

An experienced botanist knowledgeable in the complex biology of the local flora and consistent with CDFW (2009) and BLM guidelines for surveyor qualifications shall be identified as the Designated Botanist. The name(s) and qualifications of the Designated Botanist(s) shall be submitted to BLM for review and approval.

The Designated Botanist shall oversee compliance with all special status plant avoidance, minimization, and compensation measures described in this condition throughout construction and closure. The Designated Botanist shall oversee and train all other Biological Monitors tasked with conducting botanical survey and monitoring work. All personnel conducting special status plant inventories must have strong backgrounds in plant taxonomy and plant ecology and field sampling design and methods, knowledge of the floras of the inventory area including the special status plant species, and familiarity with natural communities of the area. During operation of the Project, the Designated Botanist shall be responsible for protecting special status plant occurrences within 100 feet of the project boundaries.

A) Special-Status Plant Impact Avoidance and Minimization Measures

Here are the Best Management Practices and other measures designed to avoid accidental impacts to plants occurring outside of the Project Disturbance Area and within 100 feet of the Project Disturbance Area during construction, operation, and decommissioning. The Applicant shall incorporate all measures for protecting special-status plants in close proximity to the site into the BRMIMP (Mitigation Measure VEG-7). These measures shall include the following elements:

a) Site Design Modifications: Incorporate site design modifications to minimize impacts to special-status plants along the Project linears: limiting the width of the work area; adjusting the location of staging areas, lay downs, spur roads and poles or towers; driving and crushing vegetation as an alternative to blading temporary roads to preserve the seed bank, and minor adjustments to the alignment of the roads and pipelines within the constraints of the ROW. These modifications shall be clearly depicted on the grading and construction plans, and on report-sized maps in the BRMIMP.

b) Delineate Environmentally Sensitive Areas (ESAs). Prior to the start of any ground- or vegetation-disturbing activities, a qualified Project biologist shall establish ESAs to protect avoided special-status plants that occur outside of, but within 100 feet of, the Project Disturbance Areas. The locations of ESAs shall be clearly depicted on construction drawings, which shall also include all avoidance and minimization measures on the margins of the construction plans. The boundaries of the ESAs shall be placed a minimum of 20 feet from the occurrence. Where this is not possible due to construction constraints, other protection measures, such as silt-fencing and sediment controls, may be employed to protect the occurrences. Equipment and vehicle maintenance areas, and wash areas, shall be located 100 feet from the upgradient side of any ESAs. ESAs shall be clearly delineated in the field with temporary construction fencing and signs prohibiting movement of the fencing or sediment controls under penalty of work stoppages and additional compensatory mitigation. ESAs shall also be clearly identified (with signage or by mapping on site plans) to ensure that avoided plants are not inadvertently harmed during construction, operation, or closure.

c) Special-Status Plant Worker Environmental Awareness Program (WEAP). The WEAP (Mitigation Measure VEG-6) shall include training components specific to protection of special-status plants that may occur in the Project Area.

d) Herbicide and Soil Stabilizer Drift Control Measures. Special-status plant occurrences within 100 feet of the Project Disturbance Area shall be protected from herbicide and soil stabilizer drift. The IWMP (APM BIO-5) shall include measures to minimize potential for chemical drift or residual toxicity to special-status plants consistent with guidelines outlined in a Pesticide Use Proposal (PUP), such as those provided by the Nature Conservancy's The Global Invasive Species Team (Hillmer and Liedtke 2003), the USEPA, and the Pesticide Action Network Database.

e) Erosion and Sediment Control Measures. Erosion and sediment control measures shall not inadvertently impact special-status plants (e.g., by using invasive or non-native plants in seed mixes, introducing pest plants through contaminated seed or straw, etc.). These measures shall be incorporated in any required Drainage, Erosion, and Sedimentation Control Plans.

f) Monitoring and Reporting Requirements. The Designated Botanist shall conduct weekly monitoring of the ESAs that protect special-status plant occurrences during construction and decommissioning activities.

B) Avoidance Requirements for Special-Status Plants

The Applicant shall avoid impacts to special-status plant populations whenever possible, as described below.

1. Mitigation for special-status plants as defined in Section 3.3.1.3 – Avoidance on Linear Corridors Required: If special-status species as defined in Section 3.3.1.3 are detected within the Project Disturbance Area, the Applicant shall prepare and implement a Vegetation Resources Management Plan (VRMP) that describes measures to avoid and minimize impacts to plant populations on the Project linear corridors and construction laydown areas, unless such avoidance would create greater environmental impacts in other resource areas (e.g. Cultural Resource Sites) or other restrictions (e.g., FAA or other restrictions for placement of transmission poles). The Applicant shall provide compensatory mitigation as described below in Mitigation Measure VEG-9.D for impacts to special-status plants that cannot be avoided. The content of the VRMP and definitions shall be as described as follows:

   a. A description of the occurrences of the special-status species on the Project site, ecological characteristics such as micro-habitat requirements, ecosystem processes required for maintenance of the habitat, reproduction and dispersal mechanisms, pollinators, local distribution, and a description of the extent of the population off-site occurrences. Occurrences shall be considered impacted if they are within the Project footprint, and if they would be affected by Project-related hydrologic changes or changes to the local sand transport system.

   b. A description of the avoidance and minimization measures that would achieve complete avoidance of occurrences on the Project linear corridors and construction laydown areas, unless such avoidance is infeasible.

   c. A description of the measures that would be implemented to avoid or minimize impacts resulting from Project development. Avoidance is generally considered not feasible if the species is located within the Project Disturbance Area (bounded by the tortoise exclusion fence and the drainage channels).

   d. If avoidance on the linear corridors, construction laydown areas, and solar facility combined protect less than 75 percent of the local population of the affected species, the Applicant shall implement off-site mitigation that demonstrates that the impacts will not cause a loss of viability for that species. Implementation of the compensatory off-site mitigation must meet the performance standards described in Mitigation Measure VEG-9.C, below, and may include land acquisition or implementation of a restoration/enhancement program for the species. Compensatory offsite mitigation shall occur outside of a DFA.

e. “Avoidance” shall include protection of the ecosystem processes essential for maintenance of the protected plant occurrence. For all but one of the late blooming plant species with potential to occur, the plant species are annuals that depend on a viable seed bank to maintain population health and persistence. The primary goal of avoidance for these annual species will be protection of the soil integrity and the seed bank that is closely associated with undisturbed soils. Any impacts to the soil structure or surface features will be considered an impact.

2. Preservation of the Germplasm of Affected Special-Status Plants. For all direct impacts to special-status plants, regardless of whether compensatory mitigation is required, mitigation shall include seed collection from the affected special-status plants on-site prior to construction to conserve the germplasm and provide a seed source for restoration efforts. The seed shall be collected under the supervision or guidance of a reputable seed storage facility such as the Rancho Santa Ana Botanical Garden Seed Conservation Program, San Diego Natural History Museum, or the Missouri Botanical Garden. The costs associated with the long-term storage of the seed shall be the responsibility of the Applicant. Any efforts to propagate and reintroduce special-status plants from seeds in the wild shall be carried out under the direct supervision of specialists such as those listed above and as part of a VRMP, which would include components for habitat restoration and site revegetation, approved by the BLM AO.

C) Off-Site Compensatory Mitigation for Protected Plants

This section describes performance standards for mitigation for a range of options for compensatory mitigation.

Where compensatory mitigation is required under the terms of Mitigation Measure VEG-9.B, above, the Applicant shall mitigate Project impacts with compensatory mitigation. Compensatory mitigation shall consist of acquisition of habitat supporting the species, or restoration/enhancement of populations of the species, and shall meet the performance standards for mitigation described below. Compensation shall be initiated or completed within 12 months from the time the resource impact occurs, unless a 6-month extension is approved by the Authorizing Officer.

The Applicant shall provide funding for the acquisition and/or restoration/ enhancement, initial improvement, and long-term maintenance and management of the acquired or restored lands. The actual costs to comply with this condition will vary depending on the Project Disturbance Area, the actual costs of acquiring compensation habitat, the actual costs of initially improving the habitat, the actual costs of long-term management as determined by a Property Analysis Record (PAR) report, and other transactional costs related to the use of compensatory mitigation.

The Applicant shall comply with other related requirements of this measure, as follows:

I. Compensatory Mitigation by Acquisition: The requirements for the acquisition initial protection and habitat improvement, and long-term maintenance and management of compensation lands for state and Federally protected plant species include all of the following:

1. Selection Criteria for Acquisition Lands. The compensation lands selected for acquisition may include any of the following three categories:
    a. Occupied Habitat, No Habitat Threats: The compensation lands selected for acquisition shall be occupied by the species and shall be characterized by site integrity and habitat quality that are required to support the species, and shall be of equal or better habitat quality than that of the affected occurrence. The occurrence of the species on the proposed acquisition lands should be viable, stable or increasing (in size and reproduction).
    b. Occupied Habitat, Habitat Threats. Occupied compensation lands characterized by habitat threats may also be acquired as long as the population could be reasonably expected to recover with habitat restoration efforts (e.g., OHV or grazing exclusion, or removal of invasive non-native plants) and is accompanied by a Habitat Enhancement/Restoration Plan as described in Mitigation Measure VEG-9.C.II, below.
    c. Unoccupied but Adjacent. The Applicant may also acquire habitat for which occupancy by the species has not been documented, if the proposed acquisition lands are adjacent to occupied habitat. The Applicant shall provide evidence that acquisitions of such unoccupied lands would improve the defensibility and long-term sustainability of the occupied habitat by providing a protective buffer around the occurrence and by enhancing connectivity with undisturbed habitat. This acquisition may include habitat restoration efforts where appropriate, particularly when these restoration efforts will benefit adjacent habitat that is occupied by the species.
2. Review and Approval of Compensation Lands Prior to Acquisition. The Applicant shall submit a formal acquisition proposal to the BLM AO describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for special-status plants in relation to the criteria listed above, and must be approved by the BLM AO.
3. Compensation Land Management Plan. The Applicant or approved third party shall prepare a management plan for the compensation lands in consultation with the entity that will be managing the lands. The goal of the management plan shall be to support and enhance the long-term viability of the plant occurrences. The Management Plan shall be submitted for review and approval to the BLM AO.
4. Integrating Plant Mitigation with Other Mitigation lands. If all or any portion of the acquired Mojave desert tortoise, Waters of the State, or other required compensation lands meets the criteria above for special-status plant compensation lands, the portion of the other species' or habitat compensation lands that meets any of the criteria above may be used to fulfill that portion of the obligation for plant mitigation.
5. Compensation Lands Acquisition Requirements. The Applicant shall comply with the following requirements relating to acquisition of the compensation lands after the BLM AO, has approved the proposed compensation lands:

a. Preliminary Report. The Applicant, or an approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary or requested documents for the proposed compensation land to the BLM AO. All documents conveying or conserving compensation lands and all conditions of title are subject to review and approval by the BLM AO. For conveyances to the state, approval may also be required from the California Department of General Services, the Fish and Game Commission and the Wildlife Conservation Board.

b. Title/Conveyance. The Applicant shall acquire and transfer fee title to the compensation lands, a conservation easement over the lands, or both fee title and conservation easement, as required by the BLM AO. Any transfer of a conservation easement or fee title may be to CDFW or an organization qualified to hold title to and manage compensation lands (pursuant to California Government Code §65965), to BLM, or another public agency approved by the BLM AO. If an approved non-profit organization holds fee title to the compensation lands, a conservation easement shall be recorded in favor of CDFW or another entity approved by the BLM AO. If an entity other than CDFW holds a conservation easement over the compensation lands, the BLM AO may require that CDFW or another entity approved by the BLM AO, in consultation with CDFW, be named a third party beneficiary of the conservation easement. The Applicant shall obtain approval of the BLM AO of the terms of any transfer of fee title or conservation easement to the compensation lands.

c. Initial Protection and Habitat Improvement. The Applicant shall fund activities that the BLM AO requires for the initial protection and habitat improvement of the compensation lands. These activities will vary depending on the condition and location of the land acquired, but may include trash removal, construction and repair of fences, invasive plant removal, and similar measures to protect habitat and improve habitat quality on the compensation lands. The costs of these activities are estimated to be $330 per acre, using the estimated cost per acre for Mojave desert tortoise mitigation as a best available proxy. A qualified organization, CDFW or another public agency may hold and expend the habitat improvement funds if it is qualified to manage the compensation lands (pursuant to California Government Code §65965), if it meets the approval of the BLM AO in consultation with CDFW, and if it is authorized to participate in implementing the required activities on the compensation lands. If CDFW takes fee title to the compensation lands, the habitat improvement fund must be paid to CDFW or its designee.

d. Property Analysis Record. Upon identification of the compensation lands, the Applicant shall conduct a PAR or PAR-like analysis to establish the appropriate amount of the long-term maintenance and management fund to pay the in-perpetuity management of the compensation lands. The PAR or PAR-like analysis must be approved by the BLM AO before it can be used to establish funding levels or management activities for the compensation lands.

e. Long-term Maintenance and Management Funding. In accordance with Mitigation Measure VEG-11 (Phasing), the Applicant shall deposit in the

National Fish and Wildlife Foundation's (NFWF) Renewable Energy Action Team (REAT) Account a non-wasting capital long-term maintenance and management fee in the amount determined through the PAR or PAR-like analysis conducted for the compensation lands.

f. The BLM AO, in consultation with CDFW, may designate another non-profit organization to hold the long-term maintenance and management fee if the organization is qualified to manage the compensation lands in perpetuity. If CDFW takes fee title to the compensation lands, CDFW shall determine whether it will hold the long-term management fee in the special deposit fund, leave the money in the REAT Account, or designate another entity to manage the long-term maintenance and management fee for CDFW and with CDFW supervision.

g. Interest, Principal, and Pooling of Funds. The Applicant shall ensure that an agreement is in place with the long-term maintenance and management fund (endowment) holder/manager to ensure the following requirements are met:

    i. Interest. Interest generated from the initial capital long-term maintenance and management fund shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action that is approved by the BLM AO and is designed to protect or improve the habitat values of the compensation lands.

    ii. Withdrawal of Principal. The long-term maintenance and management fund principal shall not be drawn upon unless such withdrawal is deemed necessary by the BLM AO or by the approved third-party long-term maintenance and management fund manager, to ensure the continued viability of the species on the compensation lands.

    iii. Pooling Long-Term Maintenance and Management Funds. An entity approved to hold long-term maintenance and management funds for the Project may pool those funds with similar non-wasting funds that it holds from other projects for long-term maintenance and management of compensation lands for special-status plants. However, for reporting purposes, the long-term maintenance and management funds for this Project must be tracked and reported individually to the BLM AO.

h. Other Expenses. In addition to the costs listed above, the Applicant shall be responsible for all other costs related to acquisition of compensation lands and conservation easements, including but not limited to the title and document review costs incurred from other state agency reviews, overhead related to providing compensation lands to CDFW or an approved third party, escrow fees or costs, environmental contaminants clearance, and other site cleanup measures.

i. Mitigation Security. The Applicant shall provide financial assurances in accordance with Mitigation Measure VEG-10.2 to the BLM AO to guarantee that an adequate level of funding is available to implement any of the mitigation measures required by this condition that are not completed prior to the start of ground-disturbing Project activities. Financial assurances shall be provided to the BLM AO in the form of an irrevocable letter of credit, a pledged savings account or another form of approved security ("Security"). The amount of the Security shall be $2,280 per acre, using the estimated cost per acre for Mojave desert tortoise mitigation as a best available proxy. The actual costs to comply with this condition will vary depending on the actual costs of acquiring compensation habitat, the costs of initially improving the habitat, and the actual costs of long-term management as determined by a PAR report. Prior to submitting the Security to the BLM AO, the Applicant shall obtain the BLM AO's approval of the form of the Security. The BLM AO may draw on the Security if the BLM AO determines the Applicant has failed to comply with the requirements specified in this condition. The BLM AO may use money from the Security solely for implementation of the requirements of this condition. The BLM AO's use of the Security to implement measures in this condition may not fully satisfy the Applicant's obligations under this condition, and the Applicant remains responsible for satisfying the obligations under this condition if the Security is insufficient. The unused Security shall be returned to the Applicant in whole or in part upon successful completion of the associated requirements in this condition.

j. The Applicant may elect to comply with the requirements in this condition for acquisition of compensation lands, initial protection and habitat improvement on the compensation lands, or long-term maintenance and management of the compensation lands by funding, or any combination of these three requirements, by providing funds to implement those measures into the REAT Account established with the NFWF. To use this option, the Applicant must make an initial deposit to the REAT Account in an amount equal to the estimated costs (as set forth in the Security section of this condition) of implementing the requirement. If the actual cost of the acquisition, initial protection and habitat improvements, or long-term funding is more than the estimated amount initially paid by the Applicant, the Applicant shall make an additional deposit into the REAT Account sufficient to cover the actual acquisition costs, the actual costs of initial protection and habitat improvement on the compensation lands, and the long-term funding requirements as established in an approved PAR or PAR-like analysis. If those actual costs or PAR projections are less than the amount initially transferred by the Applicant, the remaining balance shall be returned to the Applicant.

The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a non-governmental organization supportive of desert habitat conservation, by written agreement of the Energy Commission. Such delegation shall be subject to approval by the BLM AO, in consultation with CDFW, BLM, and USFWS, prior to land acquisition, enhancement or management activities. Agreements to delegate land acquisition to an approved third party, or to manage compensation lands, shall be executed and implemented within 18 months of the BLM's certification of the Project.

II. Compensatory Mitigation by Habitat Enhancement/Restoration: As an alternative or adjunct to land acquisition for compensatory mitigation the Applicant may undertake habitat enhancement or restoration for the plant species. Examples of suitable enhancement projects include but are not limited to the following: i) control unauthorized vehicle use into an occurrence (or pedestrian use if clearly damaging to the species); ii) control of invasive non-native plants that infest or pose an immediate threat to an occurrence; iii) exclude grazing by wild burros or livestock from an occurrence; or iv) restore lost or degraded hydrologic or geomorphic functions critical to the species by restoring previously diverted flows, removing obstructions to the wind sand transport corridor above an occurrence, or increasing groundwater availability for dependent species.

If the Applicant elects to undertake a habitat enhancement project for mitigation, the project must meet the following performance standards: The proposed enhancement project shall achieve rescue of an off-site occurrence that is currently assessed, based on the NatureServe threat ranking system (Master et al. 2009; see also Morse et al. 2004) with one of the following threat ranks: a) long-term decline >30 percent; b) an immediate threat that affects >30 percent of the population, or c) has an overall threat impact that is High to Very High. “Rescue” would be considered successful if it achieves an improvement in the occurrence trend to “stable” or “increasing” status, or downgrading of the overall threat rank to slight or low (from “High” to “Very High”).

If the Applicant elects to undertake a habitat enhancement project for mitigation, they shall submit a Habitat Enhancement/Restoration Plan to the BLM AO for review and approval, and shall provide sufficient funding for implementation and monitoring of the Plan. The amount of the Security shall be $2,280 per acre, using the estimated cost per acre for Mojave desert tortoise mitigation as a best available proxy for every acre of habitat supporting the plant species which is directly or indirectly impacted by the Project. The amount of the security may be adjusted based on the actual costs of implementing the enhancement, restoration and monitoring. The implementation and monitoring of the enhancement/restoration may be undertaken by an appropriate third party such as NFWF, subject to approval by the BLM AO. The Habitat Enhancement/Restoration Plan shall include each of the following:

1. Goals and Objectives. Define the goals of the restoration or enhancement project and a measurable course of action developed to achieve those goals. The objective of the proposed habitat enhancement plan shall include restoration of a plant occurrence that is currently threatened with a long-term decline. The proposed enhancement plan shall achieve an improvement in the occurrence trend to “stable” or “increasing” status, or downgrading of the overall threat rank to slight or low (from “High” to “Very High”).

2. Historical Conditions. Provide a description of the pre-impact or historical conditions (before the site was degraded by weeds or grazing or ORV, etc.), and the desired conditions.

3. Site Characteristics. Describe other site characteristics relevant to the restoration or enhancement project (e.g., composition of native and pest plants, topography and drainage patterns, soil types, geomorphic and hydrologic processes important to the site or species.

4. Ecological Factors. Describe other important ecological factors of the species being protected, restored, or enhanced such as total population, reproduction, distribution, pollinators, etc.
5. Methods. Describe the restoration methods that will be used (e.g., invasive exotics control, site protection, seedling protection, propagation techniques, etc.) and the long-term maintenance required. The implementation phase of the enhancement must be completed within five years.
6. Budget. Provide a detailed budget and time-line, and develop clear, measurable, objective-driven annual success criteria.
7. Monitoring. Develop clear, measurable monitoring methods that can be used to evaluate the effectiveness of the restoration and the benefit to the affected species. The Plan shall include a minimum of five years of quarterly monitoring, and then annual monitoring for the remainder of the enhancement project, and until the performance standards for rescue of a threatened occurrence are met. At a minimum the progress reports shall include: quantitative measurements of the projects progress in meeting the enhancement project success criteria, detailed description of remedial actions taken or proposed and contact information for the responsible parties. In review of the plan, BLM will consider the ability of the proposed activities to support BLM’s Long Term Monitoring Strategy for the Riverside East SEZ (BLM 2016).
8. Reporting Program. The Plan shall ensure accountability with a reporting program that includes progress toward goals and success criteria. Include names of responsible parties.
9. Contingency Plan. Describe the contingency plan for failure to meet annual goals.
10. Long-term Protection. Include proof of long-term protection for the restoration site. For private lands this would include conservations easements or other deed restrictions; projects on public lands must be contained in a Desert Wildlife Management Area, Wildlife Habitat Management Area, or other land use protections that will protect the mitigation site and species.

VEG-10: Mitigation for Impacts to Sensitive Riparian Habitat and State Waters. The Applicant shall implement the following measures to avoid, minimize and mitigate for direct and indirect impacts to waters of the state and to satisfy requirements of California Fish and Game Code §§1600 and 1607.

1. Acquire Off-Site State Waters: If the Project results in direct impacts to state jurisdictional waters, the Applicant shall acquire, in fee or in easement, a parcel of land, the mitigation ratio of which is to be determined by CDFW based on review of the Streambed Alteration Agreement application. The terms and conditions of this acquisition or easement shall be as described in Mitigation Measure WIL-4, Part 3, Compensation Lands Acquisition Requirements. Mitigation for impacts to state waters shall occur within the Palo Verde and surrounding watersheds, as close to the Project site as possible. If security is posted in accordance with Provision 2 below (Security for Implementation of Mitigation), the Applicant shall acquire, in fee or in easement, the land, no more than 18 months after the start of Project ground-disturbing activities.

2. Security for Implementation of Mitigation: The Applicant shall provide financial assurances to the BLM AO and CDFW to guarantee that an adequate level of funding is available to implement the acquisitions and enhancement of state waters as described in this condition. These funds shall be used solely for implementation of the measures associated with the Project. Financial assurance can be provided to the BLM AO and CDFW in the form of an irrevocable letter of credit, a pledged savings account or Security prior to initiating ground-disturbing Project activities. Prior to submittal to the BLM AO, the Security shall be approved by the BLM AO, in consultation with CDFW and the USFWS, to ensure funding. See Mitigation Measure WIL-4, Part 3, Compensation Lands Acquisition Requirements, for a discussion of the assumptions used in calculating the Security. The Security amounts may change based on land costs or the estimated costs of enhancement and endowment. The final amount due shall be determined by the PAR analysis conducted pursuant to Mitigation Measure Mitigation Measure WIL-4, Part 3, Compensation Lands Acquisition Requirements, and approved by the BLM AO and CDFW. The final mitigation acreage is also subject to CDFW concurrence with Project impacts to waters of the state that were developed by the Applicant.
3. Preparation of Compensation Land Management Plan: The Applicant shall submit to the BLM AO and CDFW a draft Management Plan that reflects site-specific enhancement measures for the drainages on the acquired compensation lands. The objective of the Management Plan shall be to enhance the wildlife value of the drainages, and may include enhancement actions such as weed control, fencing to exclude livestock, or erosion control.
4. Code of Regulations: The Applicant shall provide a copy of the BRMMP and CDFW permits to all contractors, subcontractors, and the Applicant's Project supervisors. Copies shall be readily available at work sites at all times during periods of active work and must be presented to any CDFW personnel upon demand. The BLM AO reserves the right to issue a stop work order or allow CDFW to issue a stop work order after giving notice to the Applicant. If the BLM AO in consultation with CDFW, determines that the Applicant has breached any of the terms or conditions or for other reasons, including but not limited to the following:
    a. The information provided by the Applicant regarding streambed alteration is incomplete or inaccurate;
    b. New information becomes available that was not known to it in preparing the terms and conditions; or
    c. The Project or Project activities as described in the Staff Assessment have changed.
5. Best Management Practices: The Applicant shall also comply with the following conditions to protect drainages near the Project Disturbance Area:
    a. The Applicant shall minimize road building, construction activities and vegetation clearing within ephemeral drainages to the extent feasible.
    b. The Applicant shall not allow water containing mud, silt, or other pollutants from grading, aggregate washing, or other activities to enter ephemeral drainages or be placed in locations that may be subjected to high storm flows.

c. The Applicant shall comply with all litter and pollution laws. All contractors, subcontractors, and employees shall also obey these laws, and it shall be the responsibility of the Applicant to ensure compliance.

d. Spoil sites shall not be located at least 30 feet from the boundaries and drainages or in locations that may be subjected to high storm flows, where spoils might be washed back into drainages.

e. Raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances that could be hazardous to vegetation or wildlife resources, resulting from Project-related activities, shall be prevented from contaminating the soil and/or entering waters of the state. These materials, placed within or where they may enter a drainage by the Applicant or any party working under contract or with the permission of the Applicant, shall be removed immediately.

f. No broken concrete, debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, oil or petroleum products or other organic or earthen material from any construction or associated activity of whatever nature shall be allowed to enter into, or placed where it may be washed by rainfall or runoff into, waters of the state.

g. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any drainage.

h. No equipment maintenance shall occur within 150 feet of any ephemeral drainage where petroleum products or other pollutants from the equipment may enter these areas under any flow.

VEG-11: Project Phasing. The Applicant may provide mitigation as required in multiple phases for distinct construction elements. These phases will generally include installation of fencing, clearing, grubbing and grading, and development of common facilities first, followed by the remaining power block units. All construction activities for the non-linear features during these subsequent phases shall occur within Mojave desert tortoise exclusionary fenced areas that have been cleared in accordance with USFWS protocols.

Prior to initiating each phase of construction the Applicant shall submit the actual construction schedule, a figure depicting the locations of proposed construction and amount of acres to be disturbed. Mitigation acres are calculated based on the compensation requirements for each resource type including Mojave desert tortoise (Mitigation Measure WIL-4), western burrowing owl (Mitigation Measure WIL-9), Mojave fringe-toed lizard (Mitigation Measure WIL-10), and state waters (Mitigation Measure VEG-10). Compensatory mitigation for each phase shall be implemented according to the timing required by each condition.

VEG-12: Monitoring and Research. The Applicant shall provide the BLM and/or its designees access to land within the fenced area of the Desert Quartzite solar energy facility at any time for the purposes of research and monitoring, which may also include the installation of compatible facilities within the project boundaries.

G.4 BIOLOGICAL RESOURCES – WILDLIFE

The following measures shall be implemented to reduce or avoid wildlife species impacts from construction, operation and maintenance, and decommissioning of the Project. Mitigation measures VEG-1 through VEG-8, and VEG-11 are general biological mitigation measures which are applicable to both vegetation and wildlife.

Prior to construction, the following plans required by this section and those required in Section 4.3, *Biological Resources - Vegetation*, shall be prepared and submitted to the appropriate agencies for review and approval:

1. Desert Tortoise Translocation Plan
2. Raven Monitoring and Control Plan
3. Bird and Bat Conservation Strategy
4. Burrowing Owl Mitigation Plan
5. Biological Resources Mitigation, Implementation, and Monitoring Plan
6. PAR for Mojave Fringe-toed Lizard compensation

These plans or programs are explained below in more detail.

WIL-1: Measures to Avoid Take of Mojave Desert Tortoise. The Applicant shall undertake appropriate measures to manage the construction site and related facilities in a manner to avoid or minimize impacts to Mojave desert tortoise. Methods for clearance surveys, fence specification and installation, tortoise handling, artificial burrow construction, egg handling, and other procedures shall be consistent with those described in the USFWS (2009) *Desert Tortoise Field Manual* or more current guidance provided by CDFW and USFWS. The Applicant shall also implement all terms and conditions described in the Biological Opinion prepared by USFWS. The Applicant shall implement the following measures, unless superseded by requirements of the BO.

Preconstruction Survey. Prior to the initiation of construction activities, the Applicant shall conduct a pre-construction survey to determine the number of tortoises that would be affected by Project implementation, in accordance with USFWS (2011b) protocol, and consult with USFWS to confirm the survey results.

Exclusionary Fencing. The Applicant shall erect temporary and/or permanent tortoise exclusionary fencing around active portions of the Project site following the pre-construction tortoise survey. The exclusionary fencing, whether temporary or permanent in nature, shall be installed according to USFWS (2009) protocol, which requires fencing to be buried 12 inches below the ground surface and extending to 22-24 inches above the ground surface. If a phased approach is implemented during the construction phase, the exclusionary fencing may be installed in phases, with pre-construction surveys conducted prior to and clearance surveys conducted immediately after installation of the exclusionary fence. The Applicant shall also ensure that tortoise exclusionary fencing is maintained during the decommissioning phase to keep tortoises from accessing active work areas. Throughout the construction and decommissioning phases, the tortoise exclusionary fence shall be checked regularly per item 4 below, and repaired (if necessary) to ensure its integrity. If a tortoise is encountered along the inside or outside of the fence, an Authorized Biologist shall capture it in accordance with USFWS (2009: Chapter 7) and DTC (1999) protocols, perform a health assessment in accordance with USFWS (2013) guidelines, attach a radio transmitter to the tortoise in accordance with USFWS (2009) and Boarman et al. (1998) protocols, and release the tortoise in a previously identified Project-adjacent relocation areas supporting tortoise habitat in accordance with USFWS (2011b) protocol. Temporary exclusionary fencing shall be removed following completion of the construction and decommissioning phases.

The Applicant shall ensure that the Project's perimeter security fence includes exclusionary fencing that prevents Mojave desert tortoises and other burrowing animals from accessing the Project site. The exclusionary fencing shall be installed at the base of the security fence according to USFWS (2009) specifications, and cattle guards shall be installed at entrances to the Project, also according to USFWS (2009) protocol.

All fencing installation corridors shall be flagged to assist biologists in studying the fence route and surveyed within 24 hours prior to the initiation of fence construction. Clearance surveys of the Mojave desert tortoise exclusionary fence and utility rights- of-way alignments shall be conducted using techniques outlined in the USFWS' 2009 *Desert Tortoise Field Manual*. Prior to the surveys the Applicant shall provide to the BLM Authorized Officer (BLM AO), CDFW, USFWS, and the County a figure clearly depicting the limits of construction disturbance for the proposed fence installation.

1. *Timing, Supervision of Fence Installation*. The exclusion fencing shall be installed prior to the onset of site clearing and grubbing. The fence installation shall be supervised by the Designated Biologist and monitored by the Biological Monitors to ensure the safety of any tortoise present.
2. *Fence Material and Installation.* All Mojave desert tortoise exclusionary fencing shall be constructed in accordance with the USFWS' Desert Tortoise Field Manual (2009, Chapter 8 – Desert Tortoise Exclusion Fence).
3. *Security Gates.* Security gates shall be designed with minimal ground clearance to deter ingress by tortoises. Tortoise guards shall be installed at gate locations.
4. *Fence Inspections.* Following installation of the Mojave desert tortoise exclusion fencing, the fencing shall be regularly inspected during construction, operations, and decommissioning. If tortoise were moved out of harm's way during fence construction, fencing shall be inspected daily for the first 7 days to ensure a recently moved tortoise has not been trapped within the fence. Thereafter, fencing shall be inspected quarterly and during and within 24 hours following major rainfall events. A major rainfall event is defined as one for which flow is detectable within the fenced drainage. Any damage to the fencing shall be temporarily repaired immediately to keep tortoises out of the site, and permanently repaired within 48 hours of observing damage. Inspections of site fencing shall occur for the life of the Project. Temporary fencing shall be inspected weekly and, where drainages intersect the fencing, during and within 24 hours following major rainfall events. All temporary fencing shall be repaired immediately upon discovery and, if the fence may have permitted tortoise entry while damaged, the Designated Biologist shall inspect the area for tortoise.

Mojave Desert Tortoise Clearance Surveys within the Plant Site. Clearance surveys shall be conducted in accordance with the USFWS (2011b) protocol and USFWS-approved Desert Tortoise Translocation Plan. Clearance surveys of the site may only be conducted when tortoises are most active in the Project vicinity (March through May or September through mid-November). Clearance surveys of linear features may be conducted during anytime of the year. Surveys outside of the active season within the solar plant site require approval by USFWS and CDFW. Any tortoise located during clearance surveys of the power plant site and linear features shall be relocated and monitored in accordance with the Desert Tortoise Translocation Plan.

Burrow Searches. During clearance surveys all Mojave desert tortoise burrows, and burrows constructed by other species that might be used by Mojave desert tortoises, shall be examined by the Designated Biologist, who may be assisted by the Biological Monitors, to assess occupancy of each burrow by Mojave desert tortoises and handled in accordance with the *Desert Tortoise Field Manual*. To prevent reentry by a tortoise or other wildlife, all burrows shall be collapsed once absence has been determined, but only on the last survey pass and if not occupied by other wildlife. Tortoises taken from burrows and from elsewhere on the power plant site shall be relocated or translocated as described in the Desert Tortoise Translocation Plan.

Burrow Excavation/Handling. All potential Mojave desert tortoise burrows located during clearance surveys would be excavated by hand, tortoises removed, and collapsed or blocked to prevent occupation by Mojave desert tortoises. All Mojave desert tortoise handling and removal, and burrow excavations, including nests, would be conducted by the Designated Biologist, who may be assisted by a Biological Monitor in accordance with the *Desert Tortoise Field Manual*.

Monitoring Following Clearing. Following the Mojave desert tortoise clearance and removal from the power plant site and utility corridors, workers and heavy equipment shall be allowed to enter the Project site to perform clearing, grubbing, leveling, and trenching. A Designated Biologist shall directly monitor site clearing and shall be onsite during grading activities to find and move tortoises missed during the initial tortoise clearance survey. Should a tortoise be discovered, it shall be relocated or translocated as described in the Desert Tortoise Translocation Plan.

Reporting. The Designated Biologist shall record the following information for any Mojave desert tortoises handled: a) the locations (narrative and maps) and dates of observation; b) general condition and health, including injuries, state of healing and whether Mojave desert tortoise voided their bladders; c) location moved from and location moved to (using GPS technology); d) gender, carapace length, and diagnostic markings (i.e., identification numbers or marked lateral scutes); e) ambient temperature when handled and released; and f) digital photograph of each handled Mojave desert tortoise as described in the paragraph below. Mojave desert tortoise moved from within Project areas shall be marked and monitored in accordance with the Desert Tortoise Translocation Plan (Mitigation Measure WIL-2).

Avoidance – Construction. During the construction of linear features (fencing, transmission lines, and access roads), all live tortoises and active burrows shall be avoided to the extent possible. The Applicant shall ensure that an Authorized Biologist or Biological Monitor under their supervision monitors any Project activities in unfenced areas for presence of tortoises. If an active burrow cannot be avoided by construction activities, the burrow shall be excavated using protocols in USFWS Desert Tortoise Field Manual (USFWS 2009). If a tortoise wanders into an unfenced, active work area, does not leave the area on its own accord, and cannot be avoided by

Project activities, the Applicant shall ensure that an Authorized Biologist captures the tortoise, implements a health assessment of the tortoise, relocates it to previously identified appropriate Project-adjacent habitat away from any active, unfenced work areas, and monitor the individual via telemetry, in accordance with USFWS (2011) protocol. The Authorized Biologist or Biological Monitor shall have a copy of all measures, including the BO, when monitoring Project activities. The Authorized Biologist or Biological Monitor shall have the authority to halt all non-emergency activities that are in violation of the measures. Work shall proceed only after hazards to Mojave desert tortoise are removed, the species is no longer at risk, or the individual has been moved from harm's way by an Authorized Biologist. A compliance report shall be submitted to the BLM and USFWS annually.

Avoidance – Operations and Maintenance. The Applicant shall ensure that an Authorized Biologist or Biological Monitor under their supervision monitors any Project activities in unfenced areas for presence of tortoises during the O&M phase. If a tortoise wanders into an unfenced, active work area, does not leave the area on its own accord, and cannot be avoided by Project activities, the Applicant shall ensure that an Authorized Biologist captures the tortoise, implements a health assessment of the tortoise, relocates it to previously identified appropriate Project-adjacent habitat away from any active, unfenced work areas, and monitor the individual via telemetry, in accordance with USFWS (2011) protocol. The Authorized Biologist or Biological Monitor shall have a copy of all measures, including the BO, when monitoring Project activities. The Authorized Biologist or Biological Monitor shall have the authority to halt all non-emergency activities that are in violation of the measures. Work shall proceed only after hazards to Mojave desert tortoise are removed, the species is no longer at risk, or the individual has been moved from harm's way by an Authorized Biologist. A compliance report shall be submitted to the BLM and USFWS annually.

WIL-2: Mojave Desert Tortoise Translocation Plan. If the pre-construction survey determines that more than 5 tortoises are located on the Project site, the Applicant shall identify an off-site translocation site that is depleted of tortoises, where tortoises may be translocated in accordance with USFWS (2011b) protocol. The Applicant shall ensure that each proposed translocation site is surrounded by appropriate habitat with a 6.5 km radius in accordance with USFWS (2011b) protocol. The Applicant shall also identify areas of appropriate tortoise habitat directly adjacent to the Project site where tortoises may be relocated in accordance with USFWS (2011b) protocol.

Prior to ground disturbance, a Desert Tortoise Translocation Plan shall be prepared for the Project that provides details for conducting translocation of tortoises to off-site translocation areas or relocation of tortoises to near-site relocation areas. The purpose of the plan is to describe the process of translocation, minimize mortality of Mojave desert tortoises, and assess the effectiveness of the translocation effort through a long-term monitoring program. If more than 5 tortoises are discovered in the Project site during the clearance survey, the Applicant shall implement health assessments of the tortoises, translocate them to previously identified off-site translocation sites, and monitor them via telemetry, in accordance with USFWS (2011b) protocol. If one to five tortoises are discovered in the Project site during the clearance survey, the Project proponent shall implement health assessments of the tortoises, relocate them to previously identified Project-adjacent areas, and monitor them via telemetry, in accordance with USFWS (2011b) protocol.

WIL-3: Project Notifications and Reporting. The Applicant shall provide BLM staff with reasonable access to the Project site and compensation lands under the control of the Applicant and shall otherwise fully cooperate with BLM's efforts to verify the Project owner's compliance with, or the effectiveness of, mitigation measures. The Project's Designated Representative, in consultation with the Project's Designated Biologist shall notify the BLM AO at least 14 calendar days before initiating construction-related ground disturbance activities; immediately notify the BLM AO in writing if the Applicant is not in compliance with any required conditions of Project approval, including but not limited to any actual or anticipated failure to implement mitigation measures within the specified time periods. The Project's Designated Biologist shall:

a. ***Monitoring During Grubbing and Grading.*** Remain onsite daily while vegetation salvage, grubbing, grading and other ground-disturbance construction activities are taking place to avoid or minimize take of listed species, to check for compliance with all impact avoidance and minimization measures, and to check all exclusion zones to ensure that signs, stakes, and fencing are intact and that human activities are restricted in these protective zones.

b. ***Monthly Inspections.*** Conduct inspections at a minimum of once per month after clearing, grubbing, and grading are completed and submit a monthly report to the Project's Designated Representative for their submittal to the BLM AO, USFWS, County, and/or CDFW during construction.

1) ***Notification of Injured, Dead, or Relocated Listed Species.*** In the event of an unauthorized take of a listed species in an active construction area (e.g., with equipment, vehicles, or workers), the BLM AO, CDFW, and USFWS shall be notified immediately by phone. Notification shall occur no later than noon on the business day following the event if it occurs outside normal business hours so that the agencies can determine if further actions are required to protect listed species. Written follow-up notification via FAX or electronic communication shall be submitted to these agencies within two calendar days of the incident and include the following information as relevant:

   - *Injured Desert Tortoise*. If a Mojave desert tortoise is injured as a result of Project-related activities during construction, the Designated Biologist shall immediately take it to a CDFW-approved wildlife rehabilitation and/or veterinarian clinic. Any veterinarian bills for such injured animals shall be paid by the Applicant. Following phone notification as required above, the BLM AO, CDFW, and USFWS shall determine the final disposition of the injured animal, if it recovers. Written notification shall include, at a minimum, the date, time, location, circumstances of the incident, and the name of the facility where the animal was taken.

   - *Desert Tortoise Fatality*. If a Mojave desert tortoise is killed by Project-related activities during construction or operation, submit a written report with the same information as an injury report. These Mojave desert tortoises shall be salvaged according to guidelines described in the USGS publication *Salvaging Injured, Recently Dead, Ill, and Dying Wild, Free-Roaming Desert Tortoise*. The Applicant shall pay to have the Mojave desert tortoises transported and necropsied. The report shall include the date and time of the finding or incident.

c. ***Stop Work Order.*** The BLM AO may issue the Applicant a written stop work order to suspend any activity related to the construction or operation of the Project to prevent or remedy a violation of one or more required conditions of Project approval (including but not limited to failure to comply with reporting or monitoring) or to prevent the illegal take of an endangered, threatened, or candidate species. The Applicant shall comply with the stop work order immediately upon receipt thereof.

WIL-4: Compensatory Mitigation for Desert Tortoise Habitat Losses. To fully mitigate for habitat loss and potential take of Mojave desert tortoise, the Applicant shall provide compensatory mitigation at a 1:1 ratio for impacts to 3,760 acres (consisting of all vegetation alliances, but not including disturbed/developed) within the Alternative 1 footprint, adjusted to reflect the final footprint of the selected Project alternative. For the purposes of this measure, the Project footprint means all lands directly disturbed in the construction and operation of the Project, including all linear features, as well as undeveloped areas inside the Project's boundaries that will no longer provide viable long- term habitat for the Mojave desert tortoise. To satisfy this measure, the Applicant shall acquire, protect and transfer 1 acre of Mojave desert tortoise habitat for every acre of habitat within the final Project footprint, and provide associated funding for the acquired lands, as specified below. The Applicant has another option for satisfying some or all of the requirements in this measure, in lieu of acquiring lands itself. The Applicant may satisfy the requirements of this measure by depositing funds into the REAT Account established with the NFWF, as provided below in section 3.h. of this measure. The legal authority of the in lieu fee option is outlined in WIL-11.

The timing of the mitigation shall correspond with the timing of the site disturbance activities. However, if security is posted in accordance with 3.g. below (Mitigation Security), the Applicant shall acquire the land, in fee or in easement, within 12 months from the time the resource impact occurs, unless a 6-month extension is approved by the Authorizing Officer.

If compensation lands are acquired in fee title or in easement, the requirements for acquisition, initial improvement and long-term management of compensation lands include all of the following:

1. ***Selection Criteria for Compensation Lands.*** The compensation lands selected for acquisition in fee title or in easement shall:
   a. be within the Chuckwalla Critical Habitat Unit or, if sufficient land is unavailable, in other locations within the Colorado Desert Recovery Unit;
   b. be located outside of a DFA;
   c. provide habitat for Mojave desert tortoise with capacity to regenerate naturally when disturbances are removed;
   d. be prioritized near larger blocks of lands that are either already protected or planned for protection, or which could feasibly be protected long-term by a public resource agency or a non-governmental organization dedicated to habitat preservation;
   e. be connected to lands with Mojave desert tortoise habitat equal to or better quality than the Project site, ideally with populations that are stable, recovering, or likely to recover;

   f. not have a history of intensive recreational use or other disturbance that does not have the capacity to regenerate naturally when disturbances are removed or might make habitat recovery and restoration infeasible;
   g. not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration;
   h. not contain hazardous wastes that cannot be removed to the extent that the site could not provide suitable habitat; and
   i. have water and mineral rights included as part of the acquisition, unless the BLM AO, in consultation with CDFW and USFWS, agrees in writing to the acceptability of land.

2. ***Review and Approval of Compensation Lands Prior to Acquisition.*** The Applicant shall submit a formal acquisition proposal to the BLM AO, CDFW, and USFWS describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for Mojave desert tortoise in relation to the criteria listed above. Approval from the BLM AO and CDFW, in consultation with BLM and the USFWS, shall be required for acquisition of all compensatory mitigation parcels.

3. ***Compensation Lands Acquisition Requirements.*** The Applicant shall comply with the following requirements relating to acquisition of the compensation lands after the BLM AO and CDFW, in consultation with BLM and the USFWS, have approved the proposed compensation lands:

   a. *Preliminary Report*. The Applicant, or approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary or requested documents for the proposed compensation land to the BLM AO and CDFW. All documents conveying or conserving compensation lands and all conditions of title are subject to review and approval by the BLM AO and CDFW, in consultation with the USFWS. For conveyances to the state, approval may also be required from the California Department of General Services, the Fish and Game Commission, and the Wildlife Conservation Board.

   b. *Title/Conveyance*. The Applicant shall transfer fee title to the compensation lands, a conservation easement over the lands, or both fee title and conservation easement. Transfer of either fee title or an approved conservation easement will usually be sufficient, but some situations, e.g., the donation of lands burdened by a conservation easement to BLM, shall require that both types of transfers be completed. Any transfer of a conservation easement or title must be to CDFW, a non-profit organization qualified to hold title to and manage compensation lands (pursuant to California Government Code §65965), or to BLM under terms approved by the BLM AO and CDFW. If an approved non-profit organization holds title to the compensation lands, a conservation easement shall be recorded in favor of CDFW in a form approved by CDFW. If an approved non-profit holds a conservation easement, CDFW shall be named a third party beneficiary.

c. *Initial Habitat Improvement Fund*. The Applicant shall fund the initial protection and habitat improvement of the compensation lands. Alternatively, a non-profit organization may hold the habitat improvement funds if it is qualified to manage the compensation lands (pursuant to California Government Code §65965) and if it meets the approval of CDFW and the BLM AO. If CDFW takes fee title to the compensation lands, the habitat improvement fund must be paid to CDFW or its designee.

d. *Property Analysis Record*. Upon identification of the compensation lands, the Applicant shall conduct a PAR or PAR-like analysis to establish the appropriate long-term maintenance and management fee to fund the in-perpetuity management of the acquired mitigation lands.

e. *Long-term Maintenance and Management Fund*. The Applicant shall deposit in NFWF's REAT Account a non-wasting capital long-term maintenance and management fee in the amount determined through the PAR analysis conducted for the compensation lands.

   The BLM AO, in consultation with CDFW, may designate another non-profit organization to hold the long-term maintenance and management fee if the organization is qualified to manage the compensation lands in perpetuity. If CDFW takes fee title to the compensation lands, CDFW shall determine whether it will hold the long-term management fee in the special deposit fund, leave the money in the REAT Account, or designate another entity to manage the long-term maintenance and management fee for CDFW and with CDFW supervision.

f. *Interest, Principal, and Pooling of Funds*. The Applicant, the BLM AO and CDFW shall ensure that an agreement is in place with the long-term maintenance and management fee holder/manager to ensure the following conditions:

   i. Interest. Interest generated from the initial capital long-term maintenance and management fee shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action approved by CDFW designed to protect or improve the habitat values of the compensation lands.

   ii. Withdrawal of Principal. The long-term maintenance and management fee principal shall not be drawn upon unless such withdrawal is deemed necessary by the CDFW or the approved third-party long-term maintenance and management fee manager to ensure the continued viability of the species on the compensation lands. If CDFW takes fee title to the compensation lands, monies received by CDFW pursuant to this provision shall be deposited in a special deposit fund established solely for the purpose to manage lands in perpetuity unless CDFW designates NFWF or another entity to manage the long-term maintenance and management fee for CDFW.

   iii. Pooling Long-Term Maintenance and Management Fee Funds. CDFW, or a BLM AO- and CDFW-approved non-profit organization qualified to hold long- term maintenance and management fees solely for the purpose to manage lands in perpetuity, may pool the endowment with other endowments for the operation, management, and protection of the compensation lands for local populations of Mojave desert tortoise. However, for reporting purposes, the long-term maintenance and management fee fund must be tracked and reported individually to the CDFW and BLM AO.

iv. Other expenses. In addition to the costs listed above, the Applicant shall be responsible for all other costs related to acquisition of compensation lands and conservation easements, including but not limited to title and document review costs, expenses incurred from other state agency reviews, and overhead related to providing compensation lands to CDFW or an approved third party; escrow fees or costs; environmental contaminants clearance; and other site cleanup measures.

g. *Mitigation Security*. The Applicant shall provide financial assurances to the BLM AO and CDFW with copies of the document(s) to the USFWS, to guarantee that an adequate level of funding is available to implement the mitigation measures described herein. These funds shall be used solely for implementation of the measures associated with the Project in the event the Applicant fails to comply with the requirements specified in this measure, or shall be returned to the Applicant upon successful compliance with the requirements in this measure. The BLM AO's or CDFW's use of the security to implement required measures may not fully satisfy the Applicant's obligations under this condition. Financial assurance can be provided to the BLM AO and CDFW in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security"). Prior to submitting the Security to the BLM AO, the Applicant shall obtain the BLM AO's and CDFW's approval, in consultation with the USFWS, of the form of the Security. Security shall be provided in the amounts calculated as follows:

i. land acquisition costs for compensation land, calculated at $500/acre.

ii. initial protection and improvement activities on the compensation land, calculated at $330/acre.

iii. Long term maintenance and management fee, calculated at $1,450 an acre.

The amount of security shall be adjusted for any change in the Project footprints for each phase as described above.

h. The Applicant may elect to fund the acquisition and initial improvement of compensation lands through NFWF by depositing funds for that purpose into NFWF's REAT Account. Initial deposits for this purpose must be made in the same amounts as the security required in 3.g., above, and may be provided in lieu of security. If this option is used for the acquisition and initial improvement, the Applicant shall make an additional deposit into the REAT Account if necessary to cover the actual acquisition costs and administrative costs and fees of the compensation land purchase once land is identified and the actual costs are known. If the actual costs for acquisition and administrative costs and fees are less than $500 an acre, the excess money deposited in the REAT Account shall be returned to the

Applicant. Money deposited for the initial protection and improvement of the compensation lands shall not be returned to the Applicant.

The responsibility for acquisition of compensation lands may be delegated to a third party other than NFWF, such as a private or non-governmental organization, by written agreement of the BLM AO and CDFW. Such delegation shall be subject to approval by the BLM AO and CDFW, in consultation with the USFWS, prior to land acquisition, initial protection or maintenance and management activities. Agreements to delegate land acquisition to an approved third party, or to manage compensation lands, shall be implemented within 18 months of the BLM's approval.

WIL-5: Raven Management Plan. A Raven Management Plan shall be submitted to the BLM and County for approval prior to the start of ground disturbance and issuance of a County grading permit. The Raven Management Plan shall address Project characteristics and activities that may attract or subsidize common ravens. The Raven Management Plan shall include measures designed to: 1) minimize attracting and subsidizing ravens, 2) provide education to Project personnel, 3) remove raven nests and offending ravens, and 4) implement adaptive management. The Applicant shall also provide funding for implementation of the USFWS Regional Raven Management Program, as described below.

1. The Raven Plan shall:
    a. Identify conditions associated with the Project that might provide raven subsidies or attractants;
    b. Describe management practices to avoid or minimize conditions that might increase raven numbers and predatory activities;
    c. Describe control practices for ravens;
    d. Establish thresholds that would trigger implementation of control practices;
    e. Address monitoring and nest removal during construction and for the life of the Project, and;
    f. Discuss reporting requirements.
2. USFWS Regional Raven Management Program: The Applicant shall submit payment to the Project sub-account of the REAT Account held by NFWF to support the USFWS Regional Raven Management Program. The one-time fee shall be as described in the cost allocation methodology or more current guidance as provided by USFWS or CDFW. The contribution to the regional raven management plan will be $105 per acre impacted.

WIL-6: Bird and Bat Conservation Strategy. Prior to the Notice to Proceed, the Applicant shall finalize and implement their draft BBCS to include the following:

- Describe baseline conditions for bird and bat species present within the Project site, including results of site-specific surveys.
- Assess potential risk to bird and bats based on the proposed activities.
- Specify conservation measures that will be employed to avoid, minimize, and/or mitigate any potential adverse effects to these species.

- Describe the incidental monitoring and reporting that will take place during construction.
- Provide details for avian and bat post-construction monitoring and reporting.
- Specify the adaptive management process that will be used to address potential adverse effects on these species.
- Monitor the death and injury of birds and bats from collisions with facility features such as, but not limited to, transmission lines, tower structures (e.g., meteorological towers), and the solar field.
- The monitoring data shall be used to inform a management program that would avoid and minimize Project-related avian and bat impacts. The study design shall be approved by the BLM AO in consultation with USFWS, and shall be incorporated into the Project's Biological Resources Mitigation, Implementation, and Monitoring Plan (BRMIMP; see Mitigation Measure VEG-7) and implemented.
- Post-construction mortality monitoring will be required for a minimum of two years, including the following project components: PV solar panel arrays (40% survey coverage per year), perimeter fencing (100% survey coverage per year), and the gen-tie line (50% survey coverage per year).

The Applicant shall provide analysis to BLM evaluating the feasibility of using tanks instead of ponds for water storage. Ponds shall not be used unless specifically approved by the Authorized Officer.

The applicant shall follow APLIC guidelines for avian protection on powerlines and shall use current guidelines to reduce bird mortality from collision and electrocution with powerlines. The APLIC (2006) and USFWS recommend the following:

1. Provide 60-inch minimum horizontal separation between energized conductors or energized conductors and grounded hardware;
2. Insulate hardware or conductors against simultaneous contact if adequate spacing is not possible;
3. Use structure designs that minimize impacts to birds; and
4. Shield wires to minimize the effects from bird collisions.

WIL-7: Pre-Construction Nest Surveys. Prior to ground disturbance activities (such as initial grading or mowing activity), pre-construction nest surveys for all migratory birds shall be conducted if construction activities would begin from February 1 through August 31. For construction work within 500 feet of Bendire's thrasher suitable habitat, pre-construction surveys shall be conducted prior to work from March 1 to September 30.

The qualified biologists conducting the surveys shall be experienced bird surveyors familiar with standard nest-locating techniques such as those described in Martin and Guepel (1993). The goal of the nesting surveys shall be to identify the general location of the nest sites, sufficient to establish a protective buffer zone around the potential nest site, and need not include identification of the precise nest locations. The bird surveyors shall perform surveys in accordance with the following guidelines:

1. Surveys shall cover all potential nesting habitat areas, including the Blue paloverde-Desert Ironwood vegetation that could be disturbed by each phase of grading. Surveys shall also include areas within 200 feet of the boundaries of the active construction areas (including linear facilities);
2. Pre-construction surveys for nesting birds shall be conducted within a 14-day period preceding initiation of grading or mowing activity. Workers shall be trained in the WEAP training to identify and report nests in active construction areas, additional follow-up surveys may be required if periods of construction inactivity exceed 3 weeks, an interval during which birds may establish a nesting territory and initiate egg laying and incubation;
3. If active nests or suspected active nests are detected during the survey, a buffer zone (protected area surrounding the nest, the size of which is to be determined by the qualified biologist) and monitoring plan shall be developed. Nest locations shall be mapped and submitted, along with a report stating the survey results, to the BLM AO; and
4. The qualified biologist shall monitor the nest until he or she determines that nestlings have fledged; activities that might, in the opinion of the monitors, disturb nesting activities, shall be prohibited within the buffer zone until such a determination is made.

WIL-8: American Badger and Desert Kit Fox Protection. The Applicant shall implement the following measures to avoid direct impacts to American badgers and desert kit fox:

1. ***Prepare Desert Kit Fox Management Plan*****:** At least 45 days prior to construction, the Applicant shall prepare a Desert Kit Fox Management Plan that: 1) incorporates baseline desert kit fox census findings into a cohesive management strategy that minimizes disease risk to kit fox populations; 2) specifically identifies preconstruction survey methods for kit foxes and large carnivores (e.g., badgers) in the Project area; 3) describes preconstruction and construction-phase relocation methods from the site, including the possibility for passive relocation from the site (and outlines identified CDFW permit and MOU requirements for active relocation), and; 4) coordinates survey findings prior to and during construction to meet the information needs of wildlife health officials in monitoring the health of kit fox populations. The Plan shall include contingency measures that would be performed if canine distemper were documented in the Project area or in potential relocation areas, and measures to address potential kit fox reoccupancy of the site (as documented at the Genesis site). The contents and requirements of the Plan shall be subject to review and approval by the BLM AO in consultation with USFWS and CDFW.
2. ***Implement Desert Kit Fox Management Plan:***
   a. *Pre-Construction Surveys:* Biological Monitors shall conduct pre-construction surveys for desert kit fox and American badger no more than 30 days prior to initiation of construction activities. Surveys shall also consider the potential presence of active dens within 100 feet of the project boundary (including utility corridors and access roads) and shall be performed for each phase of construction. If dens are detected each den shall be classified as inactive, potentially active, or definitely active.

b. Inactive dens that would be directly impacted by construction activities shall be excavated by hand and backfilled to prevent reuse by badgers or kit fox.

c. Potentially and definitely active dens that would be directly impacted by construction activities shall be monitored by the Biological Monitor for three consecutive nights using a tracking medium (such as diatomaceous earth or fire clay) and/or infrared camera stations at the entrance.

d. If no tracks are observed in the tracking medium or no photos of the species are captured after three nights, the den shall be excavated and backfilled by hand.

e. If tracks are observed, the den shall be progressively blocked with natural materials (rocks, dirt, sticks, and vegetation piled in front of the entrance) for the next three to five nights to discourage the badger or kit fox from continued use. After verification that the den is unoccupied it shall then be excavated and backfilled by hand to ensure that no badgers or kit fox are trapped in the den. BLM approval may be required prior to release of badgers on public lands.

f. If an active natal den (a den with pups) is detected on the site, as demonstrated by the procedures specified in paragraph c above, the BLM AO and CDFW shall be contacted within 24 hours to determine the appropriate course of action to minimize the potential for animal harm or mortality. The course of action would depend on the age of the pups, location of the den on the site (e.g., is the den in a central area or in a perimeter location), status of the perimeter site fence (completed or not), and the pending construction activities proposed near the den. A 500-foot no-disturbance buffer shall be maintained around all active natal dens.

g. The following measures are required to reduce the likelihood of distemper transmission:

   i. No pets shall be allowed on the site prior to or during construction, with the possible exception of kit fox scat detection dogs during preconstruction surveys, and then only with prior CDFW approval;

   ii. Any kit fox hazing activities that include the use of animal repellents such as coyote urine must be cleared through CDFW prior to use, and;

   iii. Any sick or diseased kit fox, or documented kit fox mortality shall be reported to CDFW and the BLM AO within 24 hours of identification. If a dead kit fox is observed, it shall be retained and protected from scavengers until CDFW determines if the collection of necropsy samples is justified.

WIL-9: Burrowing Owl Protection and Mitigation. The Applicant shall implement the following measures to avoid, minimize and offset impacts to burrowing owls:

1. ***Pre-Construction Surveys*****:** The Qualified Biologist or Biological Monitor shall conduct pre-construction surveys for burrowing owls no more than 30 days and no less than 14 days prior to start of construction. Surveys shall be focused exclusively on detecting burrowing owls, and shall be conducted from two hours before sunset to one hour after sunrise.

2. ***Implement Burrowing Owl Mitigation Plan*****:** If burrowing owls are documented during the preconstruction surveys, the Applicant shall prepare and implement a final Burrowing

Owl Mitigation Plan that is consistent with guidance provided in the CDFW (2012) *Staff Report on Burrowing Owl Mitigation*. The Plan shall be approved by the BLM AO in consultation with USFWS and CDFW, and shall identify appropriate off-site areas for creation or enhancement of burrows to support passive relocation of burrowing owls, provide details for implementing the passive burrow exclusion and relocation of burrowing owls from the Project site, and specify reporting protocol for any implemented burrowing owl mitigation measures. Active translocation may be considered, in consultation with CDFW.

3. ***Implement Avoidance Measures:*** If an active burrowing owl burrow is detected within 656 feet from the Project disturbance area the following avoidance and minimization measures shall be implemented:

    a. Establish Non-Disturbance Buffer: Caution tape shall be installed at a 250-foot radius from the occupied burrow to create a non-disturbance buffer around the burrow. The non-disturbance buffer and caution tape line may be reduced to 160 feet if all Project-related activities that might disturb burrowing owls would be conducted during the non-breeding season (September 1st through January 31st). Signs shall be posted in English and Spanish at the fence line indicating no entry or disturbance is permitted within the fenced buffer. The appropriateness of buffer distances shall be carefully reassessed and relaxed or modified, on a case-by-case based on a review by the Qualified Biologist, and shall depend on existing conditions (e.g., vegetation/topographic screening and current disturbance regimes) and/or future development plans (e.g., increased or intensified construction activities.

    b. Monitoring: If construction activities would occur within 656 feet of the occupied burrow during the nesting season (February 1 to August 31st) the Qualified Biologist or Biological Monitor shall monitor to determine if these activities have potential to adversely affect nesting efforts, and shall make recommendations to minimize or avoid such disturbance.

4. ***Acquire Compensatory Burrowing Owl Habitat*:** If preconstruction surveys determine the presence of burrowing owls that would be impacted by the Project, consistent with CDFW mitigation guidance (CBOC 1993) the Applicant shall acquire, in fee or in easement, land suitable to support a resident population of burrowing owls and shall provide funding for the enhancement and long-term management of these compensation lands based on 6.5 acres per pair or individual bird documented during the preconstruction survey as anticipated to be impacted by the Project. Compensation shall be initiated or completed within 12 months from the time the resource impact occurs, unless a 6-month extension is approved by the Authorizing Officer. The responsibilities for acquisition and management of the compensation lands may be delegated by written agreement to CDFW or to a third party, such as a non-governmental organization dedicated to habitat conservation, subject to approval by the BLM AO, in consultation with CDFW prior to land acquisition or management activities. Additional funds shall be based on the adjusted market value of compensation lands at the time of construction to acquire and manage habitat.

    a. *Criteria for Burrowing Owl Mitigation Lands:* The terms and conditions of this acquisition or easement shall be as described in Mitigation Measure Mitigation

Measure WIL-4, Part 3, Compensation Lands Acquisition Requirements, with the additional criteria to include: 1) the mitigation land must provide suitable habitat for burrowing owls, and 2) the acquisition lands must either currently support burrowing owls or be no farther than 5 miles from an active burrowing owl nesting territory. The burrowing owl mitigation lands may be included with the Mojave desert tortoise mitigation lands ONLY if these two burrowing owl criteria are met. If the burrowing owl mitigation land is separate from the acreage required for Mojave desert tortoise compensation lands, the Applicant shall fulfill the requirements described below in this measure.

b. *Security:* If the burrowing owl mitigation land is separate from the acreage required for Mojave desert tortoise compensation lands, the Applicant or an approved third party shall complete acquisition of the proposed compensation lands within the time period specified for this acquisition (see the verification section at the end of this measure). Alternatively, financial assurance can be provided by the Applicant to the BLM AO and CDFW, according to the measures outlined in Mitigation Measure Mitigation Measure WIL-4, Part 3, Compensation Lands Acquisition Requirements. These funds shall be used solely for implementation of the measures associated with the Project. Financial assurance can be provided to the BLM AO in the form of an irrevocable letter of credit, a pledged savings account, or another form of security ("Security") prior to initiating ground-disturbing Project activities. Prior to submittal, the Security shall be approved by the BLM AO in consultation with CDFW and the USFWS to ensure funding. The final amount due shall be determined by an updated appraisal and PAR analysis conducted as described in Mitigation Measure Mitigation Measure WIL-4, Part 3, Compensation Lands Acquisition Requirements.

WIL-10: Compensatory Mitigation for Mojave Fringe-toed Lizard Habitat Losses. To mitigate for permanent habitat loss and direct impacts to Mojave fringe-toed lizards, the Applicant shall provide compensatory mitigation at a 3:1 ratio, which may include compensation lands purchased in fee or in easement in whole or in part, for impacts to Mojave fringe-toed lizard habitat, as required by the NECO Plan Amendment to the CDCA Plan (BLM 2002). Without this mitigation, the project would not be consistent with the land use plan, with which BLM is required to comply. If compensation lands are acquired, the Applicant shall provide funding for the acquisition in fee title or in easement, initial habitat improvements and long-term maintenance and management of the compensation lands. Compensation shall be initiated or completed within 12 months from the time the resource impact occurs, unless a 6-month extension is approved by the Authorizing Officer.

1. ***Criteria for Compensation Lands*****:** The compensation lands selected for acquisition shall:

   a. Be deposits of eolian or fine windblown sands typically associated with dunes, washes, hillsides, margins of dry lakes, and sandy hummocks within the McCoy Valley or Chuckwalla Valley, outside of DFAs, with potential to contribute to Mojave fringe-toed lizard habitat connectivity and build linkages between known populations of Mojave fringe-toed lizards and preserve lands with suitable habitat;

   b. To the extent feasible, be connected to lands currently occupied by Mojave fringe-toed lizard;

   c. To the extent feasible, be near larger blocks of lands that are either already protected or planned for protection, or which could feasibly be protected long-term by a public resource agency or a non-governmental organization dedicated to habitat preservation;
   d. Provide quality habitat for Mojave fringe-toed lizard, that has the capacity to regenerate naturally when disturbances are removed;
   e. Not have a history of intensive recreational use or other disturbance that might make habitat recovery and restoration infeasible;
   f. Not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration;
   g. Not contain hazardous wastes that cannot be removed to the extent the site is suitable for habitat;
   h. Not be subject to property constraints (i.e. mineral leases, cultural resources); and
   i. Be on land for which long-term management is feasible.

2. ***Security for Implementation of Mitigation*:** The Applicant shall provide financial assurances to the BLM AO to guarantee that an adequate level of funding is available to implement the acquisitions and enhancement of Mojave fringe-toed lizard habitat as described in this measure. These funds shall be used solely for implementation of the measures associated with the Project. Financial assurance can be provided to the BLM AO according to the measures outlined in Mitigation Measure Mitigation Measure WIL-4, Part 3, Compensation Lands Acquisition Requirements. The final amount due shall be determined by an updated appraisal and a PAR analysis conducted as described in Mitigation Measure Mitigation Measure WIL-4, Part 3, Compensation Lands Acquisition Requirements.
3. ***Preparation of Compensation Land Management Plan*:** The Applicant shall submit to the BLM AO, CDFW and USFWS a draft Management Plan that reflects site-specific enhancement measures for the Mojave fringe-toed lizard habitat on the acquired compensation lands. The objective of the Management Plan shall be to enhance the value of the compensation lands for Mojave fringe-toed lizards, and may include enhancement actions such as weed control, fencing to exclude livestock, erosion control, or protection of sand sources or sand transport corridors.

WIL-11: In-Lieu Fees to Satisfy Compensation Requirements. The Applicant may choose to satisfy its mitigation obligations by paying an in-lieu fee instead of acquiring compensation lands, pursuant to California Fish and Game Code §§2069 and 2099 or any other applicable in-lieu fee provision, to the extent the in-lieu fee provision is found by the California Department of Fish and Wildlife to mitigate the impacts identified herein.

WIL-12: Couch’s Spadefoot Toad Protection and Mitigation. Prior to ground disturbance, the Applicant shall prepare and implement a Couch’s Spadefoot Toad Protection and Mitigation Plan (Protection and Mitigation Plan) to avoid, minimize or mitigate impacts to Couch’s spadefoot toads and their breeding habitat during construction, operation, and decommissioning of the Project. The Protection and Mitigation Plan shall be approved by BLM’s Authorized Officer in consultation with CDFW, and shall be incorporated into the Project's BRMIMP and implemented. The Protection and Mitigation Plan shall include avoidance, minimization, and mitigation measures that would be required if occupied habitat is found during habitat surveys. The Protection and Mitigation Plan shall include, at a minimum:

1. Habitat Survey Results: a. Survey methodology; b. Survey results, including a detailed discussion of potential breeding sites, and a description of areas determined not to include breeding habitat; and c. Figures showing the areas surveyed and the location of potential breeding habitat in relation to proposed Project features.

2. Impacts Assessment from: a. Habitat disturbance from construction; b. Noise from construction, operations, and potential ORV traffic; c. Increased access for vehicles from road construction or improvements; d. Changes in breeding habitat due to changes in flow levels and flow patterns to breeding ponds; e. Increased traffic from construction and operations; f. Increased risk of predation.

3. Avoidance and Minimization Measures: a. Description of measures that would be implemented to avoid impacts to potential breeding ponds, such as design strategies; protective fencing or other barriers, worker's education, minimizing construction traffic within the vicinity of breeding ponds, and biological monitoring; b. Designation of a Management Area around breeding ponds that includes an appropriate upland buffer, and a description of measures used to minimize impacts to within this buffer.

4. Mitigation: If complete avoidance of breeding sites identified during surveys is not possible, the plan shall include plans to create additional breeding habitats (ephemeral pond) at least equal in area to the acreage of ponds being impacted.

WIL-13: Development of Ponding Area. The Applicant would use temporary water tanks. Should the applicant find developing water tanks infeasible, the applicant would provide the BLM Authorized Officer with written request with justification why water tanks are infeasible prior to implementing onsite ponds. The written request would also include relevant measures to avoid attracting wildlife.

G.5 CULTURAL RESOURCES

The following Project-specific mitigation measures were developed to reduce and/or avoid potential impacts associated with cultural resources.

CULTURAL-1: NHPA §106 Memorandum of Agreement. The BLM's execution of an MOA for the proposed undertaking in accordance with the requirements of §106 of the NHPA will lead to avoidance, minimization, or mitigation of potential adverse effects to historic properties. The BLM shall prepare the MOA in consultation with the ACHP, SHPO, the Applicant, Riverside County, Native American Tribes, and other identified consulting parties. The MOA will be binding on the Applicant and the proposed undertaking. An executed MOA represents the BLM's completion of the NHPA §106 process. The MOA must be executed prior to the ROD.

The MOA will contain measures to avoid, minimize, and mitigate adverse effects to historic properties and detail the process for activities to proceed in areas where historic properties are not now known to exist; procedures for treatment of unanticipated effects and post-review discoveries; recognition that BLM will comply with NAGPRA; compliance monitoring; dispute resolution; and tribal participation. Resolution of adverse effects to historic properties will be developed in consultation and may include research and documentation, data recovery excavations, curation, public interpretation, or use or creation of historic contexts.

In addition, a Plan for Archaeological Monitoring, Post-Review Discoveries, and Unanticipated Effects (also referred to a Monitoring and Discovery Plan or MDP) shall be prepared, appended to the MOA, and implemented and shall contain procedures to avoid, minimize, and mitigate effects to historic properties, and could include measures similar to the following:

1. Avoidance of cultural resources is the preferred mitigation measure. On the basis of preliminary NRHP eligibility assessments, existing NRHP eligibility determinations, or CRHR eligibility assessments, the BLM may require the relocation of Project components to avoid or reduce damage to cultural resource values. Where operationally feasible, potentially NRHP- or CRHR-eligible resources shall be protected from direct Project impacts by Project redesign within previously surveyed and analyzed areas.
2. Where NRHP- or CRHR-eligible or -listed historic properties cannot be protected from direct effects by Project redesign, the Applicant shall comply with appropriate mitigative treatment(s) that will be detailed in the HPTP. An example of treatment is data recovery at affected sites.
3. All NRHP-listed or eligible cultural resources and all CRHR-listed, eligible, and unevaluated cultural resources being treated as eligible (as determined by the BLM) that will not be affected by direct impacts, but are within 50 feet of Project construction activities, shall be monitored during ground disturbing activities by a qualified archaeologist. Protective fencing or other markers, at the BLM's discretion, shall be erected and maintained to protect these resources from inadvertent trespass for the duration of construction in the vicinity.

CULTURAL-2: Historic Properties Treatment Plan (HPTP). Where NRHP- or CRHR-eligible or -listed historic properties cannot be protected from indirect effects by Project redesign, the Applicant shall comply with appropriate mitigative treatment(s) that will be detailed in a HPTP to be prepared for the Project prior to issuance of the NTP or a County Grading Permit. Indirect impacts include, but are not limited to visual effects, auditory effects, increased awareness of the sites, and increased traffic within the area. Treatment of the sites for indirect impacts may include complete recordation or updates of sites, field checks or long term monitoring, and rerouting of access roads near sites.

CULTURAL-3: Identification of Human Remains. For human remains discovered on BLM land, the process for securing the site, notification of responsible parties, and subsequent actions shall be identified in the MDP required by Mitigation Measure CULTURAL-5. The actions to be identified include consultation with Native Americans if appropriate and actions to comply with NAGPRA (25 U.S.C.§ 3001) relative to handling of Native American cultural items such as human remains, funerary objects, sacred objects, or objects of cultural patrimony.

For human remains encountered on private lands, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin. Further, pursuant to PRC Section 5097.98(b), remains shall be left in place and free from disturbance until a final decision as to treatment and disposition has been made. If the Riverside County Coroner determines the remains to be Native American, the NAHC shall be contacted within the period specified by law. The NAHC shall identify the “Most Likely Descendant,” who shall then make recommendations to and engage in consultation with the County and property owner concerning the treatment of the remains as provided in PRC Section 5097.98. The landowner may reach an agreement with the Most Likely Descendant for treating and disposing of human remains pursuant to state CEQA Guidelines Section 15064.5(d). Human remains from other ethnic/cultural groups with recognized historical associations to the Project area shall also be subject to consultation between appropriate representatives from that group and the County Archaeologist.

CULTURAL-4: Unanticipated Discoveries. If, during ground disturbance activities associated with construction, operation and maintenance, or decommissioning, archaeological sites are discovered that were not identified and evaluated in the archaeological survey reports or the Draft PA/EIS/EIR conducted prior to Project approval, and the following procedures shall be followed.

1. All ground disturbance activities within 100 feet of the discovered cultural resource shall be halted and the applicant shall notify the Project archaeologist, the Native American Tribal Observer, the BLM, and (on non-Federal land) the County archaeologist to discuss the significance of the find.
2. At the meeting, the significance of the discoveries shall be discussed in consultation with the Native American Tribal Observer and the Project archaeologist. The BLM alone shall determine the appropriate treatment for cultural resources on BLM- managed lands. The County Archaeologist and the BLM AO together shall determine the appropriate mitigation (documentation, evaluation, recovery, avoidance, etc.) for cultural resources on private lands. In determining the appropriate treatment on private land, the BLM shall follow requirements of 36 CFR Part 800.13 for post- review discoveries and the County Archaeologist shall implement CEQA Guidelines Section 15126.4(b) regarding mitigation related to impacts on historical resources and state CEQA Guidelines Section 15064.5(c) and 21083.2(g) regarding archaeological resources.
3. Further ground disturbance shall not resume within the area of the discovery until a meeting is convened with the aforementioned parties and a decision is made with the concurrence of the BLM and (on private land) the County Archaeologist as to the appropriate preservation or mitigation measures. The Applicant shall comply with the determinations of the County Archaeologist and BLM.

CULTURAL-5: Monitoring and Discovery Plan. Prior to issuance of the NTP or a County Grading Permit, the Applicant shall have the Secretary of the Interior Qualified/County-approved Project Archaeologist prepare and submit for approval to the BLM and the County of Riverside a MDP. The MDP shall map all cultural resources within the APE, as described in this Draft PA/EIS/EIR. The MDP shall also detail how resources, if any, are determined eligible or resources that are unevaluated but avoided by Project design, would be marked and protected as Environmentally Sensitive Areas during construction. The MDP shall also map additional areas that are considered to be of high sensitivity for discovery of buried significant cultural resources, including burials, cremations, or sacred features. The MDP shall detail provisions for monitoring construction in these high-sensitivity areas. It shall also detail procedures for halting construction, making appropriate notifications to agencies, officials, and Native American tribes, and assessing NRHP and CRHR eligibility in the event that unknown archaeological resources are discovered during construction. For all post-review discoveries, the MDP shall detail the methods, consultation procedures, and timelines for implementing Mitigation Measures CULTURAL-1 and CULTURAL-2.

CULTURAL-6: Tribal Observer. Prior to any ground disturbances within the Project area, the Applicant shall, for a period of at least 60 days, make a good faith effort to enter into a contract with and retain monitors designated by Tribal representatives. These monitors shall be known as the Tribal Observer for this Project. Documentation of efforts shall be submitted to the BLM and County Archaeologists.

CULTURAL-7: Cultural Resources Monitoring Report. Prior to the final inspection of the first building permit, the Applicant shall prompt the Project Archaeologist to submit one (1) wet-signed hard copy and one (1) CD of a Cultural Resources Monitoring Report that meets BLM Manual requirements and also complies with the current Riverside County Planning Department’s requirements for Phase IV Cultural Resource Monitoring Reports. The report shall include documentation of the required cultural/historical sensitivity training for the construction staff held during the pre-grade meeting, which shall include the BLM and County Archaeologist, unless no County representative is available. BLM and County Archaeologists shall review the report to determine adequate mitigation compliance. The accepted report shall be submitted to the BLM, County, Eastern Information Center, the Patton Memorial Museum, and interested tribes.

G.6 ENVIRONMENTAL JUSTICE

No mitigation measures are specifically recommended for environmental justice impacts. Mitigation measures are proposed to reduce impacts for several of the specific resource areas which could result in disproportionately high or adverse impacts on minority and/or low-income populations, including air quality, recreation, transportation and traffic, visual resources, and water resources. These were considered as part of the environmental justice analysis.

G.7 GEOLOGY AND SOILS

The following Project-specific mitigation measures were developed to reduce and/or avoid potential impacts associated with geologic hazards, and potential impacts to soil resources associated with the Project and alternatives.

GEO-1: Conduct geotechnical studies to assess soil characteristics and aid in appropriate foundation design. The Applicant and/or its contractor shall perform a design-level geotechnical study that includes subsurface exploration and material testing necessary to determine the 2013 CBC seismic design category and site soil class for which each of the Project components must be designed. The geotechnical study shall address geologic hazards including, but not necessarily limited to, slope stability, rock fall hazards, landslide hazards, surface fault rupture, fissures, liquefaction potential, collapsible and/or expansive soils, hydroconsolidation, subsidence, wind and water erosion, debris flows, seiche, and groundshaking potential. Based on the nature, location and severity of adverse soil conditions, the geotechnical study shall recommend appropriate and feasible design features necessary to reduce the potential for liquefiable, expansive, corrosive or collapsible soils to adversely affect DQSP facilities. Such measures might include use of corrosion-resistant materials and coatings; use of non-corrosive, non-expansive backfills; use of cathodic protection systems; soil-treatment processes; redirection of surface water and drainage away from expansive foundation soils; and/or any other combination of soil preparation methods or foundation designs necessary to avoid or reduce the adverse effects of soils on Project structures.

Studies shall be carried out by a registered geologist or certified geotechnical engineer, and shall conform to industry standards of care and ASTM standards for field and laboratory testing. For completeness and direct correlation to the Proposed Action, the Applicant shall provide the geotechnical consultant with the most recent copy of the Project case exhibit (tract map, parcel map, plot plan, etc.) for incorporation into the report. Furthermore, the consultant shall plot all appropriate geologic and geotechnical data on this case exhibit and include it as an appendix/figure/plate in their report. Study results and proposed solutions shall be provided for review and approval to the BLM at least 60 days before final Project design, and to the County Engineering Geologist prior to scheduling the case for a public hearing.

G.8 PROJECT DESIGN

The following Project-specific mitigation measures were developed to reduce and/or avoid potential impacts associated with the Project and alternatives design.

GHG-1: Seal Circuit Breakers. All SF_6-containing circuit breakers that will be installed for each power unit shall be hermetically sealed.

G.9 HAZARDS AND HAZARDOUS MATERIALS

The following Project-specific mitigation measures were developed to reduce and/or avoid potential hazard and hazardous materials impacts associated with the Proposed Action and alternatives.

HAZ-1: Site-Specific Hazardous Materials Management and Emergency Response Plan. Prior to the Notice to Proceed, the Applicant shall prepare and implement a site-specific Hazardous Materials Management and Emergency Response Plan. The plan shall identify the chemicals potentially present in onsite soils, health and safety hazards associated with those chemicals, monitoring to be performed during site activities, soil handling and disposal methods required to minimize the potential for harmful exposures, appropriate personal protective equipment, and emergency response procedures. The Plan shall be included in and implemented as part of the Project’s larger Safety and Health Program. The plan shall be submitted to the BLM and County for approval prior to commencement of construction activities and shall be distributed to all construction crew members prior to construction, operation, and decommissioning of the Project.

The Phase I Environmental Site Assessment (ESA) conducted for the Project site in 2015 identified two suspected groundwater supply wells, which were observed to be open and unsecured. In addition, hazardous substances, in the form of partially-filled oil and lubricant containers and other trash and debris, were observed on the private land parcel. There have been no subsequent response actions, including securing of the groundwater wells or sampling of environmental media, to verify whether site contamination currently exists. Prior to a notice to proceed for construction, the Applicant shall conduct additional hazardous substances investigations to establish a baseline hazardous contamination condition of groundwater and soils at the site. Hazardous materials containers currently onsite shall be removed and disposed properly. Soils in the area of these containers shall be sampled to determine whether contaminated soils are present. If present, contaminated soils shall be removed and disposed properly prior to construction in those areas. The Applicant shall sample groundwater in the vicinity of the two wells to document pre-Project groundwater quality, and then cap and secure any existing wells not used for construction or operations. Water quality and hazardous release testing of all wells and leach field would be conducted on a monthly basis and reported to the BLM Authorized Officer.

HAZ-2: Broken PV Module Detection and Handling. Damaged or broken modules shall be recycled or disposed of in an appropriately licensed landfill.

HAZ-3: Aircraft Safety Consultation. The Applicant shall consult with FAA to determine the requirements for filing FAA Forms 7460-1, Notice of Proposed Construction or Alteration, and 7460-2, Notice of Actual Construction or Alteration at least 45 days prior to the start date of construction. If such filing is required, the Applicant shall receive a “Determination of No Hazard to Air Navigation” in order to proceed.

UXO-1: UXO Identification, Training, and Reporting Plan. The Applicant shall prepare and implement a UXO Identification, Training, and Reporting Plan to properly train all site workers in the recognition, avoidance, and reporting of military waste debris and ordnance. The Applicant shall submit the plan to the BLM for review and approval prior to the start of construction. The plan shall contain, at a minimum, the following:

1. A description of the training program outline and materials, and the qualifications of the trainers;
2. Identification of available trained experts that will respond to notification of discovery of any suspected ordnance (unexploded or not);
3. Procedures to stop work immediately in the vicinity of suspected UXO and to notify the local CUPA and the U.S. Army Corps of Engineers;
4. A work plan to recover and remove discovered ordnance, and complete additional field screening, possibly including geophysical surveys to investigate adjacent areas for surface, near-surface or buried ordnance in all proposed land disturbance areas.
5. Documentation of all surveys and investigations performed to evaluate and remove discovered ordnance.

The Applicant shall submit the UXO Identification, Training, and Reporting Plan to the BLM for approval no less than 30 days prior to the initiation of construction activities at the site or within the linear corridors, as appropriate. The results of geophysical surveys shall be submitted to the BLM within 30 days of completion of the surveys.

TLSN-1: Radio Frequency Interference. The Applicant shall limit the conductor surface electric gradient in accordance with the IEEE Radio Noise Design Guide for High-Voltage

Transmission Lines. After energizing the gen-tie line, the Applicant shall respond to and document all radio frequency interference complaints received and the responsive action taken. These records shall be made available to the BLM for review upon request.

G.10 LANDS, REALTY, AND AGRICULTURAL AND FORESTRY RESOURCES

No mitigation measures are required to reduce impacts related to lands and realty and land use planning. The Project would conform to power industry standards and best practices for the co-location of utility lines. Where the IOPs associated with use of the Section 368 corridor require mitigation, that mitigation is considered under the applicable resource sections, as shown in Appendix F, Table F-1.

G.11 MINERAL RESOURCES

No mitigation measures are recommended.

G.12 NOISE

The following mitigation measures would be imposed by the BLM to avoid or reduce noise impacts on residents:

NOISE-1: Noise Level Monitoring. The Applicant shall monitor noise levels at the NNSR location daily for one week before and for one week at the beginning of Month 6, when overlap of construction activity #3 and activity #5 (as defined in the Applicant's Noise Technical Report, URS 2015) begins, to verify that energy equivalent noise levels (Leq) measured over a 20-minute period do not increase between the two measurement periods by more than 10 dBA. If this limit is not exceeded, the Applicant may present results to BLM and the County to request that the requirement for further monitoring be eliminated. If the limit is exceeded, the Applicant shall work with BLM, the County, and affected residents to achieve the necessary reduction or otherwise mitigate the effect.

G.13 PALEONTOLOGICAL RESOURCES

The following mitigation measures would be imposed by the BLM to avoid and, if necessary, mitigate any impacts to paleontological resources:

PAL-1: Project Paleontologist. Prior to the issuance of a Notice to Proceed by BLM, a qualified paleontologist approved by the BLM to serve as Project Paleontologist shall be retained by the project owner. This individual shall retain a BLM paleontological resource use permit for the project and a paleontological permit from the County of Riverside. To do so, this individual shall have the following qualifications as stipulated in BLM Manual 8270-1 Chapter IV:

1. Professional instruction in a field of paleontology relevant to the work proposed (vertebrate, invertebrate, trace, paleobotany, etc.), obtained through:

a. Formal education resulting in a graduate degree from an accredited institution in paleontology, or in geology, biology, botany, zoology or anthropology if the major emphasis is in paleontology; or

b. Equivalent paleontological training and experience including at least 24 months under the guidance of a professional paleontologist who meets qualification above that provided increased responsibility leading to professional duties similar to those in qualification above; and

2. Demonstrated experience in collecting, analyzing, and reporting paleontological data, similar to the type and scope of work proposed in the application;

3. Demonstrated experience in planning, equipping, staffing, organizing, and supervising crews performing the work proposed in the application;

4. Demonstrated experience in carrying paleontological projects to completion as evidenced by timely completion and/or publication of theses, research reports, scientific papers and similar documents.

The project owner shall provide the BLM Authorized Officer with the resume and qualifications of its Project Paleontologist for review and approval. The Project Paleontologist resume shall include the names and phone numbers of references. The resume shall also demonstrate to the satisfaction of the BLM Authorized Officer the appropriate education and experience to accomplish the required paleontological resource tasks. If the approved Project Paleontologist is replaced prior to completion of project mitigation and submittal of the Paleontological Resources Report, the project owner shall obtain BLM Authorized Officer approval of the replacement Project Paleontologist.

As described in BLM IM 2009-011, the Project Paleontologist will serve as the Principal Investigator (PI) under the BLM permit and is responsible for all actions under the permit, for meeting all permit terms and conditions, and for the performance of all other personnel. This person is also the contact person for the project proponent and the BLM.

Additional Paleontological Staff – The Project Paleontologist may obtain the services of Paleontological Field Agents, Field Monitors, and Field Assistants, if needed, to assist in mitigation, monitoring, and curation activities. These individuals must meet the qualifications as stipulated in BLM Manual 8270 1 Chapter IV and BLM IM 2009-011, and their resumes must be reviewed and approved by BLM as part of the BLM paleontological resource use permit process.

PAL-2: Materials for Project Paleontologist and BLM Authorized Officer. The project owner shall provide to the Project Paleontologist and the BLM Authorized Officer, for approval, maps and drawings showing the footprint of the power plant, construction lay-down areas, and all related facilities. Maps shall identify all areas of the Project where ground disturbance is anticipated. If the Project Paleontologist requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the Project Paleontologist and BLM Authorized Officer. The site grading plan, and plan and profile drawings for the utility lines would be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances and be at a scale between 1 inch = 40 feet and 1 inch = 100 feet. If the footprint of the Project or its linear facilities changes, the project owner shall provide maps and drawings reflecting those changes to the Project Paleontologist and BLM Authorized Officer.

If construction of the Project proceeds in phases, maps and drawings may be submitted prior to the start of each phase. A letter identifying the proposed schedule of each project phase shall be provided to the Project Paleontologist and BLM Authorized Officer. Before work commences on affected phases, the project owner shall notify the Project Paleontologist and BLM Authorized Officer of any construction phase scheduling changes.

At a minimum, the project owner shall ensure that the Project Paleontologist or Paleontological Resources Monitor (PRM) consults weekly with the project superintendent or construction field manager to confirm area(s) to be worked the following week and until ground disturbance is completed.

PAL-3: Paleontological Resources Monitoring and Mitigation Plan (PRMMP). Prior to the issuance of a Notice to Proceed by BLM, the Project Paleontologist shall submit a Paleontological Resources Mitigation and Monitoring Plan (PRMMP) for the Project to the BLM for review and approval. The appropriate Paleontology Lead or Regional Paleontologist shall review the plan for sufficiency prior to acceptance. Approval of the PRMMP by the BLM Authorized Officer shall occur prior to any ground disturbance.

The PRMMP shall be prepared and implemented under the direction of the Project Paleontologist and shall address and incorporate MM PAL-1 through MM PAL-8. The PRMMP shall be prepared at the sole expense of the project proponent, and meet all current BLM and Riverside County regulatory requirements, including BLM 8270 manual and handbook, BLM IM No. 2009-011 Assessment and Mitigation of Potential Impacts to Paleontological Resources, and BLM IM No. 2016-124 Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands. The PRMMP shall also comply with the Paleontological Resources Protection Act and final DOI PRPA rules.

The PRMMP shall function as the formal guide for survey, monitoring, collecting, and sampling activities and may be modified with BLM Authorized Officer approval. This document shall be used as the basis of discussion when on-site decisions or changes are proposed. Copies of the PRMMP shall reside with the Project Paleontologist, each monitor, the project owner's on-site manager, and the BLM Authorized Officer.

A monitoring plan indicates the avoidance or treatments recommended for the area of the proposed disturbance and must minimally address the following:

1. The design of a PFYC assessment and pedestrian paleontological survey (MM PAL-5) for any as-of-yet unsurveyed Project areas with PFYC 3, 4, 5, or unknown classification, the results of which will be used to map impact areas affecting geologic units with moderate to high sensitivity that will require monitoring or spot-checking during construction;

2. A coordination strategy to ensure that a qualified paleontologist (MM PAL-1) will conduct paleontological survey and monitoring at the appropriate locations at the appropriate intensity;

3. The significance criteria to be used to determine which resources will be avoided or recovered for their data potential;

4. Procedures for the discovery, recovery, preparation, and analysis of paleontological resources encountered during construction, in accordance with standards for recovery established by the SVP and the BLM;

5. Provisions for verification that the project proponent has an agreement with a recognized museum repository, for the disposition of recovered fossils and that the fossils shall be prepared prior to submittal to the repository as required by the repository (e.g., prepared, analyzed at a laboratory, curated, or cataloged);

6. Specifications that all paleontological work undertaken by the project proponent on public land shall be carried out by qualified paleontologists with appropriate current permits (MM PAL-1), including but not limited to a Pale- ontological Resources Use Permit (for work on public lands administered by BLM) and a Riverside County permit (for work on lands administered by the County of Riverside);

7. Description of monitoring reports that will be prepared which shall include daily logs, monthly reports, and a final monitoring report with an itemized list of specimens found to be submitted to the BLM, the Riverside County Planning Department, the project proponent and the designated repository within 90 days of the completion of monitoring;

8. The implementation sequence and the estimated time frames needed to accomplish all project-related tasks during the ground-disturbance and post- ground–disturbance analysis phases of the project shall be specified; and

9. Person(s) expected to perform each of the tasks, their responsibilities, and the reporting relationships between project construction management and the mitigation and monitoring team shall be identified.

10. All impact-avoidance measures (such as flagging or fencing) to prohibit or otherwise restrict access to sensitive resource areas that are to be avoided during ground disturbance, construction, and/or operation shall be described. Any areas where these measures are to be implemented shall be identified. The description shall address how these measures would be implemented prior to the start of ground disturbance and how long they would be needed to protect the resources from project-related impacts.

PAL-4: Approved Training Pertaining to Ground Disturbance. Prior to ground disturbance and for the duration of construction activities involving ground disturbance, the project owner and the Project Paleontologist shall prepare and conduct BLM Authorized Officer -approved training for the following workers: project managers, construction supervisors, foremen, and general workers involved with or who operate ground-disturbing equipment or tools. Workers shall not excavate in sensitive units prior to receiving BLM Authorized Officer-approved worker training. Worker training shall consist of an initial in-person Project Paleontologist training or may utilize a BLM Authorized Officer-approved video or other presentation format during the project kickoff for those mentioned above. Following initial training, a BLM Authorized Officer-approved video or other approved training presentation/materials, or in-person training may be used for new employees. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or other areas of interest or concern. No ground disturbance shall occur prior to BLM Authorized Officer-approval of the Worker Environmental Awareness Program (WEAP), unless specifically approved by the BLM Authorized Officer.

The WEAP shall address the possibility of encountering paleontological resources in the field, the sensitivity and importance of these resources, and legal obligations to preserve and protect those resources.

The training shall include:

1. A discussion of applicable laws and penalties under the law;
2. Good quality photographs or physical examples of vertebrate fossils for project sites containing units of high paleontologic sensitivity;
3. Information that the Project Paleontologist or PRM has the authority to halt or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource;
4. Instruction that employees are to halt or redirect work in the vicinity of a find and to contact their supervisor and the Project Paleontologist or PRM;
5. An informational brochure that identifies reporting procedures in the event of a discovery;
6. A WEAP certification of completion form signed by each worker indicating that he/she has received the training; and
7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

PAL-5: Pedestrian Paleontological Survey. Prior to the Final EIS, the project owner shall ensure completion of a pedestrian paleontological survey (PPS), as described in the PRMMP prepared by the Project Paleontologist and approved by the BLM Authorized Officer (MM PAL-3). The PPS shall be completed at the sole expense of the project proponent, and meet all current BLM and Riverside County regulatory requirements, including BLM 8270 manual and handbook, BLM IM No. 2009-011 Assessment and Mitigation of Potential Impacts to Paleontological Resources, and BLM IM No. 2016-124 Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands. The PPS shall also comply with the Paleontological Resources Protection Act and final DOI PRPA rules. The Project Paleontologist shall oversee and implement the BLM-approved PPS, which shall include a PFYC assessment and survey for any as-of-yet unsurveyed Project areas with PFYC 3, 4, 5, or unknown classifications. The results of the PPS shall be used to map impact areas affecting geologic units with moderate to high sensitivity that will require monitoring or spot-checking during construction. Final results of the PPS shall be included in the PRR (MM PAL-8).

PAL-6: Paleontological Monitoring Activities. The project owner shall ensure that the Project Paleontologist and PRM(s) monitor consistent with the PRMMP in all construction-related grading, excavation, trenching, and augering in areas where potential fossil-bearing materials have been identified, both at the site and along any constructed linear facilities associated with the Project. In the event that the Project Paleontologist determines full-time monitoring is not necessary in locations that were identified as potentially fossil bearing in the PRMMP, the project owner shall notify and seek the concurrence of the BLM Authorized Officer. The project owner shall ensure that the Project Paleontologist and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the Project Paleontologist. Monitoring activities shall be conducted as follows:

1. Any change of monitoring from the accepted schedule in the PRMMP shall be proposed in a letter or email from the Project Paleontologist and the project owner to the BLM Authorized Officer prior to the change in monitoring and will be included in the monthly compliance

report. The letter or email shall include the justification for the change in monitoring and be submitted to the BLM Authorized Officer for review and approval.

2. The project owner shall ensure that the PRM(s) keep a daily monitoring log of paleontological resource activities. The Project Paleontologist may informally discuss paleontological resource monitoring and mitigation activities with the BLM Authorized Officer at any time.

3. The project owner shall ensure that the Project Paleontologist notifies the BLM Authorized Officer within 24 hours of the occurrence of any incidents of non-compliance. The Project Paleontologist shall recommend corrective action to resolve the issues.

4. For any significant paleontological resources encountered, either the project owner or the Project Paleontologist shall notify the BLM Authorized Officer within 24 hours, or Monday morning in the case of a weekend event, where construction has been halted because of a paleontological find. The project owner shall ensure that the Project Paleontologist prepares a summary of monitoring and other paleontological activities placed in the monthly compliance reports. The summary will include the name(s) of Project Paleontologist or PRM(s) active during the month; general descriptions of training and monitored construction activities; and general locations of excavations, grading, and other activities. A section of the report shall include the geologic units or subunits encountered, descriptions of samplings within each unit, and a list of identified fossils. A final section of the report will address any issues or concerns about the Project relating to paleontologic monitoring, including any incidents of non-compliance or any changes to the monitoring plan that have been approved by the BLM Authorized Officer. If no monitoring took place during the month, the report shall include an explanation in the summary as to why monitoring was not conducted.

PAL-7: Implementation of PRMMP. The project owner, through the designated Project Paleontologist, shall ensure that all components of the PRMMP are adequately performed including completion of the PPS, collection of fossil materials, preparation of fossil materials for analysis, analysis of fossils, identification and inventory of fossils, the preparation of fossils for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during PPS and project construction.

PAL-8: Paleontological Resources Report (PRR). The project owner shall ensure preparation of a Paleontological Resources Report (PRR) by the designated Project Paleontologist. The PRR shall be prepared within 30 days following completion of ground-disturbing activities. The PRR shall include an analysis of the collected fossil materials and related information and submit it to the BLM Authorized Officer for review and approval. The report shall include, but is not limited to determinations of sensitivity and significance; a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; and a statement by the Project Paleontologist that project impacts to paleontological resources have been mitigated below the level of significance. At a minimum the final report must include the following details as specified by BLM IM 2009-011:

1. Name, affiliation, address, date of report, and permit number (if consultant) of the paleontologist doing the survey.

2. Project name and number (if used), name of proponent, and general location of project.

3. Date(s) of the survey and names of any personnel assisting with the survey.

4. Brief description of project and expected impacts to paleontological resources.

5. A summary of mitigation performed.

6. A summary of findings, including important discoveries.

7. A description of potentially fossiliferous areas to allow for future assessment of sites, even if no fossils were located during the project monitoring.

8. A completed BLM locality form 8270-3 or equivalent for each new locality using Universal Transverse Mercator (UTM) NAD 83 coordinates, and 1:24000 scale maps with new localities plotted using points or polygons as appropriate. Locality forms, maps, and any other information containing specific fossil locations should be bound separately or assembled as a separate section to allow for preservation of confidential locality data.

9. List of specimen field numbers and field identifications of collected material, cross-referenced to the locality field number.

G.14 RECREATION AND PUBLIC ACCESS

The following mitigation measures would be imposed by the BLM to avoid or reduce impacts on recreation and public access:

REC-1: Access to Mule Mountains ACEC. The Applicant shall ensure that the alternative access route to the Mule Mountains ACEC (identified in Figure 3.14-3) is accessible by performing light clearing and grading prior to Project construction, and then periodically throughout the duration of the Project. The alternative access route shall be marked by signage provided by the Applicant, and supported by the installation of a kiosk at a location to be determined by BLM. The Applicant shall conduct recording of historic/prehistoric trails prior to ground disturbance. Biological monitoring shall be performed during active ground disturbance.

The Applicant shall prepare and distribute interpretive materials, approved by the AO, including a construction schedule, safety information regarding trucks and other heavy equipment on local roads, and available open OHV routes to users of the Midland, Mule Mountains, and La Posa Long-Term Visitor Areas (LTVAs), Wiley's Well and Coon Hollow Campgrounds, and BLM kiosks announcing the development of the solar facilities at the Project site and the closure of the affected public land and six open routes to recreational use. The Applicant shall prepare a one-page fact sheet about the Project and submit it to the Palm Springs-South Coast Field Office for review. The BLM AO shall approve the draft materials prior to distribution.

REC-2: Temporary Route Closure. No less than 60 days prior to construction and maintenance of the gen-tie line, the Applicant shall coordinate with the AO administering the NECO Plan-designated route 660703 to establish temporary closure of the route to avoid construction/maintenance area hazards, if the route is deemed unsafe to use during construction or maintenance of the gen-tie line. The Applicant shall post a public notice of the temporary route closure and penalties for any off-route OHV activities, and shall coordinate the closure with applicable emergency response agencies. The Applicant shall document its coordination efforts with the AO and submit this documentation to the BLM and other agencies affected at least 30 days prior to construction.

REC-3: Use of LTVAs. The Applicant shall encourage Project workers to utilize local housing or private RV parks in Blythe and/or nearby communities. The Applicant shall encourage Project workers to utilize local housing or private RV parks in Blythe and/or nearby communities. If the Applicant sees a need to use the LTVAs, the Applicant shall seek additional authorization from the BLM prior to their use. If the BLM authorizes use of the LTVA, the BLM shall monitor the impact of workers using the LTVAs, including space and experience for recreational users, and condition of access roads to the LTVAs. Workers would only use the campgrounds during the LTVA season, and must supply their own water from offsite. The Applicant shall coordinate with the County to provide either hardening of the access roads, or monthly blading during the LTVA season.

G.15 SOCIAL AND ECONOMIC EFFECTS

No mitigation measures are recommended.

G.16 SPECIAL DESIGNATIONS AND LANDS WITH WILDERNESS CHARACTERISTICS

No mitigation measures would be imposed by the BLM related to special designations or lands with wilderness characteristics.

G.17 TRANSPORTATION AND TRAFFIC

The following Project-specific mitigation measures were developed to reduce and/or avoid potential transportation and traffic impacts associated with the Proposed Action and alternatives.

TRN-1: Traffic Monitoring and Control Plan. Prior to the start of ground disturbance and issuance of a County grading permit, the Applicant's Traffic Monitoring and Control Plan shall be submitted to the BLM and County for approval. The Traffic Monitoring and Control Plan, described in APM TRA-2, shall be developed and implemented to include the following features:

1. The Applicant and/or its contractor shall coordinate development and implementation of this plan with the BLM and other jurisdictional agencies (e.g., Riverside County and Caltrans), as appropriate.
2. To the extent applicable, the traffic control plan shall conform to Part 6 (Temporary Traffic Control) of the California Manual on Uniform Traffic Control Devices (Caltrans 2010), and shall include, but not be limited to, the following elements:
3. Implementing circulation and detour plans to minimize impacts on local road circulation during temporary lane closures. Flaggers and/or signage shall be used to guide vehicles through and/or around the work zone.
4. Identifying truck routes designated by Riverside County and local jurisdictions. Haul routes that minimize truck traffic on local roadways shall be utilized to the extent possible.
5. Providing sufficient-sized staging areas for trucks accessing work zones to minimize disruption of access to adjacent public right-of-ways.

6. Scheduling truck trips outside the peak morning and evening commute hours to the extent possible.
7. Limiting the duration of lane closures to the extent possible.
8. Storing all equipment and materials in designated contractor staging areas on or adjacent to the worksite, such that traffic obstruction is minimized.
9. Implementing roadside safety protocols. Advance “Road Work Ahead” warning and speed control signs (including those informing drivers of state-legislated double fines for speed infractions in a work zone) shall be posted to reduce speeds and provide safe traffic flow through the work zone.
10. Providing advance notification to administrators of police and fire stations (including fire protection agencies), ambulance service providers, and recreational facility managers of the timing, location, and duration of construction and decommissioning activities and the locations of detours and lane closures, where applicable. Maintain access for emergency vehicles within, and/or adjacent to, roadways affected by construction and decommissioning activities at all times.
11. Repairing and restoring adversely affected roadway pavements to their pre-construction condition.

TRN-2: Coordinated Transportation Management Plan. Prior to construction, the Applicant shall develop a Coordinated Transportation Management Plan and work with the BLM and Riverside County to prepare and implement a plan for roadways adjacent to and directly affected by the planned Project facilities, and to address the transportation impact of the multiple overlapping construction projects within the vicinity of the Project in the region. The Coordinated Transportation Management Plan shall include, but not be limited to, the following requirements:

1. Coordination of individual traffic control plans for the Project and nearby projects.
2. Coordination between the contractor and Riverside County in developing circulation and detour plans that include safety features (e.g., signage and flaggers). The circulation and detour plans shall address:
    - Full and partial roadways closures;
    - Circulation and detour plans to include the use of signage and flagging to guide vehicles through and/or around the construction zone, as well as any temporary traffic control devices;
    - Bicycle detour plans, where applicable;
    - Parking along arterial and local roadways; and
    - Haul routes for construction trucks and staging areas for instances when multiple trucks arrive at the work sites.
3. Protocols for updating the Coordinated Transportation Management Plan to account for delays or changes in the schedules of individual projects.

The Coordinated Transportation Management Plan shall incorporate an access road siting and management plan, and transportation plan for the transport of transmission tower components and equipment, in accordance with the requirements of the IOPs for the Section 368 corridor.

The Coordinated Transportation Management Plan shall be submitted to the BLM and County for approval prior to the start of ground disturbance and issuance of a County grading permit.

TRN-3: Reduce Construction Worker Vehicles. Prior to the Notice to Proceed, APM TRA-1 shall be modified to further reduce the number of construction worker vehicles leaving the Project site during the PM peak hour, such that the intersection of SR-78/16th Avenue operates at LOS C or better. The Applicant used an iterative analysis to determine that a maximum of 650 vehicles during the PM peak hour was necessary to achieve operation of the intersection at LOS D. The Applicant shall re-perform the iterative analysis to determine the maximum number of vehicles necessary to achieve operation of the intersection at LOS C, and then implement the measure to limit the vehicles to this number. The revised analysis shall be submitted to BLM and the County for review and approval.

TRN-4: Improve Access Road. Prior to construction of the Project fence, solar facility, gen-tie, temporary construction areas, and other facilities, the Applicant shall complete improvements to 16th Avenue/Seeley Avenue between Neighbours Boulevard (State Route 78) and the site entrance. The current unpaved road shall be paved with 32-foot wide asphalt concrete pavement designed for truck traffic, and 8-foot graded shoulders per County Standard No. 106. The paving shall include improvement of the intersection of 16th Avenue/Seeley Avenue and State Route 78 to allow for a turning lane off of 16th Avenue/Seeley Avenue onto State Route 78.

Prior to road construction, survey monuments shall be located and tied out, and corner records filed with the County Surveyor. A grading plan shall be submitted to the County transportation department for review and approval prior to issuance of a grading permit. Completion of road improvements shall not imply acceptance for maintenance by the County. Traffic signing and striping shall be performed by the County, with all costs borne by the Applicant, unless otherwise approved by the County Traffic Engineer.

Table G-17-1. Impacts and Mitigation Associated with Mitigation Measure TRN-4

Resource	Affected Environment	Impacts	Applicable Mitigation
Air Resources	Regional description of the Project area in Section 3.2 applies to the entire access road. Access road may pass closer to locations of residents than the Project itself.	Additional criteria pollutant and greenhouse gas emissions would occur from vehicle worker travel and equipment used to construct this project. Since the activities associated with TRN-4 would occur before construction of the project, and since the numbers of workers, equipment, and acreage of dust disturbance would be less than that of the Project, (for example, 20 acres of disturbance vs. 3,770 for the Proposed Action), emissions would not likely exceed the Construction Daily Emission Estimations reported for the Proposed Action in Table 4.2-2, or increase the Construction Annual Emission Estimations reported in Table 4.2-3. Even with several sets of pavers, rollers, and other equipment operating simultaneously, their emissions would not exceed maximum daily emissions thresholds for criteria pollutants, based on modeling of a recent smaller but similar roadway repaving project in Riverside County (Urban Crossroads 2018). Emissions and odors may occur in close proximity to residences and businesses along the roadway. These would be temporary, occurring only for less than a day or two as construction moved past each specific receptor. Once constructed, the paved road would reduce the fugitive dust emissions reported in Tables 2.4-2 and 4.2-3, a beneficial effect of this measure.	Dust Control Plan (AQ-1), and Construction Emissions Reduction (AQ-3)

Table G-17-1. Impacts and Mitigation Associated with Mitigation Measure TRN-4

Resource	Affected Environment	Impacts	Applicable Mitigation
Biological Resources - Vegetation	Regional description of the Project area in Section 3.3 applies to the entire access road. Resources expected to be limited/non-existent within the existing ROW. Specific presence of resources to be determined in pre-construction surveys (see mitigation measures)	Since all paving activities would occur within the previously existing easement, and pre-construction surveys would be required to identify any potentially impacted special-status plants or state jurisdictional waters adjacent to the roadway, no impacts would occur.	Designated Biologist (VEG-1 through 5), Worker Environmental Awareness Program (VEG-6), Biological Resources Mitigation, Implementation, and Monitoring Plan (APM-BIO-1 and VEG-7), General Construction Measures and Plans (APM-BIO-2, APM-BIO-3, and VEG-8), Special Status Plant Avoidance and Vegetation Resources Management Plan (APM-BIO-4 and VEG-9), Mitigation for Impacts to State Jurisdictional Waters (VEG-10), and Integrated Weed Management Plan (APM-BIO-5)
Biological Resources - Wildlife	Regional description of the Project area in Section 3.4 applies to the entire access road. Resources expected to be limited/non-existent within the existing ROW. Specific presence of resources to be determined in pre-construction surveys (see mitigation measures)	Since all paving activities would occur within the previously existing easement, pre-construction surveys would be required to identify any potentially impacted special-status wildlife or birds adjacent to the roadway, and Biological Monitoring of construction activities would be required, no impacts would occur.	Pre-construction tortoise survey and avoidance (WIL-1), tortoise translocation (WIL-2), notifications and reporting (WIL-3), Raven Management Plan (WIL-5), Bird and Bat Conservation Strategy (WIL-6), pre-construction nest surveys (WIL-7), badger and kit fox protection (WIL-9), Burrowing Owl protection (WIL-10), and Couch’s spadefoot toad protection (WIL-12)

Table G-17-1. Impacts and Mitigation Associated with Mitigation Measure TRN-4

Resource	Affected Environment	Impacts	Applicable Mitigation
Cultural Resources	Regional description of the Project area in Section 3.5 applies to the entire access road. Resources expected to be limited/non-existent within the existing ROW. Specific presence of resources to be determined in pre-construction surveys (see mitigation measures)	Since all paving activities would occur within the previously existing easement, pre-construction surveys would be required to identify any potentially impacted cultural resources within or adjacent to the roadway, and monitoring of construction activities would be required, no impacts would occur.	Unanticipated human remains (private land section of CULTURAL-3), unanticipated cultural resources (non-Federal land requirements of CULTURAL-4), Tribal Observer (CULTURAL-6), and Cultural Resources Monitoring Report (CULTURAL-7)
Environmental Justice	Regional description of the Project area in Section 3.6 applies to the entire access road. No other site-specific resources expected.	The paved roadway would not affect environmental justice populations. No impacts are expected.	None.

Table G-17-1. Impacts and Mitigation Associated with Mitigation Measure TRN-4

Resource	Affected Environment	Impacts	Applicable Mitigation
Geology and Soils	Regional description of geologic hazards in the Project area in Section 3.7 applies to the entire access road. No other site-specific geologic resources or hazards expected within existing roadway. Soils within the roadway have already been disturbed.	The paved roadway would not be affected by geologic or soil hazards. No impacts are expected.	None.
Global Climate Change	Regional description of the Project area in Section 3.8 applies to the entire access road.	Additional greenhouse gas emissions would occur from vehicle worker travel and equipment used to construct this project. These emissions are expected to be nominal compared to those of the Proposed Action.	None.
Hazards and Hazardous Materials	Regional description of the Project area in Section 3.9 applies to the entire access road. No other site-specific hazards expected within existing roadway.	As with the Proposed Action, releases of hazardous materials could occur if any unknown materials are encountered during ground disturbance, or if releases occur from vehicles or equipment. In general, the potential for releases is expected to be minimal compared to that of the Project, due to a much shorter duration of construction, and much reduced amount of equipment and vehicles. With compliance with the Hazardous Materials Management and Emergency Response Plan, impacts are expected to be less than significant.	Hazardous Materials Management and Emergency Response Plan (HAZ-1), and UXO Identification, Training, and Reporting (UXO-1)

Table G-17-1. Impacts and Mitigation Associated with Mitigation Measure TRN-4

Resource	Affected Environment	Impacts	Applicable Mitigation
Lands, Realty, and Agricultural and Forestry Resources	Road paving would occur on current County easements, and not on BLM land.	Paving would be limited to the existing easements, and would be in conformance with the conditions and limitations of those easements. The activity would not have any impacts on adjacent lands outside of the easements.	None.
Mineral Resources	Regional description of the Project area in Section 3.11 applies to the entire access road. No other site-specific resources expected within existing roadway.	The paved roadway would not affect mineral resources. No impacts are expected.	None.
Noise	Regional description of the Project area in Section 3.12 applies to the entire access road. Access road may pass closer to locations of residents than the Project itself.	Maximum noise levels from a roller, the noisiest equipment that would be used, would be about 80 dBA at 50 feet (FHWA 2008). The nearest structure to the road is about 800 feet from the road near Woodspur Farms. Based on a typical 6 dB attenuation per doubling of distance, the maximum level would be about 56 dBA at this distance. Riverside County Ordinance 847.1 (Riverside County 2007) sets day and night maximum sound levels at 45 dB for Rural Residential and Agricultural areas; however, it exempts the maintenance or repair of public properties from its restrictions. Since no County standards would be violated and noise from this measure would temporarily affect only one structure during a few days of construction, impacts would be less than significant.	None.

Table G-17-1. Impacts and Mitigation Associated with Mitigation Measure TRN-4

Resource	Affected Environment	Impacts	Applicable Mitigation
Paleontological Resources	Regional description of the Project area in Section 3.13 applies to the entire access road. No other site-specific resources expected within existing roadway.	Since all paving activities would occur within the previously existing easement, pre-construction surveys would be required to identify any potentially impacted resources within or adjacent to the roadway, and monitoring of construction activities would be required, no impacts would occur.	Project Paleontologist (PAL-1, PAL-2), Paleontological Resources Monitoring and Mitigation Plan (APM-Paleo-2, PAL-3, PAL-6, PAL-7, and PAL-8), training prior to ground disturbance (PAL-4), and pedestrian survey (APM-Paleo-1 and PAL-5).
Recreation and Public Access	Regional description of the Project area, including 16th Avenue/Seeley Avenue, in Section 3.14 applies to the entire access road. No other site-specific recreational resources expected along existing roadway.	Travel along this route would be temporarily delayed during construction. Since these impacts would be temporary, impacts would be less than significant. After construction is completed, access to public lands would improve as a result of roadway improvements.	Coordinate temporary closure of 16th Avenue/Seeley Avenue with County, local residents, and emergency services (REC-2).
Social and Economic Effects	Regional description of the Project area in Section 3.15 applies to the entire access road.	The paved roadway would not require a substantial number of workers, or works with skills that are not readily available. No impacts are expected.	None.

Table G-17-1. Impacts and Mitigation Associated with Mitigation Measure TRN-4

Resource	Affected Environment	Impacts	Applicable Mitigation
Special Designations	Regional description of the Project area in Section 3.16 applies to the entire access road. No other site-specific special designation areas expected along existing roadway.	The paved roadway would not affect any special designation areas. No impacts are expected.	
Transportation and Traffic	Regional description of the Project area, including 16th Avenue/Seeley Avenue, in Section 3.17 applies to the entire access road.	Traffic on 16th Avenue/Seeley Avenue would be disrupted during construction, possibly to include temporary closure and/or detours. The Traffic Monitoring and Control Plan and Coordinated Transportation Management Plan would require coordination with the County, local users, and emergency services to minimize impacts. Any impacts are expected to be temporary and localized. This measure would reduce the traffic impacts to the intersection of State Route 78 with 16th Avenue/Seeley Avenue during Project construction, a beneficial effect of this measure.	Traffic Monitoring and Control Plan (APM-TRA-2 and TRN-1), and Coordinated Transportation Management Plan (TRN-2).
Utilities and Public Services	Regional description of the Project area in Section 3.18 applies to the entire access road. No other site-specific utilities or services expected within existing roadway.	The paving activity would disrupt traffic on 16th Avenue/Seeley Avenue during construction, possibly to include temporary closure and/or detours. The only potential impacts to utilities or public services may be to the use of the roadway by emergency services during construction. The Traffic Monitoring and Control Plan and Coordinated Transportation Management Plan would require coordination with the County, local users, and emergency services to minimize impacts. Any impacts are expected to be temporary and localized.	No mitigation specifically for utilities. However, the Traffic Monitoring and Control Plan (APM-TRA-2 and TRN-1) and Coordinated Transportation Management Plan (TRN-2) required for transportation and traffic impacts would also address potential impacts to emergency services.

Table G-17-1. Impacts and Mitigation Associated with Mitigation Measure TRN-4

Resource	Affected Environment	Impacts	Applicable Mitigation
Visual Resources	Regional description of the Project area in Section 3.19 applies to the entire access road.	The paved roadway would not affect visual resources. No impacts are expected.	Lighting Plan (VIS-1), and Site Restoration (VIS-4).
Water Resources	Regional description of the Project area in Section 3.20 applies to the entire access road. Resources expected to be limited/non-existent within the existing ROW. Specific presence of resources to be determined in pre-construction surveys (see mitigation measures)	The paved roadway would not affect groundwater resources or surface water drainage. No impacts are expected.	SWPPP (WATER-1).
Wildland Fire Ecology	Regional description of the Project area in Section 3.21 applies to the entire access road.	Since all paving activities would occur within the previously existing easement, there is not expected to be any increase in the potential for fire ignitions. No impacts are expected.	Fire Safety Plan (FIRE-1).

References:

FWHA, 2008. Federal Highway Administration's Roadway Construction Noise Model (RCNM) Software Version 1.1, 12/08/2008.

Riverside County 2007. Ordinance No. 847 (As Amended Through 847.1) - An Ordinance of the County of Riverside Amending Ordinance No. 847 Regulating Noise. Amended June 19.

Urban Crossroads, 2018. Limited Decker Road Repairs and Repaving Focused Air Quality and Greenhouse Gas Memorandum. May 16.

G.18 UTILITIES AND PUBLIC SERVICES

No mitigation measures are recommended for impacts to utilities and public services.

G.19 VISUAL RESOURCES

VIS-1: Project Design, Building and Structural Materials. Visual design elements shall be integrated into the construction plans, details, shop drawings and specifications to be submitted to BLM prior to the Notice to Proceed; these shall include, but not be limited to, grubbing and clearing, vegetation thinning and clearing, grading, revegetation, drainage, and structural plans. Visual design elements within the plans shall be measureable and monitored while under construction, while operational, and when decommissioned. A careful study of the site shall be performed to identify appropriate colors and textures for materials; both summer and winter appearance shall be considered as well as seasons of peak visitor use (September 15 to April 15). Visual design elements to be integrated into construction plans, details, shop drawings and specifications shall be based on BLM's *Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands*, and must at a minimum include:

1. Vegetation and ground disturbance associated with access road construction, gen-tie and distribution line installations, and the perimeter access road shall be minimized and take advantage of existing clearings wherever feasible.
2. Materials, coatings, or paints having little or no reflectivity shall be used whenever feasible.
3. Grouped structures, including the water tanks and prefabricated buildings, shall be painted the same color to reduce visual complexity and color contrast.
4. The gen-tie line shall utilize to the extent available and feasible nonspecular conductors and nonreflective coatings on insulators.
5. The choice of color treatments shall be based on the appearance at typical viewing distances and consider the entire landscape around the proposed development as it would be viewed from publically accessible locations. Appropriate colors for smooth surfaces often need to be two to three shades darker than the background color to compensate for shadows that darken most textured natural surfaces. Choice of colors shall be approved by BLM District Office.
6. A lighting plan shall be prepared that documents how lighting will be designed and installed to minimize night-sky impacts during facility construction, operations, and decommissioning. Lighting for facilities shall not exceed the minimum number of lights and brightness required for safety and security, and shall not cause excessive reflected glare. Low- pressure sodium light sources shall be used to reduce light pollution. Full cut-off luminaires shall be used to minimize uplighting. Lights should be directed downward or toward the area to be illuminated. Light fixtures shall not spill light beyond the Project boundary. Lights in highly illuminated areas that are not occupied on a continuous basis shall have switches, timer switches, or motion detectors so that the lights operate only

when the area is occupied. Where feasible, vehicle mounted lights shall be used for night maintenance activities. Wherever feasible, consistent with safety and security, lighting shall be kept off when not in use. The lighting plan shall include a process for promptly addressing and mitigating complaints about potential lighting impacts.

VIS-2: Construction Phase Visual Mitigation. A pre-construction meeting with BLM landscape architects or other designated visual/scenic resource specialists shall be held before construction begins to coordinate on the visual resources mitigation strategy and confirm the compliance- checking schedule and procedures. Final design and construction documents shall be reviewed for completeness with regard to the visual mitigation elements, assuring that requirements and commitments are adequately addressed. The construction documents shall include, but not be limited to grading, drainage, revegetation plans, and must demonstrate how VRM objectives will be met, monitored, and measured for conformance.

Specific measures shall include the following:

1. The Applicant shall reduce visual impacts during construction by clearly delineating construction boundaries and minimizing areas of surface disturbance; preserving existing, native vegetation to the extent feasible; stripping, salvaging, and replacing topsoil as described in the Revegetation Plan.
2. Visual impact mitigation objectives and activities shall be discussed with equipment operators before construction activities begin.
3. Existing rocks, vegetation, and drainage patterns shall be preserved to the extent feasible.
4. Brush-beating or mowing or using protective surface matting rather than removing vegetation shall be employed where feasible.
5. Slash from vegetation removal shall be mulched and spread to cover fresh soil disturbances as part of the revegetation plan.
6. No paint or permanent discoloring agents shall be applied to rocks or vegetation to indicate surveyor construction activity limits.
7. All stakes and flagging shall be removed from the construction area and disposed of in an approved facility.

VIS-3: Operation and Maintenance Phase Visual Mitigation. Terms and conditions for VRM mitigation compliance shall be maintained and monitored for compliance with visual objectives, adaptive management adjustments, and modifications as necessary and approved by the BLM AO. Minimum measures are as follows:

1. The Applicant shall maintain vegetated surfaces until a self-sustaining stand of vegetation is re-established and visually adapted to the undisturbed surrounding vegetation. No new disturbance shall be created during operations without completion of a VRM analysis and approval by the AO.
2. Interim restoration shall be undertaken during the operating life of the Project as soon as possible after disturbances.
3. Painted facilities shall be kept in good repair and repainted when color fades or flakes.

VIS-4: Decommissioning and Site Restoration Plan. A Decommissioning and Site Restoration Plan, covering visual impact mitigation measures, shall be in place prior to construction, and reclamation activities shall be undertaken as soon as possible after disturbances occur and be maintained throughout the life of the Project. The following decommissioning/reclamation activities/practices shall be implemented to partially mitigate visual and other resource impacts associated with solar energy development, where feasible:

1. Pre-development visual conditions and integrity shall be reviewed, and the visual elements of form, line, color, and texture shall be restored to pre-development visual compatibility or to that of the surrounding landscape setting conditions, whichever achieves the better visual quality and most ecologically sound outcome.
2. A Decommissioning and Site Restoration Plan shall be developed, approved by the BLM, and implemented. The plan shall require that all aboveground and near-ground structures be removed. Some structures shall be removed only to a level below the ground surface that will allow reclamation/restoration.
3. Components of the gen-tie line shall be removed to a depth of three feet, and shall be removed promptly. Following decommissioning, the Applicant shall provide BLM survey data showing the locations of all below-grade components of the gen-tie line left in place. Access roads use for decommissioning of the gen-tie line shall follow the paths of the original access roads, to the extent possible.
4. Topsoil from all decommissioning activities shall be salvaged and reapplied during final reclamation. The plan shall include provisions for monitoring and determining compliance with the Project’s visual mitigation and reclamation objectives.
5. Soil borrow areas, cut-and-fill slopes, berms, water bars, and other disturbed areas shall be contoured to approximate naturally occurring slopes, thereby avoiding form and line contrasts with the existing landscapes. The Applicant shall contour to a rough texture (i.e., use large rocks/boulders, grade uneven surfaces, and/or vegetation mulches/debris) in order to trap seed and to discourage off-road travel, thereby reducing associated visual impacts.
6. A combination of seeding, planting of nursery stock, transplanting of local vegetation within the proposed disturbance areas, and staging of decommissioning activities enabling direct transplanting shall be utilized. Where feasible, native vegetation shall be used for revegetating to establish a composition consistent with the form, line, color, and texture of the surrounding undisturbed landscape.
7. Stockpiled topsoil shall be reapplied to disturbed areas. Gravel and other surface treatments shall be removed or buried.
8. Rocks, brush, and vegetal debris shall be restored whenever possible to approximate pre-existing visual conditions.
9. A decommissioning VRM Monitoring and Compliance Plan shall be prepared by the Applicant and approved by the BLM prior to decommissioning activities, which establishes the schedule and terms for monitoring and the conditions and methods of measurement for determining compliance. In review of the plan, BLM will consider the ability of the proposed activities to support BLM’s Long Term Monitoring Strategy for the Riverside East SEZ (BLM 2016).

10. Monitoring for appearance, function, wildlife usage, and general compliance with the restoration provisions of this plan shall be conducted twice annually for 5 years and may be extended for an additional 5 years if the performance standards have not been achieved.
11. A survey of the revegetation areas shall be conducted in the spring of each year. Qualitative data will be collected on vegetation cover, species composition, appearance, and function of the plant community. In addition to qualitative data, quantitative data on vegetation cover and species composition will be collected by using ocular estimates or transects within the revegetation areas. The data collected will be compared against similar data collected within the reference site (i.e., associated undisturbed areas immediately adjacent to the Project site) or pre-disturbance conditions within the Project site.

G.20 WATER RESOURCES

WATER-1: Implementation of a SWPPP. To ensure that stormwater quality is protected during the construction and decommissioning period for the DQSP, as well as any ground disturbance (greater than one acre) maintenance done during the operational period, the Applicant shall comply with the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction and Land Disturbance (Order No. 2009-0009-DWQ) (Construction General Permit), as applicable. Compliance with the Construction General Permit will ensure that the proposed construction activities would include BMPs to manage stormwater and control sediment and other pollutants from leaving the Project construction site. Compliance with the Construction General Permit, if applicable will require completion and implementation of a SWPPP for the DQSP site that shall be in effect during all construction, maintenance, and decommissioning activities for the solar field, the gen-tie line, and all associated facilities. The SWPPP shall identify pollutant sources that may affect the quality of stormwater discharge and shall require the implementation of BMPs to reduce pollutants in storm water discharges.

BMPs may include, but would not be limited to:

1. Stockpiles of loose material shall be covered or otherwise stabilized and runoff diverted away from exposed soil material.
2. To minimize discharge of sediment during storm events, temporary erosion control measures (such as fiber rolls, staked straw bales, detention basins, check dams, geofabric, sandbag dikes, check dams, erosion control blankets, matting, and other fabrics or other ground cover as available) shall be implemented and remain in place until surface sediments can be stabilized.
3. Sediment shall be retained on-site by a system of sediment basins, traps, or other appropriate measures.
4. No disturbed surfaces may be left without erosion control measures in place during the rainy season.
5. Erosion protection shall be provided on all cut-and-fill slopes, and shall be initiated as soon as possible after completion of grading and prior to the onset of the rainy season.

6. Hazardous materials such as fuels and solvents used on the construction sites shall be stored in covered containers and protected from rainfall, runoff, vandalism, and accidental release to the environment. All stored fuels and solvents shall be contained in an area of impervious surface with containment capacity equal to or greater than the volume of materials stored. Spill cleanup materials shall be readily available at all construction sites. Employees shall be trained in spill prevention and cleanup, and individuals shall be designated as responsible for prevention and cleanup activities.
7. Equipment shall be properly maintained in designated areas with runoff and erosion control measures to minimize accidental release of pollutants.
8. Impervious surface areas shall be graded or constructed to drain to a filtration BMP or equally effective alternative.

Storage of gasoline and diesel fuel tanks, and all refueling and maintenance of vehicles and equipment, shall occur within a designated area with proper secondary containment. The area shall not be within 100 feet of a wetland, water body, or water supply well. The applicant would report any hazardous materials release to the BLM authorized officer within 24 hours of release.

WATER-2 Comprehensive Drainage, Stormwater, and Sedimentation Control Plan. Prior to the start of ground disturbance and issuance of a County grading permit, the Applicant shall develop and implement a Comprehensive Drainage, Stormwater, and Sedimentation Control Plan prior to the initiation of construction (or decommissioning as relevant). The objective of the Plan shall be to avoid changes in onsite stormwater flow that could damage Project components, and to minimize changes in stormwater flow downstream of the facility that could impact offsite structures, biological resources, or cultural resources.

If required by the Comprehensive Drainage, Stormwater, and Sedimentation Control Plan, additional stormwater retention measures and facilities, including but not limited to retention basins and other facilities or features designed to retain stormwater on site, shall be implemented within the DQSP site. Stormwater retention facilities shall be designed to accommodate increases in flows that would be generated as a result of DQSP implementation, in comparison to existing conditions, such that DQSP implementation would not result in a net increase in discharge from the site under either a 10-year or 100-year storm event.

The use of flow-obstructing fencing shall be avoided in active drainages; instead, fencing that allows for the passage of water while minimizing buildup of debris shall be utilized on site. Stormwater flows emanating from proposed impervious surfaces shall be retained onsite and/or directed into channels and other stormwater infrastructure, and shall be sized such that unintentional ponding, flooding, erosion, or sedimentation would not occur onsite or downstream. Additionally, the number of road crossings over washes shall be minimized and necessary crossings shall be designed to provide adequate flow-through capacity during storm events, up to the 100-year event. In order to minimize disturbance to existing floodplains and natural channels, final facility designs shall be employed which minimize, to the extent practicable, the footprints of roads, parking lots, and other proposed facilities.

WATER-3: Flood Protection. In order to ensure that proposed onsite buildings and staff therein are protected from flooding, all onsite buildings and fill areas shall be placed outside of frequent flood flow areas. Additionally, proposed on-site buildings, maintenance areas, designated parking lots, and associated facilities shall be constructed in accordance with local flood control standards or as recommended by the geotechnical engineer. Slope protection shall be provided for all fill areas exposed to erosive flows. In specific areas where frequent flows are anticipated, posts for solar panels shall be constructed on a deepened footing, as recommended by the geotechnical engineer, in order to withstand anticipated scouring.

The Applicant shall ensure that during construction, temporary construction related structures such as bridges, roads, berms, and other facilities would be constructed so as to avoid interference with 100-year flood flows. Temporary installation of the following types of facilities shall be avoided: temporary elevated earthen structures such as roads and berms; earthen bridges or other structures within a waterway or flood conveyance that could interfere with flood flows; dams; unnecessary ditches; and other major structures that could concentrate flood flows. Additionally, to the extent practicable, the Applicant shall ensure that the construction process proceeds in a manner so as to minimize exposure of facilities to construction period flooding. Temporary ditches and trenches (such as for pipes, wires, or other infrastructure) shall be completed and backfilled as quickly as possible, and shall not be left open for extended periods. Drainage infrastructure shall be installed prior to installation of the solar arrays and other facilities on site. Other facilities that may be susceptible to flood damage during construction shall be managed so as to minimize construction time of those facilities. Prior to initiation of DQSP operation, the Applicant shall develop and implement a Flood Safety Plan for the site. The Flood Safety Plan shall delineate specific actions to be completed during a flood event, in order to protect workers and facilities as relevant. The Plan shall identify refuge areas that would not be susceptible to 100-year flooding, and provide requirements and guidance with respect to avoiding injury, death, or equipment damage during a flood event. The Plan shall be adhered to and updated, as needed, during the entire operation period of the DQSP.

WATER-4: Groundwater Monitoring and Mitigation Plan. If the Applicant chooses to install groundwater production wells, a Groundwater Monitoring and Mitigation Plan shall be developed and implemented prior to construction. The Groundwater Monitoring and Mitigation Plan shall be prepared by a qualified hydrogeologist registered in the State of California and submitted by the Applicant to the BLM and County for approval.

The Groundwater Monitoring and Mitigation Plan shall be based on a numerical groundwater model acceptable to the BLM and shall provide detailed methodology for monitoring background and onsite groundwater levels, water quality, and flow rates, including installation of flow meters. The Plan shall include installation of one or more monitoring wells in which the effect of groundwater withdrawal on groundwater levels can be monitored through periodic water level measurements. Monitoring shall be performed prior to construction to establish pre-construction groundwater level and water quality that can be used as a baseline against which later measurements can be compared, and to establish trigger points that would be used to determine the need for additional monitoring, investigation, and/or mitigation.

All production wells shall be metered, and the meters shall be tamper-proof and certified. Monitoring will be monthly. If a trigger point is reached, the Applicant shall notify BLM within 7 days, and shall increase the frequency of monitoring to weekly. If trigger point exceedances continue for 3 successive readings, Applicant shall meet with the BLM to re-evaluate operating conditions, which could include additional monitoring, investigation, or mitigation, and/or cessation of pumping.

The Groundwater Monitoring and Mitigation Plan shall include a schedule for submittal of monthly data reports by the Applicant to the BLM and County, for the duration of the monitoring period. These data reports shall be prepared and submitted to the BLM and County for review and approval, and shall include water level monitoring data (trend analyses) from all production and monitoring wells. Based on the results of the reports, the Applicant, the BLM, and the County shall determine if the Project's pumping activities have resulted in water level decline in the baseline at any of the monitoring wells, including nearby private wells, if any. If drawdown exceeds the established trigger levels, the Applicant shall immediately reduce groundwater pumping until water levels stabilize or recover to a reasonable level.

The Groundwater Monitoring and Mitigation Plan shall also include a schedule for submittal of annual data reports by the Applicant to the BLM and County for the first 5 years of the Project (including the construction period). These annual data reports shall be prepared and submitted to the BLM and County for review and approval, and shall include at a minimum the following information:

1. Daily usage, monthly range, and monthly average of daily water usage in gallons per day;
2. Total water used on a monthly and annual basis in acre-feet; summary of all water level data and water quality data;
3. Identification of trends that indicate potential for offsite wells to experience decline of water level; and
4. Identification of all sources of water by type (i.e., groundwater, surface water, municipal water) and well/location used on BLM land.

Upon receipt of each annual data report, the BLM and County shall determine whether groundwater wells surrounding the Project site and Project supply well(s) are influenced by Project activities in a way that requires additional mitigation and, if so, shall determine what measures are needed. After the first 5 years of the Project, the Applicant, the BLM, and the County shall jointly evaluate the effectiveness of the Groundwater Monitoring and Mitigation Plan and determine if monitoring frequencies or procedures should be revised or eliminated.

G.21 WILDLAND FIRE ECOLOGY

The following Project-specific mitigation measures were developed to reduce and/or avoid potential impacts associated with wildland fire associated with the Project and alternatives.

FIRE-1: Fire Safety Plan. Prior to the start of ground disturbance and issuance of a County grading permit, the Applicant shall prepare and implement a Fire Safety Plan to ensure the safety of workers and the public during Project construction, operation and maintenance, and decommissioning activities. This plan shall complement or supplement provisions of the Applicant's proposed Hazardous Materials Management and Emergency Response Plan. The Fire Safety Plan shall be provided to the BLM and RCFD for approval before the Applicant receives a Notice to Proceed (NTP). The Fire Safety Plan shall include, but not be limited to, the following elements:

1. All internal combustion engines used at the Project site shall be equipped with spark arrestors. Spark arrestors shall be in good working order.

2. Once initial two-track roads have been cut and initial fencing completed, light trucks and cars shall be used only on roads where the roadway is cleared of vegetation. Mufflers on all cars and light trucks shall be maintained in good working order.
3. Fire rules shall be posted on the Project bulletin board at the contractor's field office and areas visible to employees.
4. Equipment parking areas and small stationary engine sites shall be cleared of all extraneous flammable materials.
5. The Applicant shall make an effort to restrict use of chainsaws, chippers, vegetation masticators, grinders, drill rigs, tractors, torches, and explosives to outside of the official fire season. When the above tools are used, water tanks equipped with hoses shall easily accessible to personnel.
6. Smoking shall be prohibited in wildland areas and within 50 feet of combustible materials storage, and shall be limited to paved areas or areas cleared of all vegetation.
7. Each Project construction site (if construction occurs simultaneously at various locations) and the proposed solar plant site shall be equipped with fire extinguishers and fire-fighting equipment sufficient to extinguish small fires.
8. The Applicant shall coordinate with the RCFD to create a training component for emergency first responders to prepare for specialized emergency incidents that may occur at the Project site.
9. Construction workers, plant personnel, and maintenance workers at the plant and/or transmission lines to perform maintenance activities shall receive training on the proper use of fire-fighting equipment and procedures to be followed in the event of a fire. Training records shall be maintained and be available for review by the RCFD.
10. Vegetation near all solar panel arrays, ancillary equipment, and access roads shall be controlled through periodic cutting and spraying of weeds, in accordance with the VRMP.
11. The BLM and RCFD shall be consulted during plan preparation and fire safety measures recommended by the agencies included.
12. The plan shall list fire prevention procedures and specific emergency response and evacuation measures that would be required to be followed during emergency situations.
13. Operations employees shall participate in annual fire prevention and response training exercises with the RCFD
14. The Applicant shall designate an emergency services coordinator from among the full-time on-site employees who shall perform routine patrols of the site during the fire season equipped with a portable fire extinguisher and communications equipment. The Applicant shall notify the BLM and County of the name and contact information of the current emergency services coordinator in the event of any change.
15. Remote monitoring of all major electrical equipment (transformers and inverters) will screen for unusual operating conditions. Higher than nominal temperatures, for

example, can be compared with other operational factors to indicate the potential for overheating which under certain conditions could precipitate a fire. Units could then be shut down or generation curtailed remotely until corrective actions are taken.

16. Fires ignited onsite shall be immediately reported to BLM FIRE and the RCFD.

The engineering, procurement, and construction contract(s) for the proposed Project shall clearly state the requirements of this mitigation measure.

G.22 SUMMARY

Table G-22-1 describes the timing, responsible agency, and methods for verification of each mitigation measure.

Table G-22-1. Summary of Mitigation Measures

Measure Number	Measure Title	Method of Verification	Timing of Measure	Responsible Agency
AQ-1	Dust Control Plan	Plan to be reviewed and approved by BLM, the County, and MDAQMD.	Plan to be submitted no less than 60 days prior to start of construction. Plan implementation to be ongoing throughout construction activities.	BLM, Riverside County, and MDAQMD
AQ-2	Protect the Stability of Desert Pavement Areas	Plan to be reviewed and approved by BLM and the County.	Plan to be submitted prior to start of ground disturbance and issuance of County grading permit. Plan implementation to be ongoing throughout construction, operations, and decommissioning.	BLM and Riverside County
AQ-3	Construction Emissions Reduction	Inventory of equipment and DOORS registration.	Ongoing throughout construction activities	BLM, Riverside County, and CARB
VEG-1	Qualifications of Designated Biologist(s)	Proposed staff to be reviewed and approved by BLM and the County.	Prior to the start of ground disturbance and issuance of a County grading permit.	BLM and Riverside County
VEG-2	Duties of the Designated Biologist(s)	Ongoing communication with BLM, CDFW, and USFWS.	Ongoing throughout construction activities	BLM, Riverside County, USFWS, and CDFW
VEG-3	Identification of Biological Monitors	Proposed staff to be reviewed and approved by BLM and the County.	Prior to the start of ground disturbance and issuance of a County grading permit.	BLM and Riverside County

Table G-22-1. Summary of Mitigation Measures

Measure Number	Measure Title	Method of Verification	Timing of Measure	Responsible Agency
VEG-4	Duties of Biological Monitors	Ongoing communication with the Designated Biologist, who shall report to BLM, CDFW, and USFWS.	Ongoing throughout construction activities	BLM and Riverside County
VEG-5	Authority of the Designated Biologist(s) and Biological Monitors	Ongoing communication with the Designated Biologist, who shall report to BLM, CDFW, and USFWS.	Ongoing throughout construction activities	BLM and Riverside County
VEG-6	Worker Environmental Awareness Program	Program to be reviewed and approved by BLM and the County.	Ongoing throughout construction, operations, and decommissioning	BLM and Riverside County
VEG-7	Biological Resources Mitigation Implementation and Monitoring Plan	Plan to be reviewed and approved by BLM and the County.	Plan to be submitted prior to start of ground disturbance and issuance of County grading permit. Plan implementation to be ongoing throughout construction, operations, and decommissioning.	BLM and Riverside County
VEG-8	Avoidance of Biological Resources During Construction	Specific plans (Nesting Bird Monitoring and Management, Revegetation) to be reviewed and approved by BLM. Other activities to be verified through various reporting mechanisms to BLM.	Disturbance limits to be established prior to start of construction. Plan implementation to be ongoing throughout construction, operations, and decommissioning. Restoration to occur within 30 days following completion of construction.	BLM and Riverside County

Table G-22-1. Summary of Mitigation Measures

Measure Number	Measure Title	Method of Verification	Timing of Measure	Responsible Agency
VEG-9	Special-Status Plant Species Impact Avoidance and Minimization, and Compensation	Plan to be reviewed and approved by BLM and the County. Compensation to be verified through BLM approval of compensation type and amount.	Plan to be submitted prior to start of ground disturbance and issuance of County grading permit. Plan implementation to be ongoing throughout construction, operations, and decommissioning. Compensation to be initiated or completed within 12 months from the time the resource impact occurs, unless a 6-month extension is approved by the Authorizing Officer.	Plan agencies are BLM and Riverside County. Agency responsible for compensation is BLM.
VEG-10	Mitigation for Impacts to Sensitive Riparian Habitat and State Waters	Compensation to be verified through CDFW approval of compensation type and amount.	Compensation to be completed within 18 months after the start of ground disturbance.	CDFW
VEG-11	Project Phasing	Mitigation activities for each phase to be verified by the agency responsible for that activity.	Construction schedule and plans to be submitted prior to initiating each phase of construction.	BLM
VEG-12	Monitoring and Research	BLM to verify they are granted access, as required.	Ongoing throughout construction, operations, and decommissioning	BLM
WIL-1	Measures to Avoid Take of Mojave Desert Tortoise	Plans and specifications to be reviewed and approved by BLM and USFWS. Implementation of plans and specifications to be verified through compliance reports submitted to BLM and USFWS.	Surveys and fencing to be completed prior to start of construction. Plan implementation to be ongoing throughout construction, operations, and decommissioning.	BLM and USFWS

Table G-22-1. Summary of Mitigation Measures

Measure Number	Measure Title	Method of Verification	Timing of Measure	Responsible Agency
WIL-2	Mojave Desert Tortoise Translocation Plan	Plan to be reviewed and approved by BLM and USFWS.	Plan to be submitted and tortoises translocated prior to start of ground disturbance.	BLM and USFWS
WIL-3	Project Notifications and Reporting	BLM to have access to verify compliance. Applicant to perform required inspections and submit to BLM, CDFW, and/or USFWS as specified.	Ongoing throughout construction, operations, and decommissioning	BLM, USFWS, and CDFW
WIL-4	Compensatory Mitigation for Desert Tortoise Habitat Losses	Compensation to be verified through BLM approval of compensation type and amount.	Compensation to be initiated or completed within 12 months from the time the resource impact occurs, unless a 6-month extension is approved by the Authorizing Officer.	BLM
WIL-5	Raven Management Plan	Plan to be reviewed and approved by BLM and the County.	Plan to be submitted prior to start of ground disturbance and issuance of County grading permit. Plan implementation to be ongoing throughout construction, operations, and decommissioning.	BLM and Riverside County
WIL-6	Bird and Bat Conservation Strategy	BBCS to be reviewed and approved by BLM, the County, USFWS, and CDFW.	BBCS to be submitted prior to the Notice to Proceed. Plan implementation to be ongoing throughout construction, operations, and decommissioning.	BLM, Riverside County, USFWS, and CDFW

Table G-22-1. Summary of Mitigation Measures

Measure Number	Measure Title	Method of Verification	Timing of Measure	Responsible Agency
WIL-7	Pre-Construction Nest Surveys	Survey results to be submitted to BLM.	Surveys to be completed prior to start of ground disturbance, including grading or mowing.	BLM
WIL-8	American Badger and Desert Kit Fox Protection	Plan to be reviewed and approved by BLM, USFWS, and CDFW.	Plan to be submitted at least 45 days prior to start of construction. Surveys to be completed no more than 30 days prior to start of construction.	BLM, USFWS, and CDFW
WIL-9	Burrowing Owl Protection and Mitigation	Plan to be reviewed and approved by BLM, USFWS, and CDFW.	Surveys to be completed no more than 30 days and no less than 14 days prior to start of construction. Compensation shall be initiated or completed within 12 months from the time the resource impact occurs, unless a 6-month extension is approved by the Authorizing Officer.	BLM, USFWS, and CDFW. Agency responsible for compensation is BLM.
WIL-10	Compensatory Mitigation for Mojave Fringe-toed Lizard Habitat Losses	Compensation to be verified through BLM approval of compensation type and amount.	Compensation shall be initiated or completed within 12 months from the time the resource impact occurs, unless a 6-month extension is approved by the Authorizing Officer.	BLM

Table G-22-1. Summary of Mitigation Measures

Measure Number	Measure Title	Method of Verification	Timing of Measure	Responsible Agency
WIL-11	In-Lieu Fees to Satisfy Compensation Requirements	Compensation to be verified through BLM approval of compensation type and amount.	Compensation shall be initiated or completed within 12 months from the time the resource impact occurs, unless a 6-month extension is approved by the Authorizing Officer.	BLM
WIL-12	Couch’s Spadefoot Toad Protection and Mitigation	Plan to be reviewed and approved by BLM and CDFW.	Plan to be submitted prior to start of ground disturbance. Plan implementation to be ongoing throughout construction, operations, and decommissioning.	BLM and CDFW
WIL-13	Development of Ponding Area	BLM to approve any proposed ponds.	Approvals to be received before any ponds are developed.	BLM
CULTURAL-1	NHPA §106 Memorandum of Agreement	MOA to be developed by BLM in consultation with the ACHP, SHPO, the Applicant, Riverside County, and Native American Tribes.	MOA to be developed prior to the ROD. Implementation to be ongoing throughout construction, operations, and decommissioning.	BLM, ACHP, SHPO, Riverside County, and Native American Tribes
CULTURAL-2	Historic Properties Treatment Plan (HPTP)	Plan to be reviewed and approved by BLM and the County.	Plan to be submitted prior to start of ground disturbance and issuance of County grading permit. Plan implementation to be ongoing throughout construction, operations, and decommissioning.	BLM and Riverside County

Table G-22-1. Summary of Mitigation Measures

Measure Number	Measure Title	Method of Verification	Timing of Measure	Responsible Agency
CULTURAL-3	Identification of Human Remains	Incidents to be reported to County Coroner.	Reporting to be ongoing throughout construction, operations, and decommissioning.	Riverside County
CULTURAL-4	Unanticipated Discoveries	Incidents to be reported to Native American Tribal Observer, BLM, and County Archaeologist.	Implementation to be ongoing throughout construction, operations, and decommissioning.	Native American Tribal Observer, BLM, and County Archaeologist
CULTURAL-5	Monitoring and Discovery Plan	Plan to be reviewed and approved by BLM and the County.	Plan to be submitted prior to start of ground disturbance and issuance of County grading permit. Plan implementation to be ongoing throughout construction.	BLM and Riverside County
CULTURAL-6	Tribal Observer	Documentation of efforts to contract Tribal Observers to be submitted to BLM and County Archaeologists.	Within 60 days prior to ground disturbance.	Native American Tribal Observer, BLM, and County Archaeologist
CULTURAL-7	Cultural Resources Monitoring Report	Report to be submitted to BLM and County Archaeologists.	Prior to the final inspection of the first building permit.	BLM and Riverside County
GEO-1	Conduct geotechnical studies to assess soil characteristics and aid in appropriate foundation design	Study results and proposed solutions to be submitted to BLM and the County Engineering Geologist.	60 days before final Project design.	BLM and Riverside County
GHG-1	Seal Circuit Breakers	Owners of gas-insulated switchgear required to report emissions annually to CARB.	Annually.	CARB

Table G-22-1. Summary of Mitigation Measures

Measure Number	Measure Title	Method of Verification	Timing of Measure	Responsible Agency
HAZ-1	Site-Specific Hazardous Materials Management and Emergency Response Plan	Plan to be reviewed and approved by BLM and the County.	Plan to be submitted prior to Notice to Proceed. Plan implementation to be ongoing throughout construction, operations, and decommissioning.	BLM and Riverside County
HAZ-2	Broken PV Module Detection and Handling	Disposal of California-state hazardous waste, if any, is regulated by DTSC.	Ongoing throughout construction, operations, and decommissioning.	DTSC
HAZ-3	Aircraft Safety Consultation	Verified by filing of FAA Forms 7460-1.	At least 45 days prior to the start of construction.	FAA
UXO-1	UXO Identification, Training, and Reporting Plan	Plan to be reviewed and approved by BLM.	Plan to be submitted at least 30 days prior to the start of construction, and within 30 days of the completion of surveys. Plan implementation to be ongoing throughout construction.	BLM
TLSN-1	Radio Frequency Interference	Records of complaints to be submitted to BLM upon request.	Ongoing throughout operations.	BLM
NOISE-1	Noise Level Monitoring	Results of noise level monitoring to be submitted to BLM and the County.	Ongoing throughout construction activities	BLM and Riverside County
PAL-1	Project Paleontologist	Proposed staff to be reviewed and approved by BLM and the County.	Prior to the issuance of a Notice to Proceed.	BLM and Riverside County
PAL-2	Materials for Project Paleontologist and BLM Authorized Officer	Materials to be provided to BLM.	Prior to the start of each phase of construction.	BLM

Table G-22-1. Summary of Mitigation Measures

Measure Number	Measure Title	Method of Verification	Timing of Measure	Responsible Agency
PAL-3	Paleontological Resources Monitoring and Mitigation Plan (PRMMP)	Plan to be reviewed and approved by BLM.	Plan to be submitted prior to Notice to Proceed. Plan implementation to be ongoing throughout construction and any other ground disturbance.	BLM
PAL-4	Approved Training Pertaining to Ground Disturbance	Training materials to be provided to BLM for approval.	Materials to be submitted prior to start of ground disturbance. Training to be implemented throughout construction and any other ground disturbance.	BLM
PAL-5	Pedestrian Paleontological Survey	Survey results to be submitted to BLM and the County.	Prior to Final EIS.	BLM and Riverside County
PAL-6	Paleontological Monitoring Activities	Activities to be verified through daily log and monthly compliance report.	Throughout construction and any other ground disturbance. Activities to be verified through daily log and monthly compliance report.	BLM and Riverside County
PAL-7	Implementation of PRMMP	Activities to be verified through daily log and monthly compliance report.	Throughout construction and any other ground disturbance. Activities to be verified through daily log and monthly compliance report.	BLM and Riverside County
PAL-8	Paleontological Resources Report (PRR)	Report to be submitted to BLM and the County.	Within 30 days following completion of ground-disturbing activities	BLM and Riverside County

Table G-22-1. Summary of Mitigation Measures

Measure Number	Measure Title	Method of Verification	Timing of Measure	Responsible Agency
REC-1	Access to Mule Mountains ACEC	Draft interpretive materials to be submitted to BLM for review and approval.	Prior to Project construction, and then periodically throughout the duration of the Project.	BLM
REC-2	Temporary Route Closure	Documentation of coordination efforts to be submitted to BLM and other affected agencies.	No less than 60 days prior to construction and maintenance of the gen-tie line. Documentation to be provided at least 30 days prior to construction.	BLM and Riverside County
REC-3	Use of Long-Term Visitor Areas (LTVAs)	Specific authorization from BLM to be sought for use of the LTVAs.	Prior to use of LTVAs.	BLM
TRN-1	Traffic Monitoring and Control Plan	Plan to be reviewed and approved by BLM and the County.	Plan to be submitted prior to start of ground disturbance and issuance of County grading permit. Plan implementation to be ongoing throughout construction.	BLM and Riverside County
TRN-2	Coordinated Transportation Management Plan	Plan to be reviewed and approved by BLM and the County.	Plan to be submitted prior to start of construction. Plan implementation to be ongoing throughout construction.	BLM and Riverside County
TRN-3	Reduce Construction Worker Vehicles	Revised traffic analysis to be submitted to BLM and the County for review and approval.	Analysis to be submitted prior to the Notice to Proceed. Results of analysis to be implemented throughout construction.	BLM and Riverside County

Table G-22-1. Summary of Mitigation Measures

Measure Number	Measure Title	Method of Verification	Timing of Measure	Responsible Agency
TRN-4	Improve Access Road	Grading Plan to be reviewed and approved by County transportation department.	Prior to construction of the Project fence, solar facility, gen-tie, temporary construction areas, and other facilities.	Riverside County
VIS-1	Project Design, Building and Structural Materials	Project designs, specifications, and Lighting Plan to be submitted to BLM District Office for review and approval.	Construction plans, details, shop drawings and specifications to be submitted to BLM prior to the Notice to Proceed.	BLM
VIS-2	Construction Phase Visual Mitigation	Measures to be established in pre-construction meeting with BLM landscape architects or other designated visual/scenic resource specialists.	Ongoing throughout construction activities	BLM
VIS-3	Operation and Maintenance Phase Visual Mitigation	Objectives, adaptive management adjustments, and modifications to be reviewed and approved by BLM.	Ongoing throughout operations	BLM
VIS-4	Decommissioning and Site Restoration Plan	Plan to be reviewed and approved by BLM.	Plan to be submitted prior to start of construction. Plan implementation to be undertaken as soon as possible after disturbances occur. Monitoring to be conducted twice annually for 5 years and may be extended for an additional 5 years if the performance standards have not been achieved	BLM

Table G-22-1. Summary of Mitigation Measures

Measure Number	Measure Title	Method of Verification	Timing of Measure	Responsible Agency
WATER-1	Implementation of a SWPPP	Plan to be reviewed and approved by BLM.	Ongoing throughout construction, decommissioning, and any other ground disturbance greater than one acre.	BLM
WATER-2	Comprehensive Drainage, Stormwater, and Sedimentation Control Plan	Plan to be reviewed and approved by BLM and the County.	Plan to be submitted prior to start of ground disturbance and issuance of County grading permit. Plan implementation to be ongoing throughout construction and decommissioning.	BLM and Riverside County
WATER-3	Flood Protection	Grading Plan and Flood Safety Plan to be submitted to BLM and County for review and approval.	Plans to be submitted prior to start of ground disturbance and issuance of County grading permit. Plan implementation to be ongoing throughout construction, operations, and decommissioning.	BLM and Riverside County
WATER-4	Groundwater Monitoring and Mitigation Plan	Plan to be reviewed and approved by BLM and the County.	Plan to be submitted prior to start of construction. Plan implementation to be ongoing throughout construction, operations, and decommissioning.	BLM and Riverside County

Table G-22-1. Summary of Mitigation Measures

Measure Number	Measure Title	Method of Verification	Timing of Measure	Responsible Agency
FIRE-1	Fire Safety Plan	Plan to be reviewed and approved by BLM and the RCFD.	Plans to be submitted prior to start of ground disturbance and issuance of County grading permit. Plan implementation to be ongoing throughout construction, operations, and decommissioning.	BLM and RCFD

APPENDIX H

PUBLIC SCOPING REPORT

PUBLIC SCOPING REPORT

Environmental Impact Statement
Desert Quartzite Solar Project

Lead Agency:

Bureau of Land Management
Contact: Cedric Perry, 951-697-5388
22835 Calle San Juan De Los Lagos
Moreno Valley, California 92553-9046

MAY 2015

TABLE OF CONTENTS

Section **Page No.**

1.0 OVERVIEW OF NEPA SCOPING PROCESS 1
- 1.1 Introduction 1
- 1.2 Summary of NEPA Scoping Process 1
- 1.3 Agencies, Organizations, and Persons Providing Scoping Comments 3
- 1.4 Scoping Report Organization 4

2.0 SUMMARY OF PROPOSED PROJECT 6
- 2.1 Applicant's Objectives 6
- 2.2 Project Description 6

3.0 SUMMARY OF SCOPING COMMENTS 10
- 3.1 BLM Procedures 10
- 3.2 Statement of Purpose and Need 11
- 3.3 Human Environment Issues 11
  - Alternatives 11
  - Cultural Resources 12
  - Hazardous Materials/hazardous waste/solid waste 13
  - Land Use 13
  - Public Health 14
  - Tribal Governments 14
  - Environmental Justice and Impacted Communities 15
  - Visual resources 15
- 3.4 Natural Environment Issues 16
  - Air Quality /Greenhouse gases 16
  - Biological Resources 17
  - Fire 24
  - Water Resources 24
- 3.5 Indirect and Cumulative Impacts 26
- 3.6 Written Comments Received During Public Scoping Period Regarding the CEQA Process 28

4.0 SUMMARY OF FUTURE STEPS IN THE PLANNING PROCESS 29

5.0 REFERENCES CITED 32

APPENDICES

A Notice of Intent (Federal Register March 6, 2015)

B Public Notices

- B-1 Public Notice (Parker Pioneer March 18, 2015)
- B-2 Public Notice (Desert Sun March 18, 2015)
- B-3 Public Notice (Palo Verde Times March 18, 2015)

C Scoping Meeting Materials

- C-1 Written Comment Form
- C-2 Speaker Comment Card
- C-3 Scoping Meeting Presentation

D Scoping Meeting Sign-In Sheet

E Written Comments Received During Scoping Period

F Court Reporter Transcripts

TABLE

1 Written Comments Received During Public Scoping Period
2 Verbal Comments Received During Public Scoping Period
3 Written Comments Received During Scoping Period Regarding the CEQA Process

FIGURE

1 Project Vicinity Map
2 Project Map
3 Project Aerial Map
4 NEPA Process Flowchart

Abbreviations and Acronyms Used in this Report

AC	Alternating Current
ARPA	Archaeological Resources Protection Act
AVSR	Antelope Valley Solar Ranch
BBCS	Bird and Bat Conservation Strategy.
BLM	Bureau of Land Management
CDCA	California Desert Conservation Area
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CRIT	Colorado River Indian Tribes
CFR	Code of Federal Regulations
DEIR	Draft Environmental Impact Report
DEIS	Draft Environmental Impact Statement
DRECP	Desert Renewable Energy Conservation Plan
EIS	Environmental Impact Statement
gen-tie	Generation-intertie
GHG	greenhouse gas
I-10	Interstate 10
kV	kilovolt
Metropolitan	The Metropolitan Water District of Southern California
MW	megawatt
NEPA	National Environmental Policy Act
NOI	Notice of Intent
PV	photovoltaic
ROW	right-of-way
SCE	Southern California Edison
SEZ	Solar Energy Zone
USFWS	U.S. Fish and Wildlife Service

1.0 OVERVIEW OF NEPA SCOPING PROCESS

1.1 Introduction

First Solar has applied to the Bureau of Land Management (BLM) for a right-of-way (ROW) on public lands in Riverside County to develop the Desert Quartzite Solar Project, a photo-voltaic (PV) generating facility with a footprint of approximately 4,853 acres of public land and 160 acres of private land. The project site is located approximately 8 miles southwest of Blythe, in Riverside County, California. The overall site layout and generalized land uses would include a project substation, access road, realignment of an existing route, operations and maintenance buildings, temporary construction lay down areas, and a 3-mile 230-kilovolt (kV) generation-intertie (gen-tie) line. The project would interconnect to the regional electric grid via the 230/500-kV Southern California Edison (SCE) Colorado River Substation. The proposed site consists of lands administered by BLM and subject to the California Desert Conservation Area (CDCA) Plan. Authorization of the ROW by BLM would require an amendment of the CDCA Plan.

This public scoping report documents the BLM’s National Environmental Policy Act (NEPA) scoping process and the comments received for the proposed project. Specifically, this report describes the scoping activities and summarizes the written comments received on the BLM’s Notice of Intent (NOI). This report serves as an information source to the BLM in its determination of the range of issues and alternatives to be addressed in the Environmental Impact Statement (EIS). The BLM will use the comments received during the scoping period to:

1) Identify key issues to focus the analysis
2) Identify reasonable alternatives for analysis
3) Present environmental impacts of the project and alternatives
4) Identify ways to avoid or reduce environmental impacts
5) Inform the agency decision-making process

1.2 Summary of NEPA Scoping Process

The NEPA scoping process provides government agencies, public and private organizations, and the general public the opportunity to identify environmental issues and alternatives for consideration in the EIS. The scoping process and results are an initial step in the NEPA process.

To comply with the Council on Environmental Quality’s regulations regarding the scoping process under NEPA (40 CFR 1501.7), the BLM published the NOI in the Federal Register to prepare an EIS for the Desert Quartzite Solar Project (FR Vol. 80, No. 44, page 12195, March 6, 2015). The NOI serves as the official legal notice that a federal agency is commencing preparation of an EIS.

The Federal Register serves as the U.S. Government's official noticing and reporting publication. The NOI initiates the public scoping period for the EIS, provides information about the proposed project, and serves as an invitation for other federal agencies granted cooperating agency status to provide comments on the scope and content of the EIS. The NOI is included as Appendix A.

The BLM published notices, included as Appendix B, to announce the publication of the NOI, initiate the environmental review, and announce public scoping meetings for the proposed Desert Quartzite Solar Project on March 18, 2015. The notices announced a public scoping meeting in Parker, Arizona on March 23, 2015 and in Blythe, California on March 24, 2015.

The NOI and scoping meeting announcements were also made available to the public on BLM's website for the Desert Quartzite Solar Project at:

http://www.blm.gov/ca/st/en/fo/palmsprings/Desert_Quartzite.html

During the NOI comment period, the BLM held public scoping meetings on March 23, 2015 at the Parker Community Senior Center (1115 12th Street, Parker, Arizona 85344) from 6:30 to 8:30 PM, and on March 24, 2015 at the City of Blythe Multi-Purpose Room (235 North Broadway, Blythe, California 92225) from 6:30 to 8:30 PM.

The scoping meetings provided the public and government agencies the opportunity to receive information on the NEPA process and on the proposed project and to provide verbal and written comments.

Comment cards were provided as handouts at the public scoping meetings (Appendix C-1). Additional materials provided to the public at the scoping meetings are contained within Appendix C and include the following:

1) Appendix C-1 – Written Comment Card
2) Appendix C-2 – Speaker Registration Cards
3) Appendix C-3 – Scoping Meeting Presentation

Appendix D includes the scoping meeting sign-in sheets for the two meetings.

The comment period for the NOI ended on April 13, 2015 (originally scheduled for April 6, 2015). In total, 12 letters were received, as shown in Table 1 below. A total of 6 individuals made verbal comments at the scoping meetings, as shown in Table 2. These comments are incorporated into the EIS project record and are documented and summarized in this public scoping report. Finally, one written comment was addressed to the County of Riverside regarding the California Environmental Quality Act (CEQA), as shown in Table 3.

1.3 Agencies, Organizations, and Persons Providing Scoping Comments

Table 1 below identifies eleven organizations (Federal, State, and Local governments, Indian Tribes, environmental organizations, and other organizations) who provided written comments during the public scoping period. Written comments received in response to the NOI are included in Appendix E. Table 1 presents the agencies and organizations that provided written comments during the NEPA scoping process organized in the order they were issued.

Table 1
Written Comments Received During Public Scoping Period

Federal, State, and Local Agencies and Organizations	
Commenter	**Date**
Mr. Alfredo A. Figueroa, Elder/Historian/Chemehuevi Tribe Monitor for the La Cuna de Aztlan Sacred Sites Protection Circle, Blythe, CA	March 24, 2015
La Cuna de Aztlan Sacred Sites Protection Circle, Alfredo Acosta Figueroa, Elder/Historian/Chemehuevi Tribe Monitor, and Patricia Robles, President of La Cuna de Aztlan Sacred Sites Protection Circle, Blythe, CA	April 3, 2015
Basin and Range Watch, Kevin Emmerich and Laura Cunningham, Beatty, NV	April 5, 2015
U.S. Environmental Protection Agency (EPA), Region IX, Tom Plenys, Environmental Review Section, San Francisco, CA	April 6, 2015
Center for Biological Diversity, Ileene Anderson, Biologist/Public Lands Desert Director, Los Angeles, CA	April 6, 2015
U.S. Fish & Wildlife Service (USFWS), Assistant Field Office Supervisor (name?), Palm Springs Fish and Wildlife Office, Palm Springs, CA,	April 8, 2015
The Metropolitan Water District of Southern California (Metropolitan) – Office of the General Manager, Deirdre West, Manager, Environmental Planning Team, Los Angeles, CA	April 9, 2015
California Native Plant Society, Greg Suba, Conservation Program Director, Sacramento, CA	April 13, 2015
Defenders of Wildlife, Jeff Aardahl, California Representative, Natural Resources Defense Council, Helen O'Shea, and Sierra Club, Sarah K. Friedman	April 13, 2015
The Wilderness Society – BLM Action Center, Alex Daue, Assistant Director, Renewable Energy, Denver, CO, and CALWild (California Wilderness Coalition), Ryan Henson, Senior Policy Director, Anderson, CA	April 13, 2015
Colorado River Indian Tribes (CRIT), Chairman Dennis Patch, CRIT Tribal Council, Parker, AZ	April 13, 2015

Table 2 presents the individuals who provided verbal comments at the scoping meetings organized in the order they were presented.

Table 2
Verbal Comments Received at the Public Scoping Meetings

Federal, State, and Local Agencies and Organizations	
Commenter	**Date**
Mr. Keith R. Nopah, Sr., Tribal Monitor	March 23, 2015
Ms. Daphne Hill-Poolaw	March 23, 2015
Ms. Amanda Barrera, Chemehuevi Tribal Secretary, member of Colorado River Indian Tribes	March 23, 2015
Ms. Cheryl Esquerra, member of Colorado River Indian Tribes, elder	March 23, 2015
Mr. Juan Gonzalez	March 24, 2015
Mr. Alfredo A. Figueroa, Elder/Historian/Chemehuevi Tribe Monitor for the La Cuna de Aztlan Sacred Sites Protection Circle, Blythe, CA	March 24, 2015

Table 3 presents the agencies and organizations that provided written comments during the scoping period regarding the CEQA process being followed by Riverside County.

Table 3
Written Comments Received During Public Scoping Period Regarding the CEQA Process

Federal, State, and Local Agencies and Organizations	
Commenter	**Date**
Riverside County Airport Land Use Commission	April 13, 2015

1.4 Scoping Report Organization

This public scoping report summarizes the comments and issues identified through the Project's scoping period, including the public scoping meetings. The BLM will review and consider the comments received in preparing the EIS for the proposed project.

Section 2 provides summary information on First Solar's stated project objectives and a description of the project.

Section 3 provides an overall summary of the comments received and issues raised during the project's public review period.

Section 4 provides a summary of future steps in the planning process and indicates opportunities for further public participation in the environmental review process.

Section 5 includes a list of references used in preparation of this scoping report.

Following is the list of appendices that includes public scoping notices, scoping meeting materials, and public comments received during the public review period.

A. Notice of Intent (Federal Register, March 6, 2015)
B. Public Notices
    B-1 – Public Notice (Parker Pioneer, March 18, 2015)
    B-2 – Public Notice (Desert Sun, March 18, 2015)
    B-3 – Public Notice (Palo Verde Times, March 18, 2015)
C. Scoping Meeting Materials
    C-1 Written Comment Form
    C-2 Speaker Comment Card
    C-3 Scoping Meeting Presentation
D. Scoping Meeting Sign-In Sheets (March 23 and 24, 2015 Meetings)
E. Written Comments Received During Scoping Period
F. Court Reporter Transcripts of the Scoping Meetings

2.0 SUMMARY OF PROPOSED PROJECT

This section provides an overview of the Desert Quartzite Solar Project, which is located in Riverside County, approximately 8 miles southwest of the City of Blythe, California.

2.1 APPLICANT'S OBJECTIVES

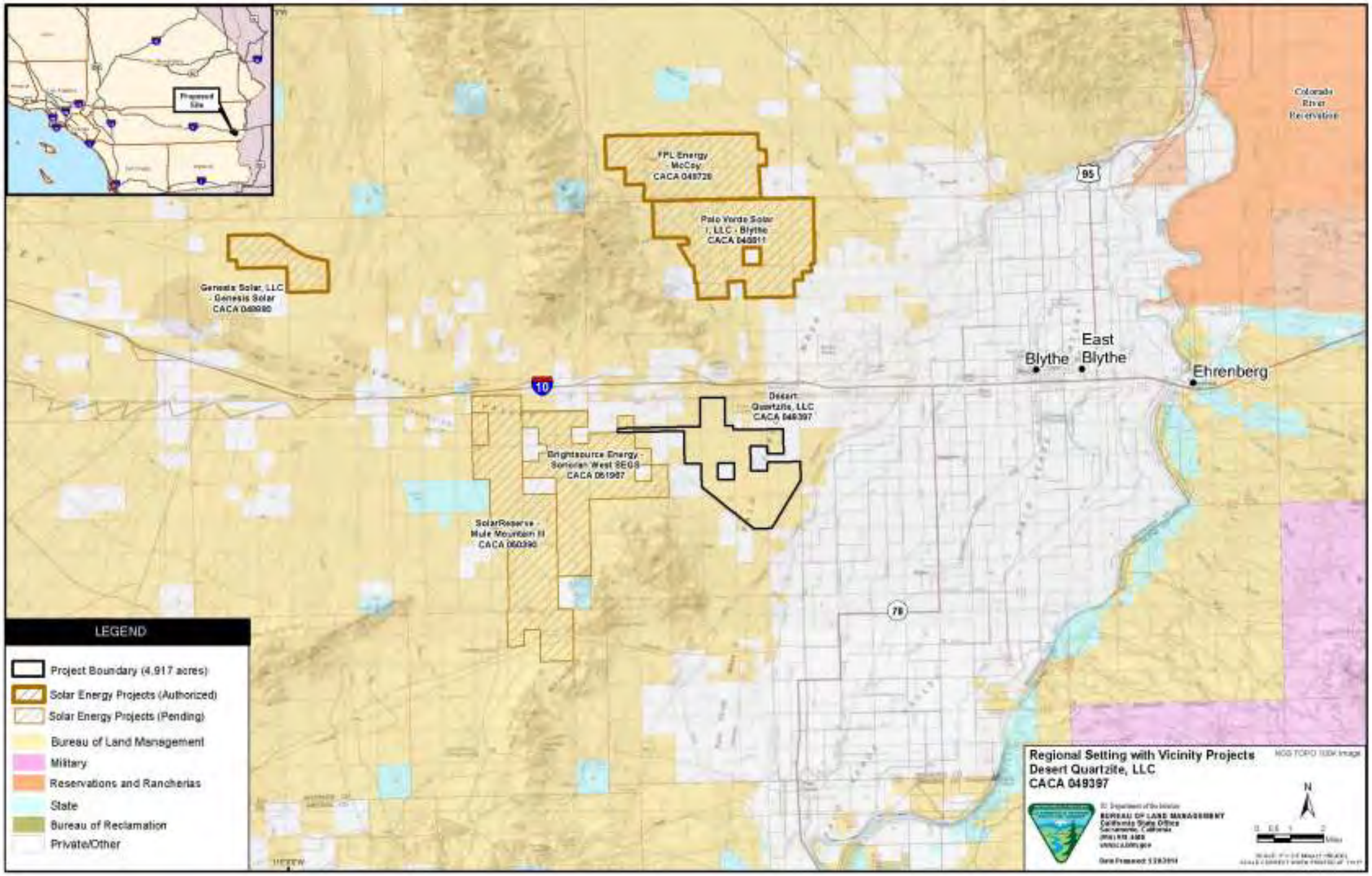
The Applicant's fundamental objective for the proposed action is to construct, operate, maintain, and eventually decommission a 300 megawatt (MW) alternating current (AC) solar PV energy generating facility along with associated interconnection transmission infrastructure to provide renewable electric power to California's existing transmission grid to help meet federal and state renewable energy supply and greenhouse gas (GHG) emissions reduction requirements. Recent national and regional forecasts project an increase in consumption of electrical energy continuing into the foreseeable future. Renewable energy, including solar generation, is expected to provide a larger component of the electrical supply in the future. Continued increased consumption requires development of new generation facilities to satisfy demand.

2.2 PROJECT DESCRIPTION

First Solar has applied to the BLM for a ROW on public lands in Riverside County to develop the Desert Quartzite Solar Project, a PV generating facility with a footprint of approximately 4,845 acres of public land and 160 acres of private land. The proposed Desert Quartzite Solar Project consists of a 300 MW AC solar photovoltaic energy generating facility along with necessary ancillary facilities including a project substation, access road, transmission lines, realignment of an existing route, operations and maintenance buildings, and lay down areas. The project is proposed on land within the Riverside East Solar Energy Zone (SEZ), near Blythe, California (see Figure 1 – Project Vicinity Map, Figure 2 – Project Map, and Figure 3 – Aerial Project Map).

The project includes a 3-mile 230-kV generation-intertie (gen-tie) line. The project would interconnect to the regional electric grid via the 230/500-kV SCE Colorado River Substation. The proposed project would include the use of either single axis or fixed-tilt tables, supported on driven steel posts or other embedded foundations. The proposed project would be built in two phases, with construction of the first 150 MW AC phase expected to begin in late 2016. The proposed site consists of lands administered by BLM and subject to the CDCA Plan. Authorization of the ROW by BLM may require an amendment of the CDCA Plan.

Figure 1 – Project Vicinity Map


Proposed Site
Colorado River Reservation
95
FPL Energy - McCoy CACA 048728
Palo Verde Solar I, LLC - Blythe CACA 048811
Genesis Solar, LLC - Genesis Solar CACA 048880
East Blythe
Blythe
Ehrenberg
10
Desert Quartzite, LLC CACA 049397
Brightsource Energy - Sonoran West SEGS CACA 051967
SolarReserve - Mule Mountain III CACA 050390
78
LEGEND
Project Boundary (4,917 acres)
Solar Energy Projects (Authorized)
Solar Energy Projects (Pending)
Bureau of Land Management
Military
Reservations and Rancherias
State
Bureau of Reclamation
Private/Other
Regional Setting with Vicinity Projects
Desert Quartzite, LLC
CACA 049397
NGS TOPO 100K Image
U.S. Department of the Interior
BUREAU OF LAND MANAGEMENT
California State Office
Sacramento, California
N
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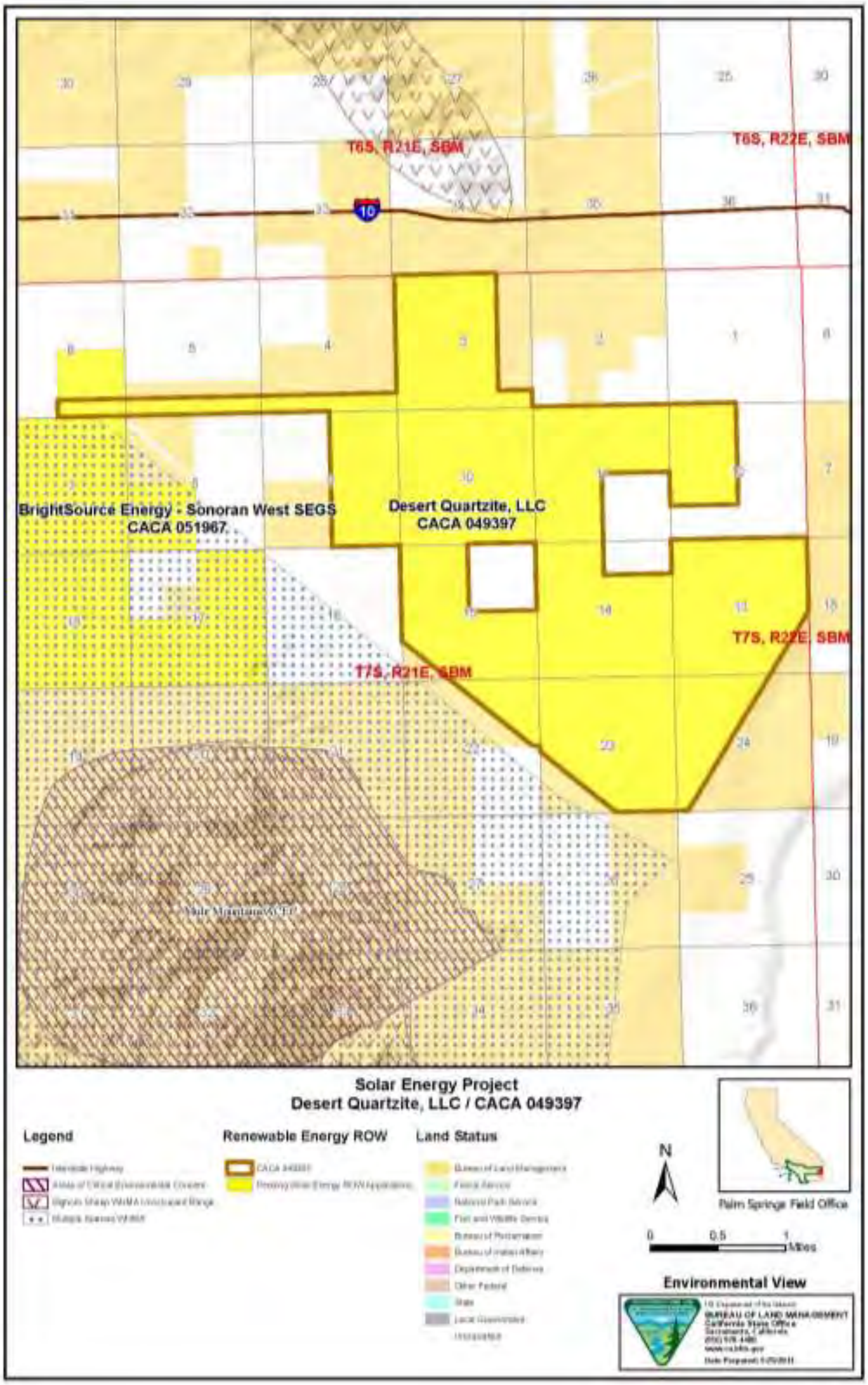
Miles

Figure 2 – Project Map


T6S, R21E, SBM
T6S, R22E, SBM
10
BrightSource Energy - Sonoran West SEGS
CACA 051967
Desert Quartzite, LLC
CACA 049397
T7S, R22E, SBM
T7S, R21E, SBM
Solar Energy Project
Desert Quartzite, LLC / CACA 049397
Legend
Interstate Highway
Areas of Critical Environmental Concern
Bighorn Sheep WHMA Unoccupied Range
Multiple Species WHMA
Renewable Energy ROW
CACA 049397
Land Status
Bureau of Land Management
Forest Service
National Park Service
Fish and Wildlife Service
Bureau of Reclamation
Bureau of Indian Affairs
Department of Defense
Other Federal
State
Local Government
N
Palm Springs Field Office
0
0.5
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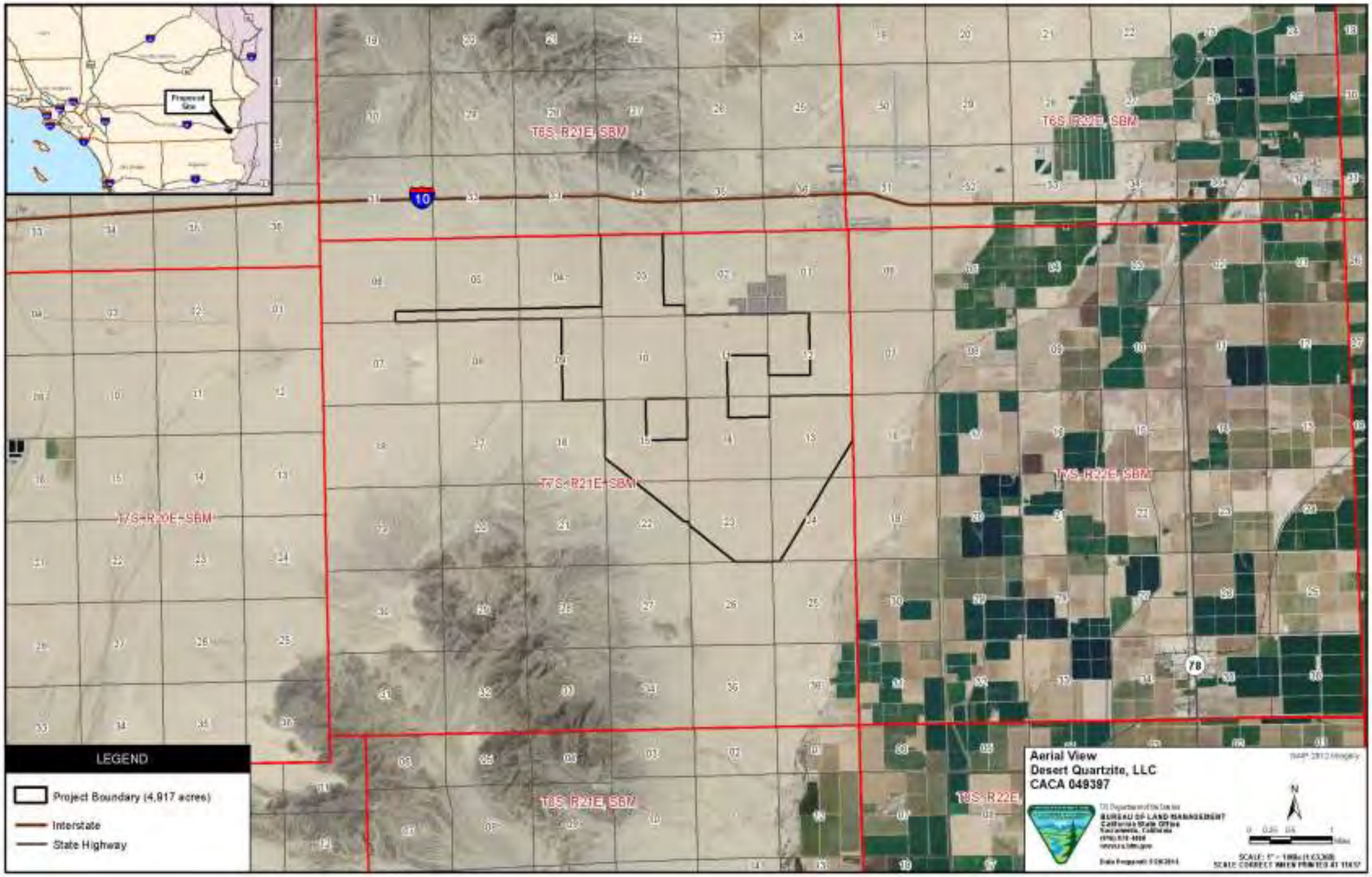
Miles
Environmental View
BUREAU OF LAND MANAGEMENT
California State Office
Sacramento, California

Figure 3 – Aerial Project Map


Proposed Site
10
T6S, R21E, SBM
T6S, R22E, SBM
T7S, R20E, SBM
T7S, R21E, SBM
T7S, R22E, SBM
T8S, R21E, SBM
T8S, R22E
78
LEGEND
Project Boundary (4,917 acres)
Interstate
State Highway
Aerial View
Desert Quartzite, LLC
CACA 049397
NAIP 2012 Imagery
US Department of the Interior
BUREAU OF LAND MANAGEMENT
California State Office
Sacramento, California
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Miles

3.0 SUMMARY OF SCOPING COMMENTS

This section of the report summarizes the comments raised by agencies and organizations during the scoping process. This summary is based upon written comments that were received during the NOI public scoping period. Table 1 provides a list of commenters including federal, State, and local agencies, Tribes, and other organizations that provided written comments during the public review period. The scoping report summarizes the comments received according to the following major themes:

1. BLM Procedures
2. Statement of Purpose and Need
3. Human environment issues
4. Natural environment issues
5. Indirect and cumulative impacts

3.1 BLM Procedures

- The tribes had less than seven days' notice regarding the public scoping meetings because the local papers published the notice on Wednesday or late Tuesday before the meeting on the following Monday, so many people were not informed until the last minute.

- The Desert Quartzite Project should include a full 90 day EIS review period, and a protest period should be provided due to the pending DRECP Land Use Amendment.

- The DEIS should discuss the applicability of the DRECP and the Solar PEIS to the development of the project.

- BLM should follow the mitigation hierarchy of avoiding, minimizing, and mitigating impacts through compensatory, off-site mitigation.

- BLM should follow guidance in Secretarial Order 3330 on mitigation and BLM's Regional Mitigation Manual in establishing mitigation requirements.

- BLM should follow Section 201 of the Federal Lands Policy Management Act, which requires BLM to maintain an inventory of all public lands and their resources and other values, including lands with wilderness characteristics, and IM 2011-154 and Manuals 6310 and 6320, which set forth the agency's policy for implementing this requirement.

- The Energy Production and Utility Corridors section of the CDCA Plan requires at a minimum that the following resource issues be addressed: 1) Consistency with the Desert Plan; 2) protection of air quality; 3) impact on adjacent wilderness and sensitive resources;

4) visual quality; 5) cooling-water source(s); 6) waste disposal; 7) seismic hazards; and 8) regional equity.

3.2 Statement of Purpose and Need

- The project is not needed in the project area, but instead where the demand is, i.e., in Los Angeles, and that this need could be met by providing solar generation facilities on roof tops in Los Angeles.

- The purpose and need statement should include mandates to protect sensitive biological, hydrological, cultural and visual resources, maintain access to public lands, and preserve the CDCA.

- The purpose and need statement should also include a need to protect the public health, quality of life, property values, and socio-economics in the adjacent communities of Blythe, Mesa Verde, and Ripley.

- The purpose and need statement should look beyond the initial boom of construction jobs and consider the long-term impacts that a project of this size would have on local communities.

- Responsible, well-planned and sited renewable energy development, on appropriate public lands is supported. Such renewable energy facilities should avoid areas with important and sensitive resources and values, and should instead utilized previously disturbed and degraded lands.

- BLM received a comment strongly supportive of the development of renewable energy production, and the generation of electricity from solar power. The comment also said that proposed solar power projects should be thoughtfully planned to minimize impacts to the environment. Particularly renewable energy projects should avoid impacts to sensitive species and habitat, and should be sited in proximity to areas of electricity end-use in order to reduce the need for extensive new transmission corridors and efficiency loss associated with extended energy transmission.

- A guided development approach established in BLM's Solar Programmatic EIS (Western Solar Plan) is supported, including development within appropriate areas such as SEZs.

3.3 Human Environment Issues

ALTERNATIVES

- A comment was received that the Draft Environmental Impact Statement / Draft Environmental Impact Report (DEIS/DEIR) should consider alternatives that utilize degraded brownfields and distributed generation. Under NEPA, agencies are required to consider alternatives outside of their jurisdiction.

- A no large-scale energy alternative can be justified with the California Energy Efficiency Strategic Plan, this plan prioritizes implementing rooftop solar and energy efficiency prior to developing large scale, remote solar and wind projects.
- The DEIS/DEIR should properly consider an adequate range of alternatives.
- The DEIS/DEIR must include a robust analysis of alternatives, including a private lands alternative and alternatives using other technologies including distribution generation.
- The objectives of the project must not unreasonably constrain the range of feasible alternatives evaluated in the DEIS/DEIR.
- At a minimum, alternatives including the no-action alternative, an environmentally preferred alternative which avoids all rare sand habitat and other significant impacts to resources (including cultural resources), and an alternative where power generation is site adjacent to power consumption need to be included.

CULTURAL RESOURCES

- In the desert there are many pristine geoglyphs and petroglyphs that are precious to the tribes in the project vicinity and in the surrounding valleys. These features should be protected from project activities. There is also a concern regarding construction and the safety of the cultural sites.
- A cultural survey showed a mining area, agricultural areas, and a military camp were found in the area and should be considered as factors in the project.
- The project is located adjacent to the Mule Mountain Area of Critical Environmental Concern which was protected for cultural resources.
- This area is rich in cultural resources and has trade trails, and the desert pavement preserve artifacts in situ for thousands of years.
- Nearly all the site recorded in the area have been described as having potential for subsurface manifestation. These sites could be considered as part of a complex archaeological district.
- One comment expressed grave concerns about the project’s potential for significant cultural resource impacts.
- The project is located in an especially sensitive cultural resource areas-these artifacts are both sacred and finite.

- NEPA guidelines specify that EISs must address impacts to "historic and cultural resources" thus requiring a more expansive analysis than the one required by the National Historic Preservation Act. Such resources include viewsheds and landscapes, plants and animals used in and /or central to cultural and religious practices and creations stories. By using the correct definition of cultural resources for this Project, BLM will ensure that impacts to a host of important tangible and intangible resources are properly considered.

- The DEIS/DEIR must ensure that potential impacts to known and unknown cultural artifacts are analyzed and avoided.

- A programmatic agreement is not appropriate for this Project, as effects on historic properties can, and must, be fully determined prior to Project approval.

- The May 2014 Plan of Development states that the project will need a cultural resource use permit under the Archaeological Resources Protection Act (ARPA) "based on planned cultural resources investigations". The ARPA only requires a permit where individuals are planning to excavate, remove, damage or otherwise alter archaeological resources-none of which would be necessary for a Class III survey. The comment requested that the BLM pursue a policy of cultural resource avoidance whenever possible.

- BLM should clarify and revise its position with respect to the ARPA permit and allow reburial of any artifacts that cannot be avoided.

HAZARDOUS MATERIALS/HAZARDOUS WASTE/SOLID WASTE

- One comment requests that the DEIS/DEIR address potential direct, indirect and cumulative impacts of hazardous waste from construction and operation of the proposed facility, and appropriate mitigation should be evaluated including measures to minimize the generation of hazardous wastes. Additional requests are to include a requirement for a decommissioning and site restoration plan.

LAND USE

- BLM must analyze potential impacts to lands with wilderness characteristics from the Desert Quartzite project, using the updated inventory information, either using inventories completed from the Desert Renewable Energy Conservation Plan (DRECP) or by conducting new inventories. Impacts to wilderness characteristics should be avoided, or wherever unavoidable should be off-set with compensatory mitigation.

- BLM should use the Western Solar Plan for its measures for avoiding, minimizing, and mitigating impacts to lands with wilderness characteristics.

- BLM received a comment expressing concern with potential direct or indirect impacts that may result in construction and operation of any proposed solar energy project on or near

Metropolitan Water District of Southern California (Metropolitan) facilities (e.g. Metropolitan-owned agricultural lands in the Palo Verde Valley, other facilities, real estate interests, and fee-owned rights-of-way, easements, transmission facilities, and other properties). An assessment of potential impacts to Metropolitan facilities with measures to avoid or mitigate significant impacts should be included in the DEIS/DEIR.

PUBLIC HEALTH

- BLM received a comment regarding the increase in the incidences of Valley Fever (*Coccidiodomycosis*). A request was made to identify whether any ground disturbing activities may result in the dispersal of *Coccidiodes* spores, if so include measures to prevent or minimize the risk to workers and local residents.

- Potential for Valley Fever is high. We are seeing this problem with several of the recently approved large energy projects. In San Luis Obispo County, 28 workers were sent home with Valley fever they worked at two large solar power constructions sites.

TRIBAL GOVERNMENTS

- The DEIS/DEIR should provide a summary of all coordination with Tribes and with the State Historic Preservation Office / Tribal Historic Preservation Office , including identification of National Register of Historic Places eligible sites, and the development of a Cultural Resource Management Plan.

- The DEIS/DEIR should address the existence of Native American sacred sites in the project area, and discuss how the BLM will avoid adversely affecting the physical integrity, accessibility, or use of sacred sites, if they exist, including:
  - The Quechan Trail that runs from an area near the project site to the Cibola Refuge and to Yuma.
  - The Aztec calendar, which is based on an area of the Colorado River in the project region and was a reason why the Mohave tribe opposed the Rio Mesa project at Mule Mountain.
  - Mule Mountain, which is called "calli" by local tribes, and is the origin of the name California.
  - Effects of the project on "tezcalticoca," or conscience.
  - The project's potential effects on the mountain in the Big Maria Mountains called "Kwikumalt" on the Quechan Trail.
  - Effects on the ability for the Chemehuevi to connect with their past wanderings in the area, their songs, the bird song and the salt song, and the trail ways that are there.

- Even though laws exist to project sacred sites, they have not been effective in doing so. As a result, if these sites are liquidated by the project, tribal children are never going to know about them.

- The DEIS/DEIR should describe the process and outcome of the government-to-government consultation between the BLM and each of the tribal governments within the project area, the issues that were raised and how these issues were addressed.

- The BLM should consult with the Cahuilla, Chemehuevi, Mojave and Serrano nations to address their concerns.

- A request has been put forward for the BLM to promptly engage with the Tribes on a meaningful government-to-government level consultation, and to include a summary of all consultation with affiliated tribal entities.

ENVIRONMENTAL JUSTICE AND IMPACTED COMMUNITIES

- BLM received comments expressing concerns about the potential impact of the proposed project on communities in the area, including:
  - Adverse effect on lands recently gained by the tribes in the area near Interstate 10 (I-10).
  - The potential for terrorists to hide under the solar panels.
  - The potential for destruction of property.

- BLM should include an evaluation of environmental justice populations within the geographic scope of the project. If such population exists, the DEIS should address the potential for disproportionate adverse impacts to minority and low-income populations, as well as approaches used to foster public participation by these populations.

- The DEIS should describe outreach conducted to all other communities that could be affected by the project.

- The vast transformation of an entire cultural landscape has significant environmental justice implications. The renewable energy benefits of the Project will flow to energy customers in southern California; whereas, the impacts will be felt by those whose interests in this area extend beyond economics to its cultural and spiritual value.

VISUAL RESOURCES

- A comment was received regarding potential hazards of glint and glare from solar power plants. Hazards from glint and glare include the potential for permanent eye injury and/or temporary disability or distractions, which could impact people working nearby, pilots flying overhead or motorists. Recommend evaluating the potential hazards of glint and glare to motorists on I-10 as well as to pilots flying overhead and include the results of this analysis in the DEIS as well as any measures that would eliminate or reduces these problems.

- Visual impacts of the project should be evaluated as a threat to the “cultural landscape” of the region.
- Large solar projects are creating a polarized glare or lake effect which causes birds and insects to be deceived and collide with solar panels or simply dehydrate. We would like to see a more proactive approach to protecting wildlife from this visual impact than just a report after the fact.

- This project will be visible from residential areas as well as from the McCoy Mountains Wilderness Area. Due to the immense size of the project, visual impacts should be analyzed in the DEIS/DEIR.

3.4 Natural Environment Issues

AIR QUALITY /GREENHOUSE GASES

- BLM should consider the potential for fugitive dust that could impact local residents in a negative way.

- The development of renewable energy would reduce GHG emissions, avoid the worst consequences of global warming, and to assist California in meeting emission reductions.

- Solar developments should be placed on previously disturbed lands not on desert riparian woodlands due to the loss of sequestered carbon dioxide (CO2).

- Additional comments were received regarding using the newly released revised draft guidance for greenhouse gas emissions and climate change, they recommended estimating the greenhouse gas emissions that would result from implementation of the project as well as each alternative, and include discussion of the impacts from climate change on the environmentally resources affected by the project.

- First Solar has had several air quality issues with existing project, some of which were approved and overlooked by BLM. The project has the potential to impact public health in the nearby communities of Blythe, Mesa Verde and Ripely.

- First Solar had had difficult times previously controlling fugitive dust for their Antelope Valley Solar Ranch (AVSR). They have been shut down 3 times for the AVSR for dust violations.

- If you build roads, transmission, large scale renewable projects you will have fugitive dust.

- The DEIS/DEIR should provide a detailed discussion of ambient air conditions and discuss the timeframe for release of these emissions over the lifespan of the project.

- The construction and operation of the proposed project will increase GHG emissions and those emissions should be quantified and off-set. The DEIS/DEIR should evaluate specific mitigation measures to reduce greenhouse gas emissions from mobile sources.

BIOLOGICAL RESOURCES

- It appears the project site is proposed on an ecologically functional desert landscape that may host a suite of rare species.

- Careful documentation of the current site resources is imperative in order to analyze how best to site the project to avoid and minimize impacts and then mitigate any unavoidable impacts.

- Thorough, seasonal surveys should be performed for sensitive plant species and vegetation communities, and animal species under the direction and supervision of the BLM, USFWS, and California Department of Fish and Wildlife (CDFW). Full disclosure of survey methods and results to the public and other agencies is important to assure NEPA and Endangered Species Act (ESA) compliance.

- Confidentiality agreements or non-disclosure agreements regarding environmental resources must not be required of any biologists participating in surveys for the proposed project.

- Surveys for plants and plant communities should follow California Native Plant Society and CDFW floristic survey guidelines.

- Vegetation maps should be at a large enough scale to be useful for evaluating impacts.

- Adequate surveys must be implemented, not just single season of surveys, in order to evaluate the existing on-site conditions. The project application should be put on hold and not proceed if key surveys have not been completed due to low rainfall or other factors.

- A number of rare species have a high potential to occur on the project site. All of the rare species that have been identified as occurring in the general vicinity of the project site must be adequately addressed in the DEIS/DEIR. The DEIS/DEIR must adequately address the impacts and propose effective ways to avoid, minimize, and mitigate the impacts of these resources through alternatives including alternative siting and alternative on-site configurations.

- The BLM should address:
    - The safe relocation of species and their habitat, including snakes and lizards that may be affected by earth moving equipment.
        - Effects on an eagle's nest in the area, less than ten miles from the site.

  - Adverse effects on the many plants in the area that are used as medicine or tea by Native Americans.
  - Destruction of wildlife and land on which Native Americans live off of.
  - Adverse effects on animals in the desert that for many years represent meanings to Native Americans.

- There are known desert washes that support microphyll woodlands, and it is not clear the extent this community occurs on site.

- The vegetation on the Project site is very low density and low in overall height, recommend not grading entire site but leaving vegetation in place between roads.

- The project lies within connectivity corridors. Many desert sensitive species of plants and animals are dependent on this natural feature.

- Concern over the rare plant surveys. The surveys were performed in years with unfavorable conditions for germination of desert annual plants.

- Concern for Mojave fringe-toed lizard habitat, and the possibility of “lake effect” because of the proximity of the Project to the Colorado River since this is a known migratory bird flyway.

- A recommendation that the DEIS/DEIR should explain how it will meet the requirements of Executive Order 13112 Invasive Species.

- The DEIS/DEIR should also describe the invasive plant management plan, and also describe post-construction activities that will be required such as surveying for invasive species following restoration site, and measures to be taken in the case of an infestation being found.

- Threats posed to birds and bats from construction and particularly the operation of renewable energy projects is not new. A recommendation to include a discussion on the occurrence of avian mortality at utility scale solar sites. Also recommend in consultation with USFWS and CDFW determine the need for a comprehensive monitoring protocol to catalog and analyze occurrences of avian mortality. If the need for a comprehensive protocol is deemed warranted, please include the draft of the protocol in the DEIS/DEIR.

- Identify all petitioned and listed threatened and endangered species and critical habitat that might occur within the project area. The DEIS/DEIR should identify and quantify which species or critical habitat might be directly, indirectly, or cumulatively affected by each alternative and mitigate impacts to these species.

- Concern specifically about this project regarding potential impacts to foraging and nesting habitat for a variety of species including but not limited to: Desert tortoise, fringe toed lizards, burrowing owls, migratory birds and raptors.

- A recommendation that the BLM consult with USFWS and prepare a biological opinion under Section 7 of the ESA, if deemed not necessary then provide information on how the determination was made within the DEIS/DEIR.

- Recommendation that the following documents as applicable be included in the DEIS/DEIR: Avian Protection Plan, a Raven Monitoring, Management and Control Plan, Burrowing Owl Mitigation Monitoring and Translocation Plan, Desert Tortoise Relocation/Translocation Plan, Desert Tortoise Compensatory Mitigation Plan, Special-Status Plant Impact Avoidance and Mitigation Plan, and Management Plan for Sand Due/Fringed-Toed Lizard.

- Another concern was the habitat fragmentation and obstructions for wildlife movement resulting from the project. They encourage habitat conservation alternatives that avoid and protect high value habitat and create or preserve linkages between habitat areas to better conserve the covered species.

- A comment that the DEIS/DEIR should discuss impacts associated with an increase of shade in the desert environment on vegetation and/or species.

- The project will impact habitat for the desert tortoise, burrowing owl, several rare plants, Mojave fringe-toed lizards, kit foxes and several migrating bird species.

- Development of the project will have direct impacts to the Mojave fringe-toed lizard

- The area contains wildlife habitat linkage that has been identified as being critical for burro deer, and could desert bighorn sheep.

- The DEIS/DEIR should consider impacts to the endangered Gila woodpecker and the elf owl.

- When deserts are scraped, biological soil crust, desert pavement, and old growth vegetation will be lost.

Mojave Desert Tortoise

- Desert tortoise are present on the site. This project will impact individual animals as well as connectivity habitat.

- Although pre-project surveys show the area serves as available habitat for desert tortoise. The proposed project would eliminate low density/linkage habitats that may be important for population and habitat connectivity for this and other desert species.

- Construction and operation of the proposed project would result in permanent and long-term elimination or degradation of 5,003 acres of desert tortoise habitat, and therefore it is recommended the BLM and Riverside County require a suite of avoidance, minimization, and mitigation measures be implemented to offset any adverse effects to the species.

- The construction and operation of the proposed project would likely lead to an increase in the number of common ravens in project area. Common ravens prey on desert tortoises, and therefore an increase in ravens at the project site would have detrimental effects on desert tortoise both near and distant from the project site.

- To address impacts on desert tortoise from common ravens that may be attracted to the site, it is recommended that BLM and the County of Riverside require on-site measures to eliminate or minimize the availability of subsidies and potential for common ravens to occupy the project site during all phases of the project.

- The BLM and the County of Riverside should require the project contribute to the Regional Common Raven Management Program.

- The DEIS/DEIR must clearly address alternative proposals for avoiding, minimizing, and mitigating impacts to the desert tortoise and any occupied habitat.

- The DEIS/DEIR must first look for ways to avoid impacts to desert tortoise, for example, by identifying and analyzing alternative sites outside of desert tortoise occupied habitat or in areas that have already been severely disturbed by other prior land use as well as alternative project configurations that would avoid or significantly reduce impacts.

- The DEIS/DEIR must look for ways to minimize any impacts to desert tortoise that it finds are unavoidable.

- Acquisition of lands that will be managed in perpetuity for conservation must be included as of part of the strategy to mitigate impacts to desert tortoise.

- Translocation as a long-term strategy for minimizing and mitigating impacts to desert tortoise may be a tool for augmenting conservation of the desert tortoise, but it cannot substitute for other mitigation such as preservation of habitat.

- An aggressive raven prevention plan needs to be developed as part of the DEIS/DEIR and followed during project development and implementation.

Yuma Ridgway's Rail

- Relatively few Yuma Ridgeway's rails are known in the project vicinity. Although few, available data suggests the solar technologies deployed by the proposed project pose a hazard to which various rail species and other water-associated birds are particularly vulnerable. The mortality risk to Yuma Ridgeway rails (and other rails) may be caused by project-related facilities such as gen-tie lines, solar panels, and perimeter fencing.

- There is concern that utility-scale solar and transmission projects may result in fatalities to Yuma Ridgway's Rail during the life-span of the project, especially given the large cumulative disturbance footprint of all existing and planned projects.

- The DEIS/DEIR should address the direct, indirect, and cumulative effects of the project on the Yuma Ridgway's rail, and include a range of avoidance, minimization, and mitigation measures.

- Because solar PV projects, like the proposed project, are attractive to water birds, including the Yuma Ridgeway's rail, the proposed project could imperil Yuma Ridgeway's rail. Therefore, the DEIS/DEIR needs to evaluate the potential impacts to these birds.

Burrowing Owl

- If burrowing owls are identified on the project site, at least one alternative should evaluate the reduction of impacts to this rare species by moving the project away from the nesting burrows. Also, acquisition lands may be required as part of the mitigation and will be managed in perpetuity for conservation.

Other Bird Species

- BLM received a comment expressing concern about potential fatality events to other listed, rare, and/or sensitive bird species (e.g. willow flycatcher and yellow-billed cuckoo), which are known to breed and migrate through the Lower Colorado River Valley.

- An assessment and analysis of project impacts on these species that improves the level of rigor and adequacy for determining the different degrees of vulnerability across all avian taxa and risk assessment that includes the quantification for take of listed and rare species is warranted. Impact avoidance, minimization, and mitigation measures should be proposed to minimize impact of incidental take.

Migratory Birds

- There is growing evidence of what is referred to as a "lake effect" or "polarized light pollution", which presents a particularly hazard to water-associated birds and other species seeking migratory stopover habitat typically found along rivers and lakeshores.

- It is recommended that the Draft DEIS/DEIR thoroughly address the potential significance for bird collisions on project specific and cumulative scales.

- It is recommended the BLM and County of Riverside require the development and implementation of avian and bat mortality and injury monitoring program as a component of a project-specific Bird and Bat Conservation Strategy (BBCS). The Draft BBCS and monitoring program should be analyzed as part of the Draft DEIS/DEIR.

- Bird carcasses should be collected to facilitate the monitoring efforts; to avoid attracting scavengers, such as common ravens (which prey on desert tortoise), and to reduce the potential for human health issues. A Special Purpose Utility Permit would be required from USFWS for this collection of bird carcasses.

- Due to the project's adjacency to the proposed Blythe Mesa project, an opportunity exists to generate important information regarding the effects of different technologies on various bird species and mortality rates. It is recommended that the BLM and County of Riverside consider requiring the proposed project to evaluate some potential design considerations. It is recommended that the BLM, County of Riverside, and the applicant discuss the applicant designing a framework under which various technologies can be used for adaptive management purposes.

- To reduce the potential for electrocution of birds, it is recommended the BLM and County of Riverside require the applicant to design and construct any aboveground electrical lines to reduce likelihood of electrocution of large birds, such as raptors.

- It is recommended that the BLM and County of Riverside include a requirement that each respective permit for the proposed project to mitigate for the project's effects on habitat and populations of migratory birds. Appropriate mitigation should be developed and implemented.

- BLM received a comment expressing concern about migratory birds, both rare and common. Because large-scale PV projects pose a significant hazard to migratory birds and especially water birds, the DEIS/DEIR needs to discuss these potential impacts and propose alternatives to avoid and minimize impacts, as well as identify and release as part of the DEIS/DEIR, a robust monitoring scheme to collect data.

Desert Kit Fox and Badgers

- The DEIS/DEIR must estimate the number of desert kit fox or badgers on the project site, and analyze impacts to them from the proposed project. The comment provided multiple recommended measures that should be included in the American Badger and Desert Kit Fox Monitoring and Management Plan.

Mojave Fringe-Toed Lizard

- The Mojave Fringe-toed Lizard is specifically adapted to blowsand habitats, such as sand sheets/fields, which characterize portions of the project site, and across which sands are transported to larger accumulations, such as sand dunes and sand hummocks that accumulate around shrubs and other obstructions.

- The DEIS/DEIR should include a thorough analysis that quantifies the direct loss of lizard habitat and the indirect effects on-site and off-site to lizard habitat. An analysis of avoidance and minimization measures to reduce direct effects to the lizard, should be included in the document.

- Indirect effects to lizard would be caused by disruption of eolian sand transport processes to blowsand habitat downwind of the project site. To minimize direct and indirect impacts to lizard and downwind habitats, it is recommended that the project be reconfigured to avoid areas of active and stabilized sand in the northern portion of the proposed project site. If the project is not reconfigured to avoid impacts to the sand transport process, it is recommended that the BLM and the County of Riverside require habitat onsite and downwind of the project be quantified and mitigated by the acquisition of suitable habitat within the Chuckwalla Valley sand transport corridor. Direct and indirect habitat losses should be mitigated at 3:1 loss to replacement ratio.

- The DEIS/DEIR needs to include a comprehensive analysis of the sand transport corridor and a thorough impact analysis from the proposed project.

- The DEIS/DEIR alternatives should all prioritize avoidance and conservation of the sand transport corridor and sand dune areas.

- The DEIS/DEIR needs to require avoidance of all habitat areas and stronger minimization measures to prevent any additional mortalities to the lizard from the proposed project.

Aquatic Insects

- Solar panels can act as ecological traps to organisms that use polarized light as behavioral cue. The design of solar panels and collectors and their placement relative to aquatic habitats will likely affect populations of aquatic insects directly. Decreases in the number of insects may indirectly affect other species because they provide food for fish, birds, and other species.

- To minimize the effect on aquatic insects, it is recommended that BLM and the County of Riverside require the project to use solar panels with reduced reflectivity and polarized light pollution or panels with white borders and grids of white strips that criss-cross the panels.

Other Rare Species

- The BLM must clearly address proposals for avoiding, minimizing and mitigating the impacts to all of the rare species that utilize the project site for all or part of their life cycle.

- Acquisition of lands that will be managed in perpetuity for conservation must be included as part of the strategy to avoid, minimize and mitigate impacts to these other rare species as well.

- For the rare plants, avoidance is preferable because of the general lack of success in transplanting rare plants. If transplantation is to be part of the mitigation strategy, a detailed final plan must be included in the DEIS/DEIR methodology for determination of appropriate conservation area where plants may be transplanted, when/how plant are to be transplanted and identification of success criteria for transplantation.

Locally Rare Species

- The DEIS/DEIR should evaluate the impact of the proposed project on locally rare species (not merely federal- and state-listed threatened and endangered species). All species found at the edge of their ranges or that occur in disjunct locations should be evaluated for impacts by the proposed project.

Non-Native Plants

- The DEIS/DEIR must identify and evaluate impacts to species and ecosystems from invasive exotics species. The projects effects contributing to potential wildland weed invasions must be evaluated in the DEIS/DEIR.

Wildlife Movement

- A thorough and independent evaluation of the project’s impacts on wildlife movement is essential. The DEIS/DEIR must evaluate all direct, indirect, and cumulative impacts to wildlife movement corridors.

FIRE

- Because any industrial project increases the potential for human-caused fire to occur on the site, fire prevention including best management practices must be addressed and clearly identified in the DEIS/DEIR, not only on-site protection of resources, but also preventing fire from moving into adjacent lands.

WATER RESOURCES

- BLM received comments expressing concern about the potential detrimental effects from runoff washes, water from the Colorado River, and water from the McCoy riverbed on the proposed project. An additional comment was received regarding the use of local groundwater to support the construction and operation of the Project-is there another viable source of water.

- Include a discussion of the amount of water needed and where this water will be obtained

- Discuss the availability of groundwater within the basin, annual recharge rates and whether water rights have been over-allocated

- Include an analysis of different types of technology that can be used to minimize or recycle water including alternative methods of cleaning PV panels.

- Discuss whether it would be feasible to use other sources of water, including potable water, irrigation canal water or wastewater.

- Altering the drainage at such a large scale will impact groundwater, and cause flooding in unexpected places.

- Large solar and wind developers often underestimate the amount of water needed for these projects-several projects have asked for additional water.

- A comment was received expressing concern about the proposed project's potential direct and cumulative impacts on water supplies, specifically potential impacts on Colorado River and local groundwater supplies.

- A comment was received that if the proposed project would use groundwater from on-site wells, then there would be concern that the wells would draw water from a groundwater basin that is hydro-geologically connected to the Colorado River, within an area that is referred to as the "accounting surface." To the extent the proposed project uses Colorado River water, it must have a documented right to do so.

- The proposed project would be required to obtain water from the existing junior priority holder, the Metropolitan, which has the authority to sell water for power plant use. Metropolitan is willing to discuss the exchange of a portion of its water entitlement, subject to any required approvals by Metropolitan's Board of Directors, through an agreement with Metropolitan.

- The project appears to impact on-site drainages on the project site. The DEIS/DEIR must clarify the impacts to the jurisdictional Waters of the U.S. and Waters of the State of California, and surface hydrology across the site. The project must avoid, minimize, and mitigate any impacts to surface water and surface hydrology.

- An evaluation of the effect of water use by the proposed project during construction and operations needs to be detailed and include alternatives and its impact the Colorado River Basin. Any groundwater pumping proposed for the project, must be analyzed in terms of groundwater resources and its effect on native plant and animal species and their habitats need to be included in the DEIS/DEIR.

3.5 Indirect and Cumulative Impacts

Commenters expressed concerned about the potential cumulative impacts of multiple large-scale renewable energy projects in the western Mojave desert/Tehachapi area on various resources. Cumulative projects and effects that should be considered include:

- Blythe, Genesis, and McCoy Southern projects, and the cumulative cultural effects on the McCoy Valley, the main valley "where the spirits descend."
- The Salton Sea, Diamond Lake in Perris, and Lake Mead, and the cumulative effects of water use, storage, and draught in the area.
- The Blythe Project, its removal of orchards, and the potential cumulative loss of local employment.
- Construction of a recent highway in the Palo Verde Valley area, and the cumulative effects on the mountains Kokopilli and Cicmitl, considered to be the Twin Group of the Creator.
- Additional comments regarding cumulative impacts assessments include the recommendation of focusing on resources of concern or resources that are "at risk" and/or are significantly impacted by the proposed project, before mitigation. The BLM should conduct assessment of the cumulative impacts to air quality, aquatic and biological resources including impacts to desert washes and desert tortoise. The DEIS should consider the cumulative impacts associated with multiple renewable energy and other development projects, and the DEIS should also describe the methodology used to assess cumulative project impacts.
- The BLM must take a hard look at cumulative impacts to cultural resources.
- The BLM and County should also assess the potential cumulative impacts of the use of scarce Colorado River and local groundwater basin resources in light of other pending renewable energy projects within the Colorado River Basin and the local groundwater basins. The DEIS/DEIR should address the proposed project's water supply and any potential direct or cumulative impacts from this use.
- Given the extent of renewable energy projects in the project vicinity, it is recommended the BLM, State, and local agencies conduct a thorough analysis identifying all cumulative, direct, and indirect effects that are expected from the proposed projects and associated infrastructure.
- There is a particular concern with impacts to Mojave Desert tortoise habitat connectivity and potential loss of gene flow within and among designated critical habitat units across the species' range. Consequently, the DEIS/DEIR should examine potential impacts to the population connectivity requirements of desert tortoise and other plant and wildlife species

throughout the project area and alternative project sites to avoid any significant adverse effects.

- The following specific measures were recommended relative to potential cumulative impacts to biological resources.
  - The project should include a range of alternatives to the project as currently proposed, including alternative sites for project outside the Lower Colorado River Valley; a reduced-footprint alternative; alternative technologies and project configurations that would reduce adverse effects to avian and wildlife species.
  - Eliminate any water features such as evaporation ponds.
  - Consider undergrounding on-site distribution lines.
  - Consider undergrounding or using monopoles for any above-ground distribution lines and gen-tie lines.
  - For any above-ground distribution and gen-tie lines, deploy visual deterrents designed to minimize avian collisions.
  - Use tracking devices so that panels may be offset to break-up any illusion of a large water body.
  - Implement deterrent testing program in the interest of adaptive management.
  - Build perimeter fence with a gap in the bottom to evaluate wildlife use of the site after construction.
  - Mark fences to determine if this reduces avian collisions with newly constructed fences.
  - Avoid use of lattice-type structures or placing external ladders and platforms on any infrastructure to minimize perching and nesting.
  - Avoid use of meteorological towers that require use of guy wires.
  - Avoid using lighting to extent possible; where lighting is necessary, facility lighting should be focused downward to reduce sky illumination.
  - Minimize permanent disturbance area by minimizing creation of roads, avoidance of excessive clearing of vegetation, and grading wherever possible.
  - A Nesting Bird Plan should be developed that articulates methods and timing for clearing of vegetation and conserving active nests; any variances from the plan should be approved by the agencies.
  - Surveys for golden eagle nests should be conducted during each year during construction activities within the nesting season.
  - Clearance surveys for burrowing owls should be completed in each construction unit; buffer areas should be determined in consultation with the wildlife agencies.
  - Mandatory site training for all construction personnel regarding avoidance of bird nests and bat colonies and other biological resources should be conducted.

- The EIS must evaluate all direct, indirect, and cumulative impacts to sensitive habitats, including impacts associated with the establishment of unpermitted recreational activities, the introduction of non-native plants, the introduction of lighting, noise, and the loss and disruption of essential habitat due to edge effects.

- A thorough analysis of the cumulative impacts from all of the permitted and proposed solar projects, within the region, and the CDCA, needs to be included in the EIS/EIR. Emphasis on cumulative impacts on migratory birds in this key thread of the Pacific flyway needs to be included.

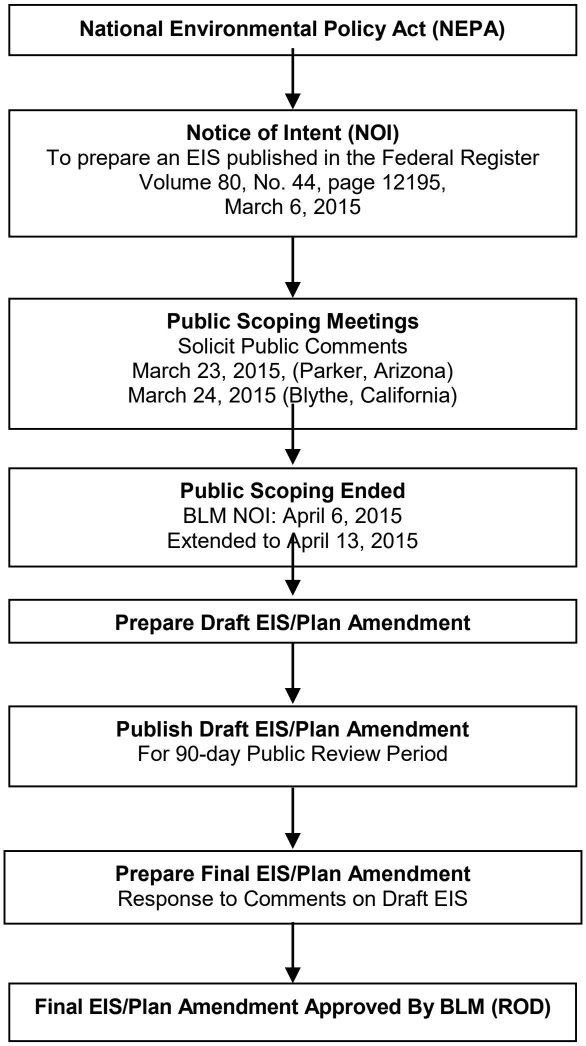
3.6 Written Comments Received During Public Scoping Period Regarding the CEQA Process

- A comment was received for Riverside County regarding the Blythe Airport, that it could ultimately be surrounded by solar projects with consequent impacts on flight safety due to glint/glare and proliferation of aboveground electrical transmission lines. The commenter reserves the right to issue additional comments as the project moves forward, in order to ensure that all potentially significant impacts upon the safety of air safety are mitigated.

4.0 SUMMARY OF FUTURE STEPS IN THE PLANNING PROCESS

The project would be located on land classified as a SEZ within the CDCA Plan. The project may require a Land Use Plan Amendment to the CDCA Plan which would occur concurrently with the NEPA process. The EIS process requires a team of interdisciplinary resource specialists to complete each step. An important part of the environmental planning process is engaging the public and relevant agencies from the earliest stages of and throughout the planning process to address issues, comments, and concerns. The steps of the NEPA planning process and decisions to be made are described as follows. Figure 1 provides a summary of the EIS (NEPA) process.

Figure 4 - NEPA Process Flowchart


National Environmental Policy Act (NEPA)
Notice of Intent (NOI)
To prepare an EIS published in the Federal Register
Volume 80, No. 44, page 12195,
March 6, 2015
Public Scoping Meetings
Solicit Public Comments
March 23, 2015, (Parker, Arizona)
March 24, 2015 (Blythe, California)
Public Scoping Ended
BLM NOI: April 6, 2015
Extended to April 13, 2015
Prepare Draft EIS/Plan Amendment
Publish Draft EIS/Plan Amendment
For 90-day Public Review Period
Prepare Final EIS/Plan Amendment
Response to Comments on Draft EIS
Final EIS/Plan Amendment Approved By BLM (ROD)

Identification of Issues

Issues associated with the project were identified through the scoping period, which initiated the planning process. The scoping process and the issues identified through the scoping process are documented in this scoping report.

Data Information and Collection

Much of the necessary resource data and information will be compiled from existing studies prepared for the project or through other local agencies. Additional data and information will be obtained from available sources to update and/or supplement existing data.

Preparing Draft EIS

Based on collected data, including public comments, a description of the project and alternatives (including no action) will be developed. Only alternatives that meet NEPA screening criteria will be considered in detail. Impacts that could result from implementing the project and alternatives will be analyzed and measures to mitigate those impacts will be identified where appropriate.

Draft EIS and Public Comment Period

The next official public comment period will begin upon publication of the Draft EIS, which is anticipated to be in late 2015. This document will evaluate a range of project alternatives including a “No Action” alternative and a “Preferred” alternative and will generally include the following:

1) Executive summary
2) Introduction/overview (including purpose and need for the project)
3) Description of project and alternatives
4) Environmental analysis (including impacts and mitigation measures to minimize impacts)
5) Comparison of alternatives
6) Other NEPA considerations

Upon completion of the Draft EIS, BLM will publish a Notice of Availability in the Federal Register and a 90-day public comment period will follow. Copies of the Draft EIS will be distributed to elected officials, regulatory agencies, and interested members of the public. The document will also be available online at the BLM project website:

http://www.blm.gov/ca/st/en/fo/palmsprings/Desert_Quartzite.html

During this time, public comment on the Draft EIS will be received.

Response to Comments, Preparation of Final EIS, Notice of Determination, and Record of Decision

After the public comment period, the BLM will respond to comments and prepare a Final EIS. The availability of the Final EIS will be announced in the Federal Register, and a 30-day public protest period will follow. Copies of the Final EIS will be distributed to elected officials, regulatory agencies, and interested members of the public. The document will also be available online at the BLM website, as described previously.

For NEPA, following a 30-day Protest Period and concurrent 60-day Governor's Review, the BLM will resolve valid protests and prepare the Record of Decision. The Notice of Availability for the Record of Decision will be announced in the Federal Register.

5.0 REFERENCES CITED

40 CFR 1501.1–1501.8. NEPA and Agency Planning.

Federal Register, Volume 80, No. 44, page 12195, March 6, 2015.

APPENDIX A

NOTICE OF INTENT
(FEDERAL REGISTER MARCH 6, 2015)

- maintenance of access for various types of recreational, scientific and other uses;
- access to private lands;
- trespass;
- regional connectivity;
- improving GIS and on-the-ground information for the public; and
- other implementation strategies such as signing, monitoring and law enforcement.

In addition, a substantial number of comments indicated issues and needs associated with specific routes and route areas in the WEMO transportation system, and included recommendations on the designation of specific routes. A few comments were also received on grazing issues and the scope of the supplemental grazing program analysis.

In response to court concerns and on-the-ground changes since 2006, NEPA considerations focused on cumulative effects of the transportation system alternatives to resource values, particularly air quality, soils, cultural resources, certain biological resources, and certain sensitive species, cumulative effects of grazing, and potential cumulative loss of recreational access opportunities. In response to public input, access considerations focused on maintaining a viable transportation network, diverse recreational opportunities, providing access for specific users, (including rock-hounders, motorcyclists, scientific and educational activities, and non-motorized users), dealing with conflicts between users, and maintaining commercial access needs.

Plan amendments would address specific CDCA Plan inconsistencies with regulation and BLM policies in the WEMO Planning Area; including amending language that limits the route network to routes that existed in 1980 and travel management guidance for route designations. Changes are proposed to the existing land-use plan to address stopping, parking, and camping adjacent to routes in Limited Access Areas within the WEMO Planning Area, and to establish a regional minimization strategy for the travel route network. Changes are also proposed to the grazing program that would reallocate forage from livestock use to wildlife use and ecosystem function in desert tortoise habitat for inactive allotments or allotments that become vacant. In addition, the Draft considers plan level decisions modifying motorized use on four specific lakebeds, including Cuddeback Lake and competitive motorized use of routes. The Draft also considers various travel management implementation frameworks. Four alternatives are evaluated, including a No Action alternative.

Finally, the Draft includes activity-level specific route designation alternatives, based on the 43CFR 8342.1 criteria and different thresholds for minimization or closure. The preferred alternative would designate approximately 10,300 miles of routes within the WEMO Planning Area as available for motorized use, approximately130 miles of routes would be available for either non-motorized or non-mechanized use, and approximately 4,400 miles of routes would be closed.

The preferred alternative also includes a regional mitigation strategy that would limit the extent of off-route stopping and parking throughout the planning area to minimize impacts to undisturbed habitat, enhance watersheds, and protect adjacent sensitive resources. Other measures are based on proximity to sensitive resources, such as riparian systems, that would enhance these resources throughout the planning area.

The preferred alternative provides for a limited number of designated camping and staging areas to direct intensive use to manageable locations. Finally, the preferred alternative proposes an integrated, community-based implementation strategy that addresses outreach, compliance and enforcement strategy in which partnerships with adjacent communities, users, local Friends and other interest groups, national and State recreational and conservation coalitions, and other interested citizens are a central component.

Please note that public comments and information submitted including names, street addresses, and email addresses of persons who submit comments will be available for public review and disclosure at the above address during regular business hours (8 a.m. to 4 p.m.), Monday through Friday, except holidays.

Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment—including your personal identifying information—may be made publicly available at any time. While you can request to withhold your personal identifying information from public review, BLM cannot guarantee that we will be able to do so.

Authority: 40 CFR 1506.6, 40 CFR 1506.10, 43 CFR 1610.2.

Thomas Pogacnik,

Deputy State Director, Natural Resources.

[FR Doc. 2015–05127 Filed 3–5–15; 8:45 am]

BILLING CODE 4310–40–P

DEPARTMENT OF THE INTERIOR

Bureau of Land Management

[CACA 049397, LLCAD06000. L51010000.ER0000.LVRWB09B2920.15X]

Notice of Intent To Prepare an Environmental Impact Statement for the Desert Quartzite Solar Project and a Possible Amendment to the California Desert Conservation Area Plan, Riverside County, California

AGENCY: Bureau of Land Management, Interior.

ACTION: Notice of intent.

SUMMARY: In compliance with the National Environmental Policy Act of 1969, as amended (NEPA), and the Federal Land Policy and Management Act of 1976, as amended (FLPMA), the Bureau of Land Management (BLM) Palm Springs/South Coast Field Office, Palm Springs, California, together with Riverside County, California, intend to prepare a joint Environmental Impact Statement (EIS) and Environmental Impact Report (EIR), which may include an amendment to the California Desert Conservation Area (CDCA) Plan, for the Desert Quartzite Solar Project (Project). By this notice, the BLM is announcing the beginning of the scoping process to solicit public comments and identify issues related to the EIS/EIR and Plan Amendment (PA).

DATES: This notice initiates the public scoping process for the EIS/EIR and PA. Comments on issues may be submitted in writing until April 6, 2015. The date(s) and location(s) of any scoping meetings will be announced at least 15 days in advance through local news media, newspapers and the BLM Web site at: *http://www.blm.gov/ca/st/en/fo/cdd.html.* In order to be included in the analysis, all comments must be received prior to the close of the 30-day scoping period or 15 days after the last public meeting, whichever is later. We will provide additional opportunities for public participation as appropriate.

ADDRESSES: You may submit comments on issues and planning criteria related to the Project by any of the following methods:

- email: *blm_ca_desert_quartzite_solar_project@blm.gov.*
- fax: (951) 697–5299.

- mail: ATTN: Cedric C. Perry, Project Manager, BLM California Desert District Office, 22835 Calle San Juan de Los Lagos, Moreno Valley, California 92553–9046

Documents pertinent to this project may be examined at the BLM California Desert District Office at the above address Monday through Friday 8:30 a.m. to 4:30 p.m.

FOR FURTHER INFORMATION CONTACT: Cedric C. Perry; telephone—(951) 697–5388; address—BLM California Desert District Office, 22835 Calle San Juan de Los Lagos, Moreno Valley, CA 92553–9046; Email—*blm_ca_desert_quartzite_solar_project@blm.gov.*

Persons who use a telecommunications device for the deaf (TDD) may call the Federal Information Relay Service (FIRS) at 1–(800)–877–8339 to contact the above individual during normal business hours. The FIRS is available 24 hours a day, 7 days a week, to leave a message or question with the above individual. You will receive a reply during normal business hours.

SUPPLEMENTARY INFORMATION: The applicant, Desert Quartzite Solar, LLC has requested a right-of-way (ROW) authorization to construct, operate, maintain and decommission a 300 MW alternating current (AC) solar photovoltaic energy-generating facility along with the necessary ancillary facilities including a project substation, access road, transmission lines, realignment of an existing route, operations and maintenance buildings, and lay down areas. The project is proposed on 4,845 acres of public land with the solar field occupying approximately 2,453 acres on lands within the Riverside East Solar Energy Zone (SEZ), southwest of Blythe, California.

This document provides notice that the BLM Palm Springs/South Coast Field Office and the County of Riverside California intend to jointly prepare an EIS/EIR, which may include a potential CDCA Plan Amendment, for the Project. It also announces the beginning of the scoping process for this effort and seeks public input on environmental issues and potential planning criteria relevant to the Project and any potential plan amendments. The purpose of the public scoping process is to guide the planning process and determine the relevant issues that will influence the scope of the environmental analysis, including alternatives and mitigation measures.

Preliminary issues for the environmental analysis and potential plan amendment have been identified by BLM; Federal, State, and local agencies; and, other stakeholders. These issues include: Air quality and greenhouse gas emissions; biological resources, including special status species; cultural resources; geology and soils; hazards and hazardous materials; hydrology and water quality; land use; lands with wilderness characteristics; noise; recreation; traffic; visual resources; cumulative effects; areas with high potential for renewable energy development; and, identification of opportunities to apply mitigation hierarchy strategies for on-site, regional, and compensatory mitigation, and, appropriate to the size of the project, landscape-level conservation and management actions to achieve resource objectives.

You may submit comments on issues and planning criteria in writing to the BLM at any public scoping meeting, or by using one of the methods listed in the **ADDRESSES** section above. To be most helpful, you should submit comments by the close of the 30-day scoping period or within 15 days after the last public meeting, whichever is later.

Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment—including your personal identifying information—may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so. The minutes and list of attendees for each scoping meeting will be available to the public and open for 30 days after the meeting to any participant who wishes to clarify the views he or she expressed.

The BLM withdrew public lands, including those where the proposed Project is located, in the State of California on July 5, 2013, under Public Land Order 7818 for a period of 20 years for future solar energy development, subject to valid existing rights, from location and entry under the United States mining laws. The lands are open to mineral and geothermal leasing, and mineral material sales.

The BLM will utilize and coordinate the NEPA scoping process to help fulfill the public involvement process under the National Historic Preservation Act (54 U.S.C. 306108) as provided in 36 CFR 800.2(d)(3). The information about historic and cultural resources within the area potentially affected by the proposed action will assist the BLM in identifying and evaluating impacts to such resources. The BLM will also consult with Indian tribes on a government-to-government basis in accordance with Executive Order 13175 and other policies. Tribal concerns, including impacts on Indian trust assets and potential impacts to cultural resources, will be given due consideration. Federal, State, and local agencies, along with tribes and other stakeholders that may be interested in or affected by the proposed action that the BLM is evaluating, are invited to participate in the scoping process and, if eligible, may request or be requested by the BLM to participate in the development of the environmental analysis as a cooperating agency.

With respect to the potential land use plan amendment, the BLM will evaluate identified issues to be addressed in any potential plan amendment, and will place those issues into one of three categories:

1. Issues to be resolved in the plan amendment;

2. Issues to be resolved through policy or administrative action; or

3. Issues beyond the scope of this plan amendment.

The BLM will provide an explanation in the Draft EIS and PA as to why an issue was placed in category two or three. The public is also encouraged to help identify any management questions and concerns that should be addressed in the plan. The BLM will work collaboratively with interested parties to identify the management decisions that are best suited to local, regional, and national needs and concerns.

The BLM will use an interdisciplinary approach to develop the potential plan amendment in order to consider the variety of resource issues and concerns identified. Specialists with expertise in the following disciplines will be involved in the planning process: Rangeland management, minerals and geology, outdoor recreation, archaeology, paleontology, wildlife, lands and realty, hydrology, soils, sociology and economics.

Authority: 40 CFR 1501.7 and 43 CFR 1610.2.

Thomas Pogacnik,

Deputy State Director, Natural Resources.

[FR Doc. 2015–05290 Filed 3–5–15; 8:45 am]

BILLING CODE 4310–40–P

APPENDIX B

PUBLIC NOTICES

B-1 – PUBLIC NOTICE (PARKER PIONEER MARCH 18, 2015)
B-2 – PUBLIC NOTICE (DESERT SUN MARCH 18, 2015)
B-3 – PUBLIC NOTICE (PALO VERDE TIMES MARCH 18, 2015)

APPENDIX B-1

PUBLIC NOTICE (PARKER PIONEER MARCH 18, 2015)

Chrismer golf tournament in March

The Poston Rotary Club will be hosting its 25th annual Bill Chrismer Memorial Golf Tournament March 27 and 28, 2015 at the Emerald Canyon Golf Course.

This tournament is usually held the first weekend of April. That was changed for this year as Easter Sunday is that weekend.

This is a four-person scramble and golfers may enter as a pair or as singles and a team will be formed based on handicaps.

Entry forms will be available at the Golf Course, the Parker Area Chamber of Commerce, Wilbur-Ellis Company in Ehrenberg, Crop Production Services in Poston, and at the Parker Elks Lodge (BPOE 1929) at Eighth Street and Laguna Avenue. They can also be requested by phone at (928) 669-0556 or by email at sharongriffin88@yahoo.com

The requested donation to enter is $80.00 and includes cart, refreshments and lunch as well as prizes for longest drive and closest to the pin. As usual, there will be a Calcutta at the Elks lodge at 6 p.m. on Friday before the tournament.

Funds raised through this tournament will support scholarships for deserving Parker students enrolling in college. Your support is very much appreciated. The Emerald Canyon Golf Course is located seven miles north of Parker on Riverside Drive.

Meeting on solar project slated

STAFF REPORTS

Desert Quartzite Solar Project EIS public scoping meeting will be held Monday, March 23, at the Parker Community-Senior Center, 1115 12th Street, Parker, from

6:30 to 8:30 p.m. The Bureau of Land Management published a Notice of Intent to prepare an Environmental Impact Statement, for the Desert Quartzite Solar Project March 6.

Desert Quartzite, LLC proposes to construct, operate, maintain and decommission an up to 300 megawatt alternating current solar photovoltaic energy-generation facility along with the necessary ancillary facilities including a project substation, access road, realignment of an existing route, operations and maintenance buildings and lay down areas, on BLM land.

The project is proposed on 4,843 acres with the solar field occupying approximately 2,453 acres. The proposed project would be located in Riverside County, California, approximately eight-miles southwest of the center of Blythe, 45 miles east of Desert Center and south of Interstate 10.

This public scoping meeting is being held to aid the public's understanding of the project and to solicit scoping comments, aimed at identifying environmental resource topics and issues that should be considered in the EIS.

For further information contact: Cedric Perry, BLM Project Manager; telephone 951-697-5388 and Email: blm_ca_desert_quartzite_solar_project@blm.gov

BRIEFS

SPRING MUSIC FEST ON SATURDAY

Spring Music Fest & Off-Road Expo, presented by Soroptimists International of Parker, will be held Saturday, March 21, at La Paz County Park, noon to 6 p.m. Two bands will be playing Catfish Junction, which features blues and rock; and Chuck E. Bumps and the Crocodiles, featuring rockabilly, classic rock, swing and R & B.

Parker Motor Co. Ford trucks and Parker Yamaha off-road vehicles will be featured at the Off-Road Expo.

Other activities include a swap meet, balloon "rides" (the balloon will be tethered) for $20. An exhibition of a "Jeep Stack" will be held at 2 p.m., by Parker 4 Wheelers. There will also be a beer/appetizer tasting.

Free admission and Bounce House for kids 10 and under. General admission is $5; including beer/appetizer tasting, admission is $10.

All proceeds benefit Soroptimists' community projects for women and children.

FISHING REPORT

Flagstaff

APPENDIX B-2

PUBLIC NOTICE (DESERT SUN MARCH 18, 2015)

Desert Quartzite Solar Project EIS

Public Scoping Meeting

Tuesday, March 24, 2015

Place: City of Blythe Multi-Purpose Room

Address: 235 North Broadway,
Blythe, CA 92225

Time: 6:30 PM to 8:30 PM

The Bureau of Land Management (BLM) published a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS), for the Desert Quartzite Solar Project (DQSP), on March 6, 2015.

Desert Quartzite, LLC proposes to construct, operate, maintain and decommission an up to 300 megawatt (MW) alternating current (AC) solar photovoltaic energy-generation facility along with the necessary ancillary facilities including a project substation, access road, realignment of an existing route, operations and maintenance buildings and lay down areas, on BLM land. The project is proposed on 4,843 acres with the solar field occupying approximately 2,453 acres. The proposed project would be located in Riverside County, California, approximately 8 miles southwest of the center of Blythe, 45 miles east of Desert Center, and south of Interstate 10.

This public scoping meeting is being held to aid the public's understanding of the project and to solicit scoping comments, aimed at identifying environmental resource topics and issues that should be considered in the EIS.

For further information contact:
Cedric Perry, BLM Project Manager;
Telephone: (951) 697-5388
Email:
blm_ca_desert_quartzite_solar_project@blm.gov
Website: http://www.blm.gov/ca/st/en/fo/cdd.html

DS-2000575864-01

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APPENDIX B-3

PUBLIC NOTICE (PALO VERDE TIMES MARCH 18, 2015)

Desert Quartzite Solar Project EIS
Public Scoping Meeting

Tuesday, March 24, 2015

Place: City of Blythe Multi-Purpose Room

Address: 235 North Broadway, Blythe, CA 92225

Time: 6:30 PM to 8:30 PM

The Bureau of Land Management (BLM) published a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS), for the Desert Quartzite Solar Project (DQSP), on March 6, 2015.

Desert Quartzite, LLC proposes to construct, operate, maintain and decommission an up to 300 megawatt (MW) alternating current (AC) solar photovoltaic energy-generation facility along with the necessary ancillary facilities including a project substation, access road, realignment of an existing route, operations and maintenance buildings and lay down areas, on BLM land. The project is proposed on 4,843 acres with the solar field occupying approximately 2,453 acres. The proposed project would be located in Riverside County, California, approximately 8 miles southwest of the center of Blythe, 45 miles east of Desert Center, and south of Interstate 10.

This public scoping meeting is being held to aid the public's understanding of the project and to solicit scoping comments, aimed at identifying environmental resource topics and issues that should be considered in the EIS.

For further information contact:

Cedric Perry, BLM Project Manager;
Telephone: (951) 697–5388
Email: blm_ca_desert_quartzite_solar_project@blm.gov
Website: http://www.blm.gov/ca/st/en/fo/cdd.html

Published: Palo Verde Valley Times / Quartzsite Times
March 18, 2015

APPENDIX C

SCOPING MEETING MATERIALS

C-1 – WRITTEN COMMENT FORM
C-2 – SPEAKER COMMENT CARD
C-3 – SCOPING MEETING PRESENTATION

APPENDIX C-1

WRITTEN COMMENT FORM

DESERT QUARTZITE SOLAR PROJECT
MARCH 23, 2015 - PUBLIC SCOPING MEETING
Parker Community Senior Center, 1115 12th Street, Parker, Arizona 85344
COMMENT CARD

Name:

Address:

Phone Number & Email Address:

Comments:

Comments may be handed in at the Public Scoping Meeting (March 23, 2015), or may be provided to BLM via email or fax at the following prior to the close of the public comment period on April 6, 2015:
Email: blm_ca_blm_ca_desert_quartzite_solar_project@blm.gov
Fax: (951) 697-5299

DESERT QUARTZITE SOLAR PROJECT
MARCH 24, 2015 - PUBLIC SCOPING MEETING
City of Blythe Multipurpose Room, 235 North Broadway, Blythe, CA 92225
COMMENT CARD

Name:

Address:

Phone Number & Email Address:

Comments:

Comments may be handed in at the Public Scoping Meeting (March 24, 2015), or may be provided to BLM via email or fax at the following prior to the close of the public comment period on April 6, 2015:
Email: blm_ca_blm_ca_desert_quartzite_solar_project@blm.gov
Fax: (951) 697-5299

APPENDIX C-2

SPEAKER COMMENT CARD

March 23, 2015

Desert Quartzite Solar Project

Bureau of Land Management

Parker Community Senior Center
1115 12th Street
Parker, Arizona 85344

Public Meeting

Speaker Registration Card

Please complete and return to staff

Name (Print)

Agency/Affiliation

Address **City** **Zip Code**

Phone Number

Email

March 23, 2015

Desert Quartzite Solar Project

Bureau of Land Management

Parker Community Senior Center
1115 12th Street
Parker, Arizona 85344

Public Meeting

Speaker Registration Card

Please complete and return to staff

Name (Print)

Agency/Affiliation

Address City Zip Code

Phone Number

Email

March 24, 2015

Desert Quartzite Solar Project

Bureau of Land Management

City of Blythe Multipurpose Room
235 North Broadway
Blythe, California 92225

Public Meeting

Speaker Registration Card

Please complete and return to staff

Name (Print)

Agency/Affiliation

Address **City** **Zip Code**

Phone Number **Email**

March 24, 2015

Desert Quartzite Solar Project

Bureau of Land Management

City of Blythe Multipurpose Room
235 North Broadway
Blythe, California 92225

Public Meeting

Speaker Registration Card

Please complete and return to staff

Name (Print)

Agency/Affiliation

Address City Zip Code

Phone Number Email

APPENDIX C-3

SCOPING MEETING PRESENTATION

Desert Quartzite Project
Scoping Meeting

First Solar, Inc.
Bureau of Land Management
March 2015

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Meeting Format

- Opening – Cedric C. Perry – Project Manager
- Welcoming Remarks – John Kalish – Field Manager
- Meeting Organization & Introductions - Cedric Perry
- BLM Presentation – Cedric Perry & Lynnette Elser
- County of Riverside Presentation – Larry Ross
- First Solar Project Presentation – James F. Cook
- Process For Public Comments – Cedric Perry
- Public Comments – Members of the Public
- Public Open House
- Meeting Adjourns at 8:30 PM

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Processing and Administration

- BLM:
  - Regulations: 43 CFR 2800
  - Right-of-Way Toolkit Information:
    - General ROW http://www.blm.gov/wo/st/en/prog/energy/cost_recovery_regulations.html
    - Solar ROW http://www.blm.gov/wo/st/en/prog/energy/solar_energy.html
    - NEPA http://www.blm.gov/ca/st/en/prog/planning/guidance.html

National Environmental Policy Act

NEPA

- Purpose of this Meeting
- Required environmental analysis documents includes Environmental Impact Statement (EIS)

NEPA
Environmental Issue Areas

- **Air Resources**
- **Vegetation**
- **Wildlife**
- **Cultural Resources**
- **Environmental Justice**
- **Geology and Soils Resources**
- **Greenhouse Gas Emissions**
- **Hazards and Hazardous Materials**
- **Lands and Realty**
- **Mineral Resources**
- **Recreation and Public Access**
- **Social and Economic Effects**
- **Special Designations and Wilderness**
- **Transportation and Traffic**
- **Utilities and Service Systems**
- **Visual Resources**
- **Water Resources**
- **Wildland Fire Ecology**

BLM LUP Amendment / NEPA Process (PA / EIS)

Notice of Intent

Public Scoping Period

Alternative Formulation

Notice of Availability (NOA) for Draft PA / Draft EIS

NOA Initiates a 90-day Public Review & Comment Period

NOA for Proposed PA / Final EIS

NOA Initiates a 30-day Protest Period on Proposed PA

Approved PA and Record of Decision

Notice to Proceed / Monitor Project

Public Participation Opportunities

- Provide comments at this and other public meetings
- Provide written comments on the Draft EIS
- Become informed by viewing the Draft EIS and the BLM webpage at:
- http://www.blm.gov/ca/st/en/fo/desertquartzite_solar_project.html

BLM Contacts and Comment Website

- **Cedric Perry, Project Manager**
    - Phone: (951) 697–5388
    - e-mail: cperry@blm.gov

- **BLM Web Page:**
  http://www.blm.gov/ca/st/en/fo

- **Send comments to:**

  Desert Quartzite Solar Project– Public Comments
  c/o Cedric Perry, Project Manager
  Bureau of Land Management
  California Desert District Office
  22835 Calle San Juan de Los Lagos
  Moreno Valley, CA 9255

  Or email comments to:
  blm_ca_desert_quartzite_solar_project@blm.gov

Riverside County's Role

Larry Ross

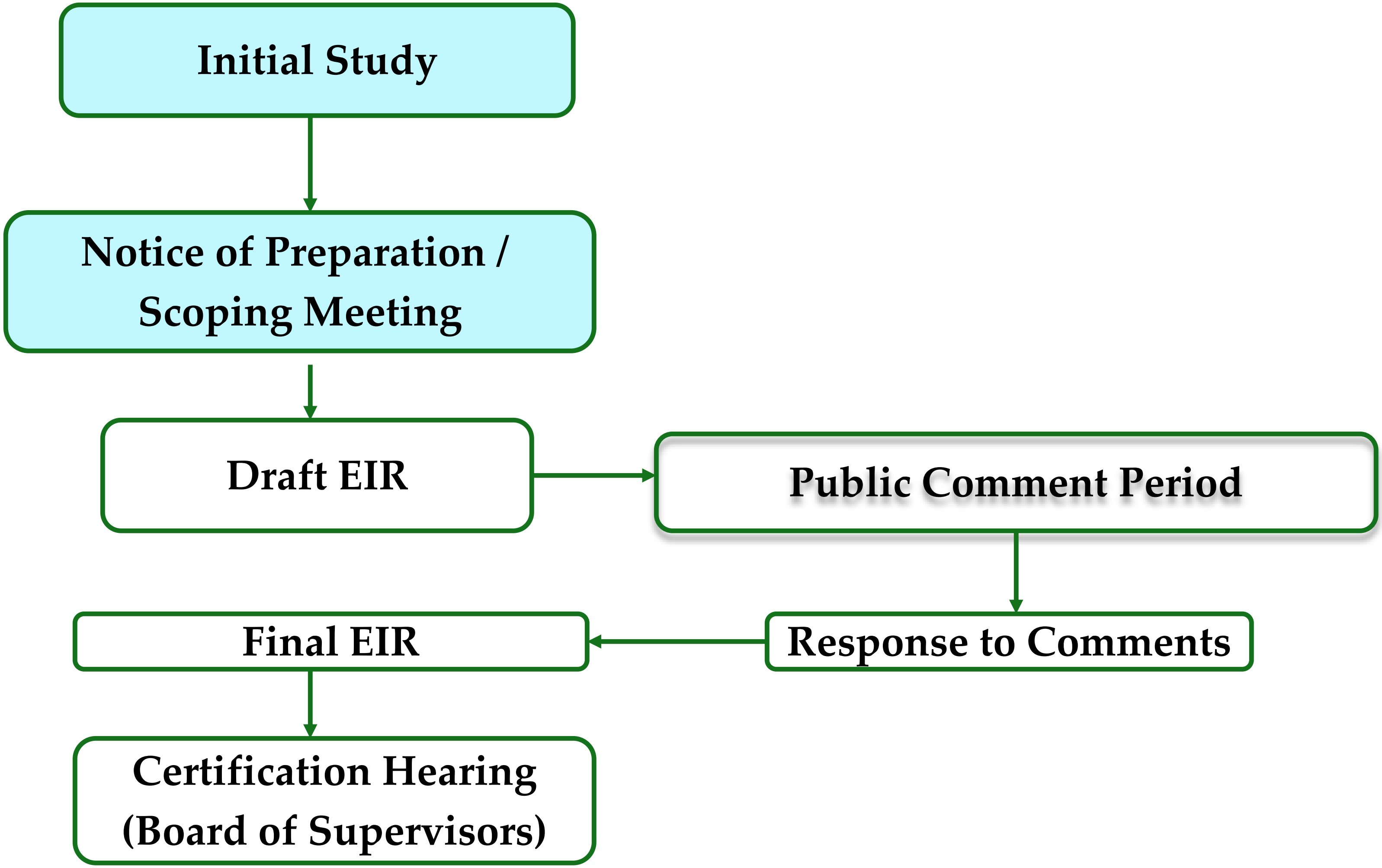
Principal Planner

Riverside County Planning Department

Riverside County's Role

- Approval of project elements on non-federal land
- Lead agency for the California Environmental Quality Act (CEQA)
  - Preparation of Environmental Impact Report

County Environmental Impact Report (EIR) Process



Initial Study

Notice of Preparation / Scoping Meeting

Draft EIR

Public Comment Period

Response to Comments

Final EIR

Certification Hearing (Board of Supervisors)

Public Participation Opportunities

- Submit written comments or statements
- Provide comments at public meetings
- Provide written comments on the Draft EIR/EIS and Final EIR/EIS

Scoping/NOP comment period for Riverside County ends on **Monday, April 13, 2015.**

Applicant's Presentation

James F. Cook

First Solar, Inc.

applicant for the
Desert Quartzite Solar Project

First Solar

Desert Quartzite Solar Project
BLM Scoping Meetings- – Parker, AZ and Blythe, CA

March 23 & 24, 2015

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First Solar at a Glance

Over 10GW installed worldwide and over 3GW contracted pipeline

Cost competitive with conventional energy sources today

Partner of choice for leading utilities and global power buyers

Driving innovation across entire value chain and plant solution

Strongest financial stability & bankability in the industry

First Solar

Founded in 1999 and publicly traded on Nasdaq (FSLR)

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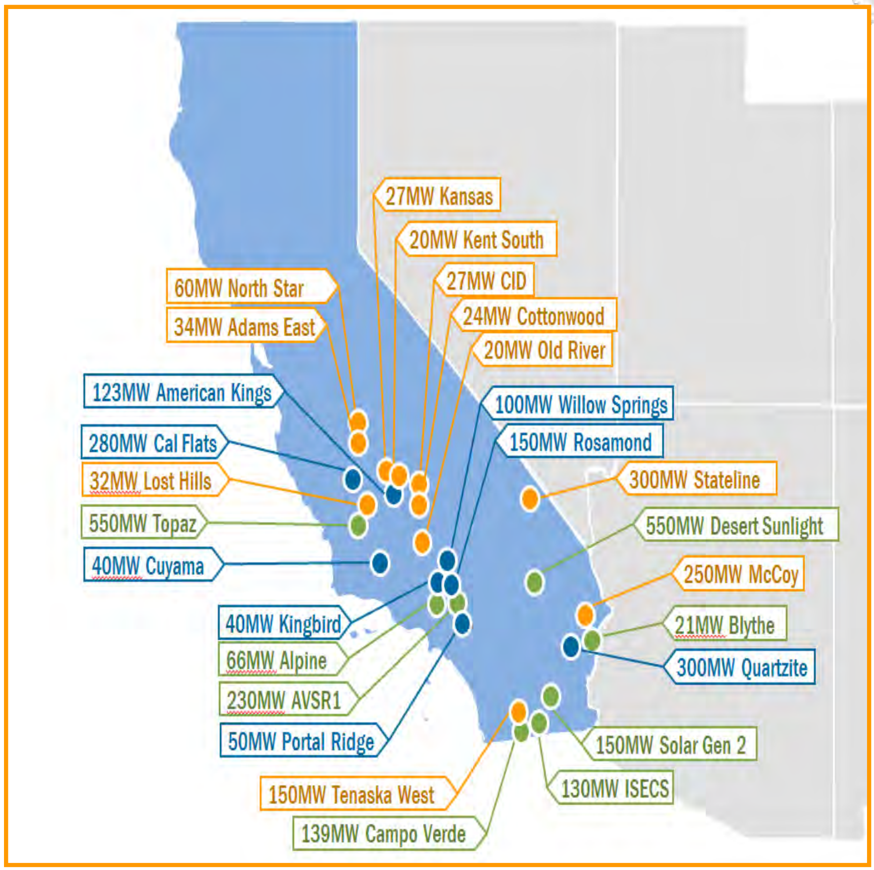
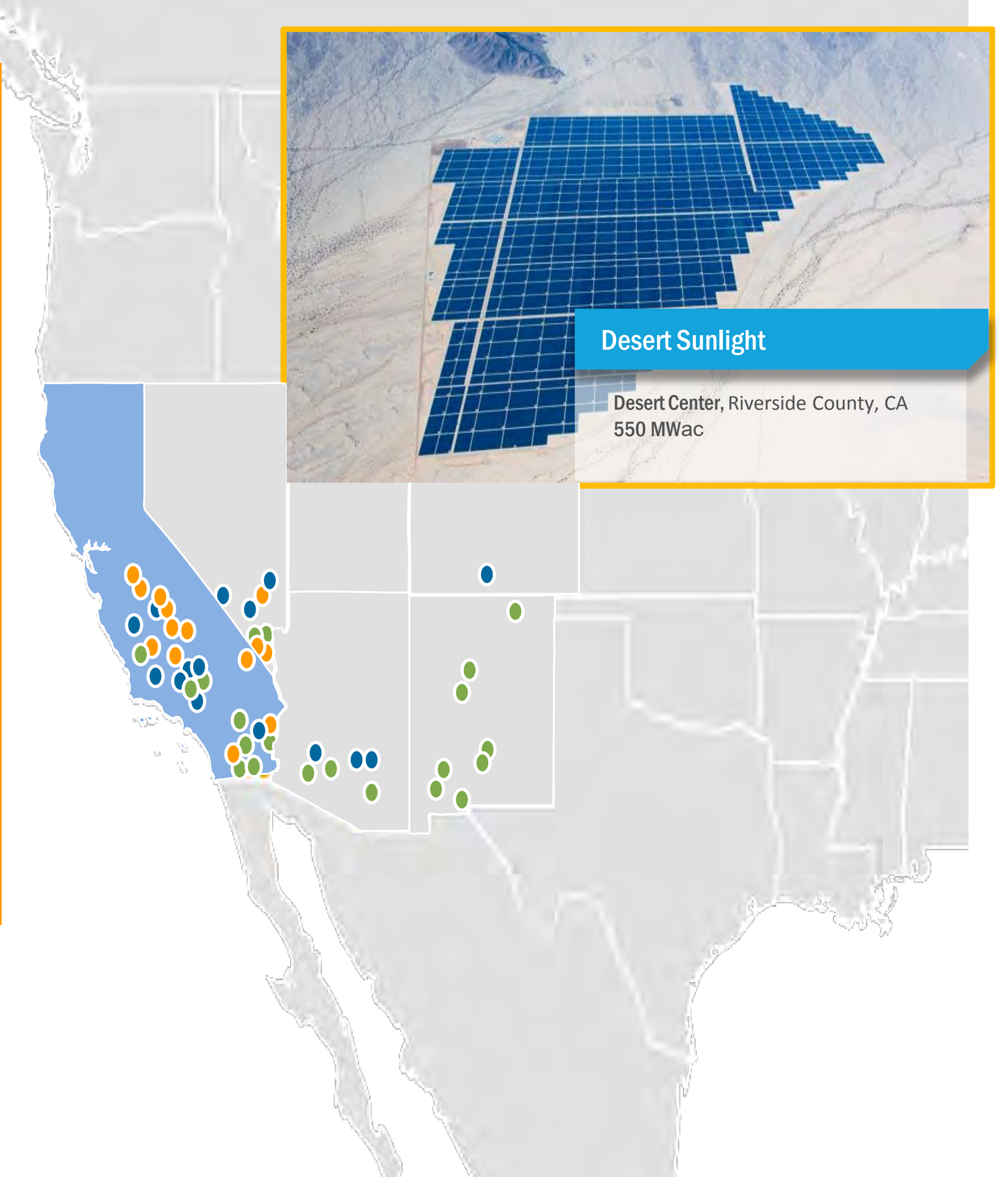
First Solar in California – Over 4,000 MW


27MW Kansas
20MW Kent South
27MW CID
24MW Cottonwood
20MW Old River
60MW North Star
34MW Adams East
123MW American Kings
100MW Willow Springs
150MW Rosamond
280MW Cal Flats
300MW Stateline
32MW Lost Hills
550MW Topaz
550MW Desert Sunlight
40MW Cuyama
250MW McCoy
40MW Kingbird
21MW Blythe
66MW Alpine
300MW Quartzite
230MW AVSR1
50MW Portal Ridge
150MW Solar Gen 2
150MW Tenaska West
130MW ISECS
139MW Campo Verde



Desert Sunlight

Desert Center, Riverside County, CA
550 MWac

● In Operation
● Under
● Construction
In Development

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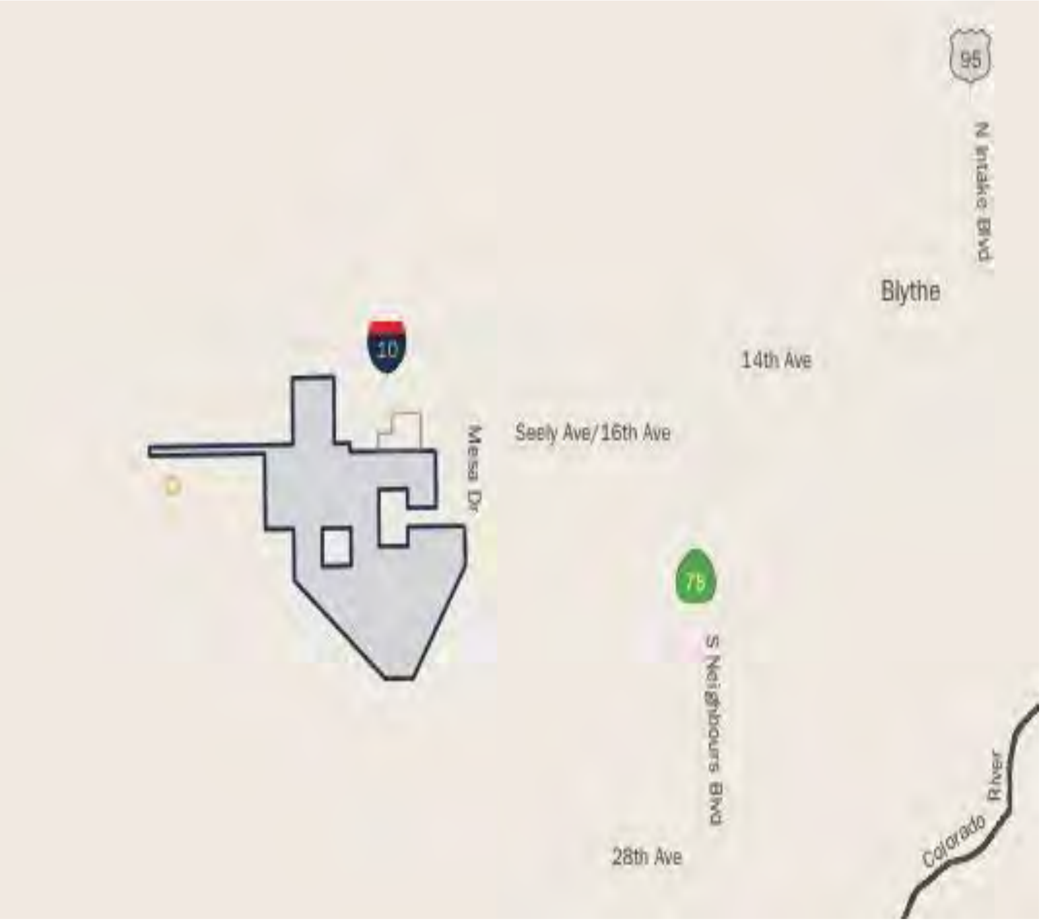
Desert Quartzite Solar Project Overview

- 300 MW proposed solar project located on BLM land west of Blythe, CA
- Project construction expected to begin in 2016
- Located in Solar Energy Zone (Riverside East SEZ)
- Quiet, low-lying, emission-free generation with no water required to generate electricity
- Creates about 600 jobs during construction, and up to 10 operations & maintenance jobs
- Committed to hiring qualified local workers for construction and operations jobs


95
N Intake Blvd
Blythe
10
14th Ave
Mesa Dr
Seely Ave/16th Ave
78
S Neighbours Blvd
28th Ave
Colorado River

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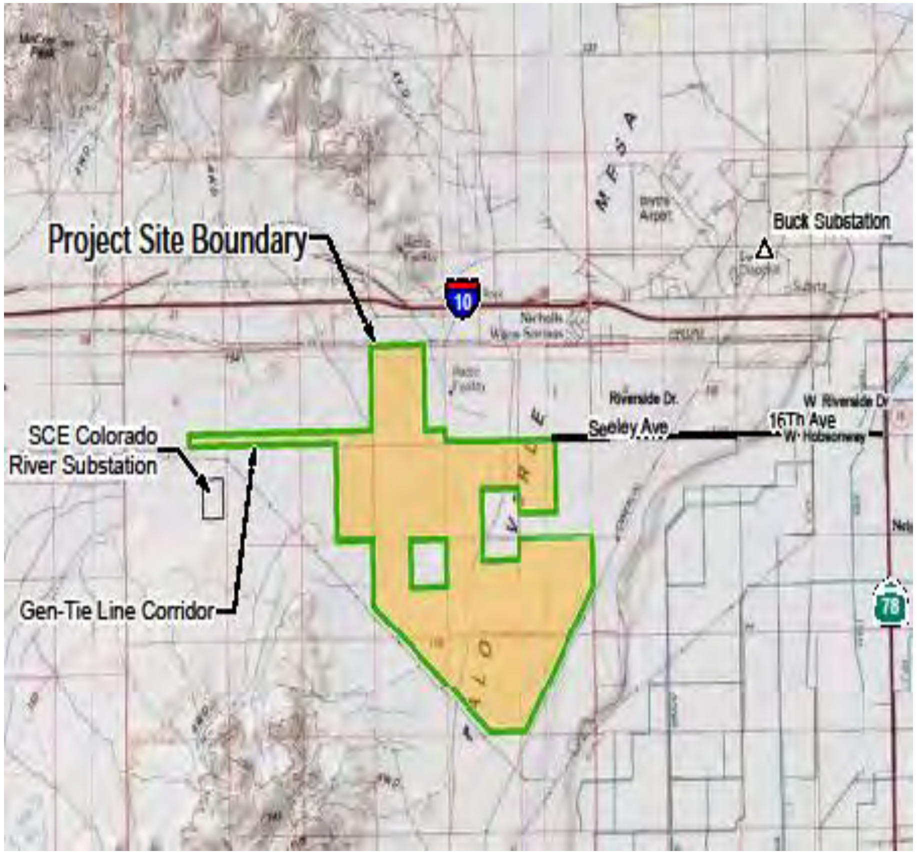
Site Selection Criteria

- Superior solar resource
- Adjacent to existing high voltage transmission lines on all three sides and substation
- Large area with flat topography
- Use existing roads to access site
- Studies indicate low desert tortoise population
- Site surrounded on all sides by and adjacent to existing development (Blythe 21MW power plant, roads, gas pipelines and transmission infrastructure)


Project Site Boundary
Buck Substation
10
Riverside Dr.
Seeley Ave
W Riverside Dr
16Th Ave
W Hobsonway
SCE Colorado River Substation
Gen-Tie Line Corridor
78
MESA

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Project Characteristics

- Approximately 4.800 acres of BLM land and 160 acres private land being studied
- Project expected to be built in two phases
- First 150MWAC phase expected to start in 2016
- Single axis tracker or fixed-tilt technology
- 230kV Gen-tie
- Advanced CAISO interconnection position

First Solar Single Axis Trackers

First Solar Fixed-Tilt

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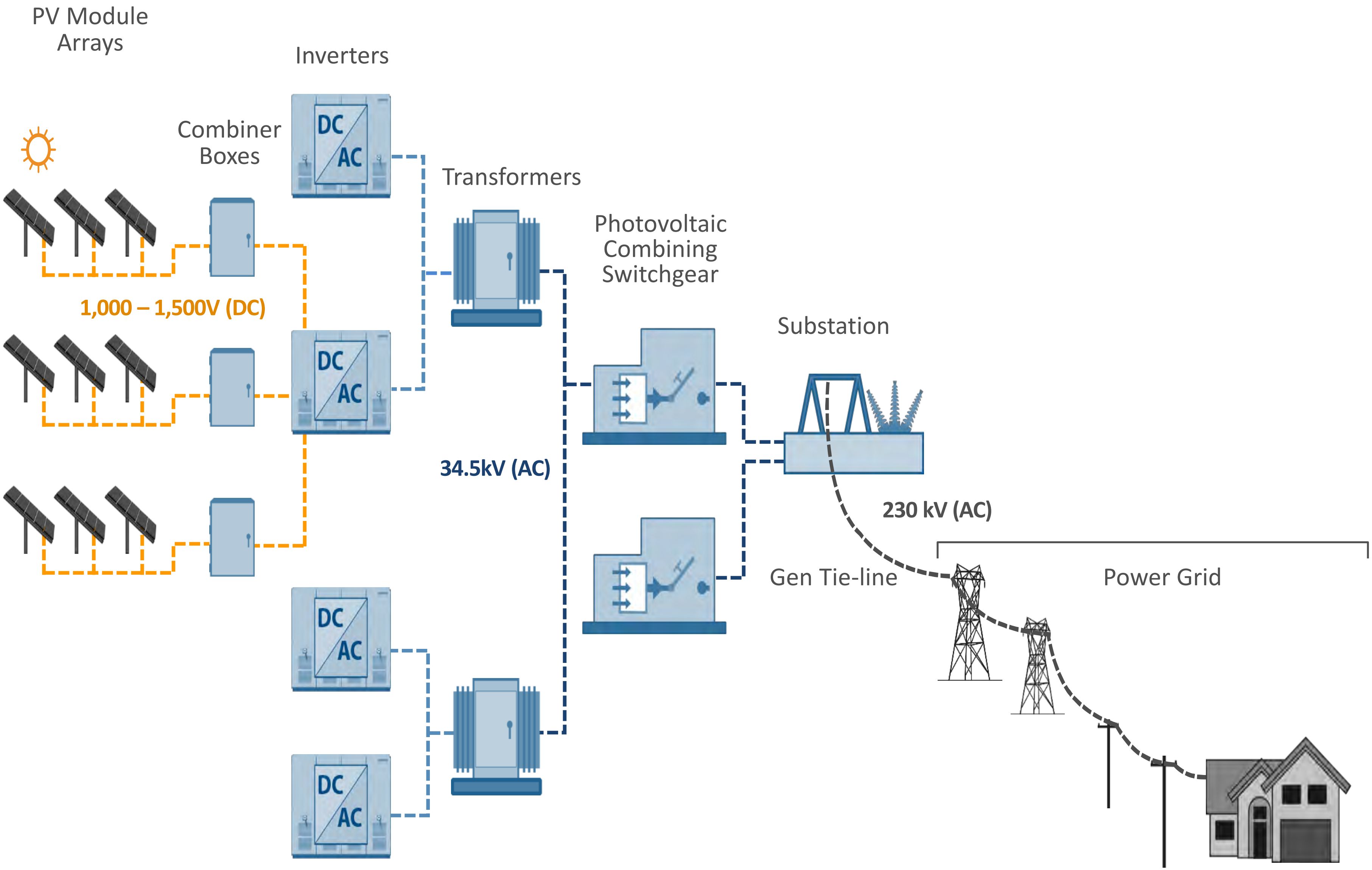
Power Plant Overview


PV Module Arrays
Combiner Boxes
Inverters
DC
AC
Transformers
Photovoltaic Combining Switchgear
Substation
1,000 – 1,500V (DC)
34.5kV (AC)
230 kV (AC)
Gen Tie-line
Power Grid

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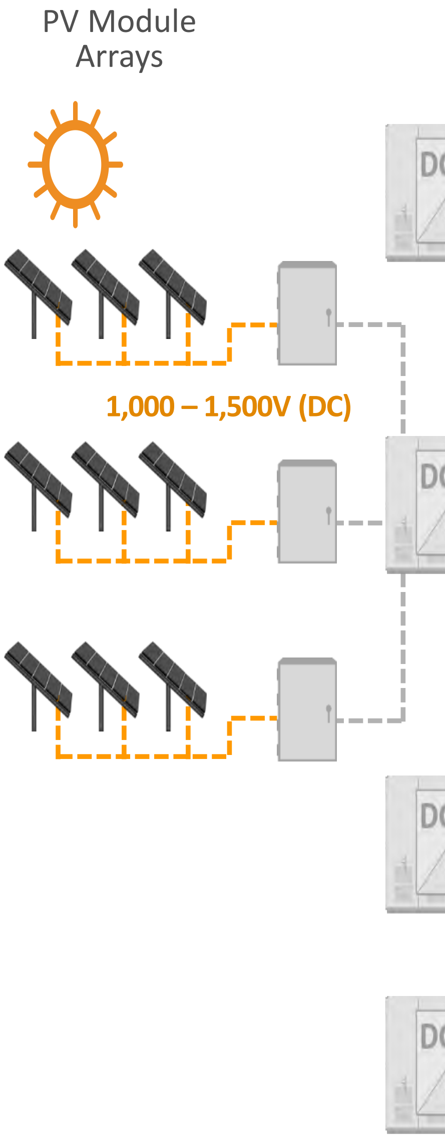
PV Module


PV Module Arrays
1,000 – 1,500V (DC)
DC
AC
DC
DC
DC

- Converts sunlight into electricity (DC power)
- Manufactured by First Solar
- Installed on string in series

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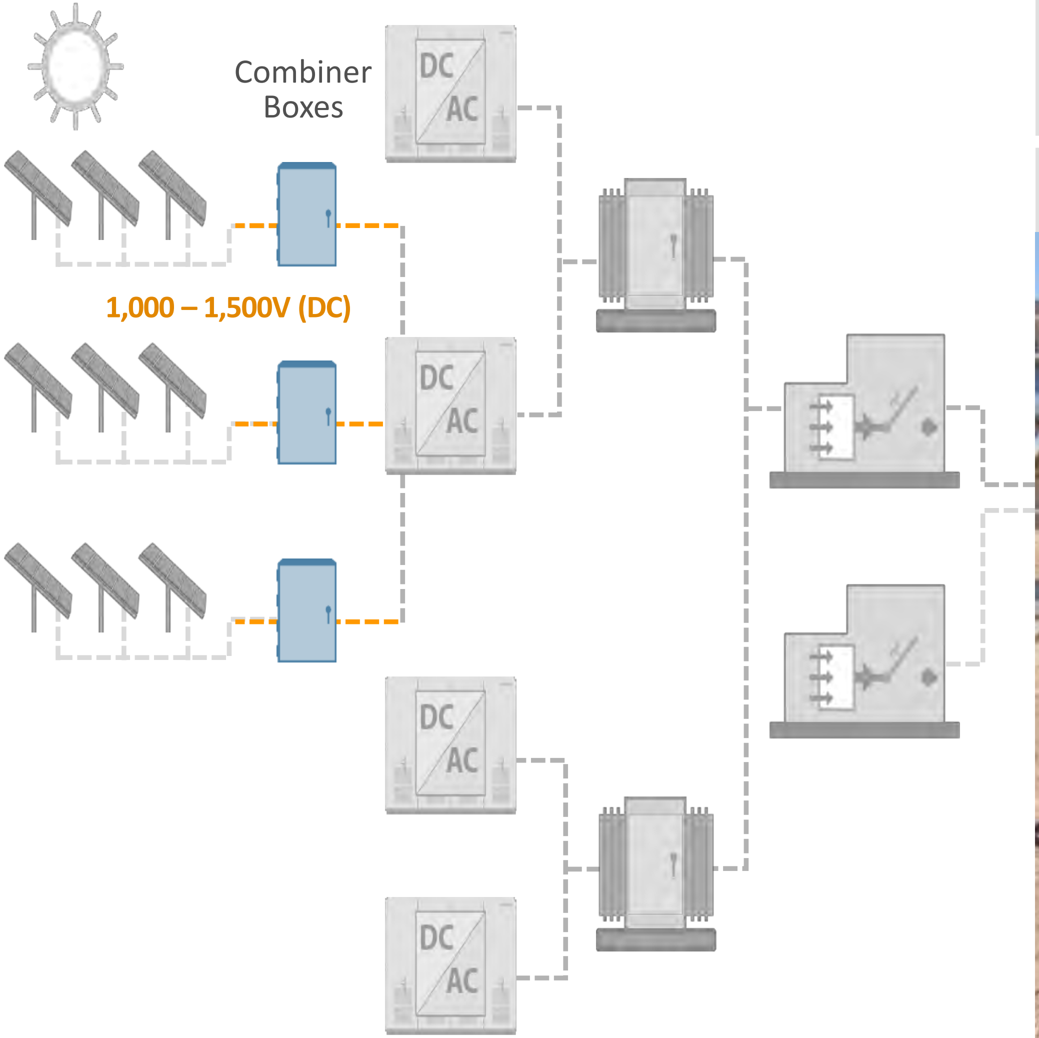
Combiner Box


Combiner Boxes
1,000 – 1,500V (DC)
DC
AC
DC
AC
DC
AC
DC
AC

- Aggregates DC wiring from multiple strings
- Provides single output to

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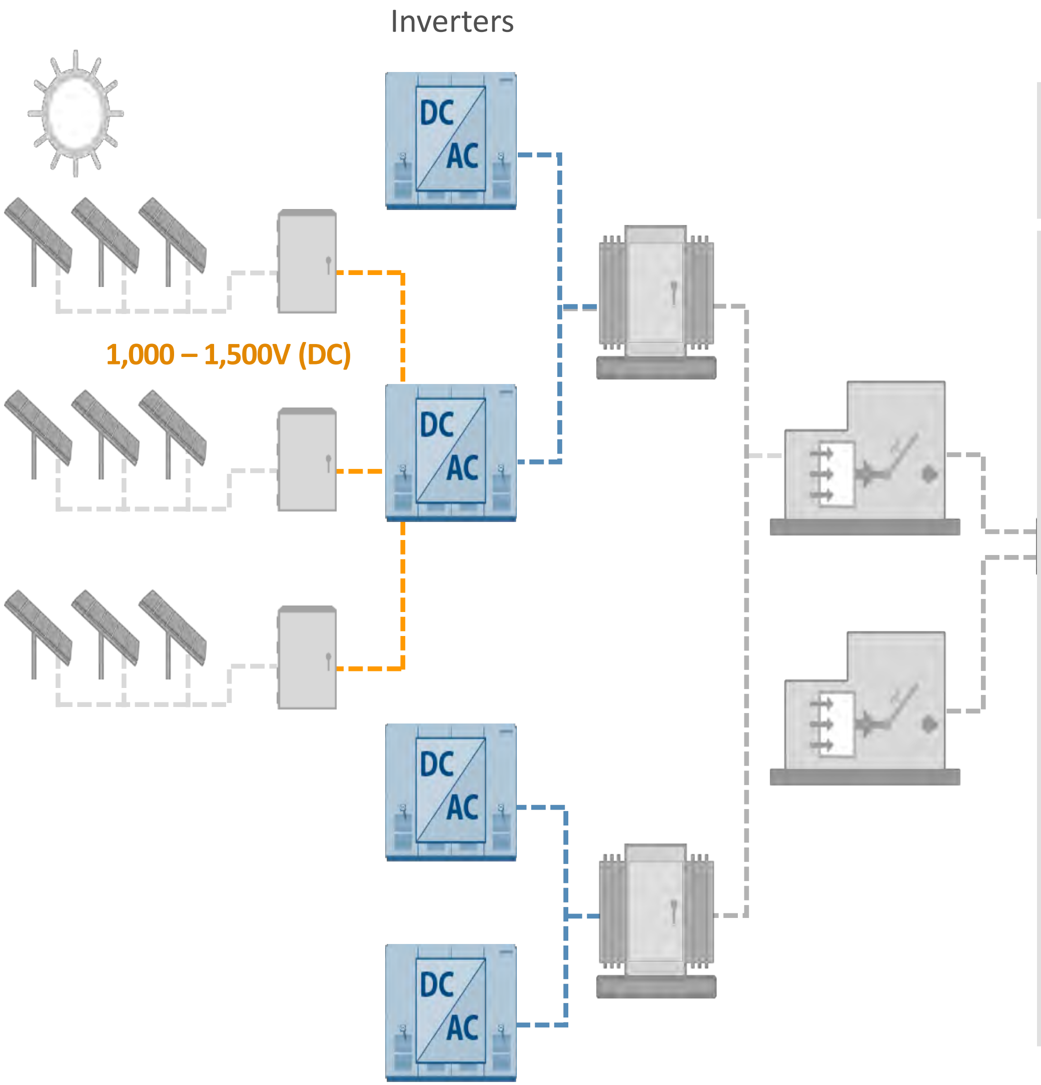
Inverter


Inverters
1,000 – 1,500V (DC)
DC
AC
DC
AC
DC
AC
DC
AC

- Converts DC power to AC (low voltage)

UTILITY
GRADE

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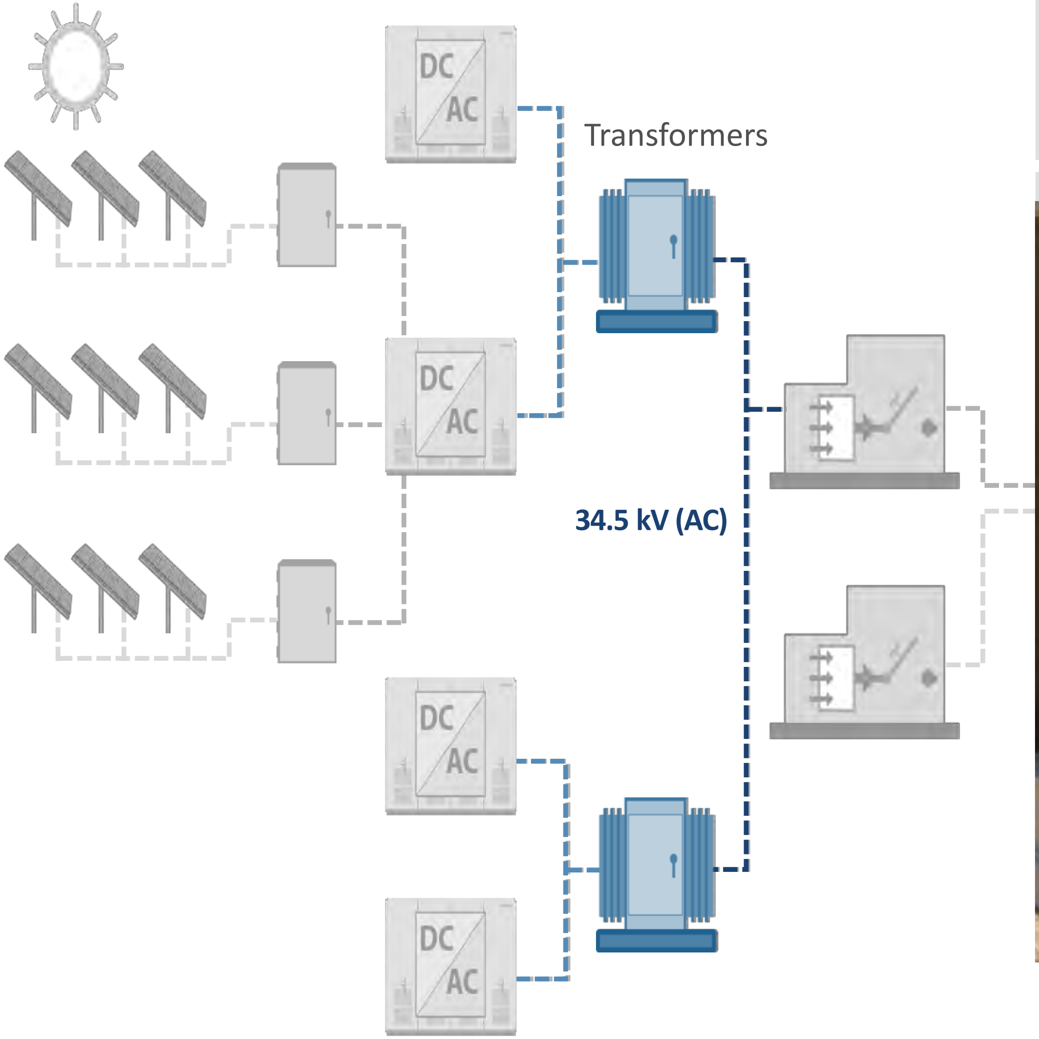
Transformer


DC
AC
Transformers
34.5 kV (AC)

- Increases low AC voltage to medium
AC voltage

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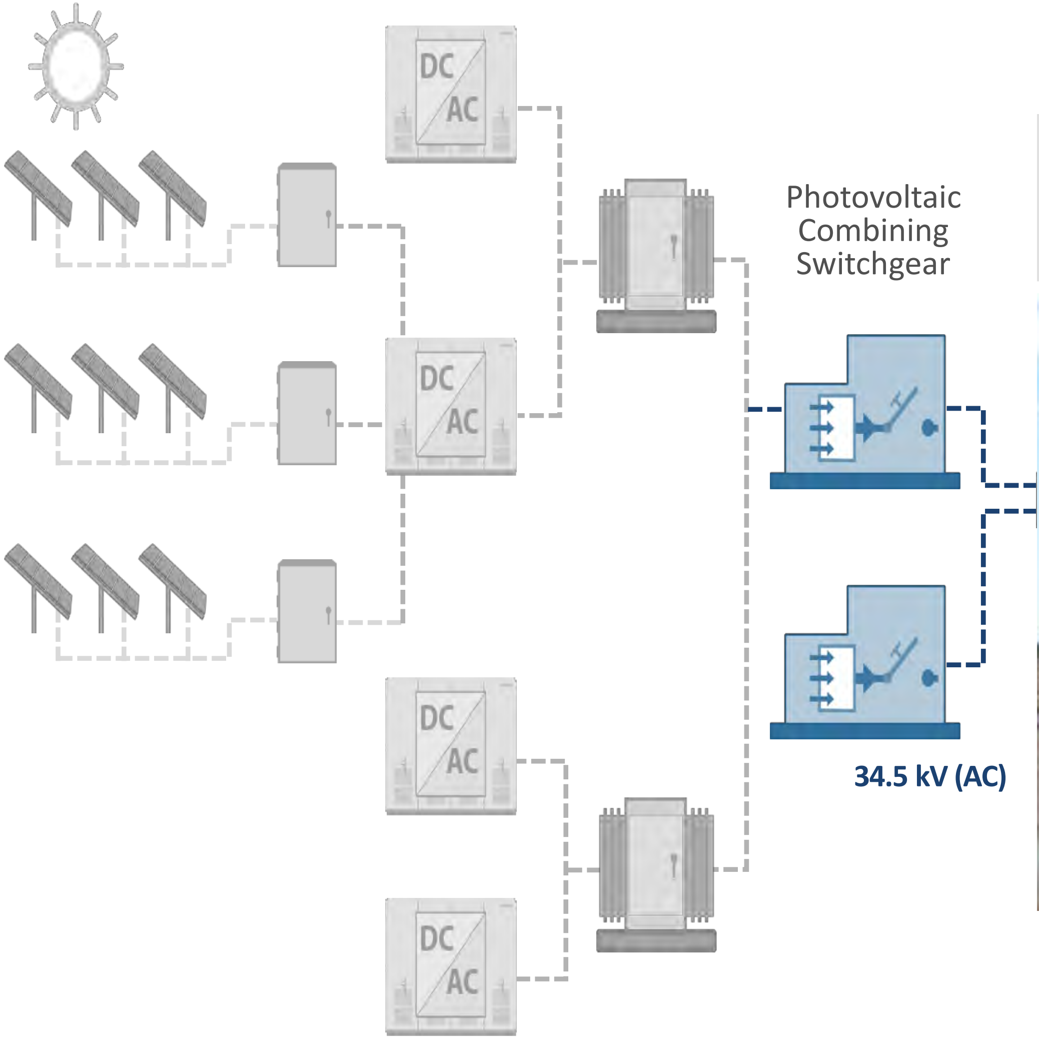
Photovoltaic Combining Switchgear (PVCS)


DC
AC
DC
AC
Photovoltaic Combining Switchgear
DC
AC
DC
AC
34.5 kV (AC)

- Aggregates AC power from multiple transformers

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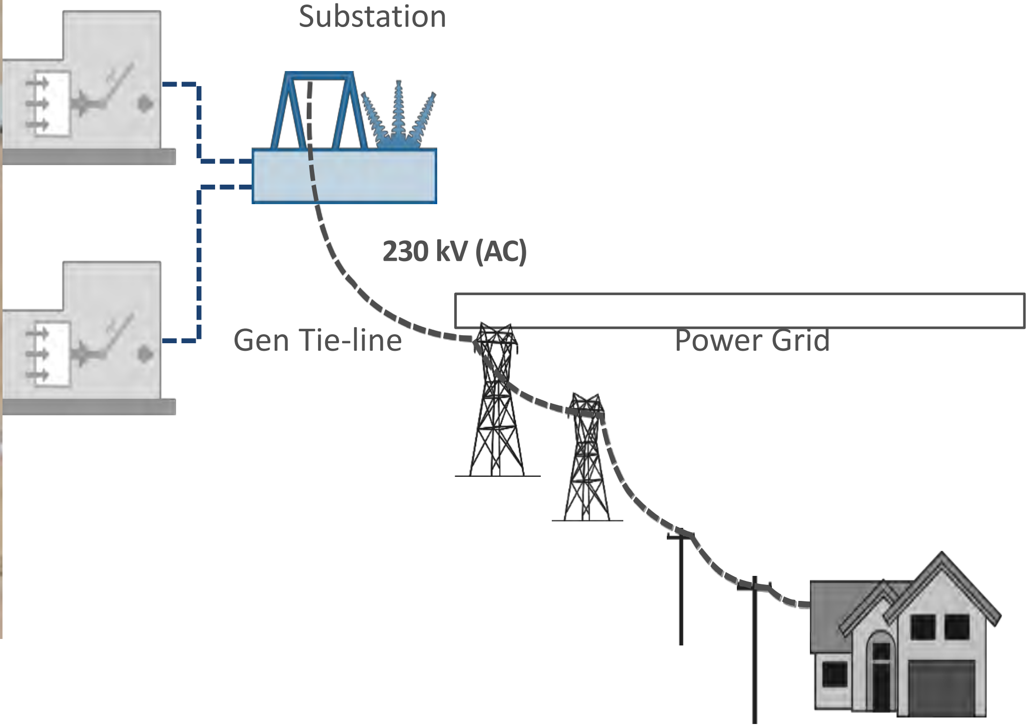
Substation and Generator Tie-line

- Provides plant controls, disconnects, and step up transformer

- Delivers electricity to the grid



34.5 kV (AC)

Substation

230 kV (AC)

Gen Tie-line

Power Grid

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Construction Techniques

- Site preparation
- Single axis trackers or fixed-tilt tables, supported on driven steel posts or other embedded foundations
- First Solar thin-film PV modules
- Installation of underground DC cable from modules to combiner boxes and PCS
- PCS mounted on concrete underground vaults
- Underground medium voltage cable to PVCS
- Overhead 34.5 kV cable from PVCS to project substation
- Plant will be decommissioned at the end of project life

FIRST SOLAR
FIRST SOLAR

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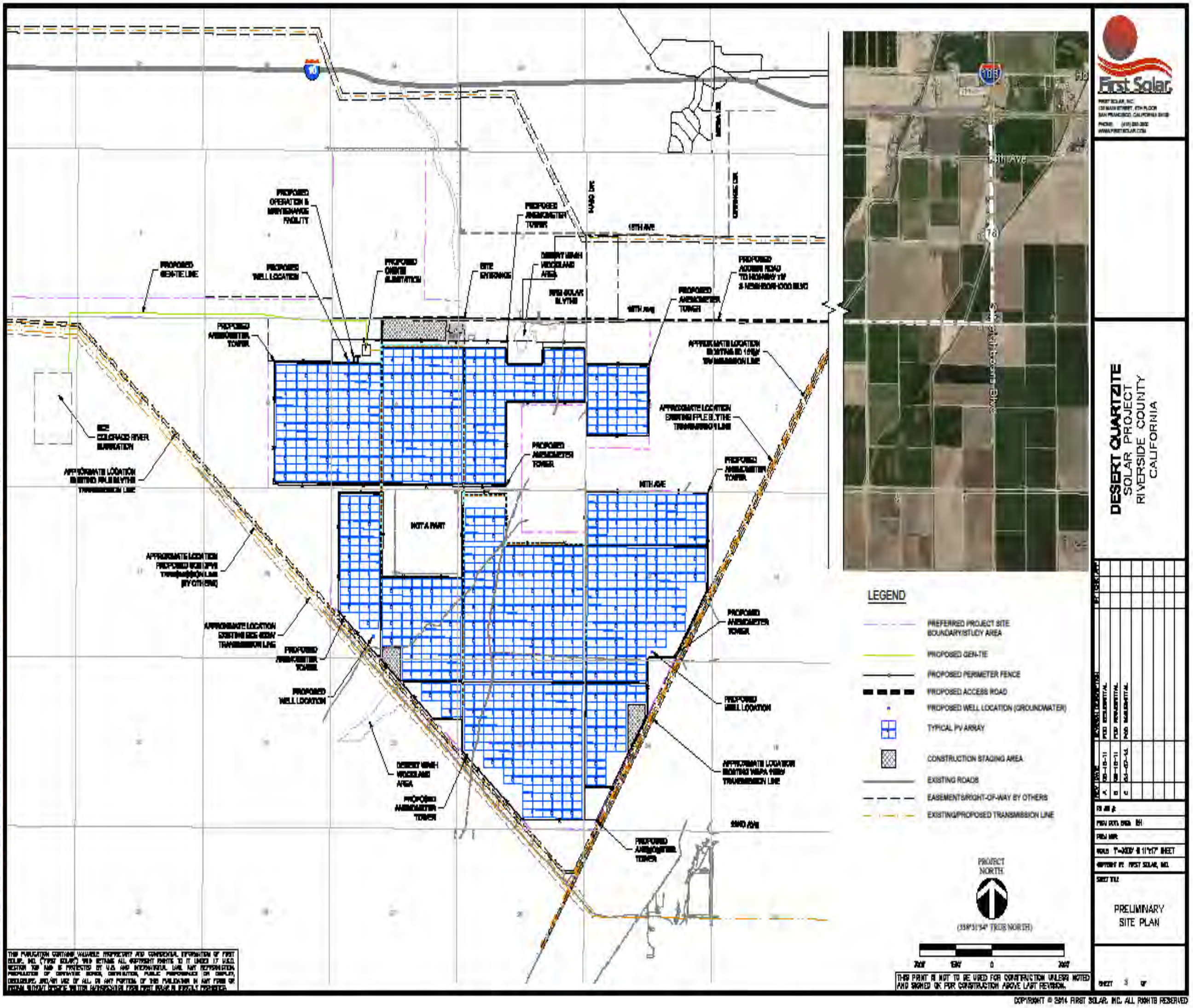
Site Layout


PROPOSED GEN-TIE LINE
PROPOSED WELL LOCATION
PROPOSED OPERATION & MAINTENANCE FACILITY
PROPOSED ONSITE SUBSTATION
SITE ENTRANCE
PROPOSED ANEMOMETER TOWER
DESERT WASH WOODLAND AREA
NRG SOLAR BLYTHE
16TH AVE
18TH AVE
20TH AVE
22ND AVE
PROPOSED ACCESS ROAD TO HIGHWAY 78 & NEIGHBORHOOD BLVD
APPROXIMATE LOCATION EXISTING SCE 161kV TRANSMISSION LINE
APPROXIMATE LOCATION EXISTING IPPLE BLYTHE TRANSMISSION LINE
SCE COLORADO RIVER SUBSTATION
APPROXIMATE LOCATION EXISTING PALE BLYTHE TRANSMISSION LINE
NOT A PART
APPROXIMATE LOCATION PROPOSED SCE DPV2 TRANSMISSION LINE (BY OTHERS)
APPROXIMATE LOCATION EXISTING SCE 500kV TRANSMISSION LINE
APPROXIMATE LOCATION EXISTING WAPA 161kV TRANSMISSION LINE
THIS PUBLICATION CONTAINS VALUABLE PROPRIETARY AND CONFIDENTIAL INFORMATION OF FIRST SOLAR, INC. ("FIRST SOLAR") WHO RETAINS ALL COPYRIGHT RIGHTS TO IT UNDER 17 U.S.C. SECTION 102 AND IS PROTECTED BY U.S. AND INTERNATIONAL LAWS. ANY REPRODUCTION, PREPARATION OF DERIVATIVE WORKS, DISTRIBUTION, PUBLIC PERFORMANCE OR DISPLAY, DISCLOSURE AND/OR USE OF ALL OR ANY PORTION OF THIS PUBLICATION IN ANY FORM OR MEDIA WITHOUT SPECIFIC WRITTEN AUTHORIZATION FROM FIRST SOLAR IS STRICTLY PROHIBITED.
6th Ave
LEGEND
PREFERRED PROJECT SITE BOUNDARY/STUDY AREA
PROPOSED GEN-TIE
PROPOSED PERIMETER FENCE
PROPOSED ACCESS ROAD
PROPOSED WELL LOCATION (GROUNDWATER)
TYPICAL PV ARRAY
CONSTRUCTION STAGING AREA
EXISTING ROADS
EASEMENTS/RIGHT-OF-WAY BY OTHERS
EXISTING/PROPOSED TRANSMISSION LINE
PROJECT NORTH
(359°31'54" TRUE NORTH)
0
THIS PRINT IS NOT TO BE USED FOR CONSTRUCTION UNLESS NOTED AND SIGNED OK FOR CONSTRUCTION ABOVE LAST REVISION.
First Solar
FIRST SOLAR, INC.
135 MAIN STREET, 6TH FLOOR
SAN FRANCISCO, CALIFORNIA 94105
WWW.FIRSTSOLAR.COM
DESERT QUARTZITE
SOLAR PROJECT
RIVERSIDE COUNTY
CALIFORNIA
A
B
C
PER SUBMITTAL
PER SUBMITTAL
PER RESUBMITTAL
PROJ DEV. ENG. BH
PROJ MGR
SCALE 1"=3000' @ 11"x17" SHEET
COPYRIGHT BY FIRST SOLAR, INC.
SHEET TITLE
PRELIMINARY SITE PLAN
SHEET 3 OF
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Biological Studies

- Baseline Sampling
  - Vegetation densities
  - Reptile abundance
  - Avian point counts
  - Small mammal abundance

- Botanical Surveys
  - Floristic surveys
  - Cactus estimates
  - Weed identification

- Wildlife Surveys
  - Desert tortoise
  - Golden eagle
  - Burrowing owl
  - Special Status Species

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Biological Study Results – Botanical

- Plants
  - 124 plant species; 114 native and 10 non-native
  - 33 special status plant species
  - No federal or state listed species
- Vegetation Communities
  - Desert Dry Wash Woodland (sensitive)
  - Sonoran Desert Scrub
  - Sand Dunes

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Biological Study Results - Wildlife

- Amphibians
  - None found
- Reptiles
  - Desert Tortoise
    - Six carcasses & one set of tracks
    - No live tortoise or burrows
  - Ten species of lizard
    - Mojave fringe-toed
    - Colorado Desert fringe-toed
  - Six snake species

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Biological Study Results - Wildlife

- Avian
  - No Golden Eagle nests within 10 miles of site
  - Burrowing owl on site
- Mammals
  - Desert Kit Fox on site
  - Bats
    - Pallid & Leaf-nosed bat recorded at mines in adjacent mountain areas
    - 4 CA species of concern identified
  - American badger sign identified in study area

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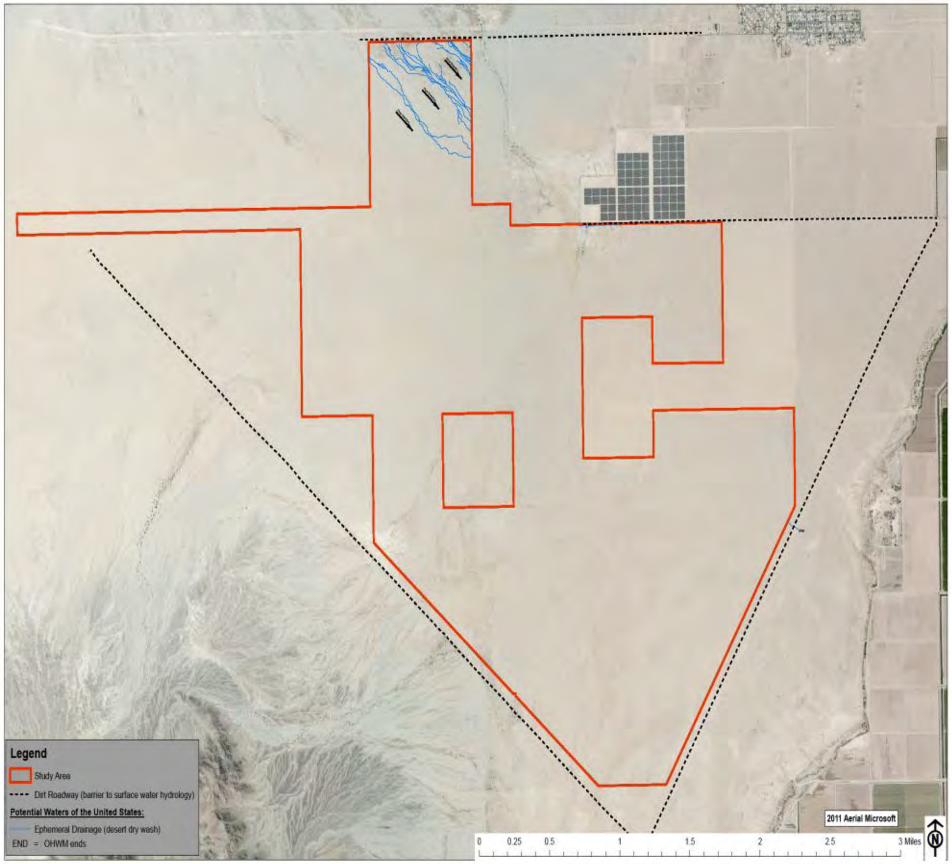
Jurisdictional Delineation

- Ephemeral drainages identified, primarily in the far northern portion of project site
- No surface connection to Traditional Navigable Waters
- Will request jurisdictional determinations from US Army Corps of Engineers and California Regional Water Quality Control Board


Legend
🟥 Study Area
---- Dirt Roadway (barrier to surface water hydrology)
Potential Waters of the United States:
Ephemeral Drainage (desert dry wash)
END = OHWM ends
2011 Aerial Microsoft
0
0.25
0.5
1
1.5
2
2.5
3 Miles
N

First Solar Desert Quartzite

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Cultural Resources Literature Review

Class I cultural resources records search, research design, and ethnographic literature review completed in early 2014

- Sacred Lands File (SLF) requested and received from the Native American Heritage Commission (NAHC) in Sacramento
- Wide variety of cultural resources from prehistoric and historical periods identified in region
- Prehistoric occupation began several millennia ago
  - ➢ Known and likely resources include campsites, lithic and ceramic artifact scatters, trails, geoglyphs; human remains (cremation burials) are also possible and have been identified in the indirect APE but not direct APE
- Historic uses include mining, agriculture, and military training

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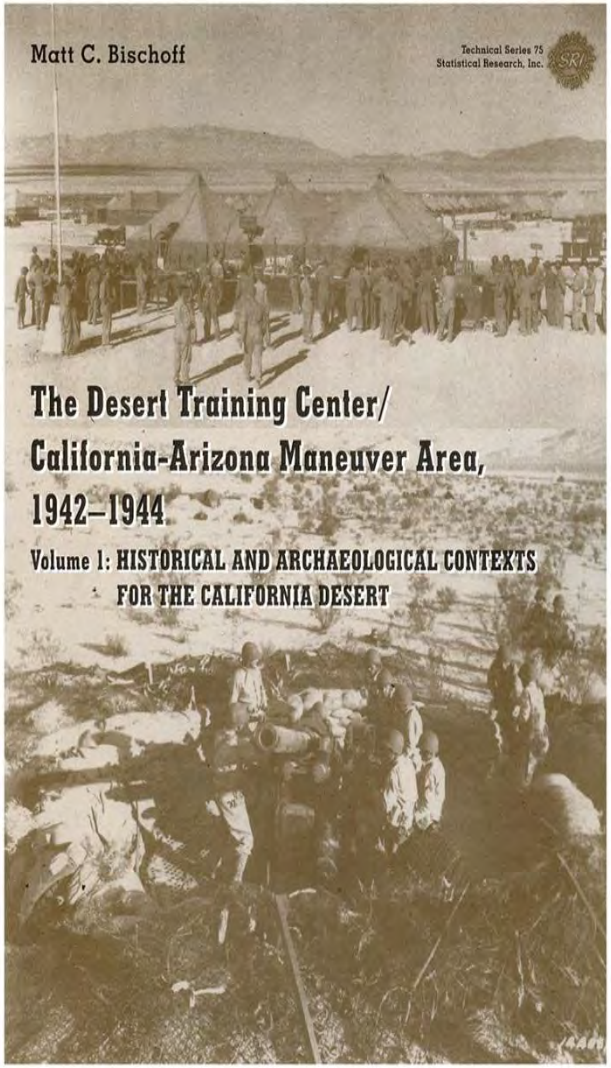
Cultural Resources Field Surveys

- Class III field survey of the Project Site completed in 2014
  - ○ Intensive pedestrian survey within APE, per BLM guidelines
  - ○ 15-meter transects across the entire site
  - ○ Recordation of identified sites
  - ○ Several potentially eligible sites identified
- Tribal Involvement
  - ○ BLM will conduct government-to-government consultation with Native American tribes
  - ○ First Solar will communicate with Tribes throughout the permitting process and provide project updates
  - ○ Tribal participation conducted during cultural surveys
  - ○ Support continued Tribal involvement during project development and construction



Matt C. Bischoff

Technical Series 75
Statistical Research, Inc.

The Desert Training Center/
California-Arizona Maneuver Area,
1942–1944

Volume 1: HISTORICAL AND ARCHAEOLOGICAL CONTEXTS
FOR THE CALIFORNIA DESERT

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Other Studies

- Air Quality
  - Quantify project vehicle emissions and fugitive dust during construction and compare to significance thresholds
- Visual
  - Evaluate visual impact from Key Observation Points on sensitive visual resources, including cultural resources
- Traffic
  - Assess construction and operational traffic impacts on local roadways
- Noise
  - Estimate construction noise levels and impact on sensitive receptors

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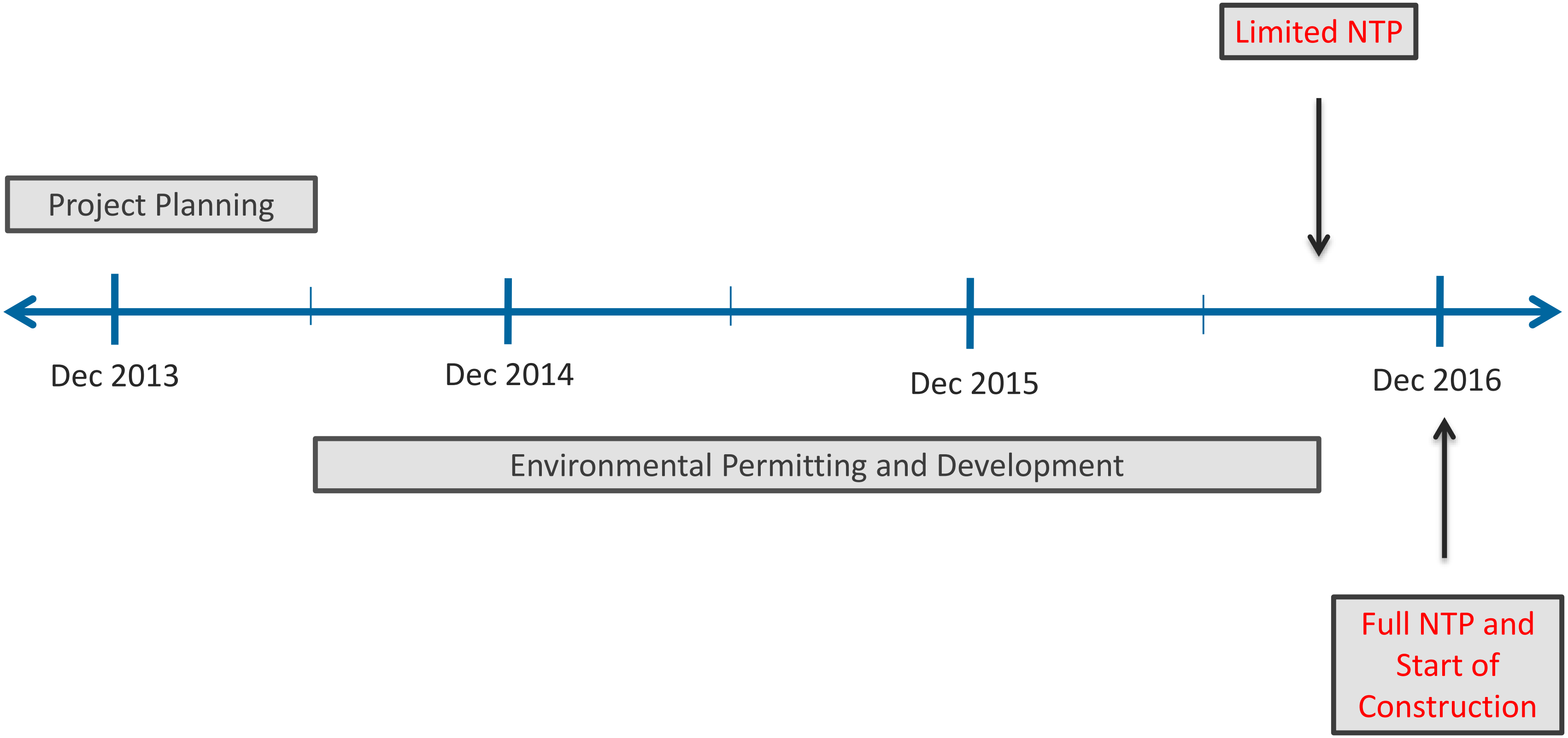
Desert Quartzite Anticipated Development Timeline



Limited NTP

Project Planning

Dec 2013

Dec 2014

Dec 2015

Dec 2016

Environmental Permitting and Development

Full NTP and Start of Construction

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Public Comment

- Please state and spell your name for the record.

- Please only one speaker at a time because we want to accurately record your comments. The court reporter can not write more than one comment at a time.

- Please respect the speaker and the speaker's opinion.

- Each speaker is allowed 3 minutes to speak.

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Comment Information

Please send comments to the BLM

BLM Address:

Desert Quartzite Project– Public Comments
c/o Cedric Perry, Project Manager
Bureau of Land Management
California Desert District Office
22835 Calle San Juan de Los Lagos
Moreno Valley, CA 92553

BLM Email:

blm_ca_desert_quartzite_solar_project@blm.gov

Public comment period closes on April 6, 2015

Open House

- Please feel free to visit the displays and ask questions at the display boards.

- Thank you for coming!

APPENDIX D

SCOPING MEETING SIGN-IN SHEETS

Sign-In Sheet

For the

Desert Quartzite Solar Project Scoping Meeting

At the

Parker Community Senior Center, Parker Arizona

On March 23, 2015

Public Scoping Meeting Sign-In Sheet

Desert Quartzite Solar Project
March 23, 2015, 6:30 – 8:30 PM
Parker Community Senior Center, 1115 12th Street, Parker, AZ 85344

Information Open to FOIA

Name	Organization (if applicable)	Address	Telephone Number and Email Address
1. Amanda Barrera	CRIT	26600 Mohave Rd Parker Az 85344	928 669-1302
2. John Gutekunst	Parker Pioneer	P.O. Box 3365 Parker, Az 85344	928-669-2275 pioneer@havasunews.com
3. Bob Dover	AECOM	10 Pateswood Dr. Greenville SC 29615	8649182892 robert.dover@aecom
4. Nancy Jasculca	CRIT/AG's office	26600 Mohave Road Parker, Az 85346	928-669-1271 njasculca@critdoj.com
5. DAPHNE Hill Poolaw	CRIT Mohave Elders Comm.	PO Box 3088 PARKER, Az 85344	9289168470 dhpoolaw@hotmail.com
6. CHERYL ESQUERRA	CRIT ELDER	PARKER, AZ.	(928)575-6690
7. Keith Nopah Sr	CRIT	426 Bluewater Dr. Parker Az 85344	(928) 575-5794
8. ANDREA STEVENS	CRIT TRIBAL MEMBER	"	(928) 216-8134
9. Keith Nopah Jr	CRIT TRIBAL Member	"	Same

Sign-In Sheets

For the

Desert Quartzite Solar Project Scoping Meeting

At the

City of Blythe Multipurpose Room, Blythe CA

On March 24, 2015

Public Scoping Meeting Sign-In Sheet
Desert Quartzite Solar Project
March 24, 2015, 6:30 – 8:30 PM
City of Blythe Multi-Purpose Room, 235 North Broadway, Blythe, CA 92225

Information Open to FOIA

Name	Organization (if applicable)	Address	Telephone Number and Email Address
1. Jill Yung	Paul Hastings	55 2nd St. San Francisco Ca 94105	jillyung@paulhastings.com 4158567230
2. Juan Gonzalez	SACRED SITES PROTECTION CIRCLE	~~424~~ RIPLEY CA 92225	juanmgnzlz@outlook.cc 760 921 5500
3. Jesse Figueroa	Sacred Sites Protection Circle	424 N. Carlton Blythe Ca. 92225	760 899 3828 Jessfig@yahoo.com
4. Mallory Sutterfield	City of Blythe	235 n. Broadway Blythe	msutterfield@cityofblythe.ca.gov
5. Alfredo Figueroa	La Cuna de Aztlan	424 N. Carlton Ave Blythe	lacunadeaztlan@aol.com
6. ZACHARY CRECELIUS	C.B. PLUMBING	345. N MAIN ST BLYTHE, CA, 92225	760-922-6550 ZCRECELIUS@OUTLOOK.COM
7. Richard Burke	TRC	123 Technology Dr. Irvine	rburke@trcsolutions.com
8.	CB Plumbing	345 N. MAIN	760 922-6550 PlumbItIn@Aol.Com
9. VINCE INGALLS	IBEW LU 440	184 N ACACIA #4 BLYTHE	

Public Scoping Meeting Sign-In Sheet

Desert Quartzite Solar Project
March 24, 2015, 6:30 – 8:30 PM
City of Blythe Multi-Purpose Room, 235 North Broadway, Blythe, CA 92225

Information Open to FOIA

Name	Organization (if applicable)	Address	Telephone Number and Email Address
1. Bob Dover	AECOM	Greenville SC	robert.dover@aecom.com 8649182892
2. Johanna Falzarano	AECOM	Camarillo, CA	johanna.falzarano @aecom.com 805.764.4019
3. Laura Abram	First Solar	San Francisco, CA	Laura.abram@firstsolar.com 650-207-9304
4. Ashley Hudgens	First Solar	Indian Wells, CA	ashley.hudgens@firstsolar.com 7609025565
5. Chris Moore	TRC	San Diego, CA	cmoore@trcsolutions.com 858-414-7363
6. JAMES F. COOK	FIRST SOLAR	SF, CA	JCOOK@FIRSTSOLAR.com 650.455.1555
7. Jackie Boyers	CB Plumbing	345 N Main St Blythe CA	760-922-6550
8. Wesley Crecelius	"	" "	"
9. Larry Ross	County of Riverside	4080 Lemon street, Riverside	951-955-9294 LRoss@RCTLMA.ORG

Public Scoping Meeting Sign-In Sheet

Desert Quartzite Solar Project
March 24, 2015, 6:30 – 8:30 PM
City of Blythe Multi-Purpose Room, 235 North Broadway, Blythe, CA 92225

Information Open to FOIA

Name	Organization (if applicable)	Address	Telephone Number and Email Address
1. ALFRED FIGUEROA JR	N/A CUNA DE AZTLAN	391 S. FOURTH ST BLYTHE CA 92225	760-921-2024
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

APPENDIX E

WRITTEN COMMENTS RECEIVED DURING SCOPING PERIOD

COMMENTER	**DATE**
Mr. Alfredo A. Figueroa, Elder/Historian/ Chemehuevi Tribe Monitor for the La Cuna de Aztlan Sacred Sites Protection Circle, Blythe, CA	**March 24, 2015**

Comment submitted by

Mr. Alfredo A. Figueroa,

Elder/Historian/Chemehuevi Tribe Monitor

For the

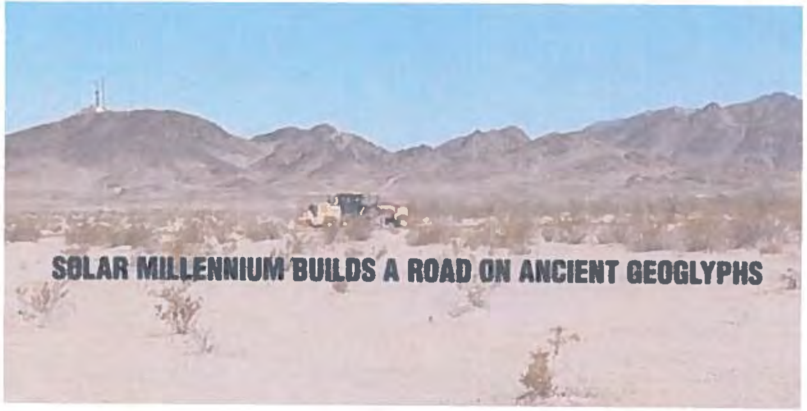
La Cuna de Aztlan Sacred Sites Protection Circle

At the

Blythe Public Meeting, Blythe CA

On March 24, 2015

Which is Worse, the Sledgehammer or the Bulldozer?



Which is worse, using a sledgehammer and torches to destroy statues, artifacts and books in Iraq by the Isis militants or the road graters (bulldozers) in the pristine desert destroying sacred geoglyphs and sites. The above photo shows the road grater destroying part of the Kokopilli/Cicmitl geoglyph group by the Blythe Solar Millennium to build the solar power project 8 miles west of Blythe.

Militants Smash Artifacts in Mosul Iraq

Islamic State militants are shown in the photos destroying the sacred archaeological sites and statues, frescos and other works that are revered around the world. These idols are over 3,300 years old and were found in Nimrud, the capital of the Assyrian empire. Irina Bokova, director general of UNESCO, stated, "...it is marked by the systematic destruction of humanity's ancient heritage."

HELP STOP THE HEINOUS CRIMES

1492- Land invaded and culture destroyed by the Europeans

2015- Continuation of land and culture being destroyed by the government.

Nothing much has changed.

Contact President Barack Obama, your Congresspersons & Senators to protest these abuses of public land and public money.

lacunadeaztlan@aol.com

COMMENTER	**DATE**
La Cuna de Aztlan Sacred Sites Protection Circle, Alfredo Acosta Figueroa, Elder/Historian/Chemehuevi Tribe Monitor, and Patricia Robles, President of La Cuna de Aztlan Sacred Sites Protection Circle, Blythe, CA	**April 3, 2015**

La Cuna de Aztlan
Sacred Sites Protection Circle

Alfredo A. Figueroa
424 N. Carlton Ave
Blythe, Ca 92225

13

Phone: (760) 922-6422
E-mail: lacunadeaztlan@aol.com

April 3, 2015

Cedric Perry, Project Manager
Bureau of Land Management
California Desert District
22835 Calle San Juan de los Lagos
Moreno Valley Ca 92553

RE: Letter in Opposition of the Proposed Desert Quartzite Solar Project in Eastern Riverside County by Desert Quartzite LLC

Dear Mr. Perry:

My name is Alfredo Acosta Figueroa. I am a native of the Colorado River, born in Blythe, CA, elder, historian and Chemehuevi Sacred Sites Tribal Monitor since 2009. I hereby declare:

We are totally against the proposed Desert Quartzite Solar Power Project.

We all know what happened at the Genesis Solar Site after Judge George H. Wu of the 9th District Federal Court denied the motion on June 28, 2012. During the construction, they committed one of the worst destructions of sacred sites, burials and thousands of artifacts that were found just as the CRIT Elders and our group, La Cuna de Aztlán Sacred Sites Protection Circle had stated in their lawsuit. It is our recommendation that the BLM does not commit these same atrocities at the Desert Quartzite Solar Project.

We have stated before in all our comments against the large solar projects being developed along the I-10 corridor in Eastern Riverside County that the sacred sites are all tied together and there is no way that they can be singled out. The solar projects cannot destroy just one sacred site without destroying the sacredness of the Creation story in the McCoy Valley.

The Desert Quartzite Solar Project is a continuation of the Blythe Solar and McCoy Solar power projects. The construction of the Blythe Solar and McCoy projects are one of the worst heinous modern day crimes committed against humanity in the world and it is occurring right now along the Colorado River I-10 Corridor. The solar projects were fast-tracked and approved by BLM and the California Energy Commission. Both are in the McCoy Valley which is one of the most sacred valleys that overlooks all the area west and northwest of Blythe. This is where the Giant Kokopilli (over 200 feet long, 250 feet wide) geoglyph image is located. Also in the same group is Cicimitl (El Cucuy, the spirit), and over 25 other geoglyphs that include the 13 level underworld temple, cairns, sacred trails, etc. The descending human spirit called El Tosco is directly in line with Granite Peak. Granite Peak is **where Sky meets Earth** and its symbol is the X like the hour glass image. In the Nahuatl language it is called

Tamoanchan, Ta-Tata/Grandfather, Moan-Meets/Merges, Chan-Chante/House. In other words it is where the human spirits descend from the Cosmos to Earth.

In the late 70's, there were a lot of people working in the McCoy Valley gathering desert varnish round pebbles that are large, approximately 2 inches in diameter and dark. They were being sold for yard decorations in the Palm Springs area. Because of the vast destruction, it was when BLM under the Antiquities Act of 1906 enforced cancelling all of the mining claims and stopped all the groups that were gathering the pebbles. These pebbles were mostly on top of the mesetas where the geoglyphs are located. Likewise, the off-roaders were also stopped because they were destroying the sacred sites. In those days the off-roaders were our main concern. Today our concern is BLM and the rest of the state and federal departments that are supporting these projects.

The California Energy Commission's (CEC) own cultural resources investigation had found an abundant of cultural resources as stipulated in their report. C-3 Cultural Resources Docket 09-AFC-8 C.3.1 Summary of conclusions dated 06/22/10 by Elizabeth A. Bagwell, Ph.D., RPA and Beverly E. Bastian: *Staff Finds that the GSEP construction impacts, when combined with impacts from past, present, and reasonably foreseeable projects, contribute in a small but significant way to the cumulatively considerable adverse impacts for cultural resources at both the local I-10 Corridor and regional levels.* ***This analysis estimates that more than 800 sites within the I-10 Corridor and 17,000 sites within the Southern California Desert Region will potentially be destroyed. Mitigation can reduce the impact of the destruction, but not to a less-than-significant level.*** Yet the CEC has not respected nor honored its own research or the BLM's despite all our touring with them of the sacred sites and describing what they mean in the human creation story.

One thing is to be ignorant of a subject, the other is to know the facts and still deliberately destroy them.

The Desert Quartzite Solar project will destroy remnants of what is the North/South Quechan trail that begins at Avi Kwame-Spirit Mountain north of Laughlin Nevada and ends in Yuma in the south. The Desert Quartzite site will also destroy the four circles that represent the four suns as shown in the Aztec Sunstone calendar and other geoglyphs which are south of I-10 and west of Mesa Verde.

The Desert Quartzite Solar Project in the Palo Verde Mesa and the orchards that were there have already been destroyed for the water allotment and its proximity to the Blythe Natural Gas Company (Florida Light & Power Co (FLP)) and the transmission lines that pass right by it. The company talks about developing jobs and here they have already displaced over 250 permanent jobs of the citrus farm workers that live in the Palo Verde Valley area. This is something similar to what happened when the FLP was constructed in 2000.

When the FLP was constructed, it destroyed 1,500 acres of citrus so they could obtain the water rights of those citrus orchards thus leaving about 550 citrus farm workers unemployed. Many had worked over 30 years with the Coachella Growers Citrus Company. The solar power projects have destroyed all but a few existing acres of citrus orchards on the Mesa. These farm workers were all permanent residents of the Palo Verde Valley. Blythe has lost population according to the census and the Palo Verde Unified School District. Currently the Palo Verde Valley is suffering the highest unemployment rate per capita in California with the exception of the Imperial Valley.

Due to the heat intensity by the project, it will change the atmospheric conditions and a lot of the agriculture in the Palo Verde Valley will be affected.

In a recent article regarding the Jenko Solar Project in China, the Chinese are setting an example in protesting against the large solar panel projects in their country because they have not only contaminated their drinking water but also the climate change has ruined their agriculture industry. Apparently not even China is benefitting from these solar panel projects. The Jenko Solar Project is an excellent example of why in the United States, we do not need these projects near agricultural land much less near the Colorado River where its water reserve in Lake Mead is barely 1/3 of its capacity and all of its water has already been allocated. Lake Mead is at its lowest level since Hoover Dam created the lake in the 1930s according to an article in the Press Enterprise of July 9, 2014. The Colorado River, as we all know, is one of the main water sources in the Southwest United States and Northwest Mexico.

All these solar power projects have to use water and they are destroying the agriculture for the water rights. That is why they are fallowing the agricultural fields for the water rights.
Governor Brown's press release of April 1, 2015 states:

Following the lowest snowpack ever recorded and with no end to the drought in sight, Governor Edmund G. Brown Jr. today announced actions that will save water, increase enforcement to prevent wasteful water use, streamline the state's drought response and invest in new technologies that will make California more drought resilient.
"Today we are standing on dry grass where there should be five feet of snow. This historic drought demands unprecedented action," said Governor Brown. "Therefore, I'm issuing an executive order mandating substantial water reductions across our state. As Californians, we must pull together and save water in every way possible."

The Desert Quartzite Solar Power Project will need a lot of water for the project. Currently the Mesa Verde Community's well is drying up and they will have to dig down deeper. The other well is contaminated and has been closed for years. The main reason the asparagus fields that were planted at the Palo Verde Mesa were abandoned was because of the lack of water.

The Desert Quartzite Solar Power Project will have to drill wells from aquifers that lead to the Colorado River. The Colorado River Board of California has stipulated that all these aquifers within 50 miles go the Colorado River and any water taken from these aquifers has to be approved by the Board of Directors.

The Blythe airport is also in opposition of the solar power projects that are proposed to be built around the airport. According to Pat Wolfe, past operator of the airport, stated "currently the pilots are experiencing severe flying conditions when they fly over the Florida Light and Power Plant when they are taking off or when they are landing on the landing strip." The FLP was built despite the opposition of the Federal Aviation Administration (FAA). FAA regulations are that the plant was to be built no less than a mile away from the end of the runway and that the towers could not be more than 150 feet tall. These two regulations are being violated.

The Blythe airport has been declared as a backup for the Los Angeles International Airport in case it is attacked. The Blythe airport will be available to provide safe landing. Currently the Blythe airport is also used as a training site for pilots. Fortunately no pilots have yet crashed flying above the FLP.

As we know, two professional pilots of the First Solar Company crashed and died when they were flying above the Desert Sunlight Solar project north of Desert Center. They were reviewing the damage that had been done by the summer monsoons on the solar project last year. The solar power projects create a dramatic atmospheric change. This is not just a threat to the planes but also to all flying birds, etc. These are facts that have been researched and documented at the Ivanpah Solar Power Project plus at the Israel BrightSource Power Projects sites in Israel. This is proof that the atmosphere cannot sustain an airplane above or near the solar sites and the Desert Quartzite project will be approx. 2 miles southwest of the airport landing strip.

According to David Danelski article of July 14, 2014, the heat created from the solar power towers of the Ivanpah plant creates up to 800 degree temperatures and now the company has trained dogs to retrieve birds that perish while flying above the solar power plant.

The Ivanpah project is currently receiving a lot of negative comments pertaining to the pilots that fly to and from Las Vegas International Airport and Nellis Air Force Base and other airports in Southern Nevada. As a matter of fact the Ivanpah Solar Project is brightly seen from the cosmos as seen by satellite photography.

Currently, one of the most recognized butterflies is the Monarch Butterfly that has its massive migration from the Northern United States and Canada down to Michoacán in the winter. It is an endangered species. One of its western migration routes is centered through the Colorado River/McCoy Valley. The Monarch image can be seen as part of the Midland Mountain outline in the Little Maria Mountain Range. The Monarchs, along with any other butterfly flying through the area will be completely destroyed as will the birds such as the eagles, herons, etc.

Already, there are many complaints by the Mesa Verde Community residents that are suffering from bronchitis, asthma, and other respiratory illnesses that lead to Valley Fever. These illnesses are related to the dust storms caused by the leveling of the pristine desert. Solar sites have been proposed nearly surrounding the Mesa Verde Community. Likewise, the residents of San Joaquin Valley parallel to I-5 north from Bakersfield to Fresno have been suffering grave Valley Fever epidemic. Close to a hundred inmates from the State Correctional facilities including Avalon, Corcoran, Coalinga and Delano have died from Valley Fever which was caused by the leveling of 410,000 acres. The land was supposed to be for proposed solar power projects and also to be farmed but was fallowed because of the lack of water. The fungus is carried by the dust of the fields that are fallowed. A lot of the sick prisoners have been brought to the Chuckawalla and Ironwood prisons in Eastern Riverside County.

There are five Indian Reservations in the lower Colorado River Basin Valleys. Each Native Tribe in the Colorado River has a unique identity and interpretation of the Creation story given to them by the Creator yet all their oral history relates to their Cosmic cultural tradition. All this oral history begins in the north with Spirit Mountain down to the Gulf of California and to Rocky Point, Sonora Mexico where the last geoglyphs are. Most of the creation stories are based on oral history thousands of years old, taught to the Indigenous Elders. It reveals how it relates to the mountain images, the solstice, the equinox, over 300 geoglyphs which center focuses are the Blythe Giant Intaglios, Bouse Fisherman, petroglyphs, and pictographs. Fortunately, the Uto-Azteca have a few Pre-hispanic Codices that inter-relate with the above sacred sites along the Colorado River Valleys.

The Rio Mesa Solar Project that was proposed to be built at the base of the sacred Mule Mountains was denied because the Palo Verde Irrigation District and other farmers plus the Cibola Wildlife Refuge and the Indigenous Tribes of the Colorado River protested it.

The U.S. Government does not need to continue its Manifest Destiny Policy of the 1850s. The Native American cultural cosmic tradition is still alive despite its 500 years of domination by the Spanish and English. One of the worst catastrophes in the world committed against a nation was when Hernan Cortes invaded Mexico/Tenochtitlan in 1521. Mexico/Tenochtitlan was completed razed and leveled off. The Spanish built a new city on top of the old one to totally destroy the Natives' cosmic traditions. With the soldiers came the Catholic priests and what wasn't destroyed by the soldiers was going to be destroyed by the priests. This is when they implemented the notorious Spanish Inquisition of the Holy Catholic Roman Church. They even built churches on top of the pyramids and other sacred sites like the cathedral in downtown Mexico City (Templo Mayor) was built on top of the Twin pyramids. The Inquisition was in operation for over 300 years until the Mexica ousted the Spanish in 1821.

The Natives of the southwest, especially from California were finally free to practice their Cosmic cultural tradition when Governor Jose Figueroa secularized all of the Catholic Mission lands in 1836 and gave them back to the natives. This freedom was short lived and only lasted 12 years until the signing of the Treaty of Guadalupe Hidalgo on February 2, 1848. This ended the war with the United States. This is when the Manifest Destiny policy was in full swing. All the land from sea to shining sea belonged to the Anglo-Saxons.

In the lower Colorado River Basin Valleys, the government tried to put all of tribes together on one reservation. The CRIT Reservation was organized in 1865 according to Gilbert Leivas. The original southwestern corner boundary was the high water flood stage level on the west mesa where I-10 goes up the mesa. CRIT at one time bordered the east side of where the dried up orchards are.

In 1875, Thomas Blythe, an Englishman with the reputation as an international speculator and swindler based in San Francisco applied to the State of California to purchase most of the Palo Verde Valley. He applied under the State Swamp and Overflow Act even though the northern half of the valley was already part of the CRIT Reservation and Chemehuevi and other tribes were living there.

According to Camiel Dekens narrative in the book, *River Man, Desert Man*, Thomas Blythe lied in his application where he mentions that nobody was living there and that he had to row a boat all over the Palo Verde Valley. Blythe neglected to mention that his row boat was carried on a buckboard wagon pulled by mules. He was successful in his first purchase of 40,000 acres of the Northern Palo Verde Valley. The United States Army forced

the majority of the Natives to go across the Colorado River. CRIT recently has regained some of its original California land.
Present day West Blythe was called Barrio de la Liebre (Jackrabbit Neighborhood) and in the Nahuatl language it was called Acacitli which is shown in the Tovar Mexica Codex. West Riverside Drive was called Vereda de la Liebre (Jackrabbit Trail). It was also called the Coco-Maricopa Trail that went up the mesa where the Florida Light and Power Plant is.

During the 1890's, the government started the Indian boarding schools, on and off the Reservation. Most of the Native Americans were forced to attend. They were prohibited to practice their culture and speak in their language, etc. On top of that, the government allowed the different Christian Church groups to build their churches on the Reservation to further deviate them from their cosmic culture tradition.

In the rest of the Nation the educational system was based on the separate but equal schools. In Blythe, they were called the Americanization schools and the majority of the Mexicans were sent there. Those schools were closed in 1947 after the Mendez vs Westminister Schools decision and for the Native Americans it was until the Brown vs The Board of Education in 1954.

Despite all the government's efforts to destroy the Native American's cosmic cultural traditions, the knowledge has survived the policy of "Kill the Indian, Save the Man".

During the war against Nazi Germany, Italy and Japan that killed over 60 million people in the world there were laws made to protect sacred sites in Europe. The protection of sacred sites has been well demonstrated during the 2nd World War. On June 23, 1943, President Franklin D. Roosevelt created the American Commission for the Protection and Salvage of Artistic and Historic Monuments in war areas. The commission drew up lists of cultural treasures with the hope that military action might be planned to avoid harming them. Dwight D. Eisenhower understood the importance of the protection and preservation of these sacred sites. Eisenhower stated "if we have to choose between destroying a famous building and sacrificing our own men, then our men's lives count infinitely more and the building must go". He prefaced the proclamation by saying, "Shortly we will be fighting our way across the Continent of Europe in battles designed to preserve **our civilization....**". His order made clear that destruction of everything in an army's path was not justifiable, that a people's long-established culture and the most beautiful manifestations of what it believes in and values matter and we, when we enter and defend it, are duty-bound to respect those things. Currently a movie is in theaters directed by George Clooney, and based on the book by Robert M. Edsel called "Monuments Men". This is a story of how strongly Eisenhower felt about saving these cultural sites and artistic monuments. Cathedrals, historic structures, famous paintings, sculptures and more were saved for the preservation of the culture of **our civilization** making references to the Anglo-Saxon.

In the Smithsonian magazine of March, 2009, the featured article related to the must-see 10 endangered cultural treasures that included many of the sacred sites that should be preserved from all over the world. In the United States, they included Route Hwy 66 but no indigenous sacred sites. According to Kaisa Barthuli, the program manager of the Route 66 Corridor Preservation Program stated, "if we lose these stories, we're really losing a sense of ourselves."

During the Iraq war, in 2003 and 2004, the United States caused damage to ancient sites with their heavy vehicles and machinery. Military forces built a helipad, carved out parking areas and trenches destroying these sites. Babylon, Iraq was damaged by war and by looters. The U.S. has said it will help rehabilitate Babylon, funding an effort by the World Monuments Fund and Iraq's State Board of Antiquities. This site is tremendously important according to Gaetano Palumbo of the World Monuments Fund, yet in its present state, Babylon is "hardly understandable" as a place where so much happened in history".

It took the Taliban only days to destroy 1,500 years of history when they destroyed the two Bamiyan Buddha twins carved into a sandstone cliff near the provincial capital in Central Afghanistan. They stand 165 feet and 114 feet tall. They were built around the 2nd century. Appeals came from all over the world such as the World Monument Fund and the United Nations Secretary General for the Taliban government of Afghanistan to preserve these sacred sites of the Buddha creation story in Afghanistan. W.L. Rathje, an archaeologist at Stanford University described the destruction of the statues as a **crime against humanity**. Afghanistan was later invaded by the United States after

they destroyed the statues that the world considered to be masterpieces. The United State Government fought to save these foreign religious sacred sites but is not willing to preserve sacred sites in its own country.
Which is worse, using a sledgehammer and torches to destroy statues, artifacts and books in Iraq by the Isis militants or the road graters (bulldozers) in the pristine desert destroying sacred geoglyphs and sites. Irina Bokova, director general of UNESCO, stated, " ...it is marked by the systematic destruction of humanity's ancient heritage.

On July 22, 2012, columnist Victor Davis Hanson said, "sometimes post-modern, politically correct westerners can be every bit as zealous and as potentially destructive of the past as pre-modern Islamics.

Agriculture Secretary Tom Vilsack has called for the USDA and the U.S. Forest Service to work more closely with tribal governments in the protection, respectful interpretation and appropriate access to Indigenous Cultural sacred sites. Vilsack said, "American Indian and Alaska Native values and culture have spirit and deserve to be honored and respected. By honoring and protecting sacred sites on national forests and grasslands, we foster improved tribal relationships and a better understanding of the Native people's deep reverence for natural resources and contributions to society."

During President Barack Obama's speech of January 28, 2014, he stated that "And while we are at it, I'll use my authority to protect more of our pristine federal lands for future generations." Also, 109 House Democratic members urged President Obama to protect National Monuments using the Antiquities Act.

We wholeheartedly support this effort by President Obama but should enforce the current laws to support the cultural resources that are related to the Native American human Creation Story and support all the laws that have been approved to protect the sacred sites by the United States government and the United Nations plus the resolutions by the Colorado River Indians Tribes and the National Congress of American Indians.

We are opposing the construction of the Desert Quartzite Solar Power Project because of its gross violation to the following Indigenous, State, Federal and United Nations laws that support our demands and why this project should not be constructed within sacred areas:

- **National Congress of American Indians**: Resolution #LNK-12-036, opposing the Department of Interior Fast-Track Polices of Renewable Energy Projects on Ancestral Homelands, June 17, 2012.
- **Inter-Tribal Council of Arizona: Resolution** 2012, opposing the Department of Interior Fast-Track Polices of Renewable Energy Projects on Ancestral Homelands, June 29, 2012. The Resolution specifies that whereas over 40 proposed solar and wind renewable energy projects are to be undertaken within a 50-mile radius of the Colorado River Indian Tribes Reservation which puts tens of thousands of acres of land within the ancestral territory homelands of CRIT as well as other Yuma tribes, at further risk of destruction.
- **Colorado River Indian Tribes Resolution and Letter to President Barack Obama**: opposing the construction of Solar Power Projects within 50-miles from the CRIT Reservation boundary of February 27, 2012.
- **United Nations Declaration on the Right of Indigenous People Resolution** of 2007: was adopted by the General Assembly during the 107th plenary meeting and was signed by President Barack Obama on December 15, 2010.
- **Native American Sacred Places**, March 6, 2003(S.B. 18)
- **Native American Sacred Lands Act**, June 11, 2003 (H.R. 2419)
- **The Sacred Land Protection Act**, July 18, 2002 (H.R. 5155)
- **The Native American Sacred Sites Protection Act**, February 22, 2002 (S.B. 1828)
- **Accommodations of Sacred Sites and Federal Land**, Signed by President Bill Clinton on May 24, 1996 (Executive Order 13007) This focuses on specific sites and Indian religion.
- **Native American Graves Protection & Repatriation Act** of 1990
- **Archeological Resources Protection Act** of 1979

- **American Indian Religious Freedom Act**, August 11, 1978
- **The Civil Right Act** of 1968
- **Antiquities Act** of 1906

La Cuna de Aztlán Sacred Sites Protection Circle under the auspices of the Athapaskan Tribe from Alaska, Chief Gary Harrison has submitted a petition to the United Nations to intervene and stop the construction of the Blythe Solar and McCoy Solar projects and declare the McCoy Mountains (Kokopilli/Cicimitl/El Tosco geoglyphs site), Big Maria Mountains (Blythe Giant Intaglios, large white eagle), Granite Mountain that includes Granite Peak (Tamoanchan) as a World Heritage Site under UNESCO.

We strongly urge that BLM consider the above information and disapprove this notorious solar power project. It will behoove President Obama to continue his motivation and concern in protecting those sacred sites by enforcing the laws and establish a National Monument in the McCoy/Big Maria Mountains and Valleys.

Sincerely,

Alfredo Acosta Figueroa

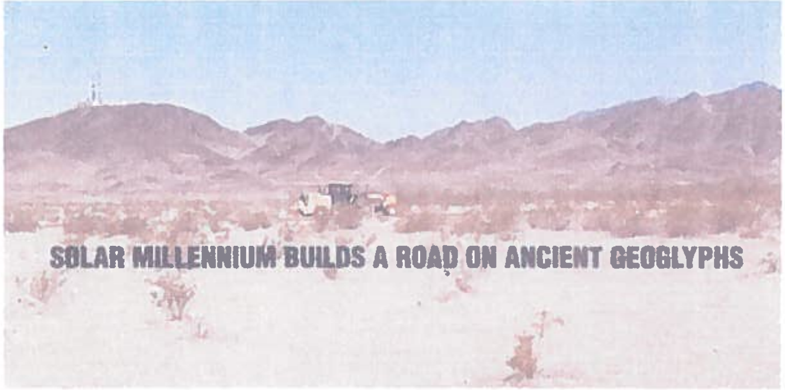
Patricia Robles

Alfredo Acosta Figueroa
Elder/Historian/Chemehuevi Tribe Monitor

Patricia Robles
President of La Cuna de Aztlan Sacred Sites
Protection Circle

Attachments included:
Which is Worse, the Sledgehammer or the Bulldozer
Militants Smash Artifacts in Mosul Iraq
The Spanish Invasion
The Spiritual Conquest
Idols or Gods
Groundbreaking of Solar Power Project
Twin Geoglyphs of Kokopilli/Cicimitl
Remnants of Quechan Trail
Aztec Sunstone Four Suns Geoglyph
Gathering of Desert Pebbles

Which is Worse, the Sledgehammer or the Bulldozer?



Which is worse, using a sledgehammer and torches to destroy statues, artifacts and books in Iraq by the Isis militants or the road graters (bulldozers) in the pristine desert destroying sacred geoglyphs and sites. The above photo shows the road grater destroying part of the Kokopilli/Cicmitl geoglyph group by the Blythe Solar Millennium to build the solar power project 8 miles west of Blythe.

Militants Smash Artifacts in Mosul Iraq

Islamic State militants are shown in the photos destroying the sacred archaeological sites and statues, frescos and other works that are revered around the world. These idols are over 3,300 years old and were found in Nimrud, the capital of the Assyrian empire.
Irina Bokova, director general of UNESCO, stated, "...it is marked by the systematic destruction of humanity's ancient heritage."

HELP STOP THE HEINOUS CRIMES

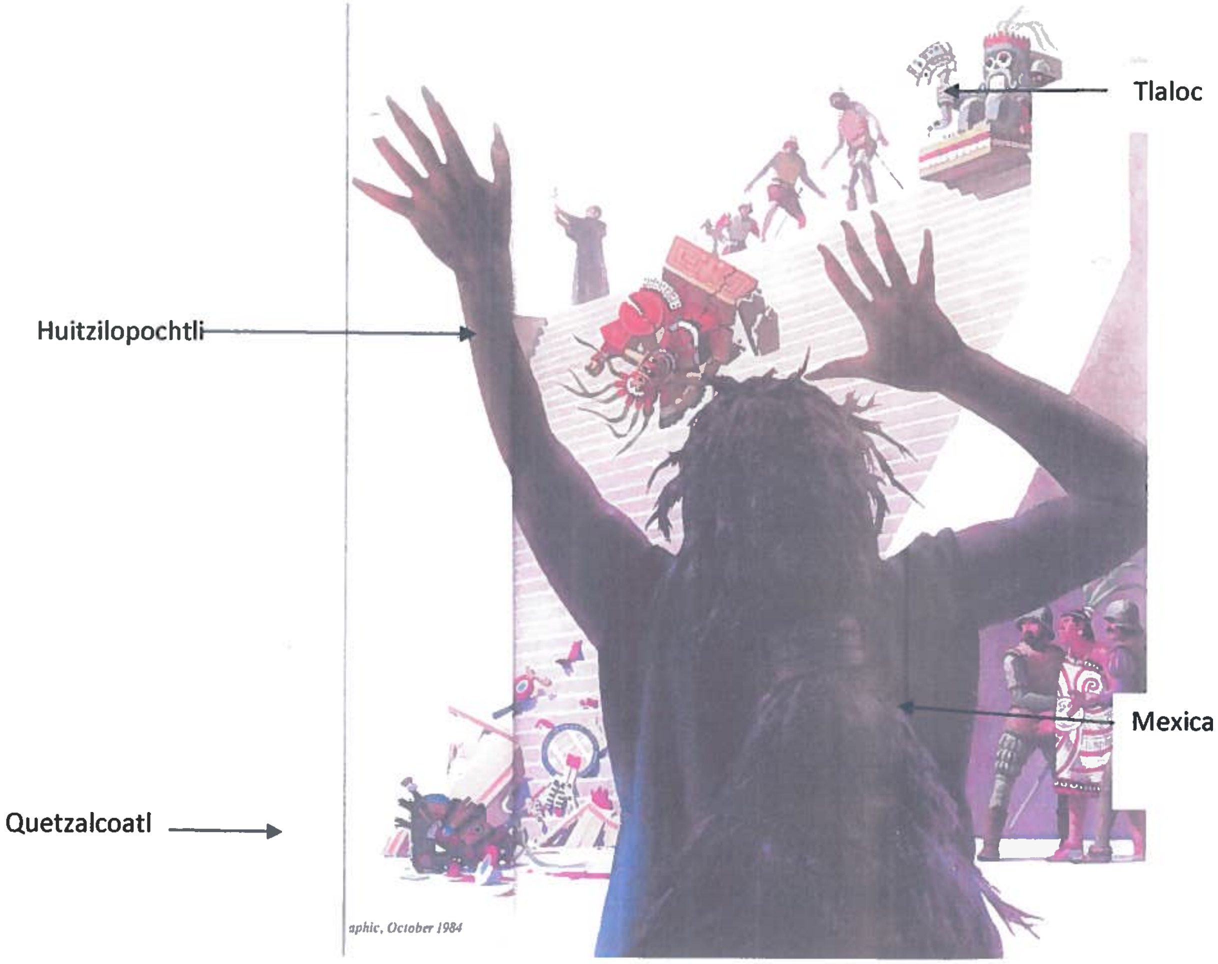
1492- Land invaded and culture destroyed by the Europeans
2015- Continuation of land and culture being destroyed by the government.

Nothing much has changed.

Contact President Barack Obama, your Congresspersons & Senators to protest these abuses of public land and public money.

lacunadeaztlan@aol.com

The Spanish Invasion at Mexico/Tenochtitlan



National Geographic Magazine, October 1984

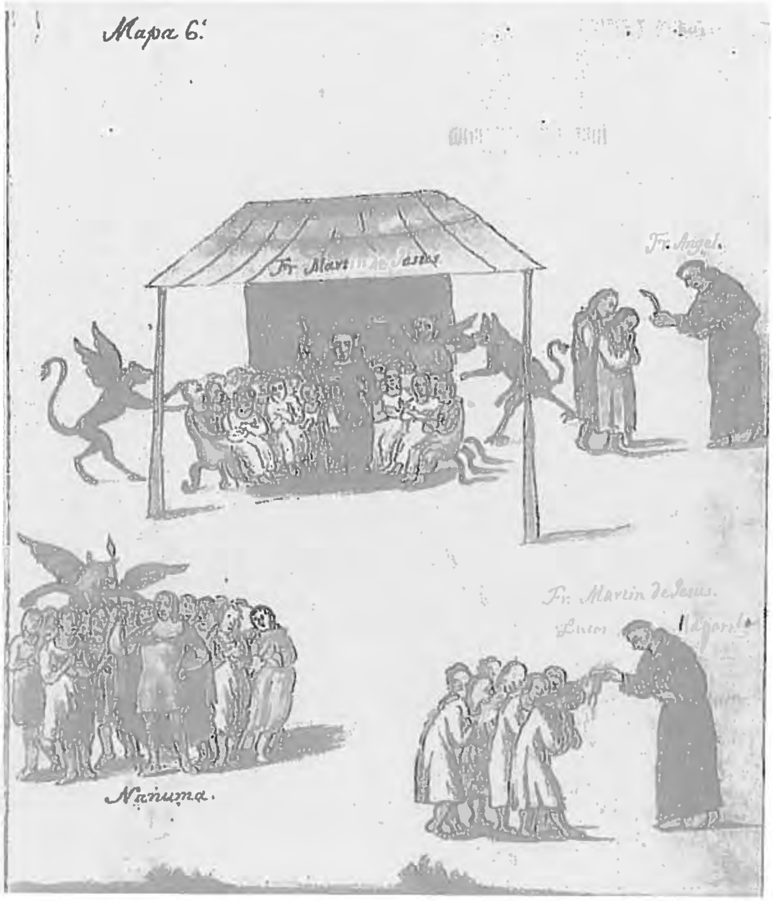
On August 13, 1531, the Spanish soldiers are destroying the main temple (Templo Mayor) in Mexico/Tenochtitlan. On top of the pyramid is the image, Tlaloc that represents earth/woman/night. Falling down the pyramid is the image of Huitzilopochtli that represents the cosmos/male/day. At the bottom of the pyramid is the image of Quetzalcoatl that represents the spirit of the male and female. The priest at the top of the pyramid is holding the Christian cross giving his blessing to the destruction of the three main images of the creator. These same images can be seen on the Big Maria Mountains and are represented by the giant geoglyphs at the Blythe Giant Intaglios and Bouse Fisherman, etc.

The Mexica in the front is horrified at seeing the Creator's images being destroyed by the Spanish soldiers.

This was the beginning of the destruction of the Native cosmic cultural tradition.

Escena de la conquista espiritual
Fray Pablo Beaumont, Crónica de Michoacán
Reprografía: Marco Antonio Pacheco/ Raíces

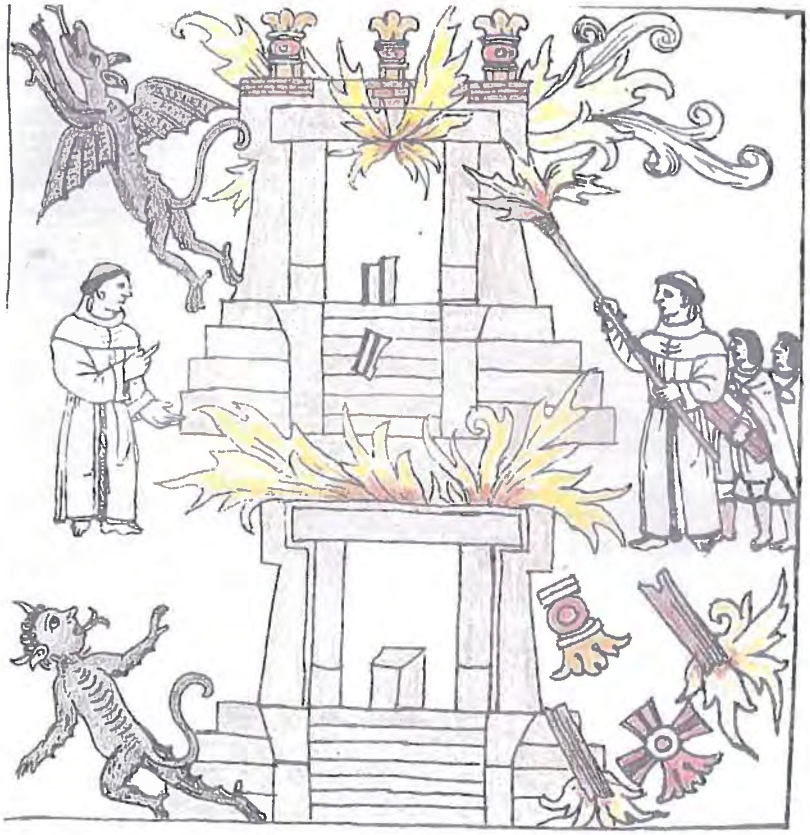
Scene of the spiritual conquest
Fray Pablo Beaumont, Michoacán Cronic
Reproduced: Marco Antonio Pacheco/Raíces


Mapa 6.
Fr. Mart de Jesus
Fr. Angel.
Fr. Martin de Jesus.
Nanuma.

Aqui se donuestra que ya pacificar los naturales, abraron en la viña del Señor, Los Padres missioneros boutizando a unos y predicando a otros, luchando al mismo tiempo con los demonios, a cuya empressa assistia fiel, y servaroso el General Nanuma.

Here it demonstrates that once the Natives were pacified, they would pray in obedience to the Lord. The missionary priests baptized a few and were preaching to the others, struggling at the same time with the demons, to lead and demonstrate a faithful assistance and servitude to General Nanuma.

Ídolos o dioses
Imágenes prehispánicas de México virreinal
Idols or Gods
Prehispanic Images of Mexico Viceroyship



Dos frailes destruyen e incendian un templo prehispánico. De entre las llamas y el humo huyen dos demonicos, dibujados con claro estilo europeo. Descripción de la provincia y ciudad de Tlaxcala. Manuscrito de Glascow

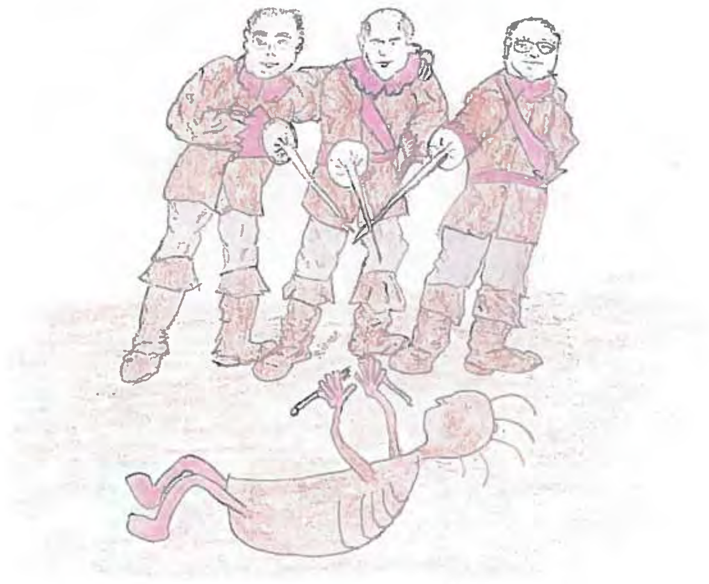
The friars destroy and torch a pre-Hispanic temple. Inside the flames and smoke, the demons are ousted. Design is European style. Description is the province and city of Tlaxcala.
Glascow manuscript.

Antonio Rubial Garcia

Groundbreaking of the Solar Trust of American Solar Power Project at the Blythe Site on June 17, 2011

SOLAR TRUST OF AMERICA

Left to Right: City of Blythe Mayor Joseph DeConinck, California Governor Jerry Brown, Solar Trust of America Chairman and CEO Uwe T. Schmidt, U.S. Secretary of the Interior Ken Salazar and 80th Assembly District Assemblymember V. Manuel Perez shovel dirt on June 17, 2011 during a groundbreaking event near Blythe, California for the Blythe Solar Power Project.

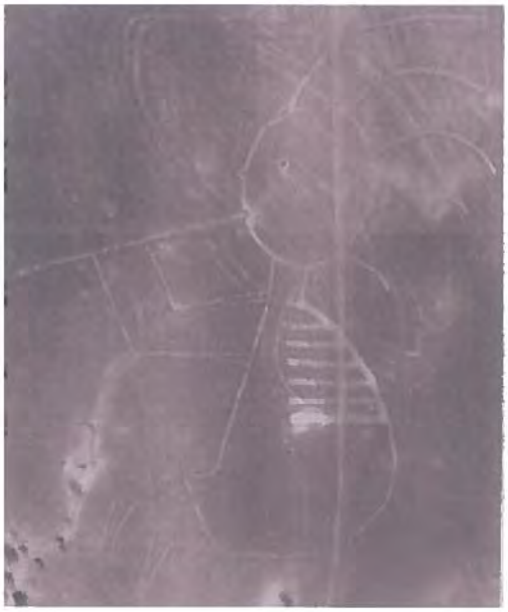


Three Musketeer cartoon emulating what the above government officials and company representatives are manifesting in the destruction of the Kokopilli/Cicimitl Geoglyph Sites.

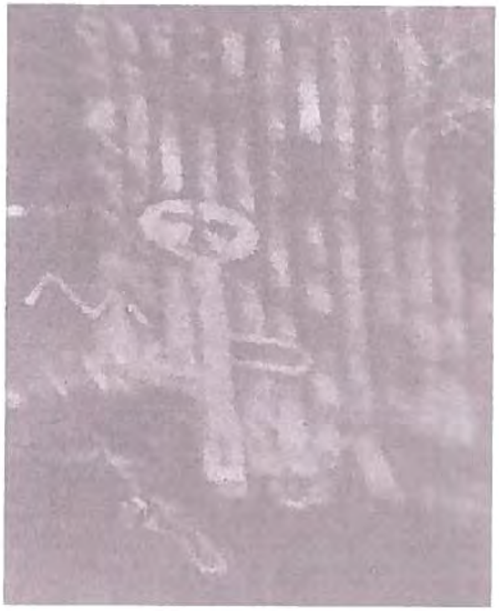
Left to right are 80th Assembly District Assemblymember V. Manuel Perez (Señor El Vendido), Governor Jerry Brown and Secretary of Interior, Ken Salazar. Mr Perez has been fully aware of the sacredness of the site and is knowledgeable of its significance. He had previously taken a tour of the sacred sites. Governor Brown was a main supporter in stopping the construction of the Sun Desert Nuclear Power Plant 10 miles south of the Kokopilli/Cicimitl site in 1979, now one of the main supporters of destroying the sacred sites. Mr. Salazar is well aware of the atrocities that are being committed.

Twin Geoglyphs of Kokopilli/Cicimitl

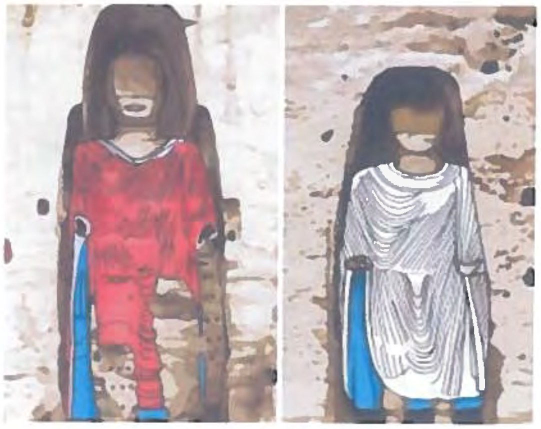
Sacred geoglyphs that are within the approved NextEra Blythe Solar Energy Project by the California Energy Commission, January 15, 2014



Kokopilli is the Creator's image of Quetzalcoatl in the form half human, half insect. He is leaving during the end of the sun of the suns in the Aztec Sunstone Calendar. Kokopilli means koko-hurt and pilli-our Lord. He is hurt because hur have not respected the Creator's dictation of harmonious equilibrium among all species

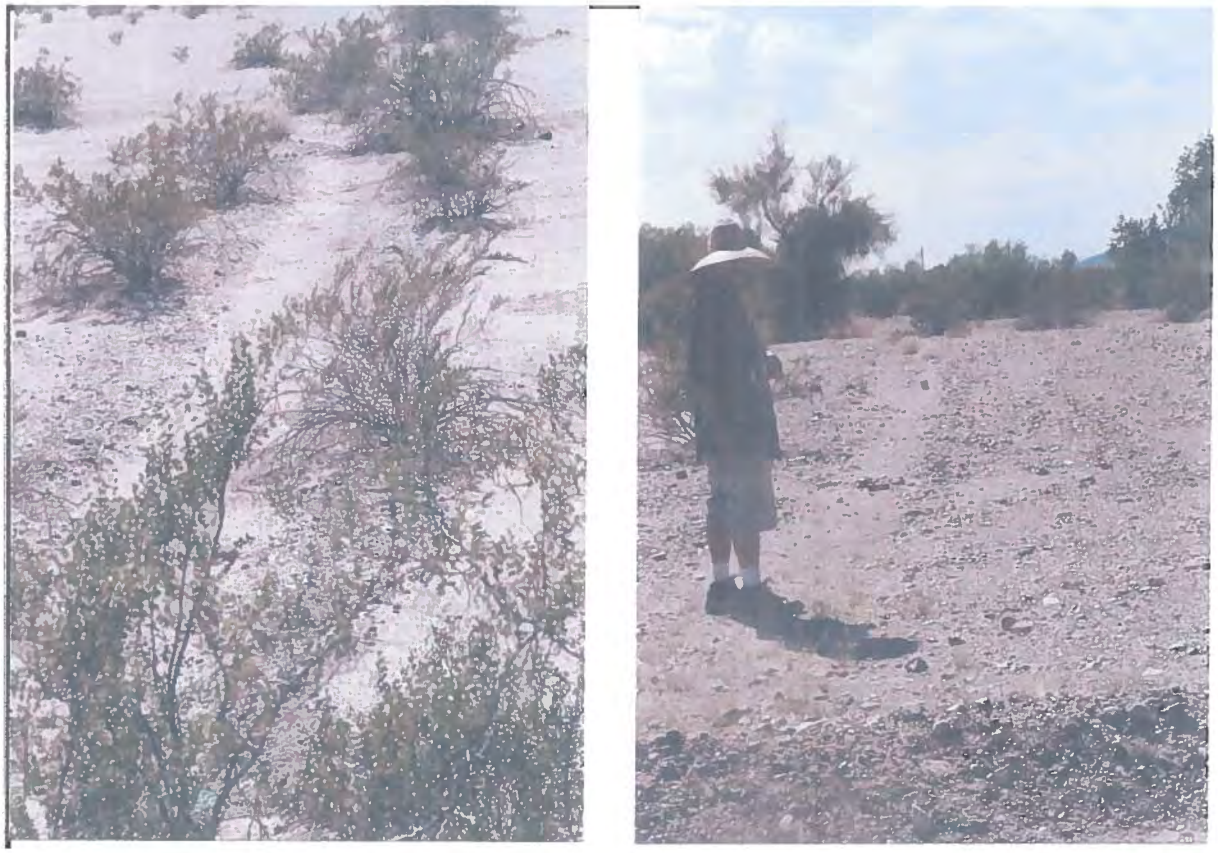


Cicimitl, the Great Spirit, El Cucuy, Kokokpilli's twin takes the human spirits to the 4 directions and to its final destination at the Topock Maze which is 13 magnetic north from the Mule Mountains (Calli-earth). In English, this image is called extra-terrestrial (ET)



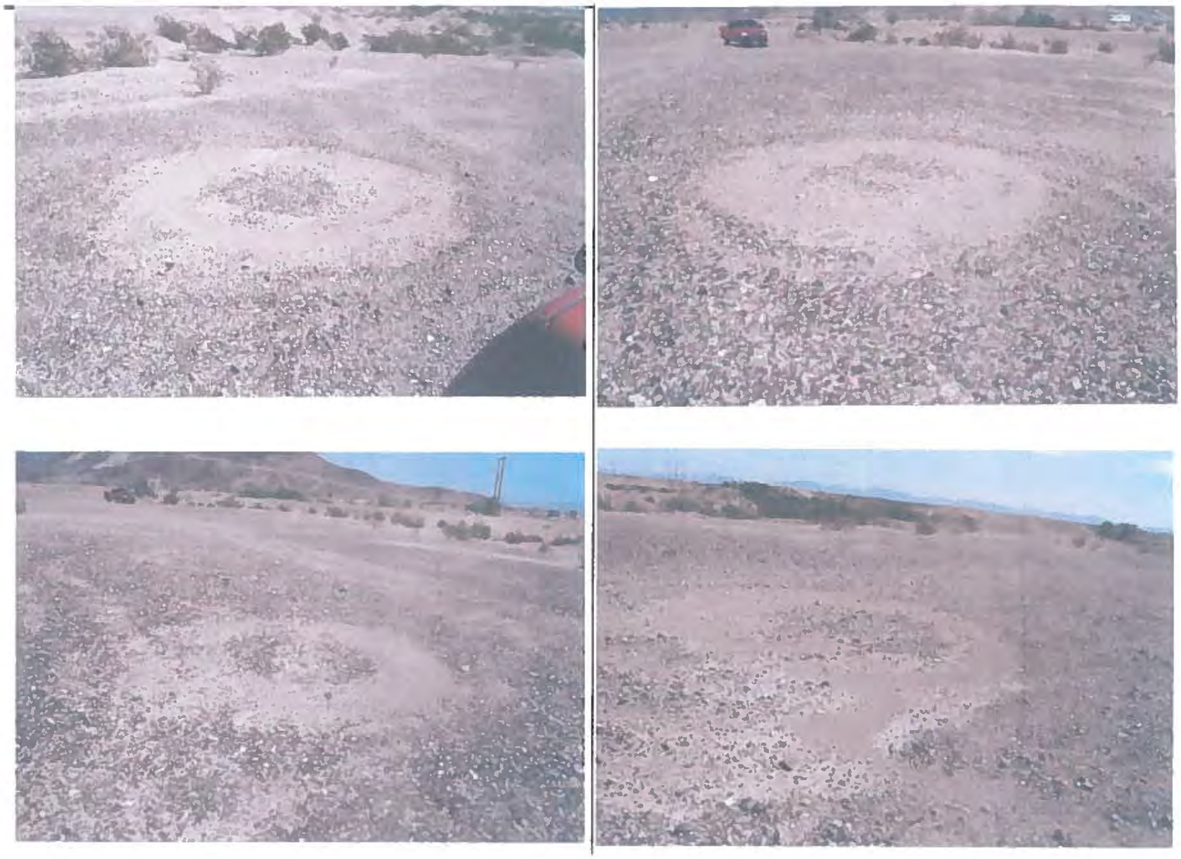
Bamiyan Buddha twins carved into a sandstone cliff near the provincial capital in Central Afghanistan. They stand 165 feet and 114 feet tall. They were built around the 2nd century. Appeals came from all over the world such as the World Monument Fund and the United Nations Secretary General for the Taliban government of Afghanistan to preserve these sacred sites of the Buddha creation story in Afghanistan. W.L. Rathje an archaeologist at Stanford University described the destruction of the statues as a crime against humanity. Afghanistan was later invaded by the United States after they destroyed the statues that the world considered to be masterpieces. The United State Government fought for these foreign religious sacred sites but is not willing to fight to preserve sacred sites in its own country.

Remnants of Quechan Trail



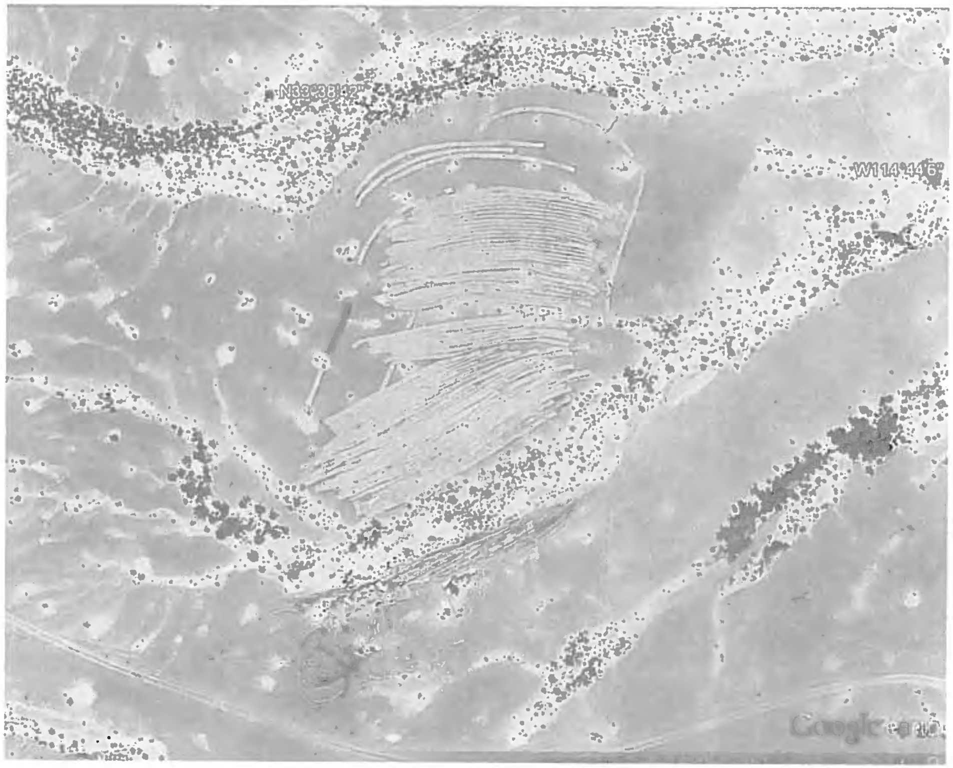
Here we can see clearly the white remnants of the Quechan trail south of I10 and west of Mesa Verde that is leading south to Yuma.

The Aztec Sunstone Four Suns Geoglyphs



These are the four geoglyph circle images that represent the four suns of the Aztec Sunstone calendar. They were designed when the Mexica Nation left the Colorado River in their migration to Mexico approximately 1067. These geoglyphs are also south of I10 and west of Mesa Verde.

Gathering of Desert Pebbles



Mine site of gathering of the pebbles within the Blythe Solar Project site

These are some of the sites where the people were gathering the desert varnish pebbles but were stopped when BLM enforced the Antiquities Act of 1906. This site is next to the Temple site inside the Blythe Solar Project boundary.

COMMENTER	DATE
Basin and Range Watch, Kevin Emmerich and Laura Cunningham, Beatty, NV	**April 5, 2015**

Basin and Range Watch

April 5th, 2015

To : Cedric C. Perry, Project Manager, 22835 Calle San Juan De Los Lagos, Moreno Valley, CA 92553-9046
Email to: blm_ca_desert_quartzite_solar_project@blm.gov.

Subject: We would like to submit the following scoping comments for the NOI for the Desert Quartzite Solar Project: **CACA # 049397**

Basin and Range Watch is a group of volunteers who live in the deserts of Nevada and California, working to stop the destruction of our desert homeland. Industrial renewable energy companies are seeking to develop millions of acres of unspoiled habitat in our region. Our goal is to identify the problems of energy sprawl and find solutions that will preserve our natural ecosystems and open spaces. We have visited the Desert Quartzite Solar Energy project site and are concerned about the direct and cumulative impacts that the project would have on the region.

Introduction: The 2,400 acre site will change the landscape for the worse. Once the boom of construction jobs passes, very few full time jobs will be created, yet this project will impact public access, air quality, biological and cultural resources. It will compromise the quality of life of people living in near buy communities.

Purpose and Need: The Purpose and Need statement should include mandates to protect sensitive biological, hydrological, cultural and visual resources. We would also like the statement to include a mandate to maintain access to public lands as well as preserve in the California Desert Conservation Area. The Statement should recognize a need to protect the public health, quality of life, property values and socio-economics in the adjacent communities of Blythe, Mesa Verde and Ripley. The statement should look beyond the initial boom of construction jobs and consider the long term impacts a project of this size would have on local communities.

Alternatives: The Draft Environmental Impact Statement should consider an alternative that utilizes degraded brownfields and distributed generation. Under the National Environmental Policy Act, agencies are required to consider alternatives outside of their jurisdiction. A no large-scale energy alternative can be justified with The California Energy Efficiency Strategic Plan (CEESP). This plan already exists as California state law and it can be fully implemented now. For more background see www.basinandrangewatch.org/DRECP-CEESP-Alternative.html It is a state plan that prioritizes implementing rooftop solar and energy efficiency prior to developing large-scale, remote solar and wind projects.

Environmental Consequences:

Air Quality: First Solar has had several air quality issues with their existing projects, some of which were approved and overlooked by BLM. The projects have the potential to impact public health in the nearby communities of Blythe, Mesa Verde and Ripely.

If you build roads, transmission, large scale renewable projects and scrape up the Mojave Desert habitat, you will have fugitive dust. When deserts are scraped, a Pandora’s Box of air quality issues is opened. Biological soil crust, desert pavement and old growth vegetation will all be lost.
This is an **Environmental Justice** issue. The health impacts that will arise from airborne particulates from construction dust could have very negative on the local residents of the area.

Dust control in hot, arid climates is very problematic. The removal of established vegetation, biological soil crusts and centuries old desert pavement creates opportunities for dust to be airborne every time the wind blows. Not only does fugitive dust create problems for visual and biological resources, it creates issues for public health as well.

Coccidioidomycosis (Valley Fever) is a common issue that impacts desert communities when dust is stirred up.

We are seeing this problem with several of the recently approved, prioritized large energy projects. The Department of Interior has been so effective in streamlining the environmental review of these projects that they have created a perfect storm of compromised air quality.

Valley Fever has been blamed for 62 deaths among California prison inmates statewide, most at the Avenal and Pleasant Valley facilities, but also two at Blythe, California:
http://www.pe.com/local-news/riverside-county/corona/corona-headlines-index/20130806-valley-fever-inland-inmates-may-replace-transferred-prisoners.ece
According to the Center for Disease Control in 2010 there were over 16,000 reported cases of Valley Fever (i.e. coccidioidomycosis), the majority of which were located in Arizona and California (Accessed by Internet, July 3 2012 at:
http://www.cdc.gov/fungal/coccidioidomycosis/statistics.html.

In San Luis Obispo County, 28 workers were sent home with Valley fever: Epidemiologists are investigating an outbreak of valley fever that has sickened 28 workers at two large solar-power construction sites in San Luis Obispo County: http://articles.latimes.com/2013/may/01/local/la-me-ln-valley-fever-solar-sites-20130501

First Solar has had very difficult times controlling fugitive dust for their Antelope Valley Solar Ranch (AVSR) and Desert Sunlight Projects. They have been shut down three times for the AVSR by Los Angeles County for dust violations.

Groundwater and floods:

Altering the drainage at such a large scale will impact groundwater and cause flooding in unexpected places.

Large solar and wind developers often underestimate the amount of water needed for these projects. We know that the Topaz Project (built by First Solar) in San Lois Obispo County used so much water, that local residents are reporting increased salinity in their wells. The Desert Sunlight Project (built by First Solar) in Riverside County, California requested to use an additional 50 acre feet of water after making their own wells run dry. The BLM granted this request. As it turns out, they have depleted a non-rechargeable fossil water aquifer. The United States Geological Survey conducted a groundwater study for the Chuckwalla Valley region in 2012 including the area around Desert Center. The conclusion was that no tritium was detected in the water supply. Most of the rechargeable aquifers in the desert southwest are slightly contaminated with tritium due to past nuclear tests and it can be detected in modern groundwater tests. If an aquifer is tritium free, it indicates that no recharge has taken place in 50 years (prior to nuke tests). The USGS Groundwater Ambient Monitoring Analyzing can be referenced here: http://pubs.usgs.gov/ds/659/

Cultural Resources: The project would be located adjacent to the Mule Mountain Area of Critical Environmental Concern which was protected for cultural resources. The visual impacts of the project should be evaluated as a threat to the "cultural landscape" of the region.

The Mule-McCoy Linkage area has shown to be rich in cultural resources. Transportation and trade trails follow the bases of the mountains and branch out across the valley floors interconnecting the mountain range routes. Out in the valley center where wind-blown sand moves across the flats, these trails lose their physical visage but remain marked by their artifact scatters, such as pot drops (ceramic sherd scatters), lithic scatters, rock features, and isolated groundstone artifacts. Cremation sites are often revealed as dune sands move about. Desert Pavement features are extremely stable and preserve artifacts *in situ* for thousands of years.

Nearly all of the sites recorded in the area as prehistoric have been described as having potential for subsurface manifestation. In addition to their individual research potential properties, the distribution of many of these sites in conjunction with other prehistoric sites recorded between Desert Center and Blythe may provide links between vestiges of the Coco-Maricopa trail system as well as clues to activities associated with transportation along that route. As such, these sites could be considered as part of a complex archaeological district that would include evidence of trade, travel, interaction among the several cultural groups associated with the area (Cahuilla, Chemehuevi, Mojave, Serrano), resource exploitation along travel routes, seasonality of habitation, and trail spurs between the primary coastal-interior route and the springs and associated rock art sites in the bordering mountain ranges.

Nextera's mitigation for cultural resources destruction for the Genesis Project has been nothing short of pathetic. They destroyed an entire cultural village on Ford Dry Lake.

Burial sites, bones and a whole village site were destroyed because Nextera did not do adequate enough surveys. This is not acceptable.

The BLM will need to consult with the Cahuilla, Chemehuevi, Mojave, and Serrano nations to address their concerns. Many of these people feel the entire region is a "cultural site" including the view-scape, the water and the biological resources.

Biological Resources:

The project will impact habitat for the desert tortoise, burrowing owl, several rare plants, Mojave fringe-toed lizards, kit foxes and several migrating bird species.

Special Status animal species within the Mule Mountain ACEC include Couch's spadefoot toad, Mojave fringe-toed lizard, Chuckwalla, Townsend's big-eared bat, pallid bat, pocketed free-tailed bat, cave myotis, occult little brown bat, California leafnosed bat, fringed myotis, prairie falcon, mountain plover, Gila woodpecker, yellow warbler, rosy boa, Leconte's thrasher, mountain lion, desert/burro deer, bighorn sheep, desert tortoise, and Colorado Valley wood rat.

Desert tortoise: Desert tortoise are present on the site, especially on the south side up near the Mule Mountains. The project will impact individual animals as well as connectivity habitat.

Mojave fringe-toed lizard: The north part of the site contains the fine-grained sand habitat for this species. Development of the project will have direct impacts to the species as well as disrupt sand transport corridors. A cumulative analysis should be prepared for the impacts of this project as well as for all the others being built in the region. It does not take a giant disturbance to impact this species. About 100 were killed for the Devers Palo Verde Transmission Project in the region.

Desert Kit Fox: This species saw an outbreak of K9 distemper, possibly due to the poor mitigation for the close by Genesis Solar Project. This should be considered as a major potential impact from the Desert Quartzite Project.

Desert Bighorn Sheep and Burro Deer:

According to the Fish and Wildlife Service, The area is bordered on the west by the Chuckwalla ACEC, on the south by the Palo Verde Wilderness, and on the north by the Palen-McCoy Wilderness. Current management in the area includes the Mule Mountain Wildlife Habitat Management Area (WHMA) and Bighorn Sheep WHMAs under the Northern and Eastern Colorado Desert Coordinated Management Plan and the Mule Mountain ACEC, a cultural resources ACEC.

The area contains wildlife linkage habitat between the Chuckwalla ACEC/ Palo Verde Wilderness and the Palen-McCoy Wilderness. The California Department of Fish and Game has identified the area as being critical for burro deer connectivity in eastern Riverside County

http://www.fws.gov/carlsbad/PalmSprings/DRECP/Appendix%20L_Bureau%20of%20Land%20Management%20Worksheets/Appendix%20L_BLM%20Worksheets%20-%20ACEC_Part5_5.pdf

Microphyll Woodlands are on the proposed project site. The Draft EIS should consider impacts the California State Endangered Gila woodpecker and the Endangered elf owl.

Polarized glare bird kills: Large solar projects are creating a polarized glare or lake effect and are causing birds and insects to be deceived and collide with solar panels or simply dehydrate. The avian impacts are not fully understood, but everyone seems to agree that this problem was underestimated during the initial boom to fast track big solar on both public and private lands in the Southwestern US. The polarized "lake effect" is now well known from the Genesis, Desert Sunlight and Ivanpah Projects, all in California. Bird species that have collided (or dehydrated) with solar panels and heliostats include the Endangered Yuma clapper rail, peregrine falcon , American kestrel and a host of water birds.

Recently, the US Fish and Wildlife Service released a report called "Avian Mortality at Solar Energy Facilities in Southern California: A Preliminary Analysis" Rebecca A. Kagan, Tabitha C. Viner, Pepper W. Trail, and Edgard O. Espinoza National Fish and Wildlife Forensics Laboratory

The report has enough information to tell us that incidental reporting of bird mortality from solar projects does not really give the complete numbers. The report finds that " Trauma was the leading cause of death documented for remains at the Desert Sunlight (First Solar project) and Genesis sites."

The report also states "These solar facilities appear to represent "equal-opportunity" hazards for the bird species that encounter them. The remains of 71 species were identified, representing a broad range of ecological types. In body size, these ranged from hummingbirds to pelicans; in ecological type from strictly aerial feeders (swallows) to strictly aquatic feeders (grebes) to ground feeders (roadrunners) to raptors (hawks and owls). The species identified were equally divided among resident and non-resident species, and nocturnal as well as diurnal species were represented."

The two main identified cause of mortality from photovoltaic projects are trauma and predation.

The report details the mortality at the 4,500 acre Desert Sunlight photovoltaic site which was built by First Solar;

“Sixty-one birds from 33 separate species were represented from Desert Sunlight. Due to desiccation and scavenging, a definitive cause of death could not be established for 22 of the 61 birds.

Blunt force impact trauma was determined to have been the cause of death for 19 Desert Sunlight birds including two Western Grebes (Aechmophorus occidentalis) and one each of 16 other species. Impact (blunt force) trauma is diagnosed by the presence of fractures and internal and/or external contusions. In particular, bruising around the legs, wings and chest are consistent with crash-landings while fractures of the head and/or neck are consistent with high-velocity, frontal impact (such as may result from impacting a mirror).

Predation was the immediate cause of death for 15 birds. Lesions supporting the finding of predation included decapitation or missing parts of the body with associated hemorrhage (9/15), and lacerations of the skin and pectoral muscles. Eight of the predated birds from Desert Sunlight were grebes, which are unable to easily take off from land. This suggests a link between predation and stranding and/or impact resulting from confusion of the solar panels with water.”

Challenges to data collection included rapid degradation of carcass quality hindering cause of death and species determination; large facilities which are difficult to efficiently search for carcasses; vegetation and panels obscuring ground visibility; carcass loss due to scavenging; and inconsistent documentation of carcass history. Searcher efficiency has been shown to have varying influences on carcass recovery with anywhere from 30% to 90% detection of small birds achieved in studies done at wind plants (Erickson et al., 2005). Scavengers may also remove substantial numbers of carcasses. In studies done on agricultural fields, up to 90% of small bird carcasses were lost within 24 hours (Balcomb, 1986; Wobeser and Wobeser, 1992). OLE staff observed apparently resident ravens at the Ivanpah power tower. Ravens are efficient scavengers, and could remove large numbers of small bird carcasses from the tower vicinity. (Erickson, W. P., G. D. Johnson, and D. P. Young, Jr., 2005, A summary and comparison of bird mortality from anthropogenic causes with an emphasis on collisions: U S Forest Service General Technical Report PSW, v. 191, p. 1029-1042; Balcomb, R., 1986, Songbird carcasses disappear rapidly from agricultural fields: Auk, v. 103, p. 817-820; Wobeser, G., and A. G. Wobeser, 1992, Carcass disappearance and estimation of mortality in a simulated die-off of small birds: Journal of Wildlife Diseases, v. 28, p. 548- 554.) “

The report concludes:

“Given these variables it is difficult to know the true scope of avian mortality at these facilities. The numbers of dead birds are likely underrepresented, perhaps vastly so. Observational and statistical studies to account for carcass loss may help us to gain a better sense of how many birds are being killed.”

And the photovoltaic projects have insect impacts: “Light and noise pollution associated with electrical power plants can be problematic for wildlife. Polarized light pollution from PV panels can attract aquatic insects and other species that mistake the panels for bodies of water, potentially leading to population decline or even local extinction of some organisms (Horvath et al. 2010). Nighttime lighting for security or other reasons may negatively impact a variety of Mojave Desert species, many of which have developed nocturnal behavior to escape the daytime heat of the desert. (Mojave Desert Ecoregional Assessment September 2010, The Nature Conservancy of California 201 Mission Street, 4th Floor San Francisco, CA 94105) p. 50"

Organized surveys for avian mortality are taking place at the Ivanpah Solar Project with only a 20 percent coverage. They have now discovered 3 kit fox dens in the project site as well as active raven nests. It is likely that scavengers are removing birds before they can be counted. The rest of the finds are simply incidental which may indicate that mortality numbers are far greater than being reported.

The approved Blythe Solar Power Project will eventually be a 4,000 acre PV facility near the Colorado River near Blythe, California also built by First Solar.

At a hearing for the California Energy Commission, there were interveners. LABORERS' INTERNATIONAL UNION OF NORTH AMERICA had biologist Shawn Smallwood estimate a number of birds that would be killed for one of the Interveners to the project. He estimated that over 2,100 birds would be killed per year by the 4,000 acre Blythe Solar Power Project. The estimate can be viewed here: http://docketpublic.energy.ca.gov/PublicDocuments/09-AFC-06C/TN201152_20131108T155000_Testimony_of_K_Shawn_Smallwood_PhD.pdf

A similar analysis should be made for the Desert Quartzite Project.

We would like to request that the agencies recommend or even require avian monitoring on this project and mitigation. Single axis units can be potentially designed to be turned upside down which could be helpful in the migration times.

We would like to see a more proactive approach to protecting wildlife than a simple "after the fact" report that we are getting from a few of the big solar projects now.

We would also like to see a full report included of the cumulative impacts of all of the documented and estimated bird kills for avian fauna in the area. The Desert Sunlight, Genesis, McCoy, Blythe and Desert Harvest Projects should all be included.

It is quite possible that the Desert Quartzite Project would kill a Federally Endangered Yuma Clapper Rail (YCR.) The project would be close to the Colorado River and the Cibola National Wildlife Refuge which is an Important Bird Area. The Bureau of Land Management should encourage First Solar to get a Take permit from the Fish and Wildlife Service for this project.

Socio-Economics/Environmental Justice: How will the project impact property values and quality of life of adjacent residents in Mesa Verde? Will the dust impact their health? Will the project hurt property values? A full analysis of the negative impacts this project would have on the community should be prepared.

Visual Resources: The project will be visible from the Mule Mountains ACEC and the McCoy Mountains Wilderness Area. It will also be visible from residential areas. Due to the immense size of the project, impacts to VRM I and II standards should be analyzed in the Draft EIS.

East Riverside Solar Energy Zone: While this zone has been approved, BLM did a poor job on analyzing the region in the Solar PEIS. The Desert Quartzite Project should be reviewed with a full 90 day Environmental Impact Statement and a protest period should be provided due to the pending Desert Renewable Energy Conservation Plan Land Use Amendment.

Conclusion:

This project is giant and can cause irreversible impacts. The BLM should consider reasonable alternatives that would place photovoltaic panels in a fully functional built environment. Please stop needlessly destroying our public lands. This is very poor management on BLM’s part.

Thanks,

Kevin Emmerich
Laura Cunningham
Basin and Range Watch
P.O. Box 70
Beatty, NV 890043
www.basinandrangewatch.org

COMMENTER	DATE
U.S. Environmental Protection Agency, Region IX, Tom Plenys, Environmental Review Section, San Francisco, CA	**April 6, 2015**

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

APR 6 2015

Cedric C. Perry, Project Manager
Bureau of Land Management
California Desert District Office
22835 Calle San Juan de Los Lagos
Moreno Valley, California 92553-9046

Subject: Notice of Intent to Prepare an Environmental Impact Statement for the Proposed Desert Quartzite Solar Project and a Possible Amendment to the California Desert Conservation Area Plan, Riverside County, California

Dear Mr. Perry:

The U.S. Environmental Protection Agency has reviewed the March 6, 2015 Notice of Intent to prepare an Environmental Impact Statement for the Proposed Desert Quartzite Solar Project, Riverside County, California. Our comments are provided pursuant to the National Environmental Policy Act, Council on Environmental Quality regulations (40 CFR Parts 1500-1508) and §309 of the Clean Air Act.

The EPA supports the development of renewable energy resources in an expeditious and well planned manner. Using renewable energy resources such as solar power can help the nation meet its energy requirements without generating greenhouse gas emissions. To assist in the scoping process, we have identified several issues for your attention in the preparation of the EIS. We are most concerned about potential impacts to site hydrology, air quality, and biological resources – including threatened and endangered species, in addition to the cumulative impacts associated with the influx of projects in the Riverside East Solar Energy Zone. The analyses of key resources, as well as consultation with tribal governments and the identification of compensatory mitigation lands, should be completed as early as possible to determine a project's viability and avoid potential project delays.

We appreciate the opportunity to review this NOI and are available to discuss our attached detailed comments. Please send one hard copy of the DEIS and one CD ROM copy to this office at the same time it is officially filed with our Washington D.C. Office. If you have any questions, please contact me at (415) 972-3238, or Scott Sysum, the lead reviewer for this project. Mr. Sysum can be reached at (415) 972-3742 or sysum.scott@epa.gov.

Sincerely,

Tom Plenys
Environmental Review Section

Enclosure: EPA's Detailed Comments

US EPA DETAILED COMMENTS ON THE NOTICE OF INTENT TO PREPARE AN ENVIRONMENTAL IMPACT STATEMENT FOR THE PROPOSED DESERT QUARTZITE SOLAR PROJECT AND POSSIBLE LAND USE PLAN AMENDMENT TO THE CALIFORNIA DESERT CONSERVATION AREA PLAN, RIVERSIDE COUNTY, CALIFORNIA, APRIL 6, 2015

Purpose and Need

The Draft Environmental Impact Statement should clearly identify the underlying purpose and need to which the Bureau of Land Management is responding in proposing the alternatives (40 CFR 1502.13). The *purpose* of the proposed action is typically the specific objectives of the activity, while the *need* for the proposed action may be to eliminate a broader underlying problem or take advantage of an opportunity.

> *Recommendations:*
> The purpose and need should be a clear, objective statement of the rationale for the proposed project. When formulating the need, identify and describe the underlying problem, deficiency, or opportunity that the action is meant to address.
>
> The DEIS should clearly indicate the factors used to determine the size of the project (in terms of megawatts and land acreage) in relation to the underlying need for the project.
>
> The DEIS should discuss the proposed project in the context of the larger energy market that this project would serve; identify potential purchasers of the power produced; and discuss how the project will assist the state in meeting its renewable energy portfolio standards and goals.

Alternatives Analysis

The National Environmental Policy Act requires evaluation of reasonable alternatives, including those that may not be within the jurisdiction of the lead agency (40 CFR Section 1502.14(c)). A robust range of alternatives will include options for avoiding significant environmental impacts. Reasonable alternatives could include, but are not limited to, alternative locations within the project area, alternative configurations and mountings, alternative capacities, and alternative photovoltaic technologies. Alternative power and transmission line routes should also be evaluated, as well as alternative configurations for access roads.

The alternatives analysis should describe the approach used to identify environmentally sensitive areas and describe the process that was used to designate them in terms of sensitivity (e.g. low, medium, and high). The EPA strongly encourages siting renewable energy projects on disturbed, degraded, and contaminated sites before considering large tracts of undisturbed lands, if possible.

> *Recommendations:*
> The DEIS should describe how each alternative was developed, how it addresses each project objective, and how it will be implemented. The alternatives analysis should include a discussion of alternative sites, alternative routes for the transmission line, and capacities, as well as alternatives that identify environmentally sensitive areas or areas with potential use conflicts.

> The DEIS should clearly describe the rationale used to determine whether impacts of an alternative are significant or not and the reasons for eliminating alternatives which are not evaluated in detail. Thresholds of significance should be determined by considering the context and intensity of an action and its effects (40 CFR 1508.27).

Consistency with the California Desert Renewable Energy Conservation Plan and the Solar Programmatic EIS

The California DRECP[1] is intended to advance state and federal conservation goals in desert regions of seven California counties (Imperial, Inyo, Kern, Los Angeles, Riverside, San Bernardino, and San Diego), while also facilitating the timely permitting of renewable energy projects. The DRECP will include a strategy that identifies and maps areas for renewable energy development and areas for long-term natural resource conservation. The Solar Programmatic EIS was developed by the BLM and the Department of Energy and is intended to apply to utility-scale solar energy projects sited on BLM-administered public lands in six southwestern states (Arizona, California, Colorado, Nevada, New Mexico, and Utah). The Desert Quartzite Solar project is located in the DRECP planning area and in the Riverside East Solar Energy Zone, as identified in the Solar PEIS.

> *Recommendation:*
> The DEIS should discuss the applicability of the DRECP and the Solar PEIS to the development of the proposed project. Identify any analyses, mitigation measures and/or design features, from either the DRECP or the Solar PEIS, that have been incorporated into the DEIS. Discuss and confirm any additional requirements and/or conditions that may apply upon approval of the DRECP.

Water Resources

Clean Water Act Section 404

The project applicant should coordinate with the U.S. Army Corps of Engineers to determine if the proposed project requires a Section 404 permit under the Clean Water Act. Section 404 regulates the discharge of dredged or fill material into waters of the United States (WOUS), including wetlands and other *special aquatic sites*. The DEIS should describe all WOUS that could be affected by the project alternatives, and include maps that clearly identify all waters within the project area. In addition, the EPA suggests that the BLM include a jurisdictional delineation for all WOUS, including ephemeral drainages. A jurisdictional delineation will confirm the presence or absence of WOUS in the project area and help determine impact avoidance or if state and federal permits would be required for activities that affect WOUS.

If a Section 404 permit is required, the EPA may review the project for compliance with Section 404(b)(1) Guidelines. Pursuant to 40 CFR 230, any permitted discharge into WOUS must be the *least environmentally damaging practicable alternative* available to achieve the project purpose. If needed, the DEIS should include an evaluation of the project alternatives within this context in order to demonstrate the project's compliance with the 404(b)(1) Guidelines. Aligning NEPA and CWA Section 404 requirements will streamline the permitting process, if a permit is required.

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[1] BLM land use designations are scheduled for completion in 2015.

Recommendations:
The DEIS should include a jurisdictional delineation for all WOUS, including ephemeral drainages, in accordance with the 1987 *Corps of Engineers Wetlands Delineation Manual* and the December 2006 *Arid West Region Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region.*

The DEIS should describe all WOUS that could be affected by the project alternatives and should include maps that clearly identify all WOUS within the project area. The discussion should include acreages and channel lengths, habitat types, values, and functions of these WOUS.

Drainages, Ephemeral Washes, and Floodplains
The DEIS should describe the original (natural) drainage patterns in the project locale, as well as the drainage patterns of the area during project operations, and identify whether any components of the proposed project are within a 50 or 100-year floodplain. The DEIS should consider the upstream and downstream reach of waters and their importance in this landscape. Natural washes perform a diversity of hydrologic, biochemical, and geochemical functions that directly affect the integrity and functional condition of higher-order waters downstream. Healthy ephemeral waters with characteristic plant communities control rates of sediment deposition and dissipate the energy associated with flood flows. Ephemeral washes also provide habitat for breeding, shelter, foraging and movement of wildlife. Many plant populations are dependent on these aquatic ecosystems and adapted to their unique conditions.

Recommendations:
The EPA recommends that the DEIS characterize the functions of any aquatic features that could be affected by the proposed project, including those determined not to constitute WOUS, and describe how the proponent will avoid, minimize and mitigate such impacts.

The EPA recommends development of a desert or ephemeral wash avoidance alternative for full evaluation in the DEIS.

To avoid and minimize direct and indirect impacts to desert washes (such as erosion, migration of channels and local scour), the EPA recommends incorporating the following design features as part of the proposed project:

- Avoid placement of support structures in washes.
- Utilize existing natural drainage channels on site and more natural features, such as earthen berms or channels, rather than concrete-lined channels.
- Commit to the use of natural washes, in their present location and natural form and include natural buffers, for flood control to the maximum extent practicable.
- Minimize the number of road crossings over washes and design necessary crossings to provide adequate flow-through during storm events.
- Avoid complete clearing and grading of the site to reduce impacts to drainages.
- Consider mounting PV panels at sufficient height above ground to maintain natural vegetation.

Discuss the availability of sufficient compensation lands within the project's watershed to replace desert wash functions lost on the project site.

Water Supply and Water Quality

The DEIS should estimate the quantity of water the project will require and describe the source of this water and potential effects on other water users and natural resources in the project's area of influence. The DEIS should clearly depict reasonably foreseeable direct, indirect, and cumulative impacts to this resource. If groundwater is to be used, the potentially-affected groundwater basin should be identified and any potential for subsidence and impacts to springs or other open water bodies and biologic resources should be analyzed.

Recommendations:

The DEIS should include:

- A discussion of the amount of water needed for the proposed PV electrical generation facility and where this water will be obtained.
- A discussion of availability of groundwater within the basin, annual recharge rates and whether water rights have been over-allocated.
- A discussion of cumulative impacts to groundwater supply within the hydrographic basin, including impacts from other large-scale solar installations that have also been proposed or constructed.
- An analysis of different types of technology that can be used to minimize or recycle water, including alternative methods of cleaning PV panels.
- A discussion of whether it would be feasible to use other sources of water, including potable water, irrigation canal water or wastewater.

The DEIS should address the potential effects of project discharges, if any, on surface water quality. Specific discharges should be identified and potential effects of discharges on designated beneficial uses of affected waters should be analyzed.

The EPA strongly encourages the BLM to include in the DEIS a description of all water conservation measures that will be implemented to reduce water demands. Project designs should maximize conservation measures such as appropriate use of recycled water, xeric landscaping and water conservation education.

Because of potential climate change effects on water quantity and California's current drought conditions, the DEIS should describe water reliability for the proposed project and clarify how existing and/or proposed sources may be affected by climate change. Discuss adaptability of the project to these changes.

Air Quality

The DEIS should provide a detailed discussion of ambient air conditions (baseline or existing conditions), National Ambient Air Quality Standards, criteria pollutant nonattainment areas, and potential air quality impacts of the proposed project (including cumulative and indirect impacts). Such an evaluation is necessary to assure compliance with State and Federal air quality regulations, and to disclose the potential impacts from temporary or cumulative degradation of air quality.

The DEIS should describe and estimate air emissions from potential construction, operation and maintenance activities, as well as proposed mitigation measures to minimize those emissions. The EPA recommends an evaluation of the following measures to reduce emissions of criteria air pollutants and hazardous air pollutants (air toxics).

Recommendations:

- *Existing Conditions* – The DEIS should provide a detailed discussion of ambient air conditions, National Ambient Air Quality Standards, and criteria pollutant nonattainment areas in the vicinity of the project.

- *Quantify Emissions* – The DEIS should estimate emissions of criteria pollutants from the proposed project and discuss the timeframe for release of these emissions over the lifespan of the project. The DEIS should describe and estimate emissions from potential construction activities, as well as proposed mitigation measures to minimize these emissions.

- *Specify Emission Sources* – The DEIS should specify the emission sources by pollutant from mobile sources, stationary sources, and ground disturbance. This source specific information should be used to identify appropriate mitigation measures and areas in need of the greatest attention.

- *Construction Emissions Mitigation Plan* – Include, in the DEIS, a list of all mitigation measures to be adopted in the Record of Decision as part of a construction emissions mitigation plan. In addition to measures necessary to meet all applicable local, state, and federal requirements, we recommend that the following measures be included:

  Fugitive Dust Source Controls:
  - Stabilize open storage piles and disturbed areas by covering and/or applying water or chemical/organic dust palliative where appropriate. This applies to both inactive and active sites, during workdays, weekends, holidays, and windy conditions.
  - Install wind fencing and phase grading operations where appropriate, and operate water trucks for stabilization of surfaces under windy conditions.
  - When hauling material and operating non-earthmoving equipment, prevent spillage and limit speeds to 15 miles per hour. Limit speed of earth-moving equipment to 10 mph.

  Mobile and Stationary Source Controls:
  - Minimize use, trips, and unnecessary idling of heavy equipment.
  - Maintain and tune engines per manufacturer's specifications to perform at EPA certification levels, where applicable, and to perform at verified standards applicable to retrofit technologies.
  - Employ periodic, unscheduled inspections to limit unnecessary idling and to ensure that construction equipment is properly maintained, tuned, and modified consistent with established specifications. The California Air Resources Board has a number of mobile source anti-idling requirements which should be employed (http://www.arb.ca.gov/msprog/truck-idling/truck-idling.htm).

- Prohibit any tampering with engines and require continuing adherence to manufacturer's recommendations.
- In general, commit to the best available emissions control technologies for project equipment.
    - *On-Highway Vehicles* - On-highway vehicles used for this project should meet, or exceed, the US EPA exhaust emissions standards for model year 2010 and newer heavy-duty on-highway compression-ignition engines (e.g., long-haul trucks, refuse haulers, shuttle buses, etc.).[2]
    - *Nonroad Vehicles & Equipment* - Nonroad vehicles & equipment used for this project should meet, or exceed, the US EPA Tier 4 exhaust emissions standards for heavy-duty nonroad compression-ignition engines (e.g., construction equipment, nonroad trucks, etc.).[3]
    - *Low Emission Equipment Exemptions* – The equipment specifications outlined above should be met unless: 1) a piece of specialized equipment is not available for purchase or lease within the United States; or 2) the relevant project contractor has been awarded funds to retrofit existing equipment, or purchase/lease new equipment, but the funds are not yet available.
    - *Advanced Technology Demonstration & Deployment* – BLM is encouraged to demonstrate and deploy heavy-duty technologies that exceed the latest US EPA emission performance standards for the equipment categories that are relevant for this project (e.g., plug-in hybrid-electric vehicles-PHEVs, battery-electric vehicles-BEVs, fuel cell electric vehicles-FCEVs, advanced technology non-road diesel engines, etc.).

Administrative controls:

- Specify the means by which BLM would minimize impacts to sensitive receptors, such as children, the elderly, and the infirm. For example, locate construction equipment and staging zones away from sensitive receptors and fresh air intakes to buildings and air conditioners.
- Prepare an inventory of all equipment prior to construction.
- Develop a construction traffic and parking management plan that minimizes traffic interference and maintains traffic flow.
- Identify where implementation of mitigation measures is rejected based on economic infeasibility.

Biological Resources and Habitat

The DEIS should identify all petitioned and listed threatened and endangered species and critical habitat that might occur within the project area. The document should identify and quantify which species or critical habitat might be directly, indirectly, or cumulatively affected by each alternative and mitigate impacts to these species. Emphasis should be placed on the protection and recovery of species due to their status or potential status under the Endangered Species Act. For this project, the EPA is concerned regarding potential impacts to foraging and nesting habitat for a variety of species including, but not limited to, desert tortoise, fringe toed lizards, burrowing owls, migratory birds and raptors. We recommend ensuring best practices are utilized to survey and adequately protect desert tortoises.

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[2] http://www.epa.gov/otaq/standards/heavy-duty/hdci-exhaust.htm

[3] http://www.epa.gov/otaq/standards/nonroad/nonroadci.htm

Recommendations:
The EPA recommends that the BLM consult with the U.S. Fish and Wildlife Service and prepare a Biological Opinion under Section 7 of the ESA for all threatened or endangered species present. If consultation is not required, provide information on how the determination was made within the DEIS.

Incorporate, into the DEIS, mitigation, monitoring, and reporting measures that result from consultation with the USFWS and CDFW, and that incorporate lessons learned from other solar projects and recently released guidances to avoid and minimize adverse effects to sensitive biological resources.

Include a clear description of how avoidance, mitigation and conservation measures will protect and encourage the recovery of the covered species and their habitats in the project area.

Include a draft of the following documents, as applicable: Avian Protection Plan, a Raven Monitoring, Management, and Control Plan, Burrowing Owl Mitigation, Monitoring and Translocation Plan, Desert Tortoise Relocation/Translocation Plan, Desert Tortoise Compensatory Mitigation Plan, Special – Status Plant Impact Avoidance and Mitigation Plan, and Management Plan for Sand Dune/Fringed-Toed Lizard.

The DEIS should include assurances that the design of the transmission line would be in compliance with current standards and practices that reduce the potential for raptor fatalities and injuries. The commonly referenced source of such design practices is found within the Avian Power Line Interaction Committee documents: *Suggested Practices for Avian Protection on Power Lines: State of the Art in 2006 Manual* and *Mitigating Bird Collisions with Power Lines: The State of the Art in 2012.* Utilize the 2005 Avian Power Line Interaction Committee and U.S. Fish and Wildlife Service Avian Protection Plan Guidelines to inform the development of the Avian Protection Plan, as applicable.

The EPA is concerned about habitat fragmentation and obstructions for wildlife movement resulting from the proposed project. The EPA is also aware that shade from the PV panels could impact vegetation and/or species in the project area. We encourage habitat conservation alternatives that avoid and protect high value habitat and create or preserve linkages between habitat areas to better conserve the covered species.

Recommendations:
The DEIS should describe the potential for habitat fragmentation and obstructions for wildlife movement from the construction of this project and other utility-scale renewable energy projects in the eastern Riverside County area.

The DEIS should indicate what measures will be taken to protect important wildlife habitat areas from potential adverse effects of the proposed project.

The DEIS should discuss the impacts associated with an increase of shade in the desert environment on vegetation and/or species.

The DEIS should discuss the impacts associated with constructing fences around the project site, and consider whether there are options that could facilitate better protection of covered species.

At this stage, it is not clear that sufficient compensatory lands are available for potential resource impacts. If the applicant is to acquire compensation lands, the location(s) and management plans for these lands should be discussed in the DEIS. In light of the renewable energy projects and potential development activities in the Riverside East Solar Energy Zone, available land to adequately compensate for environmental impacts to resources such as state jurisdictional waters, desert dry wash woodlands, and desert tortoise, may serve as a limiting factor for development.

Recommendations:
Incorporate, into the DEIS, information on the compensatory mitigation proposals (including quantification of acreages, estimates of species protected, costs to acquire compensatory lands, etc.) for unavoidable impacts to waters of the State and biological resources such as desert tortoise.

Identify compensatory mitigation lands or quantify, in the DEIS, available lands for compensatory habitat mitigation for this project, as well as reasonably foreseeable projects in the Riverside East Solar Energy Zone. Specify, in the DEIS, provisions that will ensure habitat selected for compensatory mitigation will be protected in perpetuity.

Discuss mitigation ratios for tortoise habitat and how these relate to the mitigation ratios recommended by other agencies, as well as how they relate to mitigation ratios used for other renewable energy projects in California and Nevada.

Avian Mortality
The threats posed to birds and bats from the construction, and particularly the operation, of renewable energy projects is not new (as evidenced by the long history of avian mortality at wind energy facilities). A more recent phenomenon, currently the subject of scrutiny by federal, state, and renewable energy industry biologists, is the avian mortality that has resulted from the construction and operation of utility-scale solar installations. The number of solar sites (both solar thermal facilities, as well as solar photovoltaic) reporting deaths of avian species has increased.

Recommendations:
Include an updated discussion, in the DEIS, on the occurrence of avian mortality at utility-scale solar sites, informed with the best available scientific research conducted on this topic.

In consultation with the USFWS and CDFW, determine the need for a comprehensive monitoring protocol to catalog and analyze occurrences of avian mortality. If the need for a comprehensive protocol is warranted, include a draft of the protocol in the DEIS.

Invasive Species

Executive Order 13112, *Invasive Species* (February 3, 1999), mandates that federal agencies take actions to prevent the introduction of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts that invasive species cause. Executive Order 13112 also calls for the restoration of native plants and tree species. If the proposed project will entail new landscaping, the DEIS should describe how the project will meet the requirements of Executive Order 13112.

Recommendations:
The DEIS should describe the invasive plant management plan used to monitor and control noxious weeds. If herbicides or pesticides will be used to manage vegetation, the DEIS should disclose the projected quantities and types of chemicals. The invasive plant management plan should identify methods that can be used to limit the introduction and spread of invasive species during and post-construction. These measures can include marking and avoidance of invasives, timing construction activities during periods that would minimize their spread, proper cleaning of equipment, and proper disposal of woody material removed from the ROW.

Because construction measures may not be completely effective in controlling the introduction and spread of invasives, the DEIS should describe post-construction activities that will be required such as surveying for invasive species following restoration of the construction site and measures that will be taken if infestations are found.

Cumulative and Indirect Impacts

For the cumulative impacts assessment, we recommend focusing on resources of concern or resources that are "at risk" and/or are significantly impacted by the proposed project, before mitigation. For this project, the BLM should conduct a thorough assessment of the cumulative impacts to air quality, as well as aquatic and biological resources, including impacts to desert washes and desert tortoise, especially in the context of the renewable energy developments occurring and proposed in the eastern Riverside County area. Understanding these cumulative impacts can help identify opportunities for minimizing threats. The cumulative impacts analysis should identify how resources, ecosystems and human communities of concern have already been affected by past or present activities in the project areas. Characterize these resources in terms of their response to change and capacity to withstand stresses, and identify the additional stresses that will affect resources. Trends data should be used to establish a baseline for the affected resources, to evaluate the significance of historical degradation, and to predict the environmental effects of the project components.

Recommendations:
The DEIS should consider the cumulative impacts associated with multiple renewable energy and other development projects proposed in the eastern Riverside County area and the potential impacts on various resources including: air quality, water supply, desert washes, endangered species, and wildlife habitat. EPA assisted in the preparation of a guidance document for assessing cumulative impacts (available: http://www.dot.ca.gov/ser/cumulative_guidance/purpose.htm). While this guidance was developed for transportation projects in California, the principles and steps outlined therein offer a systematic way to analyze cumulative impacts for any project type.

The DEIS should describe the methodology used to assess cumulative project impacts and include the delineation of temporal and geographic boundaries[4] for analyzing the cumulative impacts on all resources of concern.

Climate Change

On December 18, 2014, the Council on Environmental Quality released revised draft guidance for public comment that describes how federal departments and agencies should consider the effects of greenhouse gas emissions and climate change in their NEPA reviews. The revised draft guidance supersedes the draft greenhouse gas and climate change guidance released by CEQ in February 2010. This guidance explains that agencies should consider both the potential effects of a proposed action on climate change, as indicated by its estimated greenhouse gas emissions, and the implications of climate change for the environmental effects of a proposed action.

> "CEQ recognizes that many agency NEPA analyses to date have concluded that GHG emissions from an individual agency action will have small, if any, potential climate change effects. Government action occurs incrementally, program-by-program and step-by-step, and climate impacts are not attributable to any single action, but are exacerbated by a series of smaller decisions, including decisions made by the government. Therefore, the statement that emissions from a government action or approval represents only a small fraction of global emissions is more a statement about the nature of climate change challenge, and is not an appropriate basis for deciding whether to consider climate impacts under NEPA. Moreover, these comparisons are not an appropriate method for characterizing the potential impacts associated with a proposed action and its alternatives and mitigations."[5]

The revised draft guidance suggests that, if an agency determines that evaluating the effects of GHG emissions would not be useful in the decision making process and to the public to distinguish between the proposed action, alternatives and mitigations, the agency should document the rationale for that determination.

Recommendation:
Consistent with the recent CEQ guidance, in the DEIS, estimate the greenhouse gas emissions that would result from implementation of each alternative, and include a discussion of the impacts from climate change on the environmental resources affected by the project. The draft guidance is available in full at:
http://www.whitehouse.gov/sites/default/files/docs/nepa_revised_draft_ghg_guidance_searchable.pdf

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[4] For assistance with identifying appropriate temporal and spatial boundaries and identifying appropriate past, present, and reasonably foreseeable future projects to include in the analysis, refer to the Council on Environmental Quality's "Considering Cumulative Effects Under the National Environmental Policy Act", available at: (http://ceq.hss.doe.gov/publications/cumulative_effects.html) and EPA's "Consideration Of Cumulative Impacts In EPA Review of NEPA Documents" (http://www.epa.gov/compliance/resources/policies/nepa/cumulative.pdf).

[5] Council on Environmental Quality. *Guidance on Considering Climate Change in NEPA Reviews*. Dec 2014.Print.

Hazardous Materials/Hazardous Waste/Solid Waste

The DEIS should address potential direct, indirect and cumulative impacts of hazardous waste from construction and operation of the proposed facility. The document should identify projected hazardous waste types and volumes, and expected storage, disposal, and management plans. It should address the applicability of state and federal hazardous waste requirements. Appropriate mitigation should be evaluated, including measures to minimize the generation of hazardous waste. Alternate industrial processes using less toxic materials should be evaluated as mitigation since such processes could reduce the volume or toxicity of hazardous materials requiring management and disposal as hazardous waste.

Photovoltaic Production and Recycling

The product life cycle of photovoltaic technology presents opportunities to minimize environmental impacts, from raw material sourcing through end of life collection and reuse or recycling.

> *Recommendation:*
> The EPA recommends that the project proponent strive to address the full product life cycle by, to the extent feasible, sourcing PV components from a company that: 1) minimizes environmental impacts during raw material extraction; 2) minimizes waste generation, emissions, and discharges during the manufacturing of the PV modules; and 3) provides future PV module disassembly for material recovery for reuse and recycling.

Project Decommissioning, Site Restoration and Financial Assurance

Desert ecosystems have evolved over millennia to withstand severe conditions. Decommissioning and site restoration in an arid environment may take much longer and require more extensive intervention than in a more temperate region. For the Mojave Desert, sufficient moisture for regeneration is usually only available a couple of months per year. Desert ecosystems may take many years to recover even with active intervention. Disturbances can further slow this process and restoration has been found to be problematic at other sites in arid ecosystems with large-scale disturbance. The EPA recommends that the site restoration planning take into account the uncertainty and harshness of the Mojave Desert climate and include monitoring of revegetation progress for at least ten years to ensure that the effort is successful.

> *Recommendation:*
> The EPA recommends that the DEIS include a requirement for a decommissioning and site restoration plan. The plan should include: 1) cost estimates – including a requirement for the project owner to secure a performance bond, surety bond, letter of credit, corporate guarantee, or other form of financial assurance adequate to cover the cost of decommissioning and effective restoration; 2) time allotted to complete the decommissioning/restoration; 3) description of the structures, facilities, foundations to be removed; 4) description of restoration measures including recontouring the surface and revegetation to a condition reasonably similar to the original condition; and 5) monitoring of revegetation process for at least 10 years or until the effort has been deemed successful.

Coordination with Tribal Governments

Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments* (November 6, 2000), was issued in order to establish regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, and to strengthen the United States government-to-government relationships with Indian tribes.

> *Recommendation:*
> The DEIS should describe the process and outcome of government-to-government consultation between the BLM and each of the tribal governments within the project area, issues that were raised (if any), and how those issues were addressed in the selection of the proposed alternative.

National Historic Preservation Act and Executive Order 13007

Consultation for tribal cultural resources is required under Section 106 of the National Historic Preservation Act. Historic properties under the NHPA are properties that are included in the National Register of Historic Places or that meet the criteria for the National Register. Section 106 of the NHPA requires a federal agency, upon determining that activities under its control could affect historic properties, consult with the appropriate State Historic Preservation Officer/Tribal Historic Preservation Officer. Under NEPA, any impacts to tribal, cultural, or other treaty resources must be discussed, and measures to mitigate such impacts must be identified. Section 106 of the NHPA requires that Federal agencies consider the effects of their actions on cultural resources, following regulation in 36 CFR 800.

Executive Order 13007, *Indian Sacred Sites* (May 24, 1996), requires federal land managing agencies to accommodate access to, and ceremonial use of, Indian sacred sites by Indian Religious practitioners, and to avoid adversely affecting the physical integrity, accessibility, or use of sacred sites. It is important to note that a sacred site may not meet the National Register criteria for a historic property and that, conversely, a historic property may not meet the criteria for a sacred site.

> *Recommendation:*
> The DEIS should address the existence of Indian sacred sites in the project areas. It should address Executive Order 13007, distinguish it from Section 106 of the NHPA, and discuss how the BLM will avoid adversely affecting the physical integrity, accessibility, or use of sacred sites, if they exist. The DEIS should provide a summary of all coordination with Tribes and with the SHPO/THPO, including identification of NRHP eligible sites, and development of a Cultural Resource Management Plan.

Environmental Justice and Impacted Communities

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994) and the more recent Interagency Memorandum of Understanding on Environmental Justice and Executive Order 12898 (August 4, 2011) direct federal agencies to identify and address disproportionately high and adverse human health or environmental effects on minority and low-income populations, allowing those populations a meaningful opportunity to participate in the decision-making process. Guidance[6] by CEQ clarifies the terms low-income and minority population (which includes Native Americans) and describes the factors to consider when evaluating disproportionately high and adverse human health effects.

Recommendations:
The DEIS should include an evaluation of environmental justice populations within the geographic scope of the projects. If such populations exist, the DEIS should address the potential for disproportionate adverse impacts to minority and low-income populations, and the approaches used to foster public participation by these populations. Assessment of the projects impact on minority and low-income populations should reflect coordination with those affected populations.

The DEIS should describe outreach conducted to all other communities that could be affected by the project, since rural communities may be among the most vulnerable to health risks associated with the project.

Visual Impacts – Glint and Glare

It is important to assess the potential hazards of glint and glare from solar power plants to ensure public safety. Glint (a momentary flash of light) and glare (a more continuous source of excessive brightness relative to the ambient lighting) can occur from various solar energy components such as PV modules.

Hazards from glint and glare from solar power plants include the potential for permanent eye injury (e.g., retinal burn) and temporary disability or distractions (e.g., flash blindness), which may impact people working nearby, pilots flying overhead, or motorists driving alongside the site.

Recommendation:
Evaluate the potential hazards of glint and glare to motorists driving on Interstate 10, as well as to pilots flying overhead, and include the results of this analysis in the DEIS. Include, in the DEIS, the results of this analysis and any measures that would eliminate or reduce these problems to avoid significant impacts.

Valley Fever

The incidence of Valley Fever (Coccidioidomycosis) has recently increased in much of California, including Riverside County. According to the California Department of Public Health, from 2000-2011, the annual number of reported cases of Valley Fever in California increased greater than six-fold from 816 to 5,366 cases.[7,8]

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[6] Environmental Justice Guidance under the National Environmental Policy Act, Appendix A (Guidance for Federal Agencies on Key Terms in Executive Order 12898), CEQ, December 10, 1997.

[7] California Department of Public Health. Epidemiologic Summaries of Selected Communicable Diseases in California, 2001-2010.

[8] California Department of Public Health. Coccidioidomycosis yearly summary report 2011.

Recommendation:
Disclose, in the DEIS, whether any ground disturbing activities associated with the proposed action may result in dispersal of *Coccidioides* spores, and include measures to prevent or minimize the risk of workers' and local residents' exposure.

COMMENTER	DATE
Center for Biological Diversity, Ileene Anderson, Biologist/Public Lands Desert Director, Los Angeles, CA	**April 6, 2015**

CENTER *for* BIOLOGICAL DIVERSITY *Because life is good.*

protecting and restoring natural ecosystems and imperiled species through
science, education, policy, and environmental law

via electronic mail and USPS

4/6/2015

Cedric C. Perry,
Project Manager,
BLM California Desert District Office,
22835 Calle San Juan de Los Lagos,
Moreno Valley, California 92553–9046
blm_ca_desert_quartzite_solar_project@blm.gov

Larry Ross,
Principle Planner
Riverside County Planning Department
4080 Lemon Street, 12th Floor
P.O. Box 1409
Riverside, CA 92505-1409
lross@rctlma.org

RE: Comments on BLM's Notice of Intent ("NOI") to prepare an Environmental Impact Statement (EIS) and Riverside County's Notice of Preparation ("NOP") for the Proposed Desert Quartzite Solar Project and Possible Amendment to the California Desert Conservation Area Plan, Riverside County, CA 80 FR 12195 and Riverside County Conditional Use Permit No. 03721.

Dear Mr. Perry and Mr. Ross,

Please accept the Center for Biological Diversity's comments on BLM's Notice of Intent ("NOI") to prepare an Environmental Impact Statement (EIS) and Riverside County's Notice of Preparation ("NOP") for the Proposed Desert Quartzite Solar Project and Possible Amendment to the California Desert Conservation Area Plan, Riverside County, CA 80 FR 12195 and Riverside County Conditional Use Permit No. 03721., in compliance with the National Environmental Policy Act of 1969 (NEPA), as amended, and the federal Endangered Species Act (ESA), the California Environmental Quality Act (CEQA) and the California Endangered Species Act (CESA) on the impacts of the proposed project. The Center is a non-profit environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. These scoping comments are submitted on behalf of the Center's 825,000 staff, members and online activists throughout California and the western United States many of whom live in southern California and enjoy visiting, studying, photographing and hiking in the California Desert Conservation Area, including the areas on and around the project site.

The development of renewable energy is a critical component of efforts to reduce greenhouse gas emissions, avoid the worst consequences of global warming, and to assist California in meeting emission reductions. The Center strongly supports the development of renewable energy production, and the generation of electricity from solar power, in particular. However, like any project, proposed solar power projects should be thoughtfully planned to minimize impacts to the environment. In particular, renewable energy projects should avoid

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Ileene Anderson, Senior Scientist
8033 Sunset Blvd., #447 • Los Angeles, CA 90046-2401
tel: (323) 654.5943 *fax:* (323) 650.4620 *email*: ianderson@biologicaldiversity.org
www.BiologicalDiversity.org

impacts to sensitive species and habitat, and should be sited in proximity to the areas of electricity end-use in order to reduce the need for extensive new transmission corridors and the efficiency loss associated with extended energy transmission. Only by maintaining the highest environmental standards with regard to local impacts, and effects on species and habitat, can renewable energy production be truly sustainable.

The Desert Quartzite Solar Project is proposed solar photovoltaic (PV) generating facility with a proposed output of 300 megawatts and a project area covering approximately 5, 003 acres of land including 4,845 acres of public land and 160 acres of private land with the solar field occupying approximately 2,453 acres and ancillary facilities that include a project substation, access roads, transmission lines, realignment of an existing route, operations and maintenance buildings, and lay down areas. The project site is located within the Riverside East Solar Energy Zone (SEZ), southwest of Blythe, California. It would connect to the Colorado River Substation. This project requires a proposed land use plan amendment to the 1980 California Desert Conservation Area (CDCA) Plan, as amended.

The Energy Production and Utility Corridors section of the California Desert Conservation Area Plan (1980) as amended requires at minimum that the following resource issues be addressed:

1) Consistency with the Desert Plan, including designated and proposed planning corridors;
2) Protection of air quality;
3) Impact on adjacent wilderness and sensitive resources;
4) Visual quality;
5) Cooling-water source(s);
6) Waste disposal;
7) Seismic hazards; and
8) Regional equity.

Additionally, a number of other resources are of concern to us and need to be addressed in detail as follow below:

Biological Resources

Based on the proposed project description, it appears that this site is proposed on an ecologically functional desert landscape that may host a suite of rare species. Careful documentation of the current site resources is imperative in order to analyze how best to site the project to avoid and minimize impacts and then to mitigate any unavoidable impacts.

Biological Surveys and Mapping

The Center requests that thorough, seasonal surveys be performed for sensitive plant species and vegetation communities, and animal species under the direction and supervision of the BLM and resource agencies such as the US Fish and Wildlife Service and the California Department of Fish and Game. Full disclosure of survey methods and results to the public and other agencies without limitations imposed by the applicant must be implemented to assure full NEPA/ESA compliance.

Confidentiality agreements or non-disclosure agreements regarding environmental resources must not be required of any biologists participating in the surveys in support of the proposed project. Surveys for the plants and plant communities should follow California Native Plant Society (CNPS) and California Department of Fish and Game (CDFG) floristic survey guidelines[1] and should be documented as recommended by CNPS[2] and California Botanical Society policy guidelines. A full floral inventory of all species encountered needs to be documented and included in the EIS. Surveys for animals should include an evaluation of the California Wildlife Habitat Relationship System's (CWHR) Habitat Classification Scheme. All rare species (plants or animals) need to be documented with a California Natural Diversity Data Base form and submitted to the California Department of Fish and Game using the CNDDB Form[3] as per the State's instructions[4].

The Center requests that the vegetation maps be at a large enough scale to be useful for evaluating the impacts. Vegetation/wash habitat mapping should be at such a scale to provide an accurate accounting of wash areas and adjacent habitat types that will be directly or indirectly affected by the proposed activities. A half-acre minimum mapping unit size is recommended, such as has been used for other development projects. Habitat classification should follow CNPS' Manual of California Vegetation (Sawyer et. al. 2009).

Adequate surveys must be implemented, not just a single season of surveys, in order to evaluate the existing on-site conditions. Due to unpredictable precipitation, desert organisms have evolved to survive in these harsh conditions and if surveys are performed at inappropriate times or year or in particularly dry years many plants that are in fact on-site may not be apparent during surveys (ex. annual and herbaceous perennial plants). The project application should be put on hold and not proceed if key surveys have not been completed due to low rainfall or other factors.

Impact Analysis

The EIS must evaluate all direct, indirect, and cumulative impacts to sensitive habitats, including impacts associated with the establishment of unpermitted recreational activities, the introduction of non-native plants, the introduction of lighting, noise, and the loss and disruption of essential habitat due to edge effects.

A number of rare resources have high potential to occur on this site including:

Common Name	*Scientific Name*	*State/Federal/Other Status*
Yuma Ridgway's rail (formerly Yuma clapper rail)	*Rallus obsoletus yumanensis (formerly Rallus longirostris yumanensis)*	*CE/FP/FE*

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[1] http://www.cnps.org/cnps/rareplants/inventory/guidelines.php and http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/Protocols_for_Surveying_and_Evaluating_Impacts.pdf

[2] http://www.cnps.org/cnps/archive/collecting.php

3 http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/CNDDB_FieldSurveyForm.pdf

4 http://www.dfg.ca.gov/biogeodata/cnddb/submitting_data_to_cnddb.asp

Desert Tortoise	*Gopherus agassizii*	*CT/FT*
Mojave fringe-toed lizard	*Uma scoparia*	*CSC*
Couch’s spadefoot	*Scaphiopus couchii*	*CSC*
Arizona Bell’s vireo	*Vireo bellii arizonae*	*CE*
Burrowing owl	*Athene cunicularia hypugaea*	*CSC/BLM SS*
LeConte’s thrasher	*Toxostoma lecontei*	*CSC*
Crissal thrasher	*Toxostoma crissale*	*CSC*
Loggerhead shrike	*Lanius ludovicianus*	*CSC/FSC/MB*
Prairie falcon	*Falco mexicanus*	*CSC/MB*
Elf owl	*Micrathene whitneyi*	*CE*
Gila woodpecker	*Melanerpes uropygialis*	*CE*
Gilded flicker	*Colaptes chrysoides*	*CE*
Merlin	*Falco columbarius*	*WL*
Mountain plover	*Charadrius montanus*	*CSC*
Sonoran yellow warbler	*Setophaga petechiea sonorana*	*CSC*
Southwestern willow flycatcher	*Empidonax trailii extimus*	*CE/FE*
Summer tanager	*Piranga rubra*	*CSC*
Vermillion flycatcher	*Pyrocephalus rubinus*	*CSC*
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	*CE/FT*
Yellow-breasted chat	*Icteria virens*	*SSC*
Nelson’s bighorn sheep	*Ovis canadensis nelsonii*	*Game species*
Arizona myotis	*Myotis occultus*	*CSC*
California leaf-nosed bat	*Macrotus californicus*	*CSC*
Cave myotis	*Myotis velifer*	*CSC*
Colorado river cotton rat	*Signondon arizonae plenus*	*CSC*
Pallid bat	*Antrozous pallidus*	*CSC*
Pocketed free-tailed bat	*Nyctinomops femororsaccus*	*CSC*
Western yellow bat	*Lasiurus xanthinus*	*CSC*
Bradley’s cuckoo wasp	*Ceratchrysis bradleyi*	
Las Animas colubrine	*Colubrina californica*	*CA RP List 2B.3*
Harwood’s milkvetch	*Astragalus insularis var. harwoodii*	*CA RP List 2B.2*
Alverson’s foxtail cactus	*Coryphantha alversonii*	*CA RP List 4.3*
Abram’s spurge	*Euphorbia abramsiana*	*CA RP List 2B.2*
Angel trumpets	*Acleisanthes longiflora*	*CA RP List 2B.3*
Bitter hymenoxys	*Hymenoxys odorata*	*CA RP List 2B.1*
California ditaxis	*Ditaxis serrata var. californica*	*CA RP List 3.2*
California satintail	*Imperata brevifolia*	*CA RP List 2B.1*
Desert beardtongue	*Penstemon pseudospectabilis ssp. pseudospectabilis*	*CA RP List 2B.2*
Gravel milkvetch	*Astragalus sabulonum*	*CA RP List 2B.2*
Harwood’s eriastrum	*Eriastrum harwoodii*	*CA RP List 1B.2*
Roughstalk witch grass	*Panicum hirticaule ssp. hirticaule*	*CA RP List 2B.1*

State Designation

CE – State listed as endangered.

FP – fully protected species under CESA

CT State listed as threatened. Species that although not presently threatened in California with extinction are likely to become endangered in the foreseeable future.
CSC California Department of Fish and Game “Species of Special Concern.” Species with declining populations in California.

Federal Designation

FE Federally listed as endangered.
FT Federally listed as threatened.
MB Migratory Bird Treaty Act. of 1918. Protects native birds, eggs, and their nests.
BCC U.S. Fish and Wildlife Service Bird of Conservation Concern.
BLM SS BLM Sensitive Species.

Other

California Native Plant Society (CNPS)

1B.1 Plant rare, threatened or endangered in California and elsewhere, and very threatened.
1B.2 Plant rare, threatened or endangered in California and fairly threatened in CA.
2B.1 Plant rare, threatened or endangered in California, but more common elsewhere, and very threatened in CA
2B.2 Plant rare, threatened or endangered in California, but more common elsewhere, and fairly threatened in CA.
2B.3 Plant rare, threatened or endangered in California, but more common elsewhere, and not very threatened in CA.
4.3 Plants of a limited distribution, and not very threatened in CA.

All of these species have been identified as occurring in the general vicinity of the project site.[5] Therefore, the EIS/R must adequately address the impacts and propose effective ways to avoid, minimize, and mitigate the impacts to these resources through alternatives including alternative siting and alternative on-site configurations.

Yuma Ridgway’s Rail (formerly denoted Yuma Clapper Rail)

Protected since 1967 as an endangered species, the Yuma Ridgway’s rail (*Rallus obsoletus yumanensis*) is a bellwether for the health of desert waterways. It is both a state and federally-listed endangered species and in California is a fully protected species. Despite decades of protection, its numbers continue to decline. Recently, in less than a year, two Yuma Ridgway’s rail mortalities have been reported at industrial-scale solar projects built on bird-migration corridors on public and private lands in the California desert. Only 440 to 968 of these birds remain along the lower Colorado River and the Salton Sea. The proposed project lies within the within the flyway between the Yuma Ridgway rail’s two strongholds. Because the PV projects, like the proposed project, appear to be particularly attractive to “waterbirds” (see below section on migratory birds) including the Yuma Ridgway’s rail, this proposed project could imperil Yuma Ridgway rails and therefore the DEIS/R needs to evaluate the potential impacts to these highly endangered birds.

Desert Tortoise

The desert tortoise is continuing to decline throughout its range despite being under federal and state Endangered Species Acts protection as threatened[6]. The proposed Desert Quartzite project, despite being outside desert wildlife management areas (DWMAs) as identified in the Northern and Eastern Colorado Plan[7], will likely have desert tortoise occurring on site. The EIS/R must clearly address alternative proposals for avoiding, minimizing and mitigating the impacts to the desert tortoise and any occupied habitat.

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[5] CNDDB 2015 http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp

[6] USFWS 2010 http://www.fws.gov/nevada/desert_tortoise/documents/reports/2010/2010_DRAFT_Rangewide_Desert_Tortoise_Population_Monitoring.pdf

[7] BLM 2006 http://www.blm.gov/ca/st/en/fo/cdd/neco.html

The DEIS/R must first look at ways to avoid impacts to the desert tortoise, for example, by identifying and analyzing *alternative sites* outside of desert tortoise occupied habitat or in areas that have already been severely disturbed by other prior land use as well as alternative project configurations that would avoid or significantly reduce impacts. The DEIS/R must also look at ways to minimize any impacts that it finds are unavoidable, for example, by limiting the ground disturbing activities from the project and limiting access roads to the project. Acquisition of lands that will be managed in perpetuity for conservation must be included as part of the strategy to mitigate impacts to the tortoise, mitigation lands should also be high-quality habitat and, at minimum 3:1 mitigation should be provided of all acres of desert tortoise habitat destroyed. Set-aside conservation lands are particularly important because the project as proposed appears to have little or no compatibility with on-site conservation for desert tortoise.

Translocation as a long-term strategy for minimizing and mitigating impacts to desert tortoise may be a tool for augmenting conservation of the desert tortoise[8], but it cannot substitute for other mitigation such as preservation of habitat. Moreover, to date, translocation does not have a proven track record of success. If translocation (for any species) is to be a part of the mitigation strategy, a detailed final plan must be included as apart of the DEIS/R, and include methodologies for determining appropriate conservation area where tortoises may be translocated, impacts to existing "host" tortoise populations that occur on the translocation site, when/how the tortoise are to be translocated, how tortoise diseases will be addressed, and requisite monitoring of host and translocated tortoises, etc.. Monitoring of the translocated and existing "host" tortoises needs to occur for a long enough time period that is realistic to evaluate success of the translocation –10 years may be a more realistic minimum for tracking impacts to this long lived species. Success criteria for translocation must also be clearly identified. Any temporary project site needs to be fenced with tortoise proof fencing during construction and the permanent project sites need to be fenced to prevent tortoise mortality. All associated roads also need to be fenced.

An aggressive raven prevention plan also needs to be developed as part of the DEIS/R and followed during project development and implementation.

Mojave Fringe-toed Lizard

At least part of the proposed project lies within a critical sand transport corridor[9] which creates dune and stabilized sand flat habitat that is critical for the Mojave fringe-toed lizard (*Uma scoparia*). The sand transport corridor is identified as extensive, originating in the Pinto Basin of Joshua Tree National Park, moving through the Palen Valley and the Palen/McCoy Valley and extending eastwards to the edge of the agricultural development in the Palo Verde Valley south of Interstate 10, near the proposed project location. The DEIS/R needs to include a comprehensive analysis of the sand transport corridor and a thorough impact analysis from the

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[8] http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1092&context=usgsstaffpub

9 http://www.cpuc.ca.gov/environment/info/aspen/dpv2/sfeir/apps/ap3.pdf

proposed project for a number of reasons. First, disruption of sand transport corridor functionality upwind affects all downwind resources and disrupts eolian function. Secondly, because sand dune habitat is a rare resource on the landscape because the geological and geographical features that transport sand and form dunes are extremely limited, the species that have evolved to rely on this unique habitat are also quite rare and typically endemic only to dune systems. Impacts to sand transport systems are therefore comparatively greater than impacts to other habitat types because of the uniqueness of the eolian habitat. Impacts are also much more challenging to mitigate because of the limited habitat type and complex eolian requirements that form and maintain the sand transport and dune habitat. Lastly, any facility put in or even adjacent to a sand transport corridor will suffer significant impacts from sand abrasion and require regular clearing of sand from the structures, increasing maintenance and operational costs.

The DEIS/R alternatives should all prioritize avoidance and conservation of the sand transport corridor and sand dune areas. Models have been developed to identify conservation areas that are essential to maintain sand transport corridors[10]. These data and models should be incorporated into the analysis of impacts and all key areas that maintain the eolian function of the sand transport corridors should be unavailable for solar development.

Impacts to Mojave fringe-toed lizard in this area have already been significant and any additional impacts must be avoided. Although avoidance of Mojave fringe-toed lizard mortalities was the goal during construction/operation of the Colorado River substation, despite speed limits, vehicle escorts and other avoidance measures, significant Mojave fringe-toed lizard mortalities were documented[11]. The DEIS/R needs to require avoidance of all habitat areas and stronger minimization measures to prevent any additional mortalities to the lizard from the proposed project.

Burrowing Owl

Burrowing owls are continuing to decline in California. If burrowing owls are identified on the site, at least one alternative should evaluate the reduction of impacts to this rare species by moving the project away from the nesting burrows. Additionally, acquisition lands may be required as part of the mitigation and will need to be managed in perpetuity for conservation. Mitigation lands should be high-quality habitat and, at minimum 5:1 mitigation should be provided of all acres of burrowing owl habitat destroyed. Additional measures for avoidance and minimization should also be incorporated into the evaluation of impacts to this species.

Migratory Birds

The Center is concerned about the effect of this project on migratory birds, both rare and common. Recent evidence from a large PV solar project – Desert Sunlight - and a solar trough project – Genesis documented many water bird mortalities[12]. Indeed, Desert Sunlight reported a state and federally endangered species bird mortality – the Yuma clapper rail (*Rallus longirostrus yumanensis*)[13], despite the fact that on-site surveys never identified this species as occurring on the site, nor was habitat present on site. The Ivanpah Solar Electric Generating System site has also reported the mortality of the fully protected peregrine falcon (among many other migratory birds) on its project site[14]. Few if any of the bird species that died on the project sites were recorded as occurring on site in the pre-construction avian surveys. These large solar projects may in fact be attracting migratory birds to them, through the birds mistaking the project infrastructure as water – the "lake effect"[15].

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[10] Barrows 1996

[11] Helix 2013.

[12] http://www.kcet.org/news/rewire/solar/water-birds-turning-up-dead-at-solar-projects-in-desert.html ;

Because the Desert Quartzite is in a bird migration corridor rich in resources – the Colorado River Flyway - the proposed project could impact numerous species, including threatened and endangered species, if they run into the panels or land and can no longer get airborne. Because large-scale PV projects apparently pose a significant hazard to migratory birds and especially water birds, the DEIS/R needs to discuss these potential impacts and propose alternatives to avoid and minimize the impact, as well as identify and release as part of the DEIS/R, a robust monitoring scheme to actually collect data.

Desert Kit Fox and Badgers

The desert kit fox and badgers are experiencing unprecedented impacts from development of renewable energy projects in their habitat. For desert kit fox, to date on public lands alone, eighteen solar and transmission project applications covering more over 96,000 acres are currently filed as of January 2013[16]. Fifteen approved solar projects, most of which are currently under construction, cover almost 39,000 acres of desert kit fox habitat[17]. Over 30,000 additional acres of proposed solar projects not including this one are actively under going environmental review[18]. As of January 2013, eleven wind projects covering almost 75,000 acres have been approved with many of them in the construction phase[19]. Three additional projects covering 16,611 acres are currently under environmental review[20]. In addition, twenty-eight projects are authorized to do wind testing on almost 270,000 acres[21]. Another forty wind project applications

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http://docketpublic.energy.ca.gov/PublicDocuments/09-AFC-08C/TN200657_20130930T120056_August_2013_Monthly_Compliance_Report.pdf

[13] http://www.kcet.org/news/rewire/solar/water-birds-turning-up-dead-at-solar-projects-in-desert.html

[14] http://docketpublic.energy.ca.gov/PublicDocuments/07-AFC-05C/TN200642_20130930T090221_Avian_Mortality_Report_912013.xlsx

[15] http://www.kcet.org/news/rewire/solar/water-birds-turning-up-dead-at-solar-projects-in-desert.html

[16] BLM 2012. Solar Apps and Auths http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/pa/energy/solar.Par.84447.File.dat/BLM%20Solar%20Apps%20and%20Auths.pdf

[17] Ibid

[18] Ibid

[19] BLM Wind Apps & Auths July 2012 http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/pa/energy.Par.5556.File.dat/BLM%20Solar%20Apps%20&%20Auths%20July%202012.pdf and Kern County wind projects http://www.co.kern.ca.us/planning/pdfs/renewable/wind_projects.pdf

[20] Kern County wind projects http://www.co.kern.ca.us/planning/pdfs/renewable/wind_projects.pdf

[21] BLM Wind Apps & Auths July 2012 http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/pa/energy.Par.5556.File.dat/BLM%20Solar%20Apps%20&%20Auths%20July%202012.pdf

are in development or propose testing, covering an additional 485,000 acres[22]. The potential cumulative development for wind in desert kit fox habitat could cover close to 850,000 acres. The DEIR fails to adequately discuss the desert kit fox in the context of their great site fidelity, challenges of "passive relocation" with this species that generally go to great effort to return to their on-site territories.

The DEIR must estimate the number of desert kit fox or badgers on the project site, and analyze impacts to them from the proposed project. Previous BLM FEIS for a large scale PV solar project similar to the proposed project includes a much more comprehensive evaluation of desert kit fox occupancy on the project site and requires significantly greater avoidance, minimization and mitigation measures[23]. Measures that should be included in the American Badger and Desert Kit Fox Monitoring and Management Plan include but are not limited to:

- Baseline desert kit fox census and population health survey, by characterizing the demography (e.g., size, structure, and distribution) of the kit fox population on the site and receiving areas, and a testing component in which researchers trap and test a representative subsample of the population for canine distemper, and generally describe animal health on the site and receiving areas.
- Incorporation of the baseline desert kit fox census and health survey findings into a cohesive management strategy that minimizes disease risk to kit fox populations; provides a program for tagging, radio-tracking and monitoring of a subset of displaced kit foxes during the construction phase to understand how displacement affects regional kit fox populations; specifically identifies preconstruction survey methods for kit foxes (and large carnivores e.g., badgers) in the Project area; describes preconstruction and construction-phase relocation methods from the site, including the possibility for passive and active relocation from the site (and outlines identified CDFW permit and MOU requirements for active relocation); coordinates survey findings prior to and during construction to meet the information needs of wildlife health officials in monitoring the health of kit fox populations; and includes contingency measures that would be performed if canine distemper were documented in the Project area or in potential relocation areas, and measures to address potential kit fox reoccupancy of the site
- Implementation of the desert kit fox/badger management plan that includes preconstruction surveys, avoidance of active den complexes and implementation of measures to monitor, minimize and contain any canine distemper outbreaks.
- On 10/22/13, the CDFW veterinarians docketed a draft outline of a new desert kit fox program which identifies many concerns about project impacts the desert kit fox[24]. The DEIR identifies likely kit fox and dens on the proposed project site, although it is unclear if these are natal dens (DEIR at 4-88). According to the state, passive relocation or hazing activities conducted in an area experiencing or adjacent to distemper cases may enhance disease transmission and spread by multiple mechanisms. Many unanswered

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[22] Ibid

[23] BLM 2012. McCoy PA-FEIS Vol. 1 - Chapter 4 http://www.blm.gov/pgdata/etc/medialib/blm/ca/pdf/palmsprings/Solar.Par.89379.File.dat/Vol1_McCoy%20PA-FEIS.pdf

[24] http://docketpublic.energy.ca.gov/PublicDocuments/09-AFC-07C/TN200995_20131022T141658_Exhibit_2005__CDFW_Outline_for_Proposed_Desert_Kit_Fox_Health_M.pdf

questions remain, and the American badger and Desert kit fox monitoring and management plan (MM BIO-6) must include mechanisms to answer them:

- Do passively relocated animals re-establish territories adjacent to the solar site?
- Does this depend on the density or spatial distribution of foxes around a site.
- Do relocated foxes experience lower survival or different causes of mortality that might need to be addressed through mitigation efforts.
- Recursion rate – how likely are relocated foxes going to try to get back on site and return to former den areas?
- What's the demographic shifts of neighbors?
- Reproductive impact appears highly negative (n=1 relocated pair this year had den failure; most other dens were successful this year in producing pups).
- Are artificial dens helpful?
- What are the longer term translocation effects?

The answers to these questions are currently unknown. In addition, the State also identifies that the current monitoring is limited in scope and inadequate to address needs and methods and outcomes for relocation are not evaluated systematically or reported. The American badger and Desert kit fox monitoring and management plan (MM BIO-6) must address these issues.

Other Rare Species

The diversity of rare species found across the landscape near and on the Desert Quartzite site is impressive and suggests that the proposed project site is part of a larger ecologically intact and functioning unit[25]. The BLM must clearly address proposals for avoiding, minimizing and mitigating the impacts to all of the rare species that utilize the sites for part or all of their lifecycle.

Acquisition of lands that will be managed in perpetuity for conservation must be included as part of the strategy to avoid, minimize and mitigate impacts to the other species found on site as well. Acquisition is particularly important for these species because the proposed project appears to have little compatibility with any type of on-site conservation of plant communities or wildlife.

For the rare plants, avoidance is preferable because of the general lack of success in transplanting rare plants[26]. If transplantation is to be a part of the mitigation strategy, a detailed final plan must be included as part of the EIS on the methodology for determination of appropriate conservation area where plants may be transplanted, when/how plant are to be transplanted and identification of success criteria for transplantation. Monitoring of the transplanted plants needs to occur for a time period that is realistic to evaluate long-term success of the plants.

Locally Rare Species

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[25] CNDDB 2010 http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp

[26] Fiedler 1991

The Center requests that the EIS/R also evaluate the impact of the proposed project on locally rare species (not merely federal- and state-listed threatened and endangered species). The preservation of regional and local scales of genetic diversity is very important to maintaining species in perpetuity especially in light of global climate change. Therefore, we request that all species found at the edge of their ranges or that occur as disjunct locations be evaluated for impacts by the proposed permitted activities.

Water Resources

The project appears to impact on-site drainages on the project site. The EIS/R document must clarify the impacts to the jurisdictional Waters of U.S. and the Water of the State of California, and surface hydrology across the site. The project must avoid, minimize and mitigate any impacts to surface waters and surface hydrology. Impacts should be avoided to the greatest extent possible and if impacts remain they must be mitigated. In doing so, any reroute of waters and drainage on the site must assure that downstream processes are not impacted.

An evaluation of the effect of water use by the proposed project during construction and operations needs to be detailed and include alternatives and its impact on the Colorado River Basin. Any groundwater pumping proposed for the proposed project (in conjunction with other groundwater issues [pumping, nitrate plume etc.] in the basin) must be analyzed in terms of groundwater resource availability as well as water quality in the basin and surface water resources, and its effect on the native plant and animal species and their habitats need to be included in the EIS/R.

Alternatives

The EIS/R must include a robust analysis of alternatives, including a private lands alternative and alternatives using other technologies including distributed generation. The stated objectives of the project must not unreasonably constrain the range of feasible alternatives evaluated in the EIS/R. The BLM must establish an independent set of objectives that do not unreasonably limit the EIS/R's analysis of feasible alternatives including alternative sites. At a minimum alternatives including the no-action alternative, an environmentally preferred alternative which avoids all rare sand habitat and other significant impacts to resources (including cultural resources), and an alternative where power generation is sited adjacent to power consumption need to be included.

Other Issues

The construction and operation of the proposed facilities will also increase greenhouse gas emissions and those emissions should be quantified and off-set. This would include the manufacture and shipping of components of the project and the car and truck trips associated with construction and operations. Similarly, such activities will also impact air quality and traffic in the area and these impacts should be disclosed, minimized and mitigated as well. For mobile sources, since consistency with the AQMP will not necessarily achieve the maximum feasible reduction in mobile source greenhouse emissions, the EIS should evaluate specific mitigation measures to reduce greenhouse emissions from mobile sources.

Fire Impacts

Because the any industrial project increases the potential for human-caused fire to occur on site, fire prevention including best management practices must be addressed and clearly identified in the EIS/R - not only on-site protection of resources, but also preventing fire from moving into the adjacent lands. Fire is incredibly detrimental to desert ecosystems, resulting in degradation of the habitat and if frequently reburned results in a type conversion to non-native vegetation[27].

Non-Native Plants

The EIS/R must identify and evaluate impacts to species and ecosystems from invasive exotics species. Many of these species invade disturbed areas, and then spread into wildlands. Fragmentation of intact, ecologically functioning communities further aides the spread and degradation of plant communities[28]. These factors for wildland weed invasions are present in the project, and their effect must be evaluated in the EIS/R. Additionally, landscaping with exotic species is often the vector for introducing invasive exotics into adjacent habitats. Invasive landscape species displace native vegetation, degrade functioning ecosystems, provide little or no habitat for native animals, and increase fire danger and carrying capacity[29] and should be banned from the project site.

Wildlife Movement

Because the BLM has failed to identify the two north-south wildlife connectivity/linkage corridors required in the Solar PEIS specifically for the Riverside-East SEZ, it is unclear if the proposed project site is located within a connectivity corridor; although it is clearly within a sand transport corridor. A thorough and independent evaluation of the project's impacts on wildlife movement is essential. The EIS/R must evaluate all direct, indirect, and cumulative impacts to wildlife movement corridors. The analysis should cover movement of large mammals, as well as other taxonomic groups, including small mammals, birds, reptiles, amphibians, invertebrates, and vegetation communities. The EIS/R should first evaluate habitat suitability within the analysis window for multiple species, including all listed and sensitive species. The habitat suitability maps generated for each species should then be used to evaluate the size of suitable habitat patches in relation to the species average territory size to determine the appropriate size and location of linkages and that they provide both live-in and move-through habitat. The analyses should also evaluate if suitable habitat patches are within the dispersal distance of each species. The EIS/R should address both individual and intergenerational movement (i.e., will the linkages support metapopulations of smaller, less vagile species). The EIS/R should identify which species would potentially utilize the proposed wildlife movement corridors under baseline conditions and after build out, and for which species they would not. In addition, the EIS/R should consider how wildlife movement will be affected by other planned approved, planned, and proposed development in the region as part of the cumulative impacts.

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[27] http://www.nps.gov/moja/naturescience/upload/Fire%20congress%202006_brooks%20and%20draper_extended%20abstract.pdf

[28] Bossard et al 2000

[29] http://dhtlral.gosolarcalifornia.org/sitingcases/genesis_solar/documents/others/testimony_centr_biological_diversity/exhibits/Exh.%20806.%20Brooks%202000.%20Competition%20between%20alien%20annual%20grasses%20and.pdf

The EIS/R should analyze any proposed on-site wildlife movement corridors are wide enough to minimize edge effects and allow natural processes of disturbance and subsequent recruitment to function. The EIS/R should also evaluate whether the proposed wildlife movement corridors would provide key resources for species, such as host plants, pollinators, or other elements. For example, many species commonly found in washes depend on upland habitats during some portion of their cycle. Therefore, in areas with intermittent or perennial streams, upland habitat protection is needed for these species. Upland habitat protection is also necessary to prevent the degradation of aquatic habitat quality.

Cumulative Impacts

Because of the number of currently permitted and proposed projects in the projects' vicinity, the region, and the CDCA, a thorough analysis of the cumulative impacts from all of these projects on the resources needs to be included. Because the project site is within a proposed solar development zone in BLM's Solar PEIS, projects located in the zone have the potential to cumulatively significantly impact the existing biological resources and ecological processes that currently exist within the zone. To date several renewable energy projects and associated infrastructure projects have been permitted in the general vicinity, including the Colorado River substation, Desert Sunlight, Genesis, the Desert Harvest, McCoy and Blythe solar projects.[30] Additionally numerous other applications are included in the area. While the zone may be appropriate for some renewable energy development, especially on already disturbed private lands, the DEIS/R must evaluate if the cumulative impact from the projects will cause significant unmitigable impacts not only to the zone but to the surrounding resources including Joshua Tree National Park, which already is impacted by border development on the south, east and west boundaries, as well as BLM identified Areas of Critical Environmental Concern (ACECs), Wildlife Habitat Management Areas (WHMAs) and federally designated Wilderness. With the number of permitted and built projects in/near the Colorado River flyway, emphasis on cumulative impact analysis on migratory birds in this key thread of the Pacific flyway needs to be included.

Thank you for your consideration of these comments. Please add us to the distribution list for the EIS/R and all notices associated with this project.

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30 While their remains a CEC approval for trough solar at the Palen site, the recent proposal for power towers was withdrawn. Nonetheless, because the project owner has stated they intend to continue to pursue this project, the BLM and the County must consider the full potential impacts as foreseeable in the cumulative impacts analysis here.

Sincerely,

Ileene Anderson
Biologist/Public Lands Desert Director
Center for Biological Diversity

cc via email
Brian Croft, USFWS, Brian_Croft@fws.gov
Kevin Hunting, CDFG KHunting@dfg.ca.gov
Tom Plenys, EPA, Plenys.Thomas@epa.gov

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COMMENTER	DATE
U.S. Fish & Wildlife Service, Assistant Field Office Supervisor, Palm Springs Fish and Wildlife Office, Palm Springs, CA,	**April 8, 2015**

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Palm Springs Fish and Wildlife Office
777 East Tahquitz Canyon Way, Suite 208
Palm Springs, California 92262

In Reply Refer To:
FWS-ERIV-12B0378-15CPA0218

APR - 8 2015

Memorandum

To: District Manager, California Desert District Office, Bureau of Land Management, Moreno Valley, California
Attention: Cedric Perry

From: Assistant Field Supervisor, Palm Springs Fish and Wildlife Office, Palm Springs, California

Subject: Comments on the Notice of Intent to Prepare a Draft Environmental Impact Statement for the First Solar Desert Quartzite Solar Project, Riverside County, California (CACA 049397)

This memorandum is in response to the notice dated March 6, 2015, soliciting scoping comments on the joint draft environmental impact statement (EIS) and environmental impact report being prepared by the Bureau of Land Management (BLM) and Riverside County (County) for the subject project. A letter under separate cover has been submitted to Riverside County. Desert Quartzite, LLC, a subsidiary of First Solar, proposes to develop and operate a 300 megawatt (MW) photovoltaic (PV) solar facility and associated infrastructure on 4,843 acres of public lands administered by the BLM and 160 acres of private lands (totaling 5,003 acres) 1.8 miles west of the City of Blythe, south of Interstate 10, and immediately adjacent to the proposed Blythe Mesa Solar Project, which will occupy 3,587 acres of private lands.

We offer these comments under the authorities of the Endangered Species Act of 1973, as amended, the Migratory Bird Treaty Act, and other authorities of the Department of the Interior to help avoid and minimize adverse impacts to public trust resources that may be impacted by the proposed project. These resources include the federally endangered Yuma clapper rail (*Rallus longirostris yumanensis*), recently renamed Yuma Ridgway's rail (*Rallus obsoletus yumanensis*) by the American Ornithologists Union (http://aoucospubs.org/doi/full/10.1642/AUK-14-124.1), the federally endangered southwestern willow flycatcher (*Empidonax traillii extimus*), the western distinct population segment of yellow-billed cuckoo (*Coccyzus americanus*), and the federally threatened Mojave desert tortoise (*Gopherus agassizii*). Other sensitive species include golden eagle (*Aquila chrysaetos*), western burrowing owl (*Athene cunicularia*), and Mojave fringe-toed lizard (*Uma scoparia*). This letter summarizes our comments provided during a September 2014 pre-application meeting, bi-weekly conference calls, and other coordination meetings with the applicant, BLM, California Department of Fish and Wildlife (CDFW), and Riverside County.

Mojave Desert Tortoise

Preliminary results of pre-project surveys show little evidence of desert tortoise occupation on the Desert Quartzite site itself; however, live desert tortoises and desert tortoise sign have been documented in the vicinity, which indicate that the area serves as available habitat for the species. The proposed project would eliminate low density/linkage habitats that may be important for population and habitat connectivity for this and other desert species.

Construction and operation of the proposed Desert Quartzite project would result in permanent and long-term elimination or degradation of 5,003 acres of desert tortoise habitat on the project site; therefore, we recommend the BLM and the County require a suite of avoidance, minimization, and mitigation measures be implemented to offset any adverse effects to the species. These include, but are not limited to, the following (a more through description of these measures can be provided upon request):

- Use of a designated biologist, authorized desert tortoise biologists, and biological monitors;

- Implementation of a worker environmental awareness program;

- Implementation of a variety of impact avoidance and minimization measures;

- Desert tortoise clearance surveys, exclusion fencing, and translocation, if necessary;

- Desert tortoise habitat compensation; and

- Common raven (*Corvus corax*) management and control, effectiveness monitoring, and contribution on a per-acre basis to a region-wide raven management strategy (see next section).

Common Ravens

The construction and operation of the solar facility would likely lead to a local increase in the number of common ravens; these birds are highly attracted to human activity and the proposed project would provide subsidies in the form of food and sites for nesting, roosting, and perching that are not currently present in the area. In addition to food wastes that may be generated by workers during construction and operation of the facility, they may also use various structures in the project area for shade, nesting, roosting, or perching. Common ravens prey on desert tortoises and, for this reason, any local increase in the number of common ravens may have detrimental effects on desert tortoises, both near and distant, from the proposed solar facility, as these birds travel long distances on a daily basis between roosting and foraging sites.

To address project-specific impacts on desert tortoises from common ravens that may be attracted to the project site, we recommend that the BLM and the County require that applicant establish on-site measures to eliminate or minimize the availability of subsidies and the potential for common ravens to occupy the project site during all phases of the project, including construction, operation, and maintenance. To address the indirect and cumulative effects associated with increasing common raven numbers, we recommend that the BLM and the County require Desert Quartzite to contribute to the Regional Common Raven Management Program. A summary of the regional plan can be found on the Desert Managers Group website, http://www.dmg.gov/wg-rm.php. With the implementation of these measures, the adverse effects of the proposed project on the abundance of common ravens in the area may be reduced.

Yuma Ridgway's rail

Breeding Yuma Ridgway's rail populations in the project vicinity are primarily restricted to freshwater marshes along the lower Colorado River Valley and near the Salton Sea, with a few small and scattered locations along the Gila River in Arizona and recent detections on refuges in Nevada (Service 2009, 2014a). Even though few, if any, marsh/water-associated birds were documented during pre-project avian surveys for the projects in this vicinity, available data suggests the solar technologies deployed in the desert pose a hazard to which various rail species and other water-associated birds are particularly vulnerable.

To date, two Yuma Ridgway's rails are known to have been killed on solar PV projects, one at the Desert Sunlight project near Desert Center in May 2013 and one in Imperial County in April 2014. Both projects are using thin-film PV technology, though the Imperial County bird may have collided with the fence surrounding the project. Vulnerability of the Ridgway's and other rail species also is evidenced by multiple incidentally-observed fatalities to sora (*Porzana carolina*) and Virginia rail (*Rallus limicola*) at solar and transmission projects along the I-10 corridor and in the Imperial Valley. Collectively, these data indicate there is a mortality risk to all rails posed by many project-related facilities, including gen-tie lines, solar panels, and perimeter fencing. (Details on these and other mortality data can be provided upon request.)

We are concerned that utility-scale solar and transmission projects within the resident and dispersal range of Yuma Ridgway's rail may result in fatalities to multiple individuals over the life span of these projects, especially given the large cumulative disturbance footprint of all existing and planned projects. Because of the large size of these projects and the apparent lack of effective adaptive management measures and other design modifications sufficient to avoid the risk of incidental take[1], we anticipate recurrent but low levels of take at multiple project sites. Therefore, we recommend the draft EIR address the direct, indirect, and cumulative effects of the project on Yuma Ridgway's rail and include a range of avoidance, minimization, and mitigation measures.

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[1] "Take" is defined by the Act as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct.

We are also concerned about potential fatality events to other listed, rare, and/or sensitive species (e.g., willow flycatcher and yellow-billed cuckoo), which are known to breed and migrate through the Lower Colorado River Valley. These two species have been documented as fatalities on or near renewable energy projects elsewhere in their migratory range distant from suitable habitat. Because of the observed fatalities of special status species at other existing solar facilities, an analysis that improves the level of rigor and adequacy for determining the different degrees of vulnerability across all avian taxa and a risk assessment that includes the quantification for take of listed and rare species is warranted. Post-construction monitoring (discussed below) should be designed to account for fatality events of rare species. Impact avoidance, minimization, and mitigation measures also should be proposed to minimize the impact of incidental taking.

Migratory Birds

The Migratory Bird Treaty Act is the cornerstone of migratory bird conservation and protection in the United States and implements four treaties that provide for international protection of migratory birds. The Migratory Bird Treaty Act prohibits the take or possession of protected species of migratory birds (50 CFR 10.12). It does not, however, specifically authorize the incidental take of migratory birds; the California Fish and Game Code contains similar prohibitions.

The project site occurs in the Lower Colorado River Valley, which forms a major branch of the Pacific Flyway (Rosenberg *et al*. 1991). The diverse aquatic, wetland, riparian, agricultural, and desert habitat types provide permanent and seasonal refuge to hundreds of resident and migratory birds (Shuford *et al*. 2002), and is a major wintering grounds for numerous species and diverse groups of water-associated birds.

Utility-scale solar development is a relatively nascent industry and, therefore, systematically-collected mortality monitoring data are limited and the magnitude of potential impacts has not yet been accurately quantified. However, utility-scale photovoltaic (PV), parabolic trough, and power tower solar projects that are currently under construction or recently put into operation are reporting incidental observations of fatalities and injuries to a wide range of avian species, including numerous species of water-associated birds, passerines, and raptors involving various project features, including solar panels or heliostats, evaporation ponds, fencing, distribution lines within the facility, and gen-tie lines. There is growing evidence of what is referred to as a “lake effect” or “polarized light pollution” (Horvath *et al*. 2009), which presents a particular hazard to water-associated birds and other species seeking migratory stopover habitat typically found along rivers and lakeshores (Service 2014b). As of 2013, the mortality rate of marsh/water-associated bird species across all taxa represented about 40 percent of total birds reported killed at three utility-scale solar projects using different technologies (Solar One, McCrary *et al*. 1986; Desert Sunlight, Ironwood Consulting 2013; and NextEra Genesis, AECOM 2013).

We recommend that the draft EIR thoroughly address the potential significance for bird collisions on project-specific and cumulative scales. Based on the available information regarding bird fatalities cited above, the cumulative effects to migratory birds, potentially would be significant, and therefore, warrant project-specific systematic monitoring and/or a coordinated regional-scale monitoring effort. Therefore, to help the applicant reduce potential adverse effects to avian species, we recommend the BLM and the County require the development and implementation of a statistically robust, systematic avian and bat mortality and injury monitoring program as a component of a project-specific Bird and Bat Conservation Strategy (BBCS). The strategy should include sufficient monitoring to detect rare mortality events as well as those that could result during sporadic migration pulses. The draft BBCS and monitoring program should be analyzed as part of the draft EIR and include an evaluation of deterrents not previously tested at this scale and an adaptive management program that articulates how data will be used to improve and maximize measures to avoid and minimize impacts to species protected under our various laws while allowing project construction and operation to move forward in the most environmentally conscientious ways practicable.

Additionally, carcasses should be collected to facilitate the monitoring efforts; to avoid attracting scavengers, such as common ravens, which prey on desert tortoises; and to reduce the potential for human health issues. Because taking possession of avian carcasses would be a violation of the Migratory Bird Treaty Act, a Special Purpose Utility Permit (SPUT) would be required from the Service. These are typically issued separately for the construction and operational phases of the projects, and we strongly encourage the BLM, County, and Desert Quartzite to begin this process as early as possible to allow us to issue a permit prior to the onset of construction. Also, please note that a BBCS is not a surrogate for a take permit under the MBTA; therefore, it does not limit or preclude the Service from exercising its authority under any law, statute, or regulation, but can be taken into consideration under our discretionary enforcement authority. We can provide the most recent BBCS guidance and SPUT permit requirements prior to preparation of the draft EIR.

Because the project is adjacent to the proposed Blythe Mesa project, an opportunity exists to generate important information regarding the effects of the different technologies on various bird species and mortality rates. Currently, available information is lacking on which solar technologies and configuration of panels may reduce bird mortality rates. We encourage the BLM and the County to consider requiring Desert Quartzite to evaluate some potential design considerations, such as thin film versus crystalline solar PV; dual-axis tracking systems versus single-axis or static systems; and multi-layer anti-reflection coating. We recommend commencing discussions as soon as possible with the BLM, County, and the applicant to design a framework under which the various technologies currently in place and configurations amenable to comparative monitoring can be used for adaptive management purposes.

To reduce the potential for electrocution of birds, we recommend that the BLM and the County require the applicant to design and construct any aboveground electrical lines to reduce the likelihood of electrocution of large birds, such as raptors. The Avian Powerline Interaction Committee (APLIC) describes appropriate methods for the construction of such lines in its guidance documents (APLIC 2006, 2012) and at the following link: http://www.aplic.org/uploads/files/11218/Reducing_Avian_Collisions_2012watermarkLR.pdf

Regardless of the measures that would be implemented to reduce habitat loss and mortality of avian species, some residual impacts would remain. The development of numerous renewable energy projects in California has cumulatively resulted in the loss of tens of thousands of acres of habitat; therefore, we recommend that the BLM and the County include a requirement each respective permit for Desert Quartzite to mitigate for the project's effects on habitat and populations of migratory birds. We would like to work with you and the applicant to develop and implement appropriate mitigation. Some options include contributing to a fund to identify and reduce sources of mortality of migratory birds in the region and to enhance habitat specifically for the benefit of these species; contributing to institutions currently conducting genome mapping of species of conservation concern that will allow us to identify populations being impacted by mortalities at renewable energy sites; contributing to the Migratory Bird Conservation Fund, managed by the Department of Interior, which provides financing for the acquisition of migratory bird habitat; and/or contributing to one of the joint ventures that the Service has established for the conservation of migratory birds that have programs in place to facilitate such mitigation. A joint venture is a collaborative, regional partnership of government agencies, non-profit organizations, corporations, tribes, and individuals that conserves habitat for priority bird species, other wildlife, and people. More information on joint ventures is available at: http://www.fws.gov/birdhabitat/JointVentures/index.shtm.

Mojave Fringe-toed Lizard

This species is designated as a Sensitive Species by BLM and a Species of Special Concern by the State of California. These designations recognize the general rarity of this species, which is vulnerable because suitable habitat is scattered in relatively few, small, isolated patches of sand dune habitat across the Sonoran and Mojave deserts in California.

The proposed project is located at the terminus of the Chuckwalla Valley sand transport corridor. The active eolian sand transport in this zone provides periodic pulses of loose blowsand from upwind sand sources within the transport corridor west of the project site and along the length of the proposed gen-tie line to the Colorado River Substation. The lizard is specially adapted to blowsand habitats, such as the sand sheets/fields, which characterize portions of the project site, and across which sands are transported to larger accumulations, such as sand dunes and sand hummocks that accumulate around shrubs and other obstructions. The draft EIR should include a thorough analysis that quantifies the direct loss of lizard habitat and the indirect effects on-site and off-site to lizard habitat. An analysis of avoidance and minimization measures to reduce direct effects to the lizard, such as reconfiguration of the project footprint and salvaging individuals to reduce lizard fatalities, should also be included in the document.

Indirect effects would be caused by the disruption of eolian sand transport processes to blowsand habitat downwind of the project site. As can be observed on the small existing First Solar project to the east, the solar panels create turbulence to the laminar wind flow, which slows wind velocity and causes wind-entrained sand particles to drop out and settle in eddies created by the solar panels and pedestals. Thus, the wind obstruction created by the solar panels intercepts and accumulates sands on the project site, which reduces the amount of sand available to downwind habitats. Though the accumulation of sand can potentially create and improve habitat conditions for the lizard on the project site, any operations and maintenance (O&M) requirements to remove sand accumulations also would kill and injure the lizards that colonize any residual or artificially-created habitats on the project site. As such, construction of the proposed project would initially eliminate occupied and suitable habitat and lizards from the site, but as eolian sand transport delivers fresh sand supplies from the west that accumulate on-site, suitable habitat and lizards that move onto the project site would be periodically eliminated if removed by O&M practices. Therefore, to minimize direct and indirect impacts to the lizard and downwind habitats, we recommend that the project be reconfigured to avoid areas of active and stabilized sand in the northern portion of the proposed project site. If the project is not reconfigured to avoid impacts to the sand transport process, we recommend that the BLM and the County require habitat on-site and downwind of the project be quantified and mitigated by the acquisition of suitable habitat elsewhere with the Chuckwalla Valley sand transport corridor. Consistent with BLM's Northern and Eastern Colorado Coordinated Management Plan, direct and indirect habitat losses should be mitigated at a 3:1 loss to replacement ratio.

Aquatic Insects

Solar panels can act as ecological traps to organisms that use polarized light as a behavioral cue. The design of solar panels and collectors and their placement relative to aquatic habitats will likely affect populations of aquatic insects directly (Kriska *et al*. 2009, Horvath *et al*. 2010). For example, insects continuously fly over solar panels until they become exhausted and die (Kriska *et al*. 2009, Lundy *et al*. 2013). Decreases in the number of insects may indirectly affect other species because they provide food for fish, birds and other species.

To minimize this effect on aquatic insects, we recommend that the BLM and the County require Desert Quartzite to use solar panels with reduced reflectivity and polarized light pollution (see discussion above) or panels with white borders and grids of white strips that crisscross the panels. Horvath *et al*. (2010) showed that these modifications reduced the attractiveness of solar panels to aquatic insects by 10 to 26 fold.

Cumulative Effects

There are numerous applications for utility-scale solar and wind energy projects on public and private land across the southwest to meet either State-mandated or national energy priorities. The proposed Desert Quartzite and adjacent Blythe Mesa projects would remove 8,590 acres of undeveloped lands from the existing habitat baseline, and coupled with the NextEra Blythe (4,138 acres) and McCoy (4,700 acres) solar projects north of I-10, we have considerable concerns about cumulative effects to our trust resources.

Given the extent of renewable energy projects in the vicinity, we recommend that BLM, State, and local agencies conduct a thorough analysis identifying all cumulative, direct, and indirect effects that are expected from the proposed project and associated infrastructure. The Service is particularly concerned with impacts to Mojave desert tortoise habitat connectivity and the potential loss of gene flow within and among designated critical habitat units across the species' range (Averill-Murray *et al*. 2013). Consequently, the draft EIS analysis should examine potential impacts to the population connectivity requirements of desert tortoise and other plant and wildlife species throughout the project area and alternative project sites to avoid any significant adverse effects.

In addition to those articulated above, we recommend the following specific measures:

- The draft EIR should include a range of alternatives to the project as currently proposed including alternative sites for this project outside of the Lower Colorado River Valley; a reduced-footprint alternative; alternative technologies and project configurations that would minimize adverse effects to avian and other wildlife species.
- Eliminate any water features, such as construction and/or evaporation ponds from the project description.
- Underground on-site distribution lines.
- Underground or use monopoles for any above-ground distribution lines and gen-tie lines.
- For any above-ground distribution and gen-tie lines, deploy visual deterrents designed to minimize avian collisions.
- Use tracking devices so that panels may be offset to break-up any illusion of a large water body, especially at night.
- Implement deterrent testing program in the interest of adaptive management.
- Build perimeter fence with a gap in the bottom to evaluate wildlife use of the site after construction.
- Mark fences to determine if this reduces avian collisions with newly constructed fences.
- Avoid use of lattice-type structures or placing external ladders and platforms on any infrastructure to minimize perching and nesting.
- Avoid use of meteorological towers that require use of guy wires.
- Avoid using lighting to the extent possible; where lighting was necessary, facility lighting should be focused downward to reduce sky illumination.

- Minimize permanent disturbance area by minimizing creation of roads, avoidance of excessive clearing of vegetation, and grading whenever possible.

- A Nesting Bird Plan should be developed that articulates methods and timing for clearing of vegetation and conserving active nests; any variances from the plan should be approved by the agencies.

- Surveys for golden eagle nests should be conducted during each year during construction activities within the nesting season.

- Clearance surveys for burrowing owls should be completed in each construction unit; buffer areas should be determined in consultation with the wildlife agencies.

- Mandatory site training for all construction personnel regarding avoidance of bird nests and bat colonies and other biological resources should be conducted.

If you have any questions regarding this letter, please contact Jody Fraser of my staff at (760) 322-2070 extension 207 or jody_fraser@fws.gov.

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COMMENTER	DATE
The Metropolitan Water District of Southern California – Office of the General Manager, Deirdre West, Manager, Environmental Planning Team, Los Angeles, CA	**April 9, 2015**

THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

Office of the General Manager

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CALIF. DESERT DISTRICT
MORENO VALLEY, CA

April 6, 2015

Via Electronic & U.S. Mail

Mr. Larry Ross, Principal Planner
County of Riverside
Riverside County Planning Department
4080 Lemon Street, 12th Floor
Riverside, CA 92501-3634
Email: lross@rctlma.org

Mr. Cedric C. Perry, Project Manager
U.S. Bureau of Land Management
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553-9046
Email: blm_ca_desert_quartzite_solar_project@blm.gov

Re: **Notice of Preparation of Draft Environmental Impact Statement/ Environmental Impact Report**
Desert Quartzite Solar Project
Riverside County Conditional Use Permit No. 03721
BLM Project Number: CACA # 049397

To Whom It May Concern:

The Metropolitan Water District of Southern California (Metropolitan) reviewed the Notice of Preparation of a Draft Environmental Impact Report for the Desert Quartzite Solar Project (Project) and the Notice of Intent to Prepare an Environmental Impact Statement for the Desert Quartzite Solar Project and a Possible Amendment to the California Desert Conservation Area Plan, Riverside County, California (Feg. Reg., Vol. 80, No. 44, 12195 (March 6, 2015)). Metropolitan is pleased to submit comments for consideration by the County of Riverside (County) and the U.S. Bureau of Land Management (BLM) in the preparation of the Draft Environmental Impact Statement/Environmental Impact Report (DEIS/DEIR). In sum, Metropolitan provides these comments to ensure that any potential impacts on its facilities in the vicinity of the Project and on Colorado River water resources are adequately addressed.

Background

Metropolitan is a public agency and regional water wholesaler. It is comprised of 26 member public agencies serving approximately 19 million people in six counties in Southern California. One of Metropolitan's major water supplies is the Colorado River via Metropolitan's Colorado River Aqueduct (CRA). Metropolitan holds an entitlement to water from the Colorado River. The CRA consists of tunnels, open canals and buried pipelines. CRA-related facilities also include above and below ground reservoirs and aquifers, access and patrol roads, communication facilities, and residential housing sites. The CRA, which can deliver up to 1.2 million acre-feet

700 N. Alameda Street, Los Angeles, California 90012 • Mailing Address: Box 54153, Los Angeles, California 90054-0153 • Telephone (213) 217-6000

of water annually, extends 242 miles from the Colorado River, through the Mojave Desert and into Lake Mathews. Metropolitan has five pumping plants located along the CRA, which consume approximately 2,400 gigawatt-hours of energy when the CRA is operating at full capacity.

Concurrent with its construction of the CRA in the mid-1930s, Metropolitan constructed 305 miles of 230 kV transmission lines that run from the Mead Substation in Southern Nevada, head south, then branch east to Parker, California, and then west along Metropolitan's CRA. Metropolitan's CRA transmission line easements lie on federally-owned land, managed by BLM. The transmission lines were built for the sole and exclusive purpose of supplying power from the Hoover and Parker projects to the five pumping plants along the CRA.

Metropolitan's ownership and operation of the CRA and its 230 kV transmission system is vital to its mission to provide Metropolitan's 5,200 square mile service area with adequate and reliable supplies of high-quality water to meet present and future needs in an environmentally and economically responsible way.

Project Understanding

Pursuant to the Project Description in the Notice of Preparation, the Project involves the construction and operation of a 300 megawatt solar photovoltaic (PV) electrical generation facility on a total of approximately 5,003 acres of public and private land (4,843 acres[1] of BLM-managed land and 160 acres of private land). The facility would include a solar array field utilizing single axis solar PV and fixed-tilt arrays, a system of interior collection power lines, and associated infrastructure which includes substations, maintenance facilities, site access and a 230 kilovolt transmission line that will interconnect the generation facility to the statewide electrical transmission grid through the Colorado River Substation.

The Project site is located approximately 2.8 miles west of the City of Blythe in an unincorporated area of Riverside County, California.

Land Use Issues: Potential Impacts on Metropolitan Facilities

Although Metropolitan has not yet identified any direct impacts, the Project is in the general vicinity of Metropolitan owned agricultural lands in the Palo Verde Valley, perhaps as close as 3 miles, a portion of which Metropolitan fallows to increase its water supply. As described above, Metropolitan currently has a significant number of facilities, real estate interests, and fee-owned rights-of-way, easements, and other properties (Facilities) located on or near BLM-managed land in southern California that are part of our water supply and distribution system. Metropolitan is concerned with potential direct or indirect impacts that may result from the construction and operation of any proposed solar energy project on or near our Facilities. In order to avoid potential impacts, Metropolitan requests that the DEIS/DEIR include an assessment of potential impacts to Metropolitan's Facilities with proposed measures to avoid or mitigate significant adverse effects.

---

[1] Metropolitan used the acreage numbers from the County's notice. There were discrepancies between the numbers listed in the various notices, for example, the Federal Register notes this is 4,845 acres of public land.

Metropolitan is also concerned that locating solar projects near or across its electrical transmission system could have an adverse impact on Metropolitan's electric transmission-related operations and Facilities. From a reliability and safety aspect, Metropolitan is concerned with development of any proposed projects and supporting transmission systems that would cross or come in close proximity with Metropolitan's transmission system. Metropolitan requests that the DEIS/DEIR analyze and assess any potential impacts to Metropolitan's transmission system.

Water Resources: Potential Impacts on Colorado River and Local Water Supplies

Metropolitan is also concerned about the Project's potential direct and cumulative impacts on water supplies, specifically potential impacts on Colorado River and local groundwater supplies. As noted above, Metropolitan holds an entitlement to imported water supplies from the Colorado River. Water from the Colorado River is allocated pursuant to federal law and is managed by the Department of the Interior, Bureau of Reclamation (USBR). In order to lawfully use Colorado River water, a party must have an entitlement to do so. *See* Boulder Canyon Project Act of 1928, 43 U.S.C. §§ 617, et seq.; *Arizona v. California*, 547 U.S. 150 (2006).

The BLM Notice of Intent and the County NOP do not provide any information regarding a source of non-potable water to be used during construction and operation. If the Project proposes to utilize groundwater from on-site wells, Metropolitan is concerned that the wells would draw water from a groundwater basin that is hydro-geologically connected to the Colorado River, within an area referred to as the "accounting surface." The extent of accounting surface area for the Colorado River was determined by the U.S. Geological Survey (USGS) and USBR as part of a proposed rule-making process. *See* Notice of Proposed Rule Regulating the Use of the Lower Colorado River Without an Entitlement, 73 Fed. Reg. 40916 (July 16, 2008); USGS Scientific Investigation Report No. 2008-5113. To the extent the Project uses Colorado River water, it must have a documented right to do so. A map of the proposed Project in the relation to Metropolitan's Facilities and the Colorado River accounting surface area is enclosed for reference.

Entities in California are using California's full apportionment of Colorado River water, meaning that all water is already contracted and no new water entitlements are available in California. Thus, Proponents would have to obtain water from the existing junior priority holder, Metropolitan, which has the authority to sell water for power plant use. Metropolitan is willing to discuss the exchange of a portion of its water entitlement, subject to any required approvals by Metropolitan's Board of Directors, through an agreement with Metropolitan.

Metropolitan requests that BLM and the County also assess the potential cumulative impacts of the use of the scarce Colorado River and local groundwater basin resources in light of other pending renewable energy projects within the Colorado River Basin and the local groundwater basins. Metropolitan requests that the DEIS/DEIR and possible amendment to the California Desert Conservation Area Plan address the Proponent's water supply and any potential direct or cumulative impacts from this use.

We appreciate the opportunity to provide input to your planning process and we look forward to receiving and reviewing the DEIS/DEIR on the Desert Quartzite Solar Project. If we can be of further assistance, please contact Mr. Michael Melanson at (916) 650-2648.

Very truly yours,

Deborah

for Deirdre West
Manager, Environmental Planning Team

Enclosure (map)

cc: Ms. Tanya Trujillo
Executive Director
Colorado River Board of California
770 Fairmont Avenue, Suite 100
Glendale, California 91203-1068

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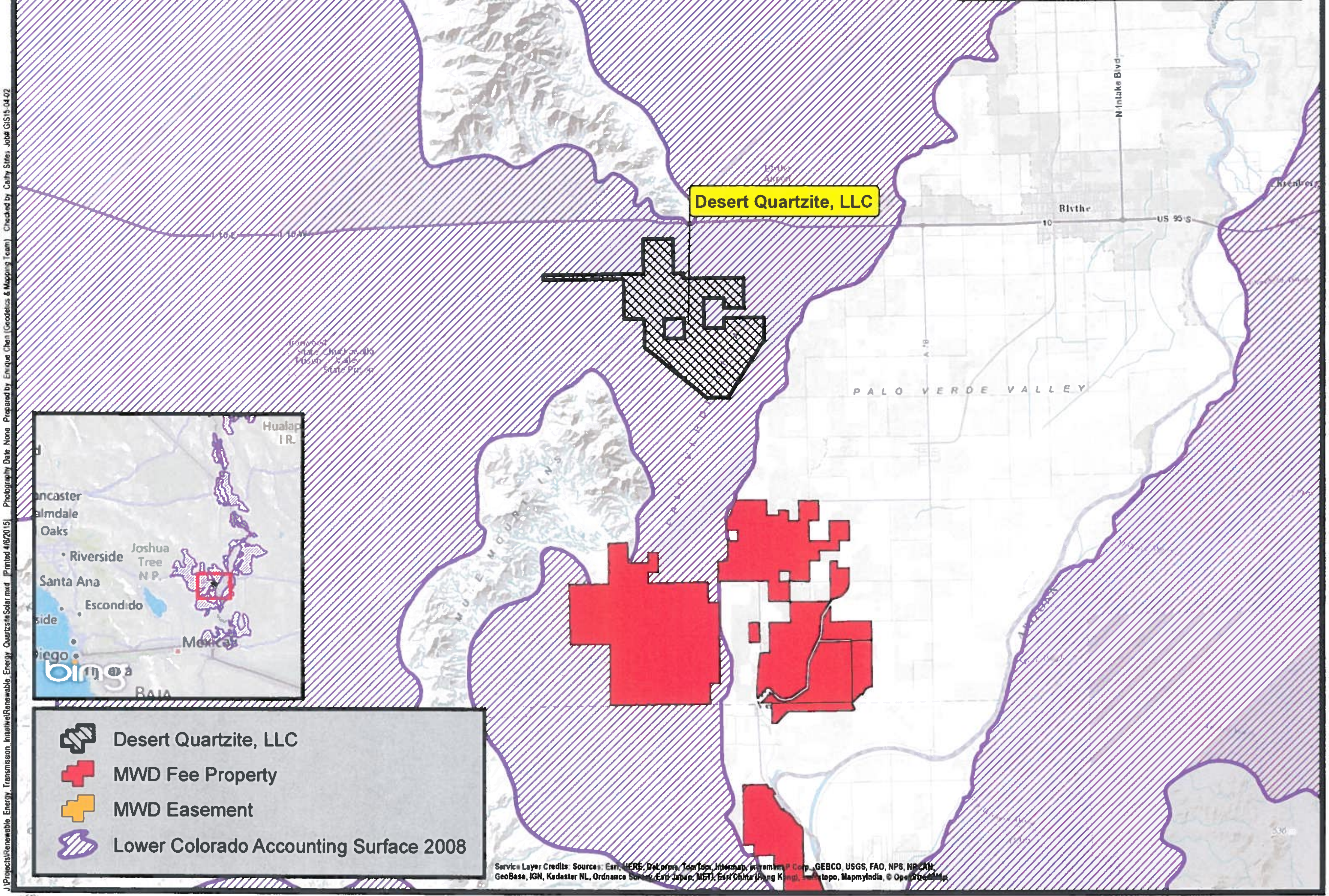
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J:\Projects\Renewable Energy_Transmission_Initiative\Renewable Energy_QuartziteSolar.mxd (Printed 4/6/2015) Photography Date: None Prepared by: Enrique Chen (Geodetics & Mapping Team) Checked by: Cathy Stites Job# GIS15-04-02

The Metropolitan Water District of Southern California
Engineering Services Group

Renewable Energy Projects

Desert Quartzite, LLC

COMMENTER	DATE
California Native Plant Society, Greg Suba, Conservation Program Director, Sacramento, CA	**April 13, 2015**

CALIFORNIA
NATIVE PLANT SOCIETY

April 13, 2015

Cedric C. Perry, Project Manager
Bureau of Land Management
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553-9046

Sent via email to: blm_ca_desert_quartzite_solar_project@blm.gov

Dear Mr. Perry;

Thank you for the opportunity to provide scoping comments to help guide the preparation of a Draft Environmental Impact Statement ("DEIS") and Proposed Amendment to the California Desert Conservation Area ("CDCA") Plan for the proposed Desert Quartzite Solar Project ("Project"). The California Native Plant Society recommends the following biological issues be addressed in the DEIS.

1. **Desert washes supporting microphyll woodlands**. The Plan of Development indicates there are three primary drainages occurring within the expanded study area for biological resources. It is unclear to that extent these woodland communities occur in drainages on the Project site. The Plan indicates that Dry Desert Wash Woodlands would be avoided and that PV panels would not be placed in "significant drainages." It is unclear what constitutes "significant drainages" but we assume they are those supporting varying amounts of microphyll woodland plant species.

The 2013 Vegetation Map developed in support of the Desert Renewable Energy Conservation Plant (2013 DRECP Vegetation Map) indicates stands of *Parkinsonia florida* - *Olneya tesota* (Blue palo verde - Ironwood) microphyll woodland alliance occur across the northeastern corner of the proposed project area. Due to time and budget constraints, the 2013 DRECP Vegetation Map delineated microphyll woodland stands only if they occurred in washes 90 feet wide or greater. Therefore, there may be additional microphyll woodland stands within the project site in washes < 90 feet wide, and the project applicant must complete project-level vegetation mapping to determine this. Project-level vegetation mapping might also reveal additional rare vegetation alliances (NatureServe state rarity rank of S1-S3) that weren't resolved by the 2013 DRECP Vegetation Map.

Project-level vegetation mapping must conform to the National Vegetation Classification System and be done at the alliance level, though association level would be most informative, to meet California state standards and be comparable to the new 2013 DRECP Vegetation Map.

We recommend that that washes supporting microphyll woodland species be fully delineated and that a protective buffer (no disturbance zone) of at least 200 feet be established on either side of these drainages. The draft DRECP called for a 200foot buffer around microphyll woodlands within development zones. In addition, since these drainages are most often used by various wildlife species for feeding, shelter, breeding and movements, we recommend that wildlife passages across the Project perimeter be required rather than blocked by the proposed perimeter fence.

The 2013 DRECP Vegetation Map also indicates that rare stands of *Pleuraphis rigida* vegetation alliance (with a NatureServe state rarity rank of S2) occur along the eastern boundary of the proposed project site.

These stands of rare vegetation should be avoided. Figure 1 illustrates 2013 DRECP Vegetation Map information related to the proposed project site.

2. **Maintaining vegetation under PV arrays.** Emerging research based on 4 years of field studies at the Ivanpah Solar Energy Generating System (ISEGS) in Ivanpah Valley, CA indicates that, despite some negative effects of persistence within the solar field, survival and recruitment of rare native plants under and between heliostats in the three units of ISEGS provides clear benefit over conventional utility-scale solar design in which entire developments are graded (*Measuring and Evaluating Rare Plant Demography in the California Desert: Implications for Solar Energy Development*. Final Report to the California Energy Commission. Moore and Pavlik, in press).

Vegetation on the Project site is very low density and low in overall height. Because of these site conditions, we recommend strong consideration is given to simply leaving vegetation in place between the access roads located between rows of solar panels. This would greatly reduce need for vegetation removal and soil compaction; would reduce fuel consumption and cost for site preparation; aid in water infiltration; and reduce the costs associated with site restoration upon Project decommissioning.

3. **Proposed project is within the terminal end of sand transport cooridor.** Figure 2 illustrates the proposed project area in relation to the Chuckwalla Valley's sand transport corridor. Many desert sensitive species of plants and animals are dependent upon this natural feature. The DRECP's Alternative 3 proposed a Development Focus Area design that would avoid impacts within this ecologically important sand transport corridor. The proposed project site would not have conformed to DRECP Alternative 3's conservation goals (see Figure 3). The DEIS must assess how the proposed project site would avoid and/or mitigate for impacts to plant and animal communities dependent on the sand transport corridor.

4. **Carbon sequestration by desert vegetation, root systems, microbes, and soils vs. GHG benefits of proposed project.** Recent research has concluded that desert vegetation, especially woodland vegetation, and desert pavements contributed significantly to atmospheric carbon sequestration.

"Data shows that caliche is dynamic, and the processes of formation and weathering can occur within the time scales of solar unit deployments. Undisturbed vegetation produces CaCO3 as long as Ca is present or coming in by wind or water erosion. But, CO2 appears to be lost from CaCO3 where the vegetation has been removed.

Siting solar developments on previously disturbed lands are recommended. Desert riparian woodlands should especially be avoided for the protection of sequestered, and their ability to increase that C sequestration. Their deep roots and microbial associations continue to sequester both organic and inorganic carbon.

It is also recommended that solar developments be revegetated. Short-statured plants, such as cacti and shrubs such as *Encelia farinosa* also respire CO2, but continue to produce organic C and build up both organic and inorganic soil C. The modeling work under these shrubs is continuing, but these steps alone should provide the critical information to allow solar developments to produce needed, "green" energy and simultaneously reduce C loss and sustain buried inorganic and organic C." (Allen et al., 2013 p. 26)[1].

---

[1] Allen, Michael F., G. Darrel Jenerette, Louis S. Santiago. (University of California, Riverside). 2013. ***Carbon Balance in California Deserts: Impacts of Widespread Solar Power Generation.*** California Energy Commission. Publication number: CEC-500-2014-063.

The CO2 sequestration benefits of intact above ground desert vegetation, their below ground root systems and associated microbes, and the carbon storage provided by undisturbed carbon soils must be accounted for and analyzed as part of a carbon budgeting related to the purpose and need of this proposed project.

As part of a GHG emmissions / carbon sequestration analysis for the proposed project, the DEIS must analyze the amount of CO2 sequestration lost annually for every acre of proposed project site disturbed. This analysis must include:
i. carbon sequestration reduction/loss of above ground desert vegetation (non-woodland species)/acre/year,
ii. carbon sequestration reduction/loss of microphyll woodland species /acre/year, and
iii. amount of carbon dioxide potentially emitted into the atmosphere due to dissolution of carbon-rich soils that would be disturbed and exposed to atmospheric moisture during project construction and operation.

4. **Rare plant surveys, avoidance, and mitigation.** A review of the most recent update (April 2015) of the California Natural Diversity Database (CNDDB) for rare plants indicates that rare plant surveys were performed across the proposed project site in Spring 2012 and 2013, and summer-fall 2012. These surveys were performed under unfavorable conditions for germination of desert annual plants.

Spring and late summer / fall field surveys for the occurrence, distribution and abundance of rare annual species must occur in multiple years in anticipation of making observations during favorable, mediocre, and unfavorable years. Distributions, density, and demographic rates of desert annuals can vary dramatically in different types of years. Without multiple types of survey years, the essential relationships between population performance and very subtle landscape features and environmental triggers will most certainly remain undetected. Individuals conducting surveys for annual species must be appropriately trained in the response of annual species to landscape subtleties. They must anticipate, observe, and record distributional variation within survey sites and over multiple seasons in order to design effective management, mitigation, and restoration strategies. In many cases, sound management will require additional detailed demographic and distributional studies over multiple active seasons. The DEIS must contemplate these factors.

Thank you for fully considering these comments.
Sincerely,

Greg Suba

Greg Suba
Conservation Program Director, CNPS

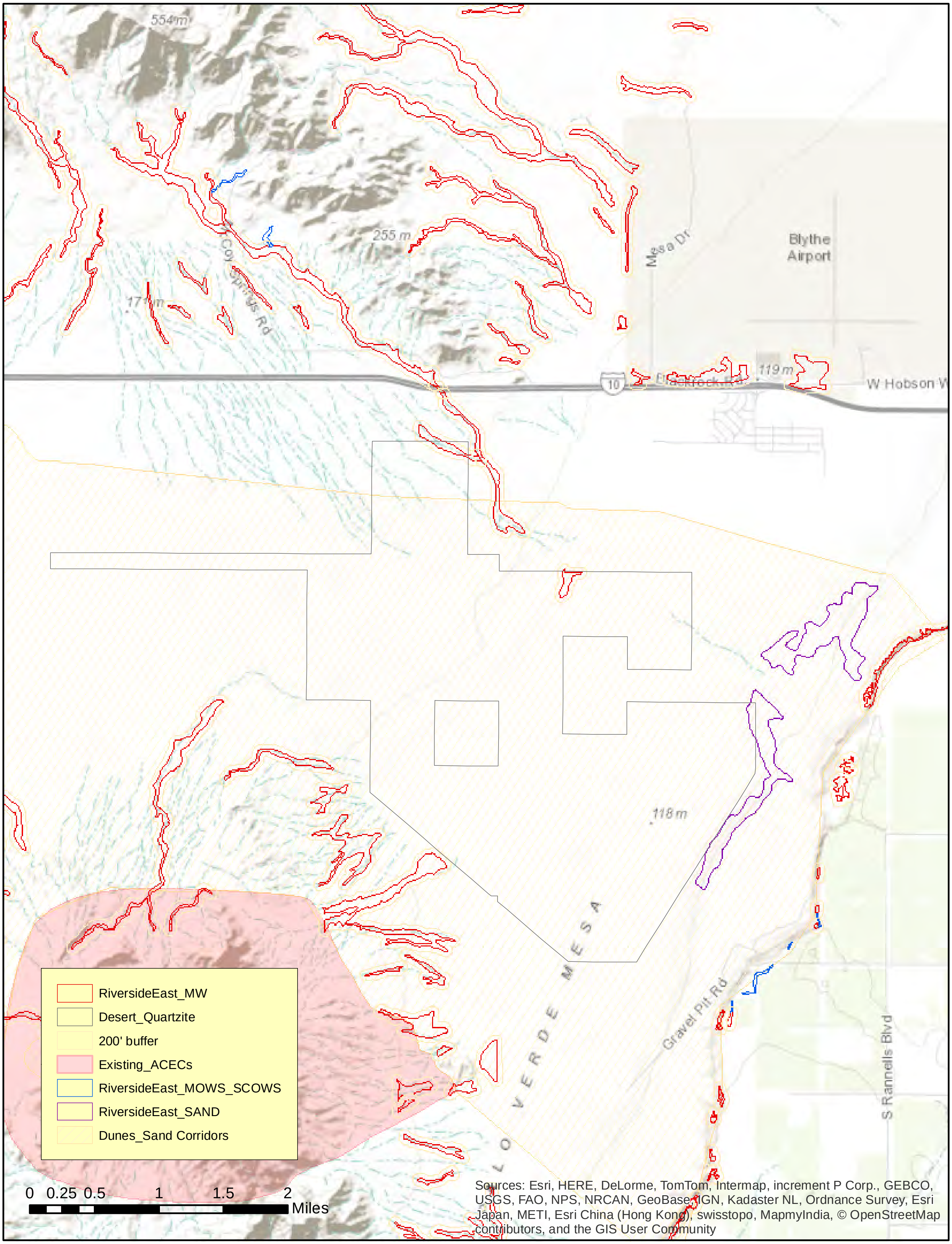
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Figure 1. 2013 DRECP Vegetation Map alliances relative to proposed project site. MW = microphyll woodlands; MOWS = DRECP Mojavean semi-desert wash scrub natural community; SCOWS = DRECP Sonoran-Coloradan semi-desert wash scrub natural community; SAND = DRECP North American warm desert dunes and sand flats natural community (Pleuraphis rigida)

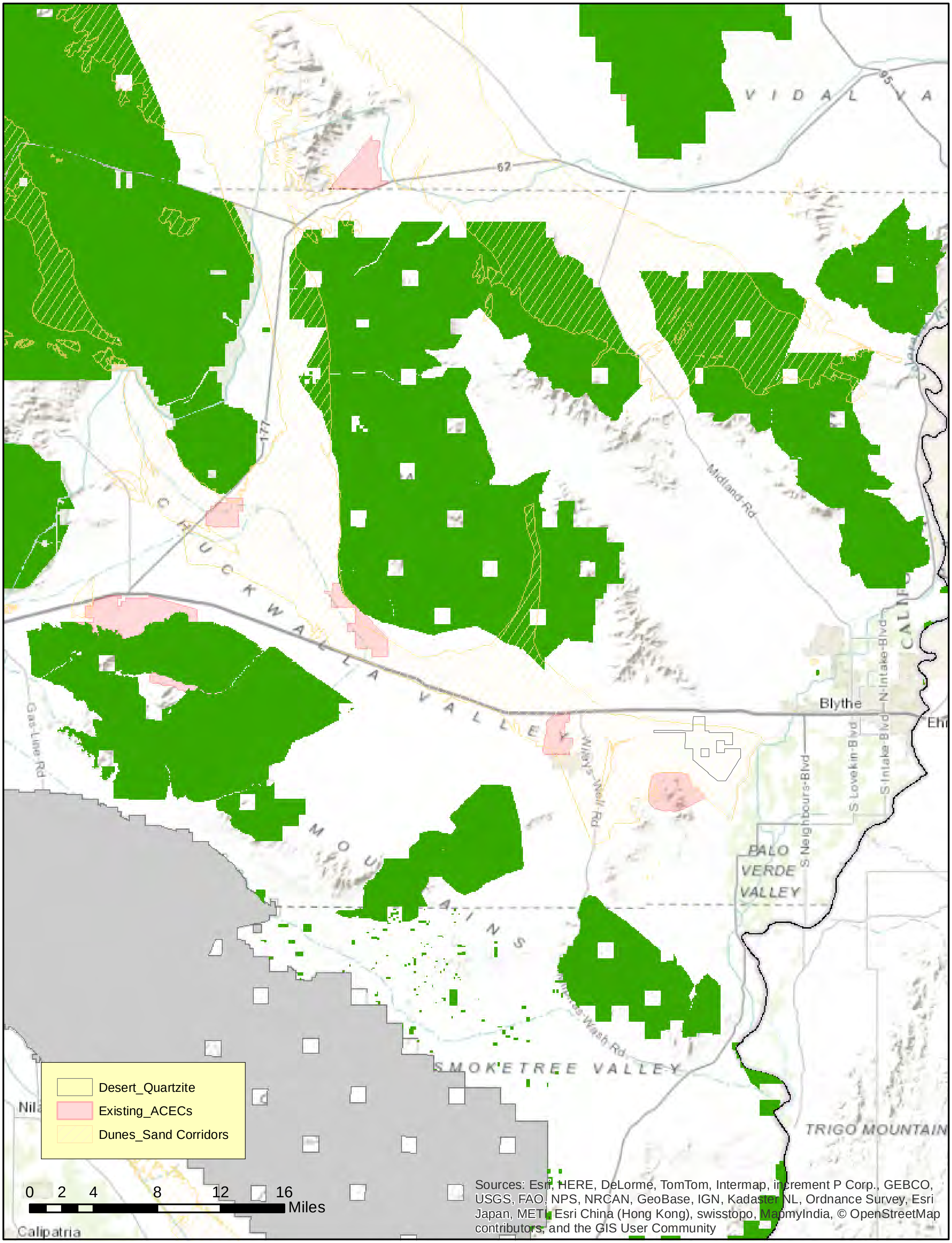
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Figure 2. Proposed project site relative to Chuckwalla Valley sand transport corridor.

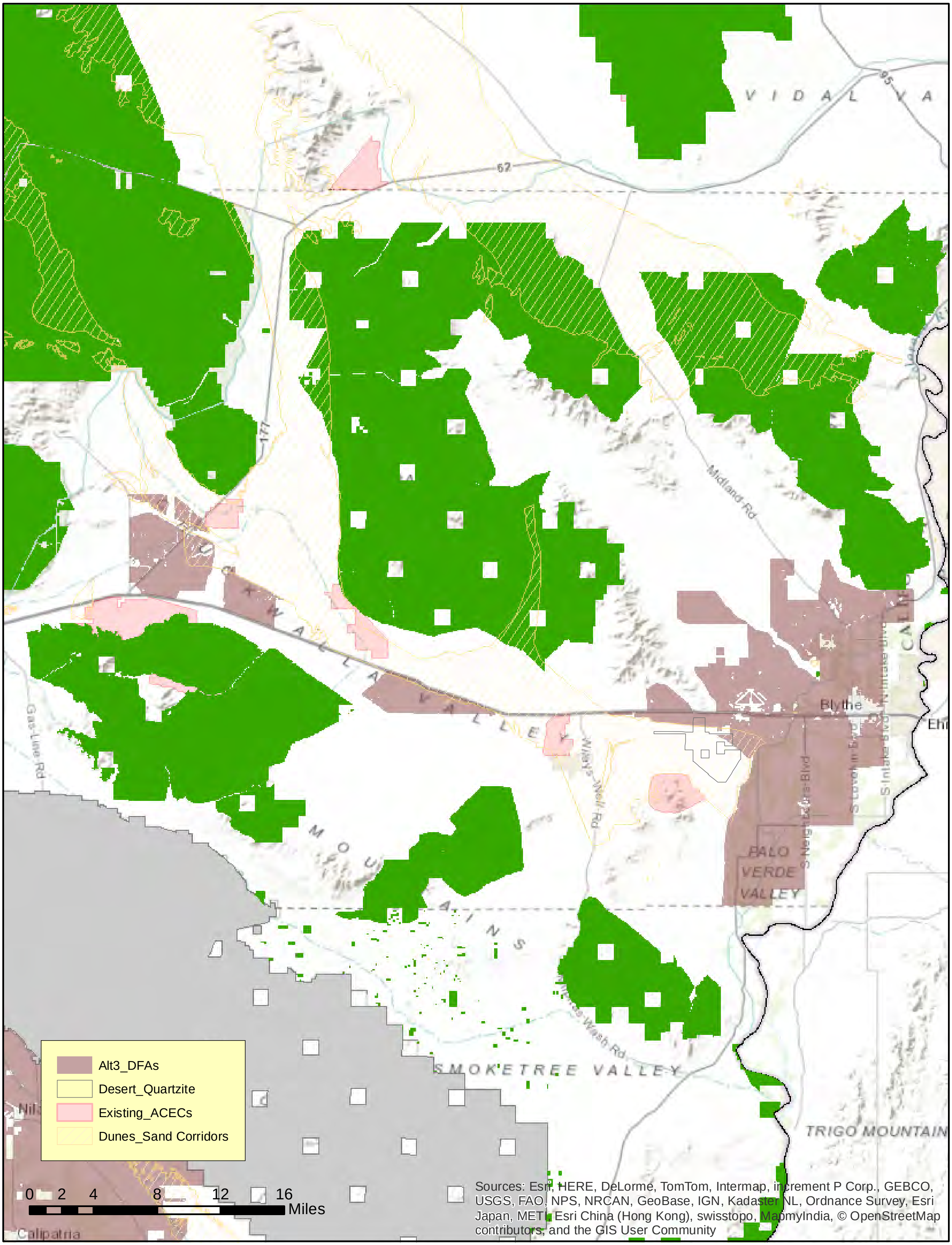
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Figure 3. DRECP Alternative 3 DFA alignment avoids impacts to ecologically important sand transport corridor. The proposed project site would not conform to those conservation goals.

COMMENTER	DATE
Defenders of Wildlife, Jeff Aardahl, California Representative, Natural Resources Defense Council, Helen O’Shea, and Sierra Club, Sarah K. Friedman	**April 13, 2015**

Defenders of Wildlife
Natural Resources Defense Council
Sierra Club

April 13, 2015

Cedric C. Perry, Project Manager
Bureau of Land Management
22835 Calle San Juan De Los Lagos, Moreno Valley, CA 92553-9046
Sent via email to: blm_ca_desert_quartzite_solar_project@blm.gov

Dear Mr. Perry;

Thank you for the opportunity to provide scoping comments to help guide the preparation of a Draft Environmental Impact Statement ("DEIS") and Proposed Amendment to the California Desert Conservation Area ("CDCA") Plan for the proposed Desert Quartzite Solar Project ("Project").

These comments are submitted on behalf of Defenders of Wildlife ("Defenders"), the Natural Resources Defense Council ("NRDC") and the Sierra Club, all non-profit public interest conservation organizations with offices in California as well as elsewhere in this country, and many members and supporters in California.

Brief description of the proposed project and Federal action:

The Project site is located in eastern Riverside County, approximately 2.75 miles southwest of the western extent of the City of Blythe, California and south of Interstate Highway 10 (I-10) and approximately 2.5 miles to the southwest of the Blythe Airport. The corridor for the Gen-Tie Line will run generally west from the proposed on-site substation near the northwestern edge of the Project to the Colorado River Substation, located approximately 2.8 miles to the west of the Project fenceline.

The Project will occupy approximately 2,453 acres, and the 600-footwide Gen-Tie Line study corridor occupies approximately 205 acres. The Gen-Tie Line is approximately 2.8 miles long (portion outside solar facility fenceline up to near northern boundary of SCE Colorado River Substation) and will occur within a 160-foot wide operational ROW corridor occupying approximately 55 acres.

We offer the following comments regarding issues that should be addressed in the forthcoming National Environmental Policy Act analysis:

1. **Groundwater**. The Project applicant is considering the use of local groundwater to support the construction and operation of the Project. We understand that groundwater studies will be undertaken to determine if this is a viable option or if another source of water would be pursued, such as from the local irrigation district. About 1,300 to 1,800 acre feet (AF) of water would be required for construction, and approximately 20 AF/year would be used for process water, fire protection, dust control, vegetation management, and at the O&M building, and 18 AF per year would be used for up to two annual panel washings. We strongly support an analysis to determine a viable and sustainable source of water for all aspects of the project, including whether or not use of groundwater would affect inflow into the Colorado River. Groundwater impacts should be mitigated sufficiently to ensure that storage is not adversely impacted and inflow into the Colorado River is not adversely impacted.

2. **Ground preparation**. The project applicant has proposed to prepare the land surface for the Project using a technique called "disc and roll" and micrograding. This technique has been used on other projects which results in removal of all vegetation and pulverizing the surface soil layers. It is typically followed by watering and compaction, and stabilizing loose soil particles with a chemical-based binder.

Vegetation on the Project site is very low density and low in overall height. Because of these site conditions, we recommend strong consideration is given to simply leaving vegetation in place between the access roads located between rows of solar panels. This would greatly reduce need for vegetation removal and soil compaction; would reduce fuel consumption and cost for site preparation; aid in water infiltration; and reduce the costs associated with site restoration upon Project decommissioning.

3. **Desert washes**. The Plan of Development indicates there are three primary drainages occurring within the expanded study area for biological resources. It is unclear to that extent these woodland communities occur in drainages on the Project site. The Plan indicates that Dry Desert Wash Woodlands would be avoided and that PV panels would not be placed in "significant drainages." It is unclear what constitutes "significant drainages." We consider any drainage supporting Microphyll Woodland species of plants to be significant.

We recommend that the drainages supporting Microphyll Woodland species (blue palo verde, smoke tree or desert ironwood) be fully delineated and that a 100 yard protective buffer (no disturbance zone) be established on either side of these drainages. In addition, since these drainages are most often used by various wildlife species for feeding, shelter, breeding and movements, we recommend that wildlife passages across the Project perimeter be required rather than blocked by the proposed perimeter fence.

4. **Mojave fringe-toed lizard**. The Plan of Development indicates numerous Mojave fringe-toed lizards were observed during site surveys on the western portion of the project and the gen-tie route.

Consideration should be given to modifying the PV solar panel layout to avoid patches of suitable habitat occupied by the species. Any unavoidable impacts to their habitat should be compensated at a ratio of 3:1.

5. **Birds and Bats**. A Bird and Bat Protection Plan should be developed for the project and included in the Draft NEPA analysis. This draft plan should be open to public review and comment. Recent field studies indicate various species of water-associated birds may be attracted to vast arrays of PV solar panels due to what is called "lake effect" caused by reflected polarized light. The proximity of the Project to the Colorado River, a known migratory bird flyway, necessitates that robust, systematic monitoring and reporting be required, and that a timely and effective adaptive management plan is in place to mitigate significant bird mortality that may occur.

6. **Wildlife Habitat Connectivity**. Connectivity corridors have been identified and mapped by SC Wildlands that intersect the northwest corner of the proposed project's Right of Way (ROW) footprint. Analysis is required to determine the impact of the proposed project on potential wildlife habitat connectivity corridors and ensure important linkages are not severed due to development of a solar facility in this area. Modifications to the proposed project ROW should be considered to remove the portion that conflicts with the identified wildlife corridor.

This concludes our issue scoping comments and recommendations for the Project. We hope you find them helpful in preparing a Draft Environmental Impact Statement for the Project.

Sincerely,

Jeff Aardahl
California Representative
Defenders of Wildlife
jaardahl@defenders.org

Helen O'Shea
Natural Resources Defense Council
hoshea@NRDC.org

Sarah K. Friedman

Sarah K. Friedman Sierra Club
Sarah.friedman@sierraclub.org

COMMENTER	DATE
The Wilderness Society – BLM Action Center, Alex Daue, Assistant Director, Renewable Energy, Denver, CO, and CALWild (California Wilderness Coalition), Ryan Henson, Senior Policy Director, Anderson, CA	**April 13, 2015**

April 13, 2015

Submitted via email to (blm_ca_desert_quartzite_solar_project@blm.gov)

Cedric C. Perry
Project Manager
Bureau of Land Management
22835 Calle San Juan De Los Lagos
Moreno Valley, CA
92553-9046

Re: Desert Quartzite Solar Scoping Comments

Dear Mr. Perry,

The Wilderness Society and California Wilderness Coalition support responsible, well-planned and sited renewable energy development, including on appropriate public lands, as part of a strategy for addressing climate change, along with aggressive efforts to increase energy efficiency, build distributed generation such as rooftop solar, and reduce demand with demand-side management. Areas with important and sensitive resources and values are inappropriate for development, and disturbed and degraded lands, including both public and private lands, will best serve as areas for focusing renewable energy development away from areas of greatest biological importance or sensitivity.

We support the guided development approach established in BLM's Solar Programmatic Environmental Impact Statement (Western Solar Plan), including the focus on development in appropriate areas within Solar Energy Zones (SEZs). The proposed Desert Quartzite Solar Project (Desert Quartzite) is within the Riverside East SEZ. All energy development should follow the mitigation hierarchy of avoiding, minimizing and mitigating impacts through compensatory, off-site mitigation. BLM should follow the guidance in Secretarial Order 3330[1] on mitigation and BLM's Regional Mitigation Manual[2] in establishing mitigation requirements for Desert Quartzite. Implementation of these policies is a fundamental requirement under the Federal Lands Policy and Management Act (FLPMA) to protect the diverse resources of our public lands.

These scoping comments focus on BLM's policies regarding inventory and management of lands with wilderness characteristics. We understand that other groups are submitting comments that address potential wildlife and other impacts.

Section 201 of FLPMA requires the BLM to maintain on a continuing basis an inventory of all public lands and their resources and other values, including lands with wilderness characteristics. IM 2011-154 and Manuals 6310 and 6320 set forth the agency's current policy for implementing that requirement. The IM directs BLM to "conduct and maintain inventories regarding the presence or absence of wilderness characteristics, and to consider identified lands with wilderness characteristics in land use plans and when analyzing projects under [NEPA]." Manual 6310 requires BLM to consider whether to update or conduct a wilderness characteristics inventory when a project that may impact wilderness characteristics is undergoing NEPA analysis (Manual 6310 at .06(A) (4)). Manual 6320 requires BLM to ensure that "wilderness characteristics inventories are considered and that, as warranted, lands with wilderness characteristics are protected in a manner consistent with this manual in BLM planning processes" (Manual 6320 at .04(C) (2)).

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[1] http://www.doi.gov/news/upload/secretarial-order-mitigation.pdf

[2] http://www.blm.gov/pgdata/etc/medialib/blm/wo/Information_Resources_Management/policy/im_attachments/2013.Par.57631.File.dat/IM2013-142_att1.pdf

BLM must analyze potential impacts to lands with wilderness characteristics from Desert Quartzite utilizing updated inventory information, either from inventories that have been recently completed as part of the Desert Renewable Energy Conservation Plan or by conducting new inventories for the project area. If lands with wilderness characteristics are found within the proposed project area, BLM should avoid impacts to those lands by excluding them from the development area. If there are unavoidable impacts to lands with wilderness characteristics, BLM should off-set them through compensatory mitigation. The Western Solar Plan established a number of measures for avoiding, minimizing and mitigating impacts to lands with wilderness characteristics, which BLM should use to address potential impacts from Desert Quartzite. (Western Solar Plan Record of Decision[3] pp. 54-56; excerpt included as Attachment 1)

We appreciate the opportunity to comment and look forward to working with you.

Sincerely,

Alex Daue
Assistant Director, Renewable Energy
The Wilderness Society – BLM Action Center
1660 Wynkoop Street, Suite 850
Denver, CO 80202
alex_daue@tws.org
(303) 650-5715

Ryan Henson
Senior Policy Director
CalWild (California Wilderness Coalition)
3313 Nathan Drive
Anderson, CA 96007
rhenson@calwild.org
(530)-365-1455

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[3] http://solareis.anl.gov/documents/docs/Solar_PEIS_ROD.pdf

Attachment 1 – excerpt from Western Solar Plan Record of Decision (pp. 54-56)

A.4.1.2 Design Features for Specially Designated Areas and Lands with Wilderness Characteristics

The following design features have been identified to avoid, minimize, and/or mitigate potential impacts on specially designated areas and lands with wilderness characteristics from solar energy development identified and discussed in Sections 5.3.1 and 5.3.2 of the Draft and Final Solar PEIS.

A.4.1.2.1 General

LWC1-1 Protection of existing values of specially designated areas and lands with wilderness characteristics shall be evaluated during the environmental analysis for solar energy projects, and the results shall be incorporated into the project planning and design.

(a) Assessing potential impacts on specially designated areas and lands with wilderness characteristics shall include, but is not limited to, the following:

- Identifying specially designated areas and lands with wilderness characteristics in proximity to the proposed projects. In coordination with the BLM, developers shall consult existing land use plans and updated inventories.
- Identifying lands that are within the geographic scope of a proposed solar project that have not been recently inventoried for wilderness characteristics or any lands that have been identified in a citizen's wilderness proposal in order to determine whether they possess wilderness characteristics. Developers shall consider including the wilderness characteristics evaluation as part of the processing of a solar energy ROW application for those lands without a recent wilderness characteristics inventory. All work must be completed in accordance with current BLM policies and procedures.
- Evaluating impacts on specially designated areas and lands with wilderness characteristics as part of the environmental impact analysis for the project and considering options to avoid, minimize, and/or mitigate adverse impacts in coordination with the BLM.

(b) Methods to mitigate unavoidable impacts on specially designated areas and lands with wilderness characteristics may include, but are not limited to, the following:

- Acquiring wilderness inholdings from willing sellers.
- Acquiring private lands from willing sellers adjacent to designated wilderness.
- Acquiring private lands from willing sellers within proposed wilderness or Wilderness Study Areas.
- Acquiring other lands containing important wilderness or related values, such as opportunities for solitude or a primitive, unconfined (type of) recreation.
- Restoring wilderness, for example, modifying routes or other structures that detract from wilderness character.

- Contributing mitigation monies to a “wilderness mitigation bank,” if one exists, to fund activities such as the ones described above.
- Enacting management to protect lands with wilderness characteristics in the same field office or region that are not currently being managed to protect wilderness character. Areas that are to be managed to protect wilderness characteristics under this approach must be of sufficient size to be manageable, which could also include areas adjacent to current WSAs or adjacent to areas currently being managed to protect wilderness characteristics.

A A.4.1.2.2 Site Characterization, Siting and Design, Construction

LWC2-1 Solar facilities shall be sited, designed, and constructed to avoid, minimize, and/or mitigate impacts on the values of specially designated areas and lands with wilderness characteristics.

COMMENTER	DATE
Colorado River Indian Tribes (CRIT), Chairman Dennis Patch, CRIT Tribal Council, Parker, AZ	**April 13, 2015**

COLORADO RIVER INDIAN TRIBES
Colorado River Indian Reservation
26600 MOHAVE RD.
PARKER, ARIZONA 85344
TELEPHONE (928) 669-9211
FAX (928) 669-1216

April 13, 2015

Via E-Mail and U.S. Mail

ATTN: Cedric C. Perry
Project Manager
BLM California Desert District Office
22835 Calle San Juan de Los Lagos
Moreno Valley, CA 92553
E-Mail: blm_ca_desert_quartzite_solar_project@blm.gov

Re: **Environmental Impact Statement for the Desert Quartzite Solar Project and Possible Amendment to the California Desert Conservation Area Plan, Riverside County, CA**

Dear Mr. Perry:

Per BLM's Notice of Intent, 40 Fed. Reg. 12195 (Mar. 6, 2015), the Colorado River Indian Tribes ("CRIT" or "Tribes") submit these comments to help guide the scoping and content of the Environmental Impact Statement the BLM is preparing for the Desert Quartzite Solar Project ("the Project"), a 300-MW photovoltaic energy-generating facility, which is proposed on 4,845 acres of public land, partially located within the Riverside East Solar Energy Zone (SEZ), southwest of Blythe, California. CRIT is a federally recognized Indian tribe whose members include Mohave, Chemehuevi, Navajo, and Hopi people. The southwestern edge of CRIT's reservation is approximately 10 miles from the Project site, consequently, CRIT is traditionally and culturally affiliated with the subject area as CRIT's Mohave and Chemehuevi members and their ancestors have lived and traveled in the Project area since time immemorial.

Because of the Tribes' past, present, and future connection to the land on which the Project is proposed, CRIT has grave concerns about the Project's potential for significant cultural resource impacts. The Desert Quartzite Project is one of dozens of renewable energy projects either approved or under consideration by BLM in the area. The collective impact of this transformation of the desert has had, and will continue to have, considerable adverse impacts on the Tribes and the cultural, spiritual, and religious practices of CRIT members. CRIT is increasingly concerned that the federal government intends to approve all renewable energy projects, no matter what the cost to affected tribes, native plants and animals, and the desert ecosystem as a whole.

CRIT is extremely concerned about cultural resource impacts relating to this Project, as it is located in an especially sensitive cultural resource area; the cultural resources and artifacts that will be excavated, collected, and possibly damaged or destroyed to make way for the Project are both sacred and finite. According to the belief system of CRIT's Mohave members, the disturbance of any cultural resources affiliated with their ancestors is taboo, and thus considered a severe cultural harm. CRIT therefore cannot support any project that will likely result in the disturbance or destruction of thousands of cultural resources and artifacts.

The National Environmental Policy Act and the National Historic Preservation Act require BLM to fully analyze the Project's impacts to cultural resources before it publishes the draft environmental impact statement, to prepare and present measures to avoid or lessen impacts on cultural resources, and to consider impacts to Tribal members throughout its impact analysis, as detailed below.

I. The DEIS Must Broadly Consider Impacts to Cultural Resources.

CRIT is concerned about the cultural harm that will result from both the unearthing and destruction of cultural resource artifacts and the Project's impacts on other resources. In preparing EISs for other solar energy facilities in the region, BLM has artificially constrained the definition of "cultural resources," thereby undermining the accuracy and quality of its subsequent analysis. In particular, BLM has taken the position that significant cultural resources are only those buildings, sites, structures, objects, and districts eligible for inclusion on the National Register of Historic Places. However, NEPA guidelines specify that EISs must address impacts to "historic *and* cultural resources" (40 C.F.R. § 1502.16(g) (emphasis supplied)), thus requiring a more expansive analysis than the one required by the National Historic Preservation Act. Such resources necessarily include viewsheds and landscapes, plants and animals used in and/or central to cultural and religious practices and creation stories, and religious and customary practices (e.g., hunting and gathering, religious ceremonies, and trail-walking). By using the correct definition of cultural resources for this Project, BLM will ensure that impacts to a host of important tangible and intangible resources are properly considered.

In addition, the DEIS must avoid conflating eligibility for the National Register of Historic Places under the NHPA and significant adverse effect under NEPA. In the past, BLM has taken the position that impacts to archaeological resources are significant for purposes of NEPA only if they are eligible for listing on the NRHP. This classification muddles two separate statutory schemes. Impacts to archaeological resources considered ineligible for listing on the NRHP—perhaps because of their lack of integrity—may nevertheless be significant for NEPA purposes.

II. The DEIS Must Ensure that Potential Impacts to Known and Unknown Cultural Artifacts Are Analyzed and Avoided.

Given CRIT's ongoing experience with utility-scale solar development on BLM land near its Reservation, the Tribes are concerned with the Project's likely impact on both known and unknown archaeological resources. Many of these cultural artifacts are intimately linked to current CRIT members, who consider their disturbance and/or damage to be a significant cultural harm. While cremation sites are of unique importance to the Tribes, other types of artifacts, including groundstones, ceramics, and lithics, are also held sacred. CRIT is also concerned about visual impacts to cultural resources, which have the potential to degrade cultural resource value.

The May 23, 2014 Revised Plan of Development (POD) for the Project states that "a Class I cultural resources records search and literature review has been completed and a Class III field survey of the Project Site will be performed in the future." Revised POD, p. 51. The results of the Class III survey have not yet been made available to CRIT, but the POD did state that the "Project Site is in an area known to be rich with cultural resources" and referenced the "wide variety of cultural resources" found at the nearby Blythe Solar Power Project and Genesis Solar Energy Project. *Id.* The POD surmises that "[t]he high density of cultural resources [at the Project Site] can be attributed to the proximity of the Colorado River and other natural resources," as "[p]rehistoric occupation of this area began several millennia ago." *Id.* Surveying reports and assessments conducted for nearby renewable energy projects corroborate this characterization of the Project site's cultural resource significance. For instance, an Ethnographic Assessment (EA) carried out for the McCoy Solar Energy Project in March 2013 identified substantial cultural resources in the Project's vicinity and recommended "[a]dditional archaeological research and pedestrian inventory." . McCoy EA, p. 71.

The Class III cultural resource survey must be completed prior to the DEIS's cultural resource analysis,, so that the environmental review can take a hard look at potential impacts to the identified resources. CRIT encourages BLM to pursue non-invasive options for determining NRHP eligibility, such as an ethnographic report rather than destructive excavation and testing. BLM's formal government-to-government consultation, as required under Section 106 of the NHPA, can also be used to gather information related to the eligibility of these sites.

CRIT also reiterates that NRHP-eligibility is not determinative of NEPA significance. Given the strong connection between CRIT's members and these archaeological resources, the DEIS must analyze the potential harm from any disturbance to these items and potential methods for mitigation. CRIT does not consider excavation and "data recovery" adequate mitigation for the cultural harm caused by disturbance of these resources; as such, the DEIS must consider avoidance of such resources. If avoidance is not considered feasible, the DEIS must carefully document and justify this reasoning.

Finally, BLM has typically relied on Programmatic Agreements or Memoranda of Agreement to comply with Section 106 of the NHPA for utility-scale solar projects, which often improperly defers consideration of cultural resource impacts until after a project has already been approved. A programmatic agreement is **not** appropriate for this Project, as effects on known historic properties can, and must, be fully determined prior to Project approval. 36 C.F.R. § 800.14(b)(1). All cultural resources should be surveyed, inventoried, and evaluated in a manner that does not harm the resources or remove them from the site prior to preparation of the DEIS so that the environmental analysis fully and adequately takes cultural resource impacts into account. BLM has provided CRIT with early information regarding the Project, and now must consult with CRIT prior to beginning its DEIS cultural resource analysis in order to take into account CRIT's concerns related to adverse effects on known historic properties and potential impacts on unanticipated cultural resources. 36 C.F.R. § 800.6(a). All information regarding sensitive historic properties and cultural resource information should be kept confidential. BLM must also ensure that cultural resource mitigation and treatment plans are in place prior to any ground disturbing activities at the site.

III. The BLM Must Explain Why the Plan of Development Requires Desert Quartzite, LLC to Obtain a Cultural Resource Use Permit Under the Archaeological Resources Protection Act.

The May 2014 POD states that Desert Quartzite, LLC will need a cultural resource use permit under the Archaeological Resources Protection Act (ARPA) "based on the planned cultural resources investigations." Revised POD, p. 28. Yet, the ARPA only requires a permit where individuals are planning to excavate, remove, damage or otherwise alter archaeological resources—none of which would be necessary for a Class III survey. CRIT urges Desert Quartzite, LLC, Riverside County, and BLM to pursue a policy of cultural resource avoidance whenever possible; however, where avoidance is not feasible, *in-situ* reburial provides the next best option for cultural resource mitigation. A reburial policy further eliminates the need for an ARPA permit, as no cultural resource removal or excavation would take place.

BLM has told CRIT in the past that the ARPA prevents the agency from pursuing CRIT's preferred mitigation measure, but the law does not support this position. Companies are not required to obtain ARPA permits where they are conducting activities on public lands pursuant to other permits or entitles, such as a right-of-way grant. *See* 43 C.F.R. section 7.5(b)(1) (no ARPA permit is required "for any person conducting activities on the public lands under other permits, leases, licenses, or entitlements for use, when those activities are exclusively for purposes other than the excavation and/or removal of archaeological resources, even though those activities might incidentally result in the disturbance of archaeological resources"); *see also Attaki v. U.S.*, 746 F.Supp. 1395, 1410 (D. Ariz. 1990) ("As evidenced by the language of the statute and the exemptions to its applicability, the Act is clearly intended to apply specifically to purposeful excavation and removal of archaeological resources, not excavations which may, or in fact inadvertently do, uncover such resources."); *Quechan Tribe of Ft Yuma Indian Reservation v. U.S. Dept. of the Interior*, 927 F.Supp.2d 921, 947 (S.D. Cal. 2013) (ARPA permit not required where Project's purpose was to provide reliable source of wind energy and not to excavate or remove archaeological resources). Thus, BLM should clarify and revise its position with respect to the ARPA permit and allow CRIT to rebury any artifacts that cannot be avoided.

IV. The DEIS Must Adequately Consider Cumulative Impacts to Cultural Resources.

The BLM must take a hard look at cumulative impacts to cultural resources. NEPA requires agencies to consider cumulative impacts, meaning "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions." 40 C.F.R. §§ 1508.7, 1508.25(c)(3). "Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." 40 C.F.R. § 1508.7.

As CRIT has explained, the collective and continual destruction and removal of cultural resources from the Tribes' ancestral lands due to renewable energy projects has already caused tremendous spiritual harm to CRIT members. In addition to triggering extensive cultural resource removal, these renewable energy projects are often sited in a way that severs the connectivity between cultural resource sites—a connectivity that is vital to the traditional value of these cultural resources. In considering the potential cultural resources impacts of the Desert Quartzite Project, BLM must analyze those impacts in light of other past, present, and reasonably foreseeable future actions impacting cultural resources in this region. BLM must also describe the methodology it uses to assess cumulative resources and list out the other projects it considers in analyzing cumulative impacts.

V. The DEIS Must Include a Distributed Generation Alternative.

BLM must take care in identifying its "Purpose and Need" for the Project to ensure that the DEIS properly considers an adequate range of alternatives. For other projects in the area, BLM has artificially constrained its alternatives analyses by stating that the purpose and need for solar energy projects is to "respond to the Applicant's application" for a right of way grant. *See, e.g.*, DEIS for the McCoy Solar Energy Project at ES-2. But under Ninth Circuit precedent, BLM is prohibited from "adopting private interests to draft a narrow purpose and need statement that excludes alternatives that fail to meet specific private objectives." *National Parks & Conservation Ass'n v. Bureau of Land Management*, 606 F.3d 1058, 1072 (9th Cir. 2010). For this Project, BLM must identify the *public purposes* to be achieved, rather than simply reacting to the whims of the developer.

In addition, BLM has frequently stated that it is mandated to develop utility-scale renewable energy projects on public land in order to meet requirements set forth in the Energy Policy Act of 2005, Executive Order 13212, and Secretarial Order 3285A1. However, these federal laws and policies, while encouraging such development, do not require it, particularly when renewable energy projects will have significant and adverse environmental consequences. The "Purpose and Need" for the project should also include a commitment to protecting cultural and biological resources, as well as the visual integrity of the desert landscape.

For these reasons, CRIT urges BLM to adopt a Purpose and Need statement that allows for the consideration of a broad range of alternatives. In particular, the statement should focus on the public benefits to be achieved: reduction in greenhouse gas emissions, increased energy independence, and economic development. A statement of Purpose and Need focused on these topics will allow the DEIS to properly include both a distributed generation and disturbed lands alternative. Such Projects can achieve the same goals as utility-scale solar projects, but with far fewer impacts to cultural resources and other environmental resources. Relatedly, the DEIS must include consideration of an environmentally superior alternative with respect to cultural and biological resources.

VI. BLM Must Consider the Environmental Justice Impacts of the Desert Quartzite Project.

The vast transformation of an entire cultural landscape has significant environmental justice implications. The renewable energy benefits of the Project will flow to energy customers in southern California and the shareholders of large energy companies. The impacts of the Project, however, will be uniquely felt by CRIT and other area tribes and their members whose interests in this area extend beyond economics to its cultural and spiritual value. As acknowledged by CEC Commissioner Karen Douglas in a siting proceeding for another utility-scale solar project proposed in this region, "Indian tribes maintain long-standing ancestral and traditional practices that connect their identities as Indian people to the environment, unlike other populations that do not have territories linked to their collective identities." Palen Solar Electric Generating System PMPD at 6.3057. Shifting the burden of renewable energy development to unique communities that have occupied this landscape since time immemorial, while providing such communities with no identified benefits, is the very definition of environmental injustice. BLM must both recognize and address such realities.

VII. BLM Must Implement Early Consultation on the Desert Quartzite Project.

According to the Notice of Intent, "BLM will consult with Indian tribes on a government-to-government basis in accordance with Executive Order 13175 and other polices," presumably including the NHPA and its implementing regulations. This language implies that BLM will begin consultation at some point in the future—perhaps after the DEIS has been developed. But the regulations implementing Section 106 of the NHPA state that "[a]gencies should consider their section 106 responsibilities *as early as possible* in the NEPA process." 36 C.F.R. § 800.8(a)(1) (emphasis added); *see also id.* § § 800.2(c)(2)(ii)(A) ("The agency official shall ensure that the section 106 process is initiated early in the undertaking's planning, so that a broad range of alternatives may be considered during the planning process for the undertaking."); *id.* § 800.2(c)(2)(ii)(A) ("Consultation should commence early in the planning process . . . .").

Though BLM has sent CRIT written notifications regarding the early stages of the application process, these documents and invitations to public meetings are not a substitute for BLM's Section 106 consultation obligations. For numerous renewable projects throughout the region, including the Genesis Solar Energy Project, the Modified Blythe Solar Energy Project, and the Six-State Solar Programmatic EIS, BLM utterly failed to engage CRIT in meaningful consultation regarding the impacts of the projects. Instead, the agency has resorted to generic form letters arriving late in the process to fulfill its responsibility under the NHPA and other federal policies. Thus, CRIT requests that BLM promptly engage with the Tribes on a meaningful, government-to-government level for this Project. Consultation provides an appropriate forum for CRIT to communicate sensitive cultural resource information regarding the Project site, rather than having to do so in a public comment. CRIT also requests that BLM include a summary of all consultation with affiliated tribal entities and the State Historic Preservation Officer (SHPO), including identification of NRHP-eligible sites and development of cultural resource management and monitoring plans.

The DEIS should also address Executive Order 13007, distinguish it from Section 106 consultation, and discuss how BLM will avoid adversely affecting the physical integrity, accessibility, and use of sacred sites in the Project area.

Thank you for considering CRIT's comments. To best understand how these comments are taken into account in the DEIS, we request that BLM provide written responses to our concerns, either in a letter to the Tribe and/or in the DEIS. Please copy Rebecca A. Loudbear, CRIT Attorney General, at rloudbear@critdoj.com, and Nancy H. Jasculca, CRIT Deputy Attorney General, at njasculca@critdoj.com, on any written correspondence to the Tribe.

Sincerely,

Chairman Dennis Patch
Colorado River Indian Tribes

Cc: CRIT Tribal Council
Rebecca A. Loudbear, CRIT Attorney General
Nancy H. Jasculca, CRIT Deputy Attorney General
Wilene Fisher-Holt, CRIT Museum/Cultural Resources
David Harper, Chairman, Mohave Elders Committee

WRITTEN COMMENTS RECEIVED DURING PUBLIC SCOPING PERIOD REGARDING THE CEQA PROCESS

COMMENTER	DATE
Riverside County Airport Land use Commission (RCALUC)	**April 13, 2015**

Riverside County
Airport Land Use Commission
RCALUC

AIRPORT LAND USE COMMISSION
RIVERSIDE COUNTY

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Hemet

Greg Pettis
Cathedral City

Steve Manos
Lake Elsinore

STAFF

Director
Ed Cooper

John Guerin
Russell Brady
Barbara Santos

County Administrative Center
4080 Lemon St, 14th Floor.
Riverside, CA 92501
(951) 955-5132

www.rcaluc.org

April 7, 2015

Mr. Larry Ross, Principal Planner
Riverside County Planning Department
4080 Lemon Street, Twelfth Floor
Riverside CA 92501
VIA HAND DELIVERY

RE: Notice of Preparation of Draft Environmental Impact Report – Conditional Use Permit No. 3721 (CUP03721)

Dear Mr. Ross:

Thank you for providing the Riverside County Airport Land Use Commission (ALUC) with a copy of the Agency Notice of Preparation of an Environmental Impact Report to analyze the site-specific and cumulative impacts of a proposed 300 megawatt solar photovoltaic (PV) electrical generating facility on a site of over 5,000 acres located southerly of Interstate 10, westerly of Rannells Boulevard, and southwesterly of the unincorporated community of Mesa Verde within the Palo Verde Valley Area Plan. Over 95 percent of the site is located within public lands managed by the United States Bureau of Land Management, but the site does include 160 acres of privately owned land. This provides the County with land use jurisdiction over at least a portion of the project.

A number of other solar projects have either been approved or are in the process of approval within this area. The Blythe Airport could ultimately be surrounded by solar projects, with consequent impacts on flight safety due to glint/glare and proliferation of aboveground electrical transmission lines. ALUC is growing increasingly concerned that the cumulative glint and glare effects of the multiple solar power plant projects and the cumulative effects of multiple transmission lines may affect the usability of Blythe Airport.

The 160-acre area of privately owned land is not located within an Airport Influence Area, but the overall project boundary including the public land extends into Compatibility Zones D and E of the Blythe Airport Influence Area. While ALUC has no official jurisdiction over development on federal lands, this project would be constructed and operated by a for-profit private entity. We would appreciate an opportunity to formally review the project at a public hearing through the ALUC application process. Projects submitted by April 29, 2015 and determined to be complete would be eligible for consideration at ALUC's meeting on June 11, 2015.

We appreciate the opportunity to comment on this proposal and look forward to working with both the Riverside County Planning Department and the Bureau of Land Management as this project proceeds through the evaluation process. ALUC reserves the right to issue additional comments as the project moves forward, in order to ensure that all potentially significant impacts upon the safety of air navigation are mitigated. We would like to receive a CD copy of the Environmental Impact Report upon its release, and would like to remain on your mailing list for subsequent notifications.

If you have any questions, please contact John Guerin, ALUC Principal Planner, at (951) 955-0982 or jguerin@rctlma.org.

Sincerely,
RIVERSIDE COUNTY AIRPORT LAND USE COMMISSION

Edward C. Cooper, Director

JJGJG

cc: Cedric C. Perry, U.S. Bureau of Land Management (Moreno Valley office)
Simon Housman, ALUC Chairman
Daryl Shippy, Riverside County EDA – Aviation Division
ALUC Staff

Y:\ALUC\Blythe\Desert Quartzite Solar Project CUP03721 - ltr to County Plng.doc

APPENDIX F

COURT REPORTER TRANSCRIPTS

PUBLIC SCOPING MEETING, PARKER, AZ, MARCH 23, 2015
PUBLIC SCOPING MEETING, BLYTHE, CA, MARCH 24, 2015

PUBLIC SCOPING MEETING, PARKER, AZ, MARCH 23, 2015

PUBLIC SCOPING MEETING FOR THE DESERT QUARTZSITE PROJECT

REPORTERS' TRANSCRIPT OF PROCEEDINGS

Taken on Monday, March 23, 2015

At 1115 12th Street
Parker, Arizona

At 6:47 p.m.

REPORTED BY: JULIETTE L. VIDAURRI CCR, RPR
AZ CR #50359/CA CSR #11081/NV CCR #748

SPEAKERS:

Cedric Perry, Project Manager, Bureau of Land Management

John Kalish, Field Manager, Bureau of Land Management

Lynnette Elser, Coordinator, Bureau of Land Management

Larry Ross, Principal Planner, Riverside County Planning Department

James Cook, Direct, Project Development, First Solar

Public Comments:

Keith R. Nopah Sr.

Daphne Hill-Poolaw

Amanda Barrera

Cheryl Esquerra

MR. PERRY: Welcome, everyone.

My name is Cedric Perry, Project Manager for the Desert Quartzsite Solar Project. I'm out of the -- now I'm out of the Palm Springs South Coast Field Office. So a little transitioning there. We have another member coming in.

We will get started. We just got started with the presentation. So we have a nice presentation coming from the BLM, Riverside County's Larry Ross. I will introduce all the speakers as we progress through.

Again, my name is Cedric Perry. We have welcome remarks from Mr. John Kalish, Field Manager, the meeting organization and introduction as far as the First Solar staff, my NEPA staff, and the archeologist, and we will go through a few personnel here.

We have a presentation -- BLM presentation with Lynnette Elser. She will cover the NEPA process.

And, Mr. Larry Ross, you want to --

MR. ROSS: I'm Larry Ross.

MR. PERRY: Thank you. You have presentation to give.

And Mr. James Cook has a presentation and introduce his staff, and at that time we will open up to the public comments, and then we have an open house if you have some questions for the applicant, and at 8:30 we will adjourn.

Next slide, please.

Before we get here, I want to introduce Mr. Kalish. Welcome.

MR. KALISH: Yeah. My name is John Kalish. I'm the Field Manager for the Bureau of Land Management from the Palm Spring South Coast Field Office. We're part of the California Desert District, which really encompasses all of the desert lands in the southern third of California, but our office that we manage out of the Palm Springs area covers all of the BLM lands in Riverside County, Los Angeles, and San Diego Counties and a little bit of BLM lands in San Bernardino County. So we handle about one million seven hundred thousand acres of public lands.

The -- and of course the one area that we handle is the Eastern Riverside County within the designated Solar Energy Zone and the location of the project we are going to be talking about tonight, the Desert Quartzsite Project.

You'll hear about -- in fact, you will get a presentation about the National Environmental Policy Act Process. One component part of that very early on is the scoping process. That is very important in terms of people being the -- public being able to provide us with issues, concerns that they have regarding the potential permitting of the project as it is proposed. So by receiving these comments, we can incorporate these concerns and issues very early on in the process as we go through analyzing the impacts of the proposed project and going through the permitting.

So we very much appreciate the attendance here today. I certainly recognize a few of you, and so thank you for coming, and we will keep it as informal as possible, and certainly feel free to provide any issue or comment or concern or any -- anything that you would like us to address within the permitting and the environmental analysis process for the Desert Quartzsite Project.

So on behalf of BLM, thank you.

MR. PERRY: Thank you, John.

These are the regulations that cover the whole processing. This application.

Next slide, please.

And now I would like to introduce Miss Lynnette Elser to go over the NEPA process.

MS. ELSER: Some people ask: Why are we doing this? Why are we starting meetings? Why are we talking about a project? How did it get picked? Why are we even considering the solar application on federal land?

And the way that the process starts is that an applicant comes to us and says we would like to develop a solar facility here on your land. We would like to have a right-of-way. So we look at it and we do an initial screen, and we see if it's suitable based upon our land classification, which is kind of a little bit like a zoning.

We look at the resources that are there at a very superficial high level. Is it wilderness, something that would screen it out? If it meets our initial screen, then we go ahead and tell the applicant to come up with a plan of development of what they really want to do, and we accept their application, but we haven't made a decision that we are going to allow it.

The NEPA process is the way that we look at a project to decide whether or not we should allow it to happen, and that's what we're starting now. NEPA is at the very beginning stages of this project.

We have an application. We have a plan of development. We want to write a comprehensive environmental report, which is an environmental report that's probably going to be about that thick, several hundreds to thousands of pages. Some of them are like about 3- to 5,000 pages right now for solar. EIS's. They are called Environmental Impact Statements.

So we don't have all the answers now. We're just starting, and part of starting is to involve the local communities and people that have interest in this land, either currently or historically, people who know about this land that have anything that they would like us to think about and consider when we are considering whether we should go ahead and issue a right-of-way.

So we are starting at the very beginning stages of the EIS, and that starts with us publishing in the Federal Register a Notice of Intent.

So next slide.

When we go through the process, we're going to analyze all of these different resources. You can see that we're analyzing everything. We're not leaving out anything in this project. We want to look at everything comprehensively. Some of these things, there may not be very much information, but we're still going to look at it and see whether or not it has impacts from this project that we are considering.

Next slide.

We are at this Notice of Intent stage, and we published in the Federal Register that we're going to be looking at this application. We are going to be doing an Environmental Impact Statement. We are going to be considering all those resources, and this is the public scoping period now.

There's 30 days where we solicit comments from public. You can give comments tonight at this meeting. You can give us comments in writing, mail them to Cedric. There will be an address later. We will consider those comments as we write a Draft Environmental Impact Statement.

We will look at alternatives. They may -- the applicant may say we want to do it this way. We might look at it and say, but there's biological resources here. There's cultural resources here. We would like you to reconfigure your project and leave out these areas or we would like you to mitigate some of the impacts by doing certain things. We don't know now what because we don't have the information now to make those decisions.

But before we write the report, we're going to look at alternatives to reduce impacts, and we will publish the Draft. When we publish the Draft, we will come back here. We will probably come back here. John Kalish makes the final decision where we go for public meetings, but we will have public meetings somewhere, and we will ask for your comments again.

We will say we wrote this report. We think we covered all the resource areas. We think we've listened to you and heard what you said and tried to address your concerns. How did we do? Is there something we left out? Is there something we need to change?

And so there will be a public comment period where we will again solicit comments, and then we will rewrite that whole document correcting any errors, putting in more information if we left something out and come up with a final. So this isn't your only chance to participate. This is just the first one.

The second chance is actually a better one because you will actually see how we were looking at the project and what we found as potential impacts, and so you can see a little bit better how the project could impact you or the things you are concerned with.

After we have the Final EIS, if there is a plan amendment, which means that our land use kind of plan governs the area, which is the California Desert Plan for the whole desert, if that plan needs to have a change to it to accommodate the project, then there would be a plan amendment.

The plan amendment could be appealed -- not appealed -- protested, and there's a 30-day period after the Final EIS that it can be protested. You can't protest other things. You can't protest you didn't consider an alternative I really liked. You can only protest the plan amendment that is being proposed.

Then there is a final decision that is signed. We don't know who is signing the decision for this project. If there's no plan amendment, it could be signed by the field manager. If there's a plan amendment, it would have to be signed by at least the State Director or above. If it's signed by somebody at the Department of Interior, then there isn't an appeal right. If it's signed by the State Director or somebody below, then there's an appeal right after the decision is signed.

After we have a final decision, then we would issue a right-of-way, and after that there would be a Notice to Proceed.

Public participation opportunities are this meeting and this comment period, either here or in writing give us comments. There's also going to be comments on the Draft EIS that will usually be a 90-day public comment period, and then you can become informed to know when the Draft will come out by looking at this web page. You can go to the BLM web page, and it will have a little thermometer that has the step that the project is at so you can always see where we are.

Next.

And if you have comments, contact Cedric. He is going to remain the project manager here. I am going to be transferred to another office. So I will be leaving this and John Dalton will take over as the new coordinator shortly, and you can contact John Dalton at the California Desert District Office or the Palm Springs office or you can contact Cedric and he will get John for you.

MR. PERRY: Okay. So Larry Ross for

Riverside County has a presentation.

MR. ROSS: As Cedric mentioned, I'm Larry Ross, Riverside County Planning Department. The portion of the project -- we actually have a much smaller portion of the project than the BLM. We have a hundred and sixty acres out of the 4,000 some-odd acres. So we are the lead agency with that tiny little -- well, not a tiny little bit. In prospective of the project, a hundred and sixty acres.

And we are the lead agency for the California Environmental Quality Act, and the California Environmental Quality Act mirrors the whole NEPA process. So a lot of what the previous speaker mentioned is mirrored in the California process.

So what we will be doing is preparing the Environmental Impact Report, and that's going to be a joint document with the EIS. So it will be -- everything -- we will be looking at the exact same things.

Next slide, please.

So very much like we were talking about earlier, it starts with the initial study and Notice of Preparation. On our initial study we decided that we are going to look at everything. We weren't going to take anything out. So we decide to look at all those different items as mentioned by the previous speaker, and we issued a Notice of Preparation and the scoping meeting.

Our noticing period is slightly off of the BLM period. We have 30 days, but we didn't got our ads out in the same time that the BLM was able to. So ours are extended by about a week and a half, two weeks.

Um, so this is the point of the project when the public can tell us what their concerns are; and just like the previous speaker said, we use those concerns and incorporate them into the formation of the EIR, and then we go to the Draft EIR portion of it, and then we go to another public comment period.

That will be when we do the Notice of Availability and that is basically the same thing as the previous speaker mentioned. We will have another series of meetings, take in more comments. After that, um, we issue a Draft EIR, and we do response to the comments that we received during this public comment period.

It is not just a public comment. It is all the different agencies. I think we did about -- sent out about 210 to different agencies, whether they are interest groups or districts, what have you. There's all -- we picked the whole landscape of who wants to -- you know, who would want to be notified and who would be interested in the project.

And then it goes to the Final EIR period, and that's when the responsive comments will get put into the document, and what we do, instead of the signing process that previous speaker mentioned, we go through a public hearing process. So what happens is we issue the Final EIR. We send out our responses to comments to the people -- the commenters that sent out -- that responded to us, and then we have a hearing before the Board of Supervisors, and those are elected officials within Riverside County.

Next slide, please.

So as mentioned before, submit your written comments or statements. We will incorporate them. Provide comments at public meetings, and I've already mentioned, provide written comments on the Draft EIR and the Final EIR/EA. It should be ERS.

So as I mentioned, our scoping period ends April 13th.

And when does yours end?

MR. PERRY: 6th.

MR. ROSS: Yeah. So we have a couple more days because of notice issues, and that concludes Riverside County's presentation.

MR. COOK: Good evening, everyone. My name is James Cook. I'm with First Solar. We are the project proponent. We are the applicant for the Desert Quartzsite Solar Project.

I wanted to quickly cover a little bit about First Solar. So we're headquartered here in Arizona. Actually, in Tempe. We manufacture solar modules in Ohio and Malaysia, and we are one of the largest solar manufacturers in the world. We have 10,000 megawatts or ten gigawatts of solar panels installed worldwide, and we have more planned for the future.

When I first started working on this project about eight years ago we couldn't say this second line so convincingly, but we are now cost competitive with conventional energy sources, and in some places actually we are building projects where we will build a solar project and provide power to the grid at less than what that person is buying the power is paying for it right now, and, um, so we are proud to point that part of it out, and we are working in various different places and we have been innovators in the field.

Our technology is slightly different than a lot of the solar technologies like the solar panels you saw outside in the parking lot, and we do build large-scale projects.

And one of the things that we found particularly during the recession that was important is because we have built a number of projects, it's important that we are able to get financing for those projects, and we find that we're very reliable within the industry, and the company was founded in 1999, which makes the company a very old solar company, and we are publicly traded.

Some of you know about our Desert Sunlight Project, which is also in Riverside County, is now fully operational, and it's about an hour -- maybe an hour and 15 minutes, hour and a half away from where we are tonight, and it was also permitted -- it's on BLM-managed land and permitted through Riverside County, so similar field. So we like to highlight that project. So that project was started a number of years ago and now is fully operational, and that's an aerial image of the plant.

And then, as you can see from the map, there's a number of other projects that we are planning in the area, both in Arizona and California and other places, and the green dots are operational solar facilities. So we've got quite a track record at this point of projects also being in operation.

And it's important for us to develop these projects in a way that we can be proud of and that is seen as favorable by the community because we will have -- we will be operating those plants for decades to come, and we would like to build some more and so it's very important for us, and that's why we are here tonight to get your input on how you would like to see incorporated -- how you would like to see us incorporate different comments you have about the design.

So for the Desert Quartzsite Solar Project in particular, we've planned a 300-megawatt project due south of the Blythe airport on the other side of the I-10, and we wouldn't expect the project to start construction until the end of next year, end of 2016.

What's important to note here is that we're -- we located the site within a Solar Energy Zone, and so we were sort of geared, pushed this direction by the federal government, and so there are a number of reasons why we choose this site, but that is one of the primary reasons, and also that it's -- I'll get into it later, but it's right next to an existing plant that we have built and it's operating, the Blythe 21 Solar Project.

We are also proud of the fact it is a quiet power plant, emissions free in its operation and generation of electricity. Low profile. It's not a very large visual impact, and we do generate electricity without using any water or -- to generate the electricity.

We'll -- we will get into a point where we use water for construction to keep down dust, but I think that's important in the time when we are in drought and in an area where we don't have much water to point this out.

The project does create quite a number of construction jobs, several hundred. We say 600 here and some -- also some maintenance in operations jobs once the plant is operational.

Finally, we are committed to hiring qualified local workers for the construction and operation jobs. This is something that we take very seriously.

And I know some of you have seen some of these slides here, but feel free to interject any questions you have as you go; but, again, the site was chosen very particularly for the large amount of sunlight that comes into the area, for the fact that it is adjacent to electrical transmission lines. So there are transmission lines on all three sides of the project.

So this is an area where there's -- you don't have to build large new transmission lines to augment something because they are already there. The Colorado River Substation was built right next to this site by Southern California Edison. It's also a large flat area. So it's ideally suited for this type of solar project. We are able to use existing roads. So we use Seeley Avenue coming off of the 10 and through 78 and down on Seeley.

And, um, the other attractive part for us when we were planning the site was the fact that the environmental impact is low, and in particular, as noted in the slide here, that the desert tortoise -- this is considered a -- not a superior desert tortoise habitat. And that was shown by the fact that when we did biological surveys there were no live tortoises found on the site. However, we know that tortoises could be in the area so we will be planning for that, but we like the fact that compared to other places it is low desert tortoise habitat.

I will say here that I recognize there is an impact, a cultural impact. I do understand that and I do recognize that.

Um, so the fact that infrastructure is there is important for two reasons. One is having electrical infrastructure. We are able to connect into the grid easily without having to go a long distance, and the other thing, of course, is that there -- that those lines are there and so they define the site. There is this sort of infrastructure there that would indicate this would be a good place for electrical generation of solar.

Go ahead.

I think Cedric and Larry both mentioned and maybe Lynnette did as well did mention that the site is approximately 4,800 acres. We will not build on all of that in the end. And as we go through this process, as we do the surveys and find out what is on the land, we will be shrinking the size of the impact of the project, and, of course, we have a hundred and sixty acres of privately held land.

If you would mind going back one slide.

It's not highlighted in the green color, but that is part of the project. That's the private land, and you can kind of see it when you look at this map why we would want to include that. You wouldn't want to have someone be surrounded by the solar project. So we do have an agreement that we are allowed to buy that land, and we are planning to put the solar project there or that's our proposal.

So we would expect to build the project in two distinct phases. They may come close together or they may come separated. We don't know at this point.

But the first phase we would expect to start, as I mentioned before, by the end of next year, by the end of 2016. This is approximately a two-year construction process for that phase. So we would imagine we would be done in 2018.

We are planning to use one of either a single-axis tracking technology or fix tilt. Although they look very similar in these slides, the key difference is that the fixed tilt is what you see at the Desert Sunlight Project or the Blythe 21 Project. The panels do not move. They are set in a frame and they're stationary.

We are now more commonly planning the single-axis tracking systems. The key distinction you would see in the ground is that they are faced in a -- the arrays go in a north-south direction rather than an east-west direction, and then the panels follow the course of the sun as it moves from east to west during the course of the day. So they track singlely, and it's more likely that we will use that technology, but you will see in the permit application that we have both in case one or the other is preferable.

We would connect at two hundred and thirty thousand volts at this -- at the substation, at the -- as I mentioned, the Southern California Edison substation, Colorado River substation, and we do have actually two different interconnection requests that are being studied by Southern California Edison and the California Independent System Operator at this time as well.

I would like to go through in some detail just to make sure that everyone understands the -- the -- how the technology is used.

So you can go ahead and go to the next slide.

But the power plant works that sun does hit the modules that, again, we manufacture in the United States and in Malaysia. When the sun hits the panels, electrons are excited and create a flow, a direct current of electricity, and we combine all those into -- the next slide -- combiner boxes. Again, this is in direct current in about either a thousand or 1500 volts of direct current.

And the next slide.

We then take inverters, which transform the power from direct current to alternating current, which is the kind of electricity we use in our homes and our workplaces.

Next slide.

And we -- there's a two-step process where we increase the voltage two different times. At this point in the plan architecturally increase the voltage from 11 -- sorry -- a thousand or 1500 volts to 34,500 volts, and that's where we -- through the plant. That's where the power is running into the next -- these combining switch gear. These little metal boxes.

And then we further transform the power -- the next slide -- when we get to our on-site substation, where we will want to connect -- we want to get the power so that it is -- meets the grid at the grid level and so that it's operating in a safe and efficient way.

We step up the power again to 230,000 volts or 230 kilovolts, and then connect into the grid.

At that point the power goes into the grid, and largely it will be flowing to the west, but it does flow in whatever direction it is pulled in by the load. The "load" being our homes, offices, schools, hospitals. So that's the basic structure of how this solar plant will work. At least, however, we're proposing.

It's important to note the construction techniques. I think about the project -- the project as being -- if you see an existing solar plant like the Desert

Sunlight Plant, it's virtually silent from off the -- from outside the power plant. There's no noticeable sound. There's no emissions of any sort. It's very benign in terms of the sensory impacts.

However, during construction there's, as you can imagine, quite a bit of work that goes on, and there's an impact through all that work. So I wanted to go quickly through the process of construction.

We prepare the site so that it's safe for people to walk around. You can imagine people walking with pieces of glass two by three feet. You don't want to have trip hazards nearby them. So there's site preparation we do mechanically.

Then we drive in metal posts into the ground with this machine here, and you can see -- even in this you can barely see, but it's very straight lines. So we methodically put in the posts. We also will dig a trench between 18 and 30 inches or so down to the ground, put in the cabling that we talked about before where we are bringing the power into combined space.

Once that has been done, we are putting in the -- more of the structure here around the panels. This is a fixed-tilt structure, but it's fairly similar on the tracking system -- slightly more hardware in the tracking system.

And this is where I was saying the power is combined and transferred into these -- we have these vaults that are installed.

And then, finally, the power will go up -- when it's at high voltage, it's coming into the on-site substation and then going into the grid from there.

The site layout. Again, here's that private piece. So that actually would -- our intention would be that modules would go in that place. This is sort of saying that if the entire site were covered with modules but for 300 megawatts. It will be less than that. You would actually in the end see less panels than that, and that will be based on the input you give us tonight, that we've received from you last week and before, we receive from other folks at the public hearing tomorrow.

And then also, in addition to the BLM's process of holding public scoping meetings and the county's process, we will be holding our own individual meetings with your community and with other communities to make sure that we get as much input as possible to put into building the best solar project that can be built on this site.

Part of the input that comes through that is the baseline surveys we do on biology. We have conducted a number of these surveys already. We are looking for what types of plants, how many of them, and the locations of them.

We are also looking for animal life locations, and we did more of these surveys on birds than we have in the past. We have been doing those, and they will be ongoing.

And the botanical surveys. We identify the types of plants and where they are located. It's very important to have that full understanding as we come to laying out the project; and, in particular, I have noted -- we've noted a few different species here that we're looking for with particular interest: Desert tortoise, as I mentioned before, golden eagle, burrowing owl, and other species. So it's a fairly all-encompassing group, and, of course, you can't do it much justice with the one slide, but we wanted to make sure we've gone through that.

So the surveys were done. The plant surveys in particular were done in a time where there was some heavy rains. I think it was the summer before last when we had quite a bit of rain, and we sent a team out to take a look and make sure that we kind of get the highest number and the best viewing of these -- the desert plants.

As you can see, we found a number of different types of plants, and so those are also being noted as we get those out to the public and as we take input to creating the site plan.

In addition, there's the different vegetative communities. We will -- we noted that the Desert Dry Wash Woodlands are mostly in the north end of the site. We will be staying out of those. The rest of the site is largely, if you are familiar with, a lot of you, is what they call the Sonoran Desert Scrub, and then there is an area on the site and off the site to the northwest of the site near the point of interconnection to the grid where we do have some sand dunes, fairly small, mostly on the site and stable, but we do want to note that's an important component of the area.

While we found no amphibians, we did -- of course, as I mentioned, we were looking particularly closely for the desert tortoise. They did find six carcasses and a set of tracks up in the northwest area where the -- our Gen-tie is planned. That's our connection between the site and the grid.

No live tortoises or burrows were found on the site, but we would expect that it's possible that tortoises could be on the site the next time we do surveys. We will be doing other surveys in particular before we would start construction and if we were approved to do so.

And then we would -- there's several different species of lizards. We picked these two because these are particularly notable species and ones that we would like to avoid in any solar plan. The next species as well on the site. Again, probably not a surprise to anyone that lives in this area.

So this should say "there were no Golden Eagle nests within ten miles of the site." That's a species that we're watching out for, and I do believe that we did find a burrowing owl on the site, and so we would like to stay away from those species, and we do know that desert kit fox can be found on the site. In particular, one was found when they built the Colorado River substation. I know that. And there was a sign of American badger as well as we know that there are some bat recordings at the site as well.

As of the process, we would be identifying ephemeral drainages; and as we note here, they are primarily in the north, which also does line up with the wash areas, the Desert Dry Woodland wash areas, which are here and through here.

Um, as far as we've determined there's no surface connection to traditional navigable waters. I think I didn't probably make enough of a note of it, but we are just a few miles -- we are about seven miles to the west of Blythe, and then we are just about three or four miles off the -- maybe even less off the riverbed for the Colorado River. So there's the mesa up here, the sandy mesa, and then down below there's the river valley.

So we will request jurisdictional determination from the U.S. Army Corps of Engineers and the Colorado Regional Water Quality Control Board as part of the permitting process.

Now, in particular interest to some of you would be the cultural surveys. I will just go through what has been done so far, which are the -- these literature review, and, um, doing an extensive review of this, and so we have both the more recent uses, mining, agriculture, and military training, and so I've seen out there sometimes where there's piles of cans -- rusting cans from World War II training, but also we know that there -- we would expect there might be some cultural artifacts in the area, and those, however, will be -- and I think I mentioned this last time we talked -- those will be identified within the cultural survey, which the survey itself has been done.

The surveyor did make sure that there was tribal involvement during the survey, and then they will be writing up a report, which should be coming out soon, a field report, which should be coming out and finalized soon. By that, I mean in the next few weeks, certainly in the next couple of months we would expect, but we aren't privy to the results of that survey. So some of you might know more than we do.

The Attorney General's Office might have some more information than the applicant does, but primarily this is in connection with the BLM and some of the information is kept sort of at length from the developer. So we don't know much about what the findings are yet.

Next slide.

But the surveys have been conducted and, um, so we just wanted to point that out, and the way the survey was conducted is here, and they were conducted in the last few months -- last three or four months -- three months, I would say, of last year.

Next slide.

So as Lynnette mentioned, there's quite a lot that goes into that large document -- that we expect will be quite a large document. Air quality, visual, traffic and noise impacts are some of the things that are -- that are looked at by -- through the permitting of the project.

We have things like the vehicle emissions themselves while they are driving on the site. The dust that's created through construction. The visual impacts are looked at from multiple different angles, and we try to include sensitive resources including cultural resources in the view points and the visual impacts analysis.

And the traffic analysis talks about the construction as well as operations. So as I mentioned before, construction is where the real traffic impacts are and noise associated largely with the construction.

And then just as a rough idea of the time line here. We are in the -- we kind of come out of the initial planning phase. We are now into the environmental permitting process led by the BLM and the County of Riverside.

We are into the point where we've done some of that, and, you know, really in some ways we are kicking off the permitting process here right now with you all, and we expect that process to go for at least another year, perhaps a year and a half or more, and idea -- our goal is to be at least have the possibility, if approved, to start construction by the end of 2016.

And I think that's it for us, for the First Solar presentation. There are a number of us here. I do want to point out my colleagues: Dave Watkins over here; Ashley Hudgens, as some of you already now; Laura Abram, our Director of Public Relations and Governmental Relations; and Jill Yung is our outside counsel -- legal counsel; and, again, I'm your Project Developer James Cook from First Solar.

So we are here. We would love to get any comments, both formally through the process that we will begin right now and also informally if you want to stay afterwards and discuss any of the aspects of the project. I am glad to give you my card and we can keep in touch. You can give me comments afterwards or, you know, in the next -- in the coming weeks and months.

So thank you all very much for your time.

MR. PERRY: Thank you, James.

This is the point of the presentation where we open the floor to your comments, and we appreciate if you put those comments in writing so we can respond to those appropriately.

So far I have one person that would like to comment. I would like for you to please spell your name and you have approximately three minutes, a little more depending on how many -- if we have any additional people that would like to speak.

Right now there's Mr. Keith R. Sr.

MR. NOPAH: My name is Keith Nopah. Do you want me to come up here? My name is Keith Nopah, and I'm a tribal monitor for the tribes. Um, I'm just here for support for the tribe. I would like to say I'm late. That's all I've got to say.

Thank you.

MR. PERRY: Thank you very much.

MR. ELSER: Keith, we have a court reporter here. A court reporter is writing down the contents, so we need to have the spellings for the names.

MR. PERRY: Can you spell your name for us, please. How do you spell your name?

MR. NOPAH: K-e-i-t-h, Keith. R is middle name -- I mean, my middle initial. Nopah, N-o-p-a-h.

MR. PERRY: Senior?

MR. NOPAH: Senior.

MR. PERRY: Thank you.

Okay. Miss Daphen Hill-Poolaw.

MS. HILL-POOLAW: Poolah.

MR. PERRY: I'm sorry.

MS. HILL-POOLAW: Thank you.

My name is Daphne Hill-Poolaw. I'm a representative for the Colorado River Indian Tribes Mohave Elders Group, and I know -- Good to see you, John. You and I have bumped heads many -- for a couple of years now, haven't we? Some of you that are sitting here.

Um, I'm vocal about solar, and I'll just be blunt. I don't want to be hypocritical about this. I'm totally against it.

I know you're the applicant, sir. Is that correct?

MR. COOK: Yes, ma'am.

MS. HILL-POOLAW: And I always -- you know, I just totally oppose it. Totally oppose solar. And I speak for the rest of the Mohave elders who are not here. I've gotten ahold of them.

Although recognizing you said there will be 600 jobs possibly created for the community or the population thereabouts. Although that sounds good, but at the same time, you know, I look at the cultural.

And my elders that aren't able to be here, they are in their 80's plus almost 90, they would be totally against it as well.

We've had issues in the past; still having issues. We've got things out there. We've been here in memorial for many years before you all got here, all of you.

And the plants that you show, the listing of a hundred and twenty-six, I believe, you showed up there. I don't know if it means anything to any of you Anglos. They're medicine to us regardless whether it be off I-10 or I can be traveling in New Mexico and I can pull off the side of the road and know where I can get some tea or wild medicine grass to put on any wound, a bee sting or anything like that. I would know that, but I don't know if any of you would know that. Perhaps some of you that study plants or whatever, you would know that. But this land means a lot to us, the Native Americans.

Now, I just -- you know, question myself and ponder in my mind why would you want to dance around an area where there is a river and where there is hardly, you say, nothing. Just land. You say BLM land. It wasn't their land. It was our land till you guys got here, and -- but I oppose it.

Years ago back in the early 1950's my grandfather had a solar -- he built his own solar, and he cooked off of it, and he pointed it to the sun. But in ending he said to us, you better get away because it's hot. "A-pel-pa Ma-hav-va." "Goo wrec," he said. Get away. Get far away from it because it will cook you.

And it wasn't a big solar. It was a round one that he made, and they cooked off of it. They cooked their deer meat. They cooked turtle, which you -- believe it or not, we cooked our rabbits and quails off of that, but that was used to cook. And when the sun went down, it was time to go to bed. You didn't have to wait for no, uh, turn the lights off. It was time to go. So we knew.

And all this that I see, you know, that's coming around. I totally strongly -- I don't know what other words to use except I oppose you and your application that you submitted to Quartzsite. I've dealt with some of the members of the community in Quartzsite. Some of them don't get along with Native Americans. I already know that. Okay.

Now, I'm very adamant about this solar project that is going to be coming up. Why here? Why -- we got -- we just won ground several years ago off I-10, the tribes did after a hundred-year battle. We just won it, and it is right near there.

Why not go somewhere else and build your solar and do what you will with it?

But I'm totally against it. I know I only have three minutes to say what I've got to say. I am totally against it. Totally. And I speak for the Colorado River Indian Mohave elders as well as some of the elders that live on the reservation, which would be the Mohave, Hopi, Navajo, and the Chemehuevi. I speak against it.

But as I said in the beginning, I always say the white man has an agenda, and I'm not racist either. Okay. The white man always has an agenda. There is something in it for him. We live okay. We're all right.

And with all the tragedy that is going on in the United States with ISIS, you know, I'm concerned about that because I sure don't want no ISIS camp group coming around and hiding under the solar camps, you know. So we've had issues.

And as long as I'm alive -- and I may not have too long. I am probably older than some of you here, but as long as I'm alive I'm going to keep voicing it because I was raised old school. I believe old school.

Thank you for the tennis shoes that you guys made because I can wear that now. I don't have to wear my moccasins anymore, but thank you.

But I am against it, and I'll keep speaking out against it. "Ma-hav-va."

You understand where I'm coming from. I'm not speaking from the mind or intellectually, but I'm speaking from my heart.

I heard a native chief back in the early '50s say, and with the Good Book, which is the King James version, he said one day we're going to have the white man, he's going to be so smart, so smart that he's going to outsmart himself and it's going to backfire on him. I believe that today. I truly believe that today. So -- and I say this is concern. With concern.

We have medicine out there. You say there's no turtles out there. There's turtles out there. I lived here all my life. They don't want to see you. They know when there's danger coming. They sense it. All animals sense it. They've got more sense than the human being.

So I say that all -- to all of you, those of you that are in involved in this, just the beginning stages, I look at the paper. You only give us so many days to respond. That's how they work. Give you last minute, and you got to hustle. I'm not no attorney. I know nothing about what you guys know. I got no document or paper, but I got experience, how to live and survive on the land. I got the experience.

But I just want to say to you think about it. I am against it. I speak out against it, and I'm very adamant about it. Okay. Thank you.

MR. PERRY: Thank you.

I have Miss Amanda Barrera.

MS. BARRERA: Good evening. My name is Amanda, A-m-a-n-d-a, Barrera, B-a-r-r-e-r-a.

I'm a member of the Colorado River Indian Tribes. I'm a Chemehuevi Indian, but I'm also serving on tribal council as a tribal secretary.

I just have a few comments in regards to the Federal Register. In the notice it says 15 days notice. I want it to be noted that the tribes received theirs last week. Our newspapers just put it in last week. That's seven days. Less than seven days. Our paper comes out Wednesday, late Tuesday, so in six days you had the meeting. So a lot of people don't pick it up until last minute. Just a note.

The other thing I want to talk about is, you know, we talk about that area and that area being south of the I-10 and the history that we have there and all the solar project -- other ones are out there -- to Genesis, to McCoy, to Blythe Solar that's going on, and then now you have the proposal for the Quartzsite being on that same site as

Blythe Solar.

And we were just out at McCoy and meeting with Art and taking care of something that was uncovered on that end. We know more so about the history on that side and its impact. So be prepared.

The river ran wild. And you say not a very cultural impact, not an environmental impact. There is. And you need to understand Indian country. Cultural and environmental we are one.

So as you try to minimize it, you don't minimize it because the impacts are many, as you heard from one of our elders, when it comes to the medicine, when it comes to the animals that are out there who are one with us.

You know, before they put up the boundaries and told us where we can go and how we can do it there was a rhyme and a reason to all of them, and so that impact is very -- it is detrimental, especially to the Mohave people whose indigenous lands who you are incorporating in there.

The same with the Chemehuevi in our wanderings in through that area, the very bands that went through there, and you will see it and you hear it if you know it in our songs, the bird song and in the salt song, and the trail ways that are there, and you know that too being in there through that wave through the Coachellas just as it is through the Tehachapies and the woodlands and the medicines that were identified over the mountains and in the oceans and in the grandmother. What they call the grandmother of waters, that being the ocean waters, and then water here, the Colorado River. Before it was tamed, it knew no boundaries. It ran its course. McCoy is like that. It's a riverbed, you know. So think about that. Think about that when you are considering it and those impacts because it is detrimental.

And I will fight long and hard with the council in whichever direction they take, but I do extend again an invitation to you to present to our tribal council in full on April 27th. We are still gearing for that date.

Okay. Thank you.

MR. PERRY: Thank you very much. I appreciate all of the information that was -- that you are submitting to us, and also would appreciate if you have any additional comments or information, please take the opportunity to put that information on those comment cards and send those to us to analyze the project.

Miss Cheryl --

MS. ESQUERRA: Esquerra.

MR. PERRY: Esquerra?

MS. ESQUERRA: Yes.

MR. PERRY: Would you spell your name for us, please.

MS. ESQUERRA: E-s-q-u-e-r-r-a. Cheryl, C-h-e-r-y-l.

I too am a member of the Colorado River Indian Tribes and an elder, and I do also represent our elder seniors, and I do believe the same information that Miss Barrera and Miss Poolaw represented tonight and speak.

Um, I too was taught many things by my grandfather and my grandmother years ago. We all learned the natural way, and I too believe that when you did a cultural survey, it showed a mining area and agricultural, military camp were noted in small areas. Now, that could be a factor also, and we also do have the runoff washes, and you never know what's going to be coming down those streams, and animals do survive in this desert, and they are a part of us. They represent meanings to us, and we've had that for years, many years in our forefathers.

And like Miss Poolaw said, we live off the land. We still do in this world today, the 20th century. We still live off the land. We still eat those wildlife, and I'm sure many of you have gone hunting. So, I mean, you're destroying what we have, what we live off of.

And I too am against it, and we've dealt with this for months and years, and we're not going to stop now just because you're a new plant. I mean, you've probably been in the process before I came along. I just joined within the last year, two years, but I don't want to see any property destroyed.

We've seen the impacts of what those solar systems do to animals, to the planes up in the air, to their surroundings. You know, we don't want to see this. We don't need it here. We -- and I know Quartzsite doesn't want it. I am sure maybe for jobs, but that's not our point.

Our point is cultural, land and water; and our grandfathers told us many years and our forefathers before, if we don't take care of that, we have nothing. So that's what we fight for, and I do disagree. I do not want this, and I speak for many of my family and relatives.

Thank you.

MR. PERRY: Are there any others that want to speak?

(No response.)

MR. PERRY: Your comments, please, if you would like to submit those to me, you can either mail them to me at this address or submit them to the project specific email address, and the comment period ends April 6th.

Next slide.

At this point we open up the open house and you can peruse the poster boards back there and ask any questions of the applicant.

And at this point I want to thank everyone for coming to the scoping meeting, and please submit your comments to us. We will use that information to assist in analyzing the project.

So I've just been told we will be extending the comment period to match the county's time, which is April 13th.

MR. ROSS: It is on the slide.

MR. PERRY: Yes, April 13th.

All right.

MS. BARRERA: John, will notices go out officially to the tribe as the change from the 6th to the 13th then?

MR. KALISH: We will start by emailing that out in a day or two and then follow up with a letter, but we will start off with an email.

MS. BARRERA: Okay. Thanks.

MS. ELSER: We should get it changed on our website as well.

MR. PERRY: At this point also I would like to let everyone know in the future we will be trying to -- I am trying to set up a site visit so the tribes can go out and take a look at the various locations and various places. So we will get that letter sent out with the invitation to everyone to have. I will appreciate a response back to

RSVP.

MS. BARRERA: And the one tomorrow night in Blythe is that at city hall like they had before at 6:30?

MR. PERRY: Yes. It will be the same time, tomorrow at 6:30.

MS. BARRERA: All right.

MR. PERRY: Any other questions for me?

(No response.)

MR. PERRY: Any question of my lead coordinator archeologist?

(No response.)

MR. PERRY: Thank you very much.

(The proceedings were concluded at 7:53 p.m.)

CERTIFICATE OF REPORTER

State of Arizona)
)   ss.
County of Mohave)

I, Juliette L. Vidaurri, CCR, RPR, do hereby certify that I took down in shorthand (stenotype) all of the proceedings had in the above-entitled matter at the time and place indicated, and that thereafter said shorthand notes were transcribed into typewriting at and under my direction and supervision, and the foregoing transcript constitutes a full, true, and accurate record of the proceedings had, all done to the best of my skill and ability.

In witness whereof, I have hereunto affixed my hand the 5th day of April, 2015.

NDTCA · Signed Electronic Transcript

Juliette L. Vidaurri

Juliette L. Vidaurri, CCR, RPR
AZ CR #50359/CA CSR #11081/NV CCR #748

PUBLIC SCOPING MEETING, BLYTHE, CA, MARCH 24, 2015

PUBLIC SCOPING MEETING FOR THE DESERT QUARTZSITE PROJECT

REPORTERS' TRANSCRIPT OF PROCEEDINGS

Taken on Tuesday, March 24, 2015

At 235 North Broadway
Blythe, California

At 6:34 p.m.

REPORTED BY: JULIETTE L. VIDAURRI CCR, RPR
AZ CR #50359/CA CSR #11081/NV CCR #748

SPEAKERS:

Cedric Perry, Project Manager, Bureau of Land Management

John Kalish, Field Manager, Bureau of Land Management

Lynnette Elser, Coordinator, Bureau of Land Management

Larry Ross, Principal Planner, Riverside County Planning Department

James Cook, Direct, Project Development, First Solar

Public Comments:

Juan Gonzalez

Alfredo A. Figueroa

MR. PERRY: Welcome again. My name is Cedric Perry. I'm the Project Manager for the Desert Quartzsite Solar Project. I'm a project manager for the Bureau of Land Management out of the Palm Spring South Coast Field Office, originally out of California Desert District Office in Moreno Valley, but due to transition, I work for that office now.

And here we are starting the scoping meeting for this solar project, and this is right before the start of the NEPA process. This is when we would like to entertain your comments to help us to analyze, let us know information that we may not know about the project, about the area so you can help us to analyze the information.

Okay. I'm Cedric Perry, Project Manager. We have welcome remarks by Mr. John Kalish, the Field Manager, and this is the itinerary of what we try to follow.

Okay. Right now I have opening welcome by Mr. John Kalish.

MR. KALISH: Yeah. Welcome. On behalf of BLM, I would like to welcome you to the scoping meeting for the Desert Quartzsite Project. We on the federal side are just beginning to start the permitting process for this solar energy project, and so now is the time that we open up the process in the very beginning for people to identify issues or concerns or provide information that -- that you or they would like us to address within the environmental analysis process for the overall project.

So I certainly appreciate all of your attendance here tonight. I would really like to keep this very informal, and don't hesitate to -- when after the presentations and we open this up to the public comment to share with us what your thoughts are relative to moving forward and analyzing this proposed solar energy project.

Again, on behalf of BLM, welcome, and we'll continue on with the presentations.

MR. PERRY: Thank you, John.

To let everyone know, we have numerous -- two or three presentations we will have here.

I would like to introduce a couple of my people that are on my team. There's Miss Lynnette Elser, NEPA coordinator -- current NEPA coordinator; George Kline, the archeologist, BLM; and Larry Ross. He's from Riverside County Planning, and James Cook, who is the applicant. He will be introducing his staff.

Okay. Also, we have a court reporter here that will be recording everything. So we need to make sure that when we get to that point, I will ask everyone to -- if you would like to speak, please fill out a comment card, a business card. So when we get here, I can have you come up. Please spell your name and speak clearly so the court reporter can record all the information.

We have a BLM presentation by myself and Miss Lynnette Elser. We have County of Riverside, Larry Ross will be giving a presentation, and then the applicant will have a presentation.

After that, I will open up the floor for comments from you, and I will call your name by the comment cards or the cards that have been submitted to me.

After that, we have a public open house where the applicant will be -- go outside and you can ask them various questions about the project, and the meeting we expect to adjourn approximately around 8:30.

These are the regulations that we use to govern the analysis of the project. Take time to jot those down if you would like. If you don't have that, I will give that to you later, the NEPA process.

And now Miss Elser.

MS. ELSER: The reason that we're having this meeting is because we received an application from First Solar to develop a solar project on land that's managed by the Bureau of Land Management.

When we first get the interest, even before we accept an application, we talk to the applicant and we ask them about their project. We ask them to develop a plan of development. We look at it. We see if it looks like it preliminary may fit with the land that they are applying to use. For example, if they want to do development in a wilderness area, laws and regulations prevent that. Or if they want to do it in an area that has, say, another active project on it that's already encumbered by different right of way? That's not compatible.

So the initial screen showed us that this is a project that can be compatible with this land. So the next step is we start to do a Notice of Intent so that we can let the public know that we are considering an application to build a solar project.

We published the Notice of Intent in the Federal Register on March 6th. We announce these public meetings on our web page, on the BLM web page on March 6 to inform the public of these meeting. We send out postcards and we do notifications in newspapers to inform the public of these meetings because we want your participation.

The whole NEPA process is to allow the public to have input into the government's decisions to make sure that the government decision-maker has all the information that they need to make a good decision.

We've looked at the potentials for this project, and we determined that we need to do an Environmental Impact Statement, which is the highest level of NEPA documents that we do. The other type that we typically would do would be an environmental assessment, which is a smaller, less intense look at the project.

In our Environmental Impact Statement we will be looking at all of these issues. If you can look at it, you can see it's a pretty complete list. We've not eliminated any issue from consideration, and so the report will actually probably be several thousand pages thick. They are running like 3- to 5,000 pages thick, and they will cover all of these topics.

When you have an opportunity to ask questions or tell us your concern, if you see anything that's not here that you would like us to consider, put that in. If you have detail or specific concerns about any of these issues, let us know that.

The NEPA process has several steps, and there's a couple of different opportunities for public involvement. We've already done the Notice of Intent, and we are now in the public scoping period.

The public scoping period is 30 days, and it started March 6th. For BLM it would typically have ended April 6th, but we are doing a joint document with the County of Riverside. The County of Riverside's timing and ours didn't mesh at the beginning of the scoping period. So the County of Riverside has until April 13th for their public comments.

Since it is a joint document, there's no reason for us to say if you have a comment after April 6th, give it to the county then we can consider it. We're going to accept the comments jointly for both agencies up through April 13th in a common document.

We are going to look at the comments and then we are going to come up with alternatives. One alternative will be no action. BLM denies a right of way, and we leave the land the way it is and don't do any changes to it.

One alternative will be is what the applicant has proposed in their plan of development, but we'll also look at the different resources and concerns and then develop other alternatives. Then we will analyze those alternatives based on all those resources on the previous slide, and we will publish a Draft Environmental Impact Statement.

The Draft Environmental Impact Statement may have a proposed plan amendment. It may not. There will be a public comment period after that. That's a 90-day public comment period. We'll have meetings again so that you can come and tell us if we hit the mark, if we need to change things in the document.

It's a draft. We know we are not going to get everything perfect and right the first time. So we will invite the public back to tell us where did we miss the mark, what do we need to change, what do we need to look at again, and then we will take those comments and make a Final Environmental Impact Statement, and we will -- if we are going to propose a plan amendment, then would propose a plan amendment and that document.

A plan amendment is like a land use zoning kind of a thing. It means that the current way of managing the land doesn't necessarily completely include the project or a part of the project, and so we may have to make a change in it, and that's because our land use management plan was originally done back in 1980, and at that time period there were certain things they couldn't project, and so there wasn't a lot of concern at that time for certain types of, say, energy development and transmission lines. They projected where they thought they might want to have transmission lines, but not necessarily where the population in California grew.

So instead of trying to guess everywhere, they said, if it comes up later and they need to do energy development or put in transmission lines, you go through a plan amendment process to do that.

The difference between having the plan amendment process and not having a plan amendment process is the 90-day public comment period. It can be short if you don't have a plan amendment.

And the other step is after the Final EIS is published, if there is a plan amendment, there is a 30-day protest period. The protest period is only for the plan amendment. You can't protest you didn't include an alternative I like or you left out a species of animals. You can't protest basic things. You can only protest if the plan amendment is something that the land should be managed for if that change should occur.

So if there is a 30-day protest, it would be right after the Final EIS is published. Then we would have a Record of Decision. Depending on who signs the Record of Decision, there may be an appeal process. If the decision has a plan amendment, it has to be signed be the State Director of BLM or higher. If it doesn't have a plan amendment, it could be signed by the field manager.

If it does happen to get signed by somebody in the Department of Interior instead of BLM, there's no appeal because the appeal is actually taking a BLM decision and going to the Department of Interior and saying look what BLM did. Give it a second look. We don't think they did it right. But if the Department of Interior signs the decision, then there's no appeal because there's no one to appeal it to. The Department signed the decision.

After we have a signed decision and the appeal has been processed, there could be a stay or not a stay. Then we would have a Notice to Proceed for the applicant, and then they can begin construction if the decision was to approve the project and issue a right of way.

So the public participation opportunities, they're now; and then after the Draft is published, those are the two main opportunities you have. You can give comments here at this meeting. You can give us comments in writing. You can email them or write them hard copy, get them to Cedric, and you can continue to be informed on the status by going to our web page. There's a little thermometer there. It will tell you which stage we are at in the project, and you can kind of see as the thermometer gets full when we are getting closer to the next step.

The project manager for your comments is Cedric, and it has the web page to get the information from, and you can send the comments to this address and this email address. We recommend you do not send public comments to Cedric's email address. The reason is it can get full and reject them. So we set up project websites. The project websites have an unlimited amount of space so he can get as many comments as are sent.

MR. PERRY: Thank you.

There are comment cards that were given to you as you entered the facility here. You can turn those in tonight or you can email those to me or scan a copy or you can mail them to me, and they will be accepted until the

13th.

Now we have Larry Ross, Riverside County Planning.

MR. ROSS: Hi. I'm Larry Ross, Riverside County Planning Department. The -- today's -- County's portion is smaller than the BLM's portion. We have about a hundred and sixty acres of BLM's project that's about 4,000 acres. We are the lead agency for the CEQUA, for California Environmental Quality Act. California Environmental Quality Act -- I got stuttering there in the beginning.

The California Environmental Quality Act is kind of a mirror of what a federal process. We just add -- you know, because it's California, we have to add and change a couple of things, so but it's fairly similar. And there will be a preparation of Environmental Impact Report as opposed to a Environmental Impact Statement.

Okay. So how our process. You will see it's very similar to what she mentioned just a couple of minutes ago. We have an initial study which sets up what subjects we will be looking at, and basically for this project we will be looking at them all. Just like she mentioned, all those -- all those particular items, we'll be looking at those exact same items. This will be a joint document, a joint EIR/EIS.

And right now we are at the Notice of Preparation Scoping Meeting. Like they mentioned before, the county was a little bit delayed in getting its noticing out, so the BLM was gracious enough to catch up to us. So the final date for comments will be April 13th.

After that, we will go to a Draft EIR, which will be when all the studies and everything -- the document is started -- prepared based on the information we get from you all today and various studies and stuff.

Now, after that Draft EIR is prepared, we'll go into a public comment period. That will -- from the County's prospective we will be issuing a Notice of Availability. A Notice of Availability saying, okay, we're opening another comment period, and this will be your opportunity to comment on the actual document and see if we got everything right like she had mentioned or if we need to improve a document or if we are missing something.

And then after the public comment period is closed, the consultants will work on all the comments from the various agencies and the public, working on it trying to improve a document to the point where it is deemed more or less complete.

At that point we start preparing the document for hearing, and we release the responsive comments. So we respond to all the different commenters, and we set the project for a hearing before the Board of Supervisors, which is a public body, five supervisors from various districts. This project will be in the Fourth District.

Once at the Board of Supervisors, the Board of Supervisors will hear the item; and if they decide to approve the item, they will certify the EIR. This is our highest body. So there's no appeal at this point.

So submit written comments or statements. Provide comments at both the public meeting and the one that will be in the future, and written comments on the Draft ERS and the Final ERS; and as I mentioned before, the scoping session and the NOP comment period for Riverside ends Monday, April 13th.

That concludes the County of Riverside's presentation.

MR. COOK: Good evening, everyone. Thank you for coming tonight. I really appreciate it. We are here to discuss our application for the Desert Quartzsite Solar Project, and not only to discuss it, but to get your input because that's the way we make the project a better project, and so that's the purpose of tonight's meeting. I appreciate you coming for that purpose.

And I'll be talking about the Desert Quartzsite Project because I'm the developer for the project, but I'm here with my colleagues and it's definitely a team effort. So I do want to point out Jill Yung, Laura Abram, Ashley Hudgens, Dave Watkins. Thank you guys for being here and making the project work.

I'll discuss First Solar briefly in order to sort of establish our credentials for proposing this project.

We have over 10,000 megawatts or, as the slide says, ten gigawatts of solar panels worldwide. We have several gigawatts of planned projects coming in the future.

The company is committed to providing low cost, clean energy that's renewable and sustainable.

We are cost competitive today with conventional energy sources, and that's critical because when we started this a few years ago we were getting close to that, but we are there now in a lot of places.

We work with companies like NRG to provide modules, construction services, and development work, as well as operation plants throughout the globe.

We are an innovative company, bankable company. We finance a large number of these projects, and the company is a -- considered an old solar company being founded in 1999, and we are a publicly traded company.

Another way of pointing out our -- what we believe are credentials are is to point out the experience we have in actually developing and building and operating these power plants.

If you look at the slide -- especially I like the picture up here on the top right-hand corner. The County of Riverside and the BLM in a very similar process than the one we want to take Desert Quartzsite to and the County and the BLM have discussed.

We would like to build a project like Desert Sunlight, which is just about a 45-minute drive west of here out on I-10 and just to the north of Desert Center.

And the projects are listed here from the ones that we have that are in development through the ones that are in construction and also in operations. So there's a slight typo down here. So the -- these yellow or orangy ones are under construction and the blue ones are the ones like Desert Quartzsite, which are under development, and then the operational ones are these lime green ones.

As you can see, we have projects throughout the county, also counties to the south and north in Imperial and in Riverside -- in San Bernardino County as well as other parts of California and in other parts of the west.

So Desert Quartzsite. We planned this as a 300-megawatt solar project mostly on BLM land west of here just south of the Mesa Verde community. You know the exit off the freeway where the airport is to the north, this site is to the south. We've also built a solar project right here we call Blythe 21. It's in operation and has been since 2009.

We plan to begin construction by the end of next year, and so that, of course, depends on both getting through the permitting process and being approved by both the key entities, our friends here at the BLM and Riverside County.

The project is located in the Riverside East Solar Energy Zone, and we propose it as a quiet, low lying, emission-free generation of electricity with no water required to actually generate electricity. We do use water during construction primarily to keep down dust. The water used during operations is mostly for domestic purposes.

We want to point out that the project does create up to 600 construction jobs during the course of construction and up to ten jobs for the operations of the plant, and we are committed to hiring locally, and you've seen that on projects we have built recently in the area.

So site selection, it's a fantastic -- as you all know, it's a fantastic area for sunlight, and another key component for us is the electrical infrastructure, which actually surrounds the site on all three sides, and importantly the Southern California Edison's Colorado River substation, which is just under two miles to the west of the site, and these are key characteristics because obviously it's less expensive. We don't have to send our -- the transmission line, the Gen-tie line from the project site to the grid interconnection there at the substation very far because of this co-location, and you have transmission lines all around the site. In some ways we see that as an ideal site for solar.

In addition, we chose the site because there aren't that -- we found compared to other places in the area and other places in California in the desert we find a lower population of desert tortoise. So that's a key indicator of sort of the -- the -- what impacts we might have on species.

As I think Cedric and Lynnette mentioned and Larry did, we're proposing this on 4,800 acres of federal land, a hundred and sixty acres of privately-owned land that we have control over, and we won't actually need all that space, but we've -- we've planned for that in case we need to move around within the site for various comments that you will provide and constraints that we will find with the various surveys and through the permitting process.

We expect the project to be build in two distinct phases. The first phase, as I mentioned before, which will be half the site, a hundred and fifty megawatts will be started construction at the end of the next, ideally.

We propose both single-axis and fixed-tilt configurations. Typically we build the fixed-tilt. You've seen that in the Blythe 21 Project, Desert Sunlight are done that way. The single-axis trackers are what we are building currently for our partners NextEra at the McCoy site. So not very far away, and there are a number of folks in the area working on that project now.

As I mentioned, we have a generation tie-line. They typically look something like this, and we do have interconnection -- two interconnection requests into the Grid Operator for the project.

I do want to go quickly through the design of the plant and how solar really works. The important thing here is that we harness the energy that the light photons have from the sun. We are trying to absorb as much energy from the sun as possible as opposed to either solar thermal technology were you're actually using the heat from the sun or in solar ovens where you are using heat. We are using the power that the photons have to knock loose electrons and create a stream of electricity.

The electricity changes several times during the -- within the architecture of the plant from what's considered a relatively low voltage, a thousand and 1500 volts DC eventually to getting up to the grid which at this point would be connecting at 230,000 volts.

So the panels take that energy from the sun absorbing as much of it as possible. The power within the arrays is combined in different combiner boxes and sent to the inverter system. The inverters take is what a direct current of electricity coming out of the panels to an alternating current, which is what we use in this building, our homes and schools within the rest of the grid.

At this point in the architecture we do use transformers to increase the voltage from a thousand to 1500 volts to 34,500 volts. Again, that power is combined through the we call them PCS's, photovoltaic combining switchgear, and that's sent to our substation on the site.

The substation at McCoy is up and running. Looks fairly similar to me and to a lot of you probably to what you have the configuration at the Colorado River substation, just a little bit smaller. This is where we transform the energy one last time from the 34,500 volts up to the 230,000 volts to get into the grid.

I will also walk you through quickly the construction techniques. We do prepare the site typically with a till and roll methodology. Till and roll takes the existing site conditions and does two things. We want to be able to combine safety with minimal environmental impact. So we try to reduce the amount of foot trip hazards there are on the site and at the same time we want to keep the seed -- local seed bank in the soil so the seeds and the plants are tilled into the soil and will remain there.

As I mentioned, we put in single dual axis trackers -- sorry -- single-axis trackers or fixed-tilt trackers. This is a fixed-tilt.

And the steel poles are driven straight into the ground with this machine right here. Depending on the soils condition, that will dictate the depth and the size of those poles.

We trench for underground cable here, some of that when we are combining the power. We will be bringing it through these trenches. The trenches are anywhere from 18 to 30 inches deep and brought into those volts, which were, as I mentioned, the PCS system and then brought overhead into the substation.

Important to note that at the end the plant will be decommissioned at the end of life of the project, and this equipment you see above ground will be removed.

So current site layout except for we forgot to add in Larry's hundred and sixty acres here. That's right in this location. Right now we show modules covering most of the project site. In the end we'll cover somewhat less than this. Again, taking your input, taking the input of the biological surveys, cultural surveys to make the project as good as we can, and that eventually will look slightly different than this, but in this vicinity.

We are -- we have done and are doing biological surveys to the site looking for mainly different -- what different types of plants and animals there are and how many there are and where they're located.

Importantly we are looking for some specific species, but we do a broad survey to see actually what all is there on the site.

Here's some of the things we found. Some of the more obvious vegetative communities are Dry Woodland Washes, which we will be staying out of. The most common is this Sonoran Desert Scrub, which you see in the image over here, and there are sand dunes primarily northwest -- in the northwest corner of the site and off the site. Obviously, we have sand throughout the site looking like this. Mostly stabilize throughout the site.

Different species of plants. Again, that helps us determine what the final layout. When we can avoid different plants and animals' habitat, we will.

Although no amphibians were found, we did -- and we did not find any actual live tortoise on the sight. The assumption this is desert tortoise habitat, not a very fine one. Carcasses of tortoise have been found, one set of tracks was found in the north-west of the site. Again, we are going over almost 5,000 acres of land. Very little site of these animals.

We do have Mohave fringe toed lizard, particularly in the northwest of the side back here in this area where there is looser sand, and Colorado desert fringe toed and then we found some snake species as well.

I did want to point out that no golden eagle nests were found within ten miles of the site. So typically that's a distance where you got a cut off for where they might be forging into the area. You might be concerned about that.

Burrowing owls can be found on site and desert kit fox can be found on site. So we will be adjusting the design accordingly because of the species, and we will be working with the agencies as well as BLM to make sure the design is done as well as it can be.

As part of the permitting process we do a jurisdictional delineation. It's not a huge factor on this particular site mostly found these -- they don't connect to a waterway, but they are found in the northern portion of the site, and it actually lines up pretty well with the Dry Woodland Washes I mentioned before. They kind of go throughout this area here on and off the site.

Cultural surveys have been conducted on the site. We have initially began with literature review, and so this covers prehistoric. Mostly we are looking for prehistoric as well as his historic uses, and field surveys have been conducted. So these were conducted at the end of last year and soon a field report will be coming -- will be given to the BLM. The BLM having reviewed it, will then also be submitting it to -- for tribal input and review.

Oh. I just wanted to point out one thing here. Last night, of course, the BLM did hold a scoping meeting in Parker, Arizona, and a number of members of tribal communities were there.

The BLM will be conducting a thorough government-to-government consultation. We are doing, in addition to that non-government-to-government meetings with the tribes, we have begun those meetings. We had some last week. We had some this week, and we did meet with them in the fall of last year as well, and important to us and the BLM there was tribal participation during the cultural surveys themselves.

We are looking -- as Lynnette mentioned, we're covering a number of areas. Studies will be done on air quality, visual impacts, traffic impacts as well as noise impacts. Just to give you a brief rundown of these, air quality of course the plant does not have any emissions. So the air quality during the operations is, I assume, nothing or next to nothing during. There is some emissions that are created during construction.

Visual. We find that the plants are fairly hard to see. You barely notice the existing Blythe 21 Project when you drive off the freeway, but we, of course, will be testing that theory by taking a look at a number of different points.

Traffic is, of course, created mostly during construction, and, again, noise is mostly during the construction phase.

We did project planning and are now in the permitting process. Really sort of at the beginning of that process with the permitting, although there's quite a number of studies and work that goes into getting to this point. We hope we can get through in this time frame and start construction by the end of 2016, which will depend, of course, on approval by the BLM, by the county, and then whether or not we are ready to build primarily hinges on whether or not we have a contract to sell power.

So that's it for my presentation. I really appreciate you listening through all the way and looking forward to hearing your comments.

And like Cedric mentioned, myself and the team will be here to answer questions now and after the meeting, and I also have business cards if anyone wants those. Some of you I handed them to. I would be glad to answer any questions coming up in the future.

That's it. Thank you very much.

MR. PERRY: We begin now the public comment period where you're welcome to come up here and give us some of the information to assist us again, um, in the process as far as evaluating information that you give us.

Please -- when I call your name, please come up here, spell your name, speak clearly so our court reporter can get all that. Spell your names properly. We have approximately three minutes, depending on how many speakers may come available up here. Please give respect to the speaker and let them say what they want to say about the project and give us the information so it can help us out.

Again, this is the address where you can send those comments to me. And the project-specific email address, it has an unlimited storage capacity.

First of all, I would like to call Mr. Juan Gonzalez.

MR. GONZALEZ: Juan Gonzalez, J-u-a-n G-o-n-z-a-l-e-z.

Um, I was born and raised here in Blythe, California. There's a lot of stuff out here in the desert, lot of pristine geoglyphs, petroglyphs that are precious to the tribes here and in the surrounding valleys.

I'm going to be honest, I didn't know most of the stuff existed during my childhood, but under the last six years I've been studying under Alfredo Figueroa. He's my mentor and elder.

I had no problems against the solar project. There's plenty of room. There's plenty of other desert land that is already barren or been -- it's kind of destroyed.

And we would appreciate, you know, to protect those geoglyphs if there's any out there and all those sites.

I had a question also. Now, those species that you found out there, are those moved to a better habitat or are you just going in there and destroying their homes or are they moved out and put somewhere else?

MS. ELSER: We have not made that determination yet. When we go through the draft document, we do look at different species. Typically if there's tortoises, they will be moved somewhere else. Lizards and snakes typically aren't moved somewhere else. If it's a fox, sometimes we do monitoring of the burrows and we will try to encourage the fox to leave when there's no young. So if the burrow's inactive, then there's no issue; but if we find a fox that's got young or it's in breeding season, then we typically try to protect that area and tell the developer to do that part last. Wait till they're gone, and then you can go into that area.

So we try to look at the different species there, and the special status species listed in endangered species threat and endangered species, they both have some form of protection. Unfortunately, we don't really have a protection plan for most snakes or lizards.

MR. GONZALEZ: Well, that's -- Well, we see that as a problem because every animal out there is precious to us or to everybody out here, but, I mean, it's not breeding season the whole year around, you know, so we don't understand that because all animals should be protected even though they are snakes or lizards. They can move by themselves.

But if I'm a bulldozer driver, because I used to work in the agriculture, and I would be cutting hay and sometimes I will be cutting up rattle snakes left and right, you know, but I would ask why can't we go and do something, you know, and move them out or scare them away? Oh, they will come back, but that's not right, you know. That's just my comment -- my theory or my view.

Okay. Thank you.

MR. PERRY: Thank you.

Mr. Alfredo Figueroa.

MR. FIGUEROA: I have to go way up there?

MR. PERRY: Yes, sir.

MR. FIGUEROA: Thank you.

MR. PERRY: That's Alfredo A. Figueroa.

MR. FIGUEROA: A-l-f-r-e-d-o F-i-g-u-e-r-o-a.

I am from the reservation, but I was born in Blythe, and I'm the monitor for the Chemehuevi Tribe Sacred Sites. So it looks like an old story here, but here we are.

Let me tell you, in 2000 we were able to divert the North Baja Gas -- Natural Gas Line from that same area. Those geologists from the North Baja Pipeline recognized that we knew what we were talking about. So they diverted it and went south.

They didn't go over here and then south because we showed them the trail, the Quechan Trail that goes all the way from what we call land and goes all the way to Yuma.

So -- and also right there is where we have the four zeros that are in the Aztec calendar. The whole Aztec calendar is laid out in the area of the Colorado River. That's why we were able very successful with the Mohave out at Mule Mountain to stop the Rio Mesa. I don't know if it's stopped or not, but anyway we haven't seen much progress.

Because that main mountain is called "calli." That's where the name California comes from. The upside down mountain. That's why the Mohaves, they were molcajete, and we -- there's a nest. An eagle's nest is right there, and it is less than ten miles from the site.

So we know what we are talking about. We've been doing this for all our lives thanks to our elders and to the stories we've heard, and to our constant visualize of all these sites.

So on behalf of the cultural, this is the wrong place, just an extension of the grave damage that has been done already in the Blythe and McCoy Southern projects.

That is -- the main valley is the McCoy Solar Project Valley -- the McCoy Valley -- the main valley where the spirits descend.

So I know people -- the invading people are nice people. They want to continue with this manifest destiny. We don't know what we're talking about. Yet we have ten laws -- ten laws to project sacred sites and yet not one has been fulfilled by the government. Here they are. I record them all.

So the other day we had a big -- the government was upset because they were with sledgehammers some people over there, the Arab country. The Iraqs bringing the sledgehammer there. Iraq. My lands. So we say, here, "Which is worse, the sledgehammer or the bulldozer?"

This is for you, Mr. Perry

MR. PERRY: Thank you, sir.

MR. FIGUEROA: So which is worse; a bulldozer or a sledgehammer? It's going to be liquidated forever, and our children are not going to know what's going to happen -- what happened.

Let me tell you, things are going to move very fast. It's not us saying it. We have, you know, a nice group called the NASA. California runs out of water it says in a year. NASA. NASA. Boy, they know their business.

We have the saving the sea here, the Salton Sea.

My lands.

Diamond Lake in Perris. Good bye, Joe. If you want to go ride your car or your motor boat, you can't because it's dried up.

Lake Mead, one-third full.

Let me tell you, things are going to happen drastically within the next year, and you are going to say we are preaching. No. This is all how the cycles have happened, and we have been more interested in destroying than preserving.

So this is very upset -- And, also, you know, this barely came out in the paper just Wednesday when they had the meeting -- had the meeting in Mesa Verde and had the meeting in Ripley, so I don't know if people went or not. But let me tell you, this is very discouraging.

And to continue, even the name of the site, Quartzsite. People have gotten confused with the Quartzsite project in Quartzsite. Why would you name two projects Quartzsite? You know, there's no quartz there. There might be a little bit of the chips -- of the Creator's chips, which represents the cosmos there; but as far as quartz base -- I'm a miner. I'm a retired miner. So I know quartz. So I don't know why they call it. It's just confusing with Quartzsite.

So, anyway, what we are doing here, we are totally in opposition of. This is going to be very -- as a matter of fact, you see the Blythe Mesa Project where they destroyed all those orchards, not all of them but the majority, offering jobs. Who do you think worked in those orchards, you know? Oh, probably a lot of you people don't work in farms, but our people here do work in farms, and that's why it's been very discouraging to see all those orchards destroyed because those orchards used to employ a lot of people.

Let me tell you, I was one of the farmers of the United Farm Workers. The guy named Cesar Chavez -- And we worked. We worked to get those orchards going, to get people employed, to have people live in Blythe and to get jobs, and they were getting better jobs than before the union. So this is just our comments that we are doing here.

We know that Kokopilli and Cicmitl. Cicmitl is ET. It's a cucuy, and they just bulldozed a big highway right straight through the meseta where Kokopilli and Cicimitl are. So we all have a conscience.

Right here. This mountain right here in the south in the Big Maria Mountains. It's called "kwikumalt." "Kwikumalt" on the -- on the Quechan, and we say "tezcalticoca," and he is the conscience. The conscience.

All of us have a conscience, and we know what we are doing here and yet we still continue because we've got

Wall Street and the guy where? Pennsylvania Avenue. I guess he wants this -- these projects.

But let me tell you, these projects have been the worst that have ever happened. We need the project where? Los Angeles. We need the projects where? On the roof tops. That's where we need projects, not these thousands -- and this right there. This is the pathway also of going down to the Cibola Refuge. So it affects all over, but our main concern is the culture and it affects all over.

So if you have any questions, I would be more than glad to ask you questions -- or answer your question because we can tell you.

As a matter of fact, I'm going to be at UCR with Dr. Fisher April the 8th. Go there. Three o'clock in the afternoon to UCR. Dr. Fisher is the -- one of the head guys of the -- it's called the process of where did we come from? Where are we going to? Humans.

Go there. It's sponsored by the UCR there. So you can see more of what we are talking about of the culture and how humans are here and where we're going. And if you want to be an associate of that, well, "tezcalticoca." "Kwikumalt." Take care of business.

Thank you. If you have any questions, let me know. I'm here. I'm 80 years old. And they say how long? And they say not long, so you'd better hurry up.

Thank you.

MR. PERRY: Thank you, sir.

Are there any other comments anybody have to speak?

(No response.)

MR. PERRY: We have displays outside where they will be available -- the applicant will be available to answer any additional questions you may have in the lobby. BLM staff will be here also. So we'll be here until approximately 8:30. So you are more than welcome.

Again, I would like to thank you for attending the scoping meeting here, and there will be additional meetings in the future.

Thank you for coming.

(The proceedings were concluded at 7:33 p.m.)

CERTIFICATE OF REPORTER

State of Arizona)
)   ss.
County of Mohave)

I, Juliette L. Vidaurri, CCR, RPR, do hereby certify that I took down in shorthand (stenotype) all of the proceedings had in the above-entitled matter at the time and place indicated, and that thereafter said shorthand notes were transcribed into typewriting at and under my direction and supervision, and the foregoing transcript constitutes a full, true, and accurate record of the proceedings had, all done to the best of my skill and ability.

In witness whereof, I have hereunto affixed my hand the 5th day of April, 2015.

NDTCA · Signed Electronic Transcript

Juliette L. Vidaurri

Juliette L. Vidaurri, CCR, RPR
AZ CR #50359/CA CSR #11081/NV CCR #748

APPENDIX I
INVESTIGATION OF THE PRESENCE OF CORPS AND US EPA JURISDICTIONAL WATERS

Investigation of the Presence of Corps and US EPA Jurisdictional Waters Desert Quartzite Project Site Riverside County, California

Prepared for

First Solar Development, LLC
135 Main Street, 6th Floor
San Francisco, California 94105
415.935.2514

Prepared by

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS
828 Mission Avenue
San Rafael, California 94901
415.925.2000

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TABLE OF CONTENTS

EXECUTIVE SUMMARY 1

1.0 INTRODUCTION 5

1.1 Purpose and Scope of Work 5
1.2 General Site Description 5
1.3 Contact Information 5
1.4 Driving Directions to Study Area from Corps Office 6
1.5 Environmental Setting 6
  1.5.1 Topography 6
  1.5.2 Land Use 6
  1.5.3 Geology 7
  1.5.4 Soils 8
  1.5.5 Vegetation 9
  1.5.6 Climate 9
  1.5.7 Hydrology 10
  1.5.8 FEMA Flood Zone 10
1.6 Disclaimer 10

2.0 REGULATORY BACKGROUND 12

2.1 Section 404 of the Clean Water Act 12
  2.1.1 Geographic Extent of Jurisdiction for Section 404 of the Clean Water Act 12
  2.1.2 Limits of Section 404 CWA Jurisdiction 13
2.2 Section 10 of the Rivers and Harbors Act 14
  2.2.1 Geographic Extent of Section 10 of the Rivers and Harbors Act Jurisdiction 14
  2.2.2 Limits of Section 10 RHA Jurisdiction for Rivers and Lakes 14
2.3 Wetlands Delineation Criteria 14
  2.3.1 Wetland Hydrology 15
  2.3.2 Hydric Soils 16
  2.3.3 Prevalence of Wetland Vegetation 19
  2.3.4 Difficult Wetland Situations in the Arid West 21
2.4 Using an Ordinary High Water Mark to Establish CWA Jurisdictional Limits 21
  2.4.1 Ephemeral/Intermittent Channels in the Arid West 22
  2.4.1 Corps Regulatory Guidance Letter 05-05 23

3.0 DELINEATION METHOD 25

3.1 Preliminary Investigations 25
3.2 Detailed Field Investigations: Wetlands 25
3.3 Detailed Field Investigations: Other Waters 25
3.4 Mapping 26

4.0 TECHNICAL FINDINGS 27

4.1 Field Indicators of Wetland Vegetation 27
4.2 Field Indicators of Hydric Soils 28
4.3 Field Indicators of Wetland Hydrology Conditions 29
4.4 Field Indicators of Ordinary High Water 29

TABLE OF CONTENTS, continued

5.0 AREAS POTENTIALLY SUBJECT TO FEDERAL JURISDICTION..31

5.1 CWA Wetlands Jurisdiction 31
5.2 Other Waters of the US Jurisdiction 31
5.3 RHA Navigable Waters Jurisdiction 31

6.0 CWA JURISDICTIONAL ANALYSIS 32

7.0 REFERENCES..33

LIST OF TABLES

Table ES1	Potential Waters of the US Found Within the Study Area
Table ES2	Waters Found to be Potentially Excluded from Jurisdiction Within the Study Area
Table 1	Average Monthly Temperatures, Blythe, CA
Table 2	Wetland Hydrology Indicators (1987 Wetlands Delineation Manual)
Table 3	Wetland Hydrology Indicators (Arid West Supplement)
Table 4	Field Indicators of Hydric Soil Conditions (1987 Corps Manual and Corps Guidance Documents)
Table 5	Hydric Soil Indicators (Arid West Supplement)
Table 6	2014 National Wetland Plant List Indicator Definitions
Table 7	Data Form and Map Sheet Correlation Table
Table 8	Potential Waters of the US Found Within the Study Area
Table 9	Waters Found to be Potentially Excluded from Jurisdiction Within the Study Area

LIST OF APPENDICES

Appendix A	**Figures**
Figure 1	Regional Map
Figure 2	USGS Topographic Map of the Jurisdictional Study Area
Figure 3	Southern Mojave and Imperial Reservoir USGS HUC 8 Hydrologic Units
Figure 4	USGS HUC 12 Watershed Units
Figure 5	USGS NHD 1:25K High Resolution Mapping With Flow Arrows Showing Direction and Route of Surface Water Flow
Figure 6	Potential Waters of the US Subject to Corps/US EPA Section 404 Jurisdiction (Index Map and Map Sheets 1 – 17)
Figure 7	Location of Areas Potentially Excluded from Corps and US EPA Jurisdiction as Waters of the US
Appendix B	**NRCS Custom Soil Report**
Appendix C	**WETS Analysis**
Appendix D	**Corps Regulatory Guidance Letter 05-05, OHWM Identification**
Appendix E	**Field Data**
Appendix F	**Representative Onsite Photographs**
Appendix G	**Corps-Approved Jurisdictional Determination Form and Waters Upload Sheet**

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34 pages plus Appendices.

EXECUTIVE SUMMARY

At the request of First Solar Development, LLC (First Solar), Huffman-Broadway Group, Inc. (HBG) conducted an investigation of the geographic extent of wetlands and other waters at First Solar's proposed Desert Quartzite photovoltaic solar power generation facility site in Riverside County, California, that are potentially subject to:

(1) US Army Corps of Engineers (Corps) and US Environmental Protection Agency (US EPA) regulation under Section 404 of the Clean Water Act (CWA) and

(2) Corps jurisdiction under Section 10 of the Rivers and Harbors Act.

The purpose of the investigation was to provide a detailed jurisdictional delineation in accordance with Corps methodology and guidelines that can be used by First Solar in determining the need to pursue project authorization from the Corps for development of a solar-photovoltaic generation facility onsite. The investigation covered a contiguous 5,002.8-acre study area (Study Area) in an unincorporated portion of eastern Riverside County. Appendix A, Figure 1, shows the general location of the Study Area.

Study Area Location and Background Information

The Study Area is in the Colorado Desert Section of the Sonoran Desert in an unincorporated part of Riverside County, California. The city of Blythe is about 6.5 miles to the east (Appendix A, Figure 1). The Study Area is approximately 0.46 mile south of Interstate I-10, and is northeast of the Mule Mountains, east of Milpitas Wash Road, and west of Palo Verde Valley and the Lower Colorado River (Appendix A, Figures 1 and 2). Approximate latitude and longitude coordinates for the center of the Study Area are 33.57895 / -114.756497.

The Study Area is on largely vacant, undeveloped land within the Palo Verde Mesa in eastern Riverside County.

- **Topography.** The Study Area is within portions of the Roosevelt Mine (1983) and Ripley (1952, rev.1975) USGS 7.5-minute quadrangles (Appendix A, Figure 2). The majority of the Study Area has relatively flat desert terrain. Elevations range from approximately 380.6 to 577.4 feet (116.0 to 176.0 meters) above mean sea level.
- **Soils.** The NRCS custom soil resources report In Appendix B indicates that the Study Area is within the Colorado Desert Area and Palo Verde Area NRCS soils mapping units. Nine soil types have been mapped within the Palo Verde Area portion of the Study Area (4,446.6 acres [89%]). The parent material / landform of more than 80% of these soils is mixed alluvium / alluvial fan remnants; the parent material / landform of about 14% of the soils is Eolian sands /sand sheets, with the remainder being mixed sand and gravel soils in the arroyos landform. No soils data have been collected for the Colorado Desert Area in the western 556.3 acres of the Study Area although HBG found soils in this unmapped area to be the same as or similar to the Palo Verde Area soils.

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- **Hydrology.** The Study Area primarily lies within the Imperial Reservoir 8-digit Hydrologic Unit Code (HUC) watershed, HUC 15030104. The western tip of the Study Area, however, is in the South Mojave 8-digit HUC watershed (HUC 18100100). Figures 3 and 4 in Appendix A show HUC 8 and HUC 12 watersheds. Figure 5 shows National Hydrography Dataset (NHD) flowlines and flow directions for the Study Area and its vicinity. Most flow onto the Study Area is from the north-northwest, crossing the northernmost portion of the site.

  Surface and channel flooding can occur within the Study Area any time of year; however, many years can pass between surface flow events. If flow does occur, it typically runs within small localized areas before it infiltrates the soil. Flooding as a result of high intensity thunderstorms typically lasts only a few hours and typically occurs in localized areas.

- **Vegetation.** The Study Area is dominated by one distinctive vegetation type, creosote bush scrub, with a small amount of desert dry wash woodland (following the Holland 1986 California Vegetation Classification System).

- **Weather.** The Study Area has a desert climate with very hot, dry summers and mild winters based on review of WETS data (Appendix C). Average annual precipitation at the Blythe AP WETS Station for the period of record (1971 – 2000) is 4.02 inches. For the same period of record, the annual average temperature is 72° F; maximum temperatures in June, July, and August are between 104° F and 107° F.

Regulatory Framework

Section 2.0 describes the regulatory framework for jurisdictional delineations, describing the geographic extent of Corps jurisdiction under Section 404 of the Clean Water Act and definitions of "waters of the United States," including wetlands; the geographic extent and limits of federal jurisdiction under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899; the key diagnostic criteria used for determining the presence of wetlands related to hydrophytic vegetation, hydric soil, and wetland hydrology; and the use of the ordinary high water mark (OHWM) to establish CWA jurisdictional limits in the absence of wetlands.

Delineation Method

This study consisted of both preliminary and detailed field investigations and data mapping followup at HBG's office. The preliminary investigations identified areas onsite where waters of the US may potentially occur based on a March 2014 field reconnaissance and review of USGS topographic mapping, USGS National Hydrography Dataset (NHD) HUC 8 and HUC 12 mapping, NAIP orthorectified aerial photography, and an NRCS Custom soil resources report.

Detailed field investigations were conducted on foot within the Study Area during May 2014 and February 2015. The locations of field sampling points and OHWMs were documented in the field using a hand-held, Trimble XT global positioning system (GPS) unit with sub-meter accuracy after geoprocessing.

Wetlands. Field data to assess the presence or absence of wetland soil, hydrology and vegetation conditions were collected in accordance with the regulations, policy, and methodology described in Section 2.0; field data were recorded on Wetland Determination Data Forms (Arid West Region).

Other Waters. Field data to assess the presence or absence of other waters of the US were recorded on OHWM Determination Data Forms. The locations of potential other waters of the US within the Study Area was determined using physical characteristics as described in Corps Regulatory Guidance Letter 05-05 to define an OHWM (e.g., evidence of erosion, drift, sediment deposition, change in plant community).

Mapping. Recorded GPS data were incorporated into a Geographic Information System (GIS) and georeferenced in overlay fashion onto a USGS topographic base map and March 2011 NAIP digital aerial photograph. This aerial photograph was orthorectified to a 1:25,000 USGS topographic base following national mapping standards. Active linear drainage features were mapped as line features due to their narrow width. The maps of areas potentially subject to Corps jurisdiction are presented in Appendix A, Figure 6. The GIS data and mapping were used to assist in the analysis, identification and digitization of the location and geographic extent of areas that would potentially qualify as waters of the United States.

Technical Findings

Wetlands. No areas were found within the Study Area that meet the technical criteria for wetlands described in Section 2.3.

Other Waters of the US. Physical characteristics indicative of high water associated with surface water flows were found along the sides of channel banks or streambeds of active ephemeral stream channels and an excavated ephemeral stream drainage. The physical characteristics found included water marks (in the form of bank scour, erosion and/or shelving), sediment deposits (linear deposits of fine-grained sediment), drift deposits (flow deposited woody and soft tissue plant debris), and a distinctive no vegetation / vegetation line or border. Field data for the Study Area are presented in Appendix E.

On the basis of the technical findings resulting from the field data analysis, it was determined that areas potentially subject to Corps and US EPA jurisdiction as other waters of the US occur within the Study Area. This determination was based on the presence of OHWMs found at the margins of streambeds / active floodplains, which are locally referred to as desert dry washes or arroyos. The OHWM determination is based on physical characteristics that represent stormwater flows that occur on a regular or frequent basis. These potential jurisdictional waters are summarized below in Table ES1 by NWI habitat type, type of water of the US, and length within the Study Area. Figure 6 in Appendix A provides mapping showing the locations of these potential jurisdictional waters. The “Corps Waters Upload Sheet” in Appendix G identifies the length and width of each potential water of the US.

Table ES1. Potential Waters of the US Found Within the Study Area		
Habitat Type[1]	**Corps / US EPA Type of Potential Waters of the US**	**Linear Feet**
Riverine	Other Waters of US	
Ephemeral Riverine Intermittent Streambed	Stream	40,349
Excavated Ephemeral Riverine Intermittent Streambed	Stream	1,583
Total		**41,932**
[1] Wetlands / Other waters of the US classified using the US Fish and Wildlife Service's *Classification System for Wetland and Deepwater Habitats* (Cowardin *et al*. 1979)		

RHA Navigable Waters Jurisdiction. No streambed areas were found to be subject to Section 10 RHA jurisdiction. The streambeds identified are not navigable waters subject to the ebb and flow of the tide, nor are they presently used, used in the past, or susceptible for use to transport interstate or foreign commerce.

Conclusions

Using the analysis in the Corps' Approved Jurisdictional Determination Form (Appendix G), it was determined that the potential jurisdictional waters identified in Table ES1 are isolated intrastate waters in that they lack a surface hydrologic connection to a Traditional Navigable Water either directly or indirectly through a Relatively Permanent Water or Non-Relatively Permanent Water. These potential jurisdictional waters do not meet the test for *jurisdictional* isolated waters. These waters do not meet the "significant nexus" standard; they are not currently used, were not used in the past, and are not susceptible to use in interstate or foreign commerce; nor would "the use, degradation or destruction of" these waters affect interstate or foreign commerce. Figure 7 shows the location of these waters. Table ES2 summarizes these findings.

Table ES2. Waters Found to be Potentially Excluded from Jurisdiction Within the Study Area				
Habitat Type[1]	**Corps / US EPA Potential Type of Waters of the US**	**Linear Feet**	**Rationale for Exclusion**	
Riverine			**Isolated Water**	**Lacks Interstate or Foreign Commerce Nexus**
Ephemeral Riverine Intermittent Streambed	Other Water	40,349	Yes	Yes
Excavated Ephemeral Riverine Intermittent Streambed	Other Water	1,583	Yes	Yes
Total		**41,932**		
[1] Wetlands / Other waters of the US classified using the US Fish and Wildlife Service's *Classification System for Wetland and Deepwater Habitats* (Cowardin *et al*. 1979)				

1.0 INTRODUCTION

1.1 Purpose and Scope of Work

At the request of First Solar Development, LLC (First Solar), Huffman-Broadway Group, Inc. (HBG) conducted an investigation of the geographic extent of wetlands and other waters at First Solar's proposed Desert Quartzite photovoltaic solar power generation facility site in Riverside County, California, that are potentially subject to

(1) US Army Corps of Engineers (Corps) and US Environmental Protection Agency (US EPA) regulation under Section 404 of the Clean Water Act (CWA) and

(2) Corps jurisdiction under Section 10 of the Rivers and Harbors Act.

The purpose of the investigation was to provide a detailed jurisdictional delineation in accordance with Corps methodology and guidelines that can be used by First Solar in determining the need to pursue project authorization from the Corps for development of a solar-photovoltaic generation facility onsite. The investigation covered a contiguous 5,002.8-acre study area (Study Area) in an unincorporated portion of eastern Riverside County. Appendix A, Figure 1, shows the general location of the Study Area.

This study was conducted in accordance with *Code of Federal Regulations* (CFR) definitions of jurisdictional waters, the Corps' 1987 *Wetlands Delineation Manual*, the Corps' 2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) ("Arid West Supplement"),* and supporting Corps and US EPA guidance documents. This investigation was conducted to seek a Corps Verified Jurisdictional Determination pursuant to applicable Corps guidance documents.

1.2 General Site Description

The Study Area is in the Colorado Desert Section of the Sonoran Desert in an unincorporated part of Riverside County, California. The city of Blythe is about 6.5 miles to the east (Appendix A, Figure 1). The Study Area is approximately 0.46 mile south of Interstate I-10, and is northeast of the Mule Mountains, east of Milpitas Wash Road, and west of Palo Verde Valley and the Lower Colorado River (Appendix A, Figures 1 and 2). Approximate latitude and longitude coordinates for the center of the Study Area are 33.57895 / -114.756497.

1.3 Contact Information

Applicant Contact	***Wetland and Biological Consultant***
Applicant: Roy Skinner First Solar Development, LLC 135 Main Street, 6th Floor San Francisco, California 94105 415.531.6909 (cell) • 415.935.2500 (office)	**Huffman-Broadway Group, Inc.** 828 Mission Avenue San Rafael, California 94901 **Contact***:* Terry Huffman, PhD 415.385.1045 thuffman@h-bgroup.com

1.4 Driving Directions to Study Area from Corps Office

From: US Army Corps of Engineers
Regulatory Division, Los Angeles Office
915 Wilshire Boulevard
Los Angeles, California 90017

To: Study Area

Route Changes	Directions	Miles
1	Head southeast on Wilshire Blvd toward S Figueroa St	
2	Take the 1st left onto S Figueroa St	**387 ft**
3	Turn left at the 3rd cross street onto W 5th St	**0.2 mi**
4	Continue straight to stay on W 5th St	**141 ft**
5	Take the exit toward **Adams Blvd**	**43 ft**
6	Keep right at the fork, follow signs for CA-110 N/Harbor Fwy N and merge onto CA-110 N/Harbor Fwy	**0.2 mi**
7	Merge onto CA-110 N/Harbor Fwy	**0.5 mi**
8	Take the US 101 exit toward Ventura/Interstate 5 S/Interstate 10 E/California 60 E	**0.1 mi**
9	Keep right at the fork, follow signs for I-10/San Bernardino/I-5/Santa Ana and merge onto US-101 S	**1.6 mi**
10	Keep left at the fork to continue on San Bernardino Fwy, follow signs for San Bernardino/Interstate 10 E	**1.3 mi**
11	Merge onto I-10 E	**212 mi**
12	Take the Mesa Dr exit toward Airport	**0.2 mi**
13	Turn right onto Mesa Dr	**0.4 mi**
14	Turn right to stay on Mesa Dr	**0.5 mi**
15	14005-14077 Mesa Dr	**0.0 mi**
Estimated Driving Time & Distance	About **3 hours 13 minutes**	**217 miles**

1.5 Environmental Setting

1.5.1 Topography

The Study Area is within portions of the Roosevelt Mine (1983) and Ripley (1952, rev.1975) USGS 7.5-minute quadrangles (Appendix A, Figure 2). The majority of the Study Area has relatively flat desert terrain. Elevations are shown in meters on the western approximately two-thirds of the map and in feet for the eastern third of the map. Elevations range from approximately 380.6 to 577.4 feet (116.0 to 176.0 meters) above mean sea level.

1.5.2 Land Use

The Study Area is on largely vacant, undeveloped land within the Palo Verde Mesa in eastern Riverside County.

1.5.3 Geology

The site is in the east-northeastern Colorado Desert Geomorphic Province. The San Andreas Fault defines the southwestern boundary of the eastern Colorado Desert while the San Bernardino Mountains form a less-defined boundary to the north. Review of recent aerial imagery and site photographs, and the NRCS custom soil report in Appendix B indicates that the area consists of active younger sediments with limited evidence of desert pavement in the northern margin of the Study Area. The active younger sediments are of Holocene age and consist of fine to coarse sand interbedded with clay, silt, and gravel. Topography in these areas tends to be consistent, relatively flat with 0 to 2 percent slopes with stream channels generally less than 1 foot deep. These shallow channels within the younger sediments likely exhibit frequent channel avulsion and lateral migration during flood flows.

Review of March 2011 aerial imagery, an onsite recognizance survey, the NRCS soils report, and site photographs indicates that three significant geologic environments occur within the Study Area:

- Older alluvial sediments with developed desert pavement
- Active younger sediments with no evidence of desert pavement
- Eolian sand sheets

Older Alluvial Sediments

Alluvial fan deposits composed of non-marine Pleistocene sediments extend into the Palo Verde Mesa from both the McCoy Mountains on the north-northwest slightly into the northernmost part of the Study Area and the Mule Mountains into the southwest portion of the Study Area. Desert pavement type deposits (manganese and iron oxidized coatings on cobbles and sand) occur on older alluvial fan material.

Active Younger Sediments

The active younger sediments are of Holocene age and consist of fine to coarse sand interbedded with clay, silt and gravel. There is no evidence of desert pavement. Topography in these areas tends to be consistent. Stream channels within the Study Area appear to be relatively active in terms of channel avulsion and lateral migration with channels generally less than 1 foot deep.

Eolian Sand Sheets

Aeolian sand sheets were described as follows by WorleyParsons (2010):

> Sand sheets (or plains) are flat or gently undulatory broad floors of tabular windblown sand deposits derived from accumulating sand ripple migration. The tabular deposits generally range in thickness from a few centimeters to a few meters. Some sand sheets, as in the southwestern U.S., are local deposits that extend only a few square kilometers in and around dune fields, where they are exposed on interdune floors and form the aprons or trailing margins of dune fields and along sand migration corridors. Sand sheet deposits are composed of gently inclined or nearly horizontal layers, each less than about a centimeter

> thick, of coarse silt and very fine to medium sand separated by layers, one grain thick, of coarse sand and granules. Unlike dune sand, the unconsolidated sand and granules are closely packed and firm under foot. The surface is protected by a wind abrasion lag, one grain thick, of the coarsest particles that can be shifted by the wind, ranging from coarse sand to pea-size gravel. In any one place, however, the sizes of the lag particles are remarkably uniform, and the lag may be so closely packed that it forms a miniature desert pavement. In the Chuckwalla Valley, the wind abrasion lag often contains small gravel that may have been derived from burrowing animals moving coarser grained alluvial deposits containing gravel to the surface in the past ([*citation*]). The existence of a wind abrasion lag containing gravel from underlying alluvial units suggests that the surface is a minimum of a few thousand years old in order to provide sufficient time for burrowing animals to mix the near surface units over a relatively large area. Sand sheets in themselves indicate little about wind direction regimes, but the particle size of sand and gravel lag on ripple surfaces seems dependent on the strength of the winds in any given locality. Inactive sand sheet deposits near and at the surface however do provide evidence of past wind sand migration corridors.

1.5.4 Soils

Appendix B is an NRCS custom soil resources report for the Study Area. According to NRCS, the Study Area is within the Colorado Desert Area and Palo Verde Area NRCS soils mapping units. No soils data have been collected for the Colorado Desert Area, California (CA803), in the western 556.3 acres of the Study Area (USDA NRCS 2015). Although soils have not been mapped in this area, onsite observation of surface conditions and interpretation of aerial photography and NRCS soils mapping for the Palo Verde Area portion indicate that the soils found in this unmapped area are the same as or similar to the Palo Verde Area soils described below.

Nine soil types have been mapped within the Palo Verde Area, California (CA681), portion of the Study Area (4,446.6 acres [89%]) (USDA NRCS 2015). The soils and their parent materials and landforms are summarized below:

Soil type	Parent Material / Landform
Aco gravelly loamy sand (Ac)	Mixed alluvium / alluvial fan remnants landform
Aco sandy loam (Af)	Mixed alluvium / alluvial fan remnants landform
Carrizo gravelly sand (Ce)	Mixed sand and gravel / arroyo landform
Chuckawalla very gravelly silt loam (Ch)	Mixed alluvium / alluvial fan remnants landform
Orita fine sand (Oc)	Mixed alluvium / alluvial fan remnants landform
Orita gravelly fine sandy loam (Or)	Mixed alluvium / alluvial fan remnants landform
Rositas fine sand, 0 to 2 percent slopes (RoA)	Eolian sands / sand sheets landform
Rositas fine sand, 2 to 9 percent slopes (RoB)	Eolian sands / sand sheets landform
Rositas gravelly loamy sand, 0 to 2% slopes (RsA)	Eolian sands over mixed alluvium parent material / sand sheets on stream terraces landform

The parent material / landform of more than 80% of these soils is mixed alluvium / alluvial fan remnants; the parent material / landform of about 14% of the soils is Eolian sands /sand sheets, with the remainder being mixed sand and gravel soils in the arroyos landform. Depth to water for all soils is greater than 80 inches. The NRCS soils report indicates that the five alluvial fan remnant soils (Ac, Af, Ch, Oc, Or) are well-drained; the Carrizo gravelly sand (Ce) is "excessively drained," and the three Rositas soils (RoA, RoB, and RsA) are "somewhat excessively drained."

Note: The acreage given in the NCRS soil report does not include an approximately 160-acre area in the central portion of the Study Area that was added after the NRCS report was generated. Soils mapped in this area are Rositas fine sand, 0 to 2 percent slopes, Orita fine sand (Oc), and Orita gravelly fine sandy loam (Or).

1.5.5 Vegetation

The Study Area is dominated by one distinctive vegetation type, creosote bush scrub, with a small amount of desert dry wash woodland (following the Holland 1986 California Vegetation Classification System).

Creosote Bush Scrub

Plant species typical of the creosote bush scrub include creosote bush (*Larrea tridentata*), burro bush (*Ambrosia dumosa*), boxthorn (*Lycium* sp.), brittlebush (*Encelia farinose*), Schott's indigo bush (*Psorothamnus schottii*), and prickly pear cactus (*Opuntia* and *Cylindropuntia* sp.). The evergreen creosote bush is relatively uniformly spaced within the desert landscape where it occurs.

Desert Dry Wash Woodland

Plants species typical of the desert dry wash woodland vegetation type include blue palo verde (*Cercidium floridum*), ironwood (*Olneya tesota*), smoke tree (*Psorothamnus spinosa*), and desert willow (*Chilopsis linearis*). Desert dry wash woodland was found to occur within the Study Area adjacent to ephemeral dry wash areas having braided channels that support dynamic flow.

1.5.6 Climate

The Study Area has a desert climate with very hot, dry summers and mild winters based on review of WETS data (Appendix C). HBG obtained climate data for the Blythe, California AP WETS Station (CA158; US Army Corps of Engineers 2005). This WETS station is on Hobsonway Road within approximately 2 miles of the Study Area (Appendix A, Figure 1). Average monthly temperatures (° F) for the period of record (1971 – 2000) are presented in Table 1:

Table 1. Average Monthly Temperatures, Blythe, CA

Month/ Temperature (° F)	January	February	March	April	May	June	July	August	Sept.	Oct.	Nov	Dec
Average	54.2	58.9	63.9	71.0	78.9	88.4	93.7	92.5	86.0	74.0	61.1	53.5
Average Daily Maximum	66.6	72.0	77.6	85.7	93.9	104.1	107.2	105.4	99.6	88.0	74.7	66.0
Average Daily Minimum	41.7	45.7	50.2	56.2	63.9	72.6	80.2	79.5	72.4	60.0	47.4	40.9

Average annual precipitation at the Blythe AP WETS Station for the period of record (1971 – 2000) is 4.02 inches. Average precipitation for the winter months (October through March) is 2.36 inches. Precipitation data for January 2013 to January 2015 (Appendix C) indicate that precipitation ranged between normal and below normal rainfall, with January and November 2013, December 2014, and January 2015 having an above normal rainfall. These above normal rainfall periods for the 2013 – 2015 winter months result in stormwater runoff events that define the limits of jurisdiction within streams found within the Study Area.

1.5.7 Hydrology

The Study Area primarily lies within the Imperial Reservoir 8-digit Hydrologic Unit Code (HUC) watershed, HUC 15030104, more specifically in the HUC 12 Cinnabar Wash-Palo Verde Valley (HUC 150301040804) watershed. The western tip of the Study Area, however, is in the South Mojave 8-digit HUC watershed (HUC 18100100), specifically in the Wileys Well 12-digit watershed (HUC 181001005201). See Appendix A, Figures 3 and 4. Figure 5 shows National Hydrography Dataset (NHD) flowlines and flow directions for the Study Area and its vicinity overlain on a March 2011 aerial photograph. Most flow onto the Study Area is from the north-northwest, crossing the northernmost portion of the site.

Surface and channel flooding can occur within the Study Area any time of year; however, many years can pass between surface flow events. General winter and summer storms generate low amounts of precipitation that typically infiltrates the ground where it falls, with little or no surface flow generated. If flow does occur, it typically runs within small localized areas before it infiltrates the soil. Flooding as a result of high intensity thunderstorms typically lasts only a few hours at most and typically occurs in localized areas.

1.5.8 FEMA Flood Zone

The Federal Emergency Management Agency (FEMA) has not conducted a flood hazard analysis of the Study Area; no FEMA flood zone designation exists.

1.6 Disclaimer

Huffman Broadway Group, Inc., and First Solar Development, LLC, have made a good-faith effort herein to thoroughly describe and document the presence of potential factors that the Corps may consider in asserting jurisdiction pursuant to Section 404 of the Clean Water Act. Nevertheless, First Solar reserves the right to challenge or seek revision to any areas over which the Corps may assert such jurisdiction, should such jurisdiction be further clarified or altered through formal guidance, assertions, or disclaimers of jurisdiction over other properties, court decisions, or other relevant actions.

2.0 REGULATORY BACKGROUND

This section describes the regulatory framework for jurisdictional delineations. Section 2.1 addresses Section 404 of the federal Clean Water Act, including the geographic extent of jurisdiction and the definitions of "waters of the United States" and wetlands (Section 2.1.1) and the limits of Section 404 jurisdiction (Section 2.1.2). Section 2.2 describes the geographic extent and limits of federal jurisdiction under Section 10 of the Rivers and Harbors Act of 1899 (Sections 2.2.1 and 2.2.2, respectively). Section 2.3 identifies the key diagnostic criteria for determining the presence of wetlands and Section 2.4 describes using an ordinary high water mark (OHWM) to establish CWA jurisdictional limits in the absence of wetlands.

2.1 Section 404 of the Clean Water Act

2.1.1 Geographic Extent of Jurisdiction for Section 404 of the Clean Water Act

Section 404 of the Federal Clean Water Act (33 U.S.C. 1251, et seq.) authorizes the Corps and US EPA to regulate activities that discharge dredged or fill material to wetlands and other waters of the United States.

Waters of the United States. As defined in Corps regulations (Title 33 *Code of Federal Regulations* [CFR] 328.3(a)), the term "waters of the United States" encompasses the following resources:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All interstate waters including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
    i. Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
    ii. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
    iii. Which are used or could be used for industrial purpose by industries in interstate commerce;
4. All impoundments of waters otherwise defined as waters of the United States under the definition;
5. Tributaries of waters identified in above paragraphs (1-4);
6. The territorial seas; and
7. Wetlands adjacent to waters identified in above paragraphs (1-6) except waters that are themselves wetlands.
8. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted

> cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA.
>
> ….

Wetlands. As defined in Corps regulations (33 CFR § 328.3(b)):

> The term *wetlands* means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

The term "*under normal circumstances*" refers to situations in which the vegetation has not been substantially altered by human activities as defined in Appendix A of the Corps' 1987 *Wetlands Delineation Manual* (hereinafter *Corps 1987 Manual*).

Implicit in the definition is the need for a site to meet certain water, soil, and vegetation criteria to qualify as a jurisdictional wetland. These criteria and the methods used to determine whether they are met are described in the *Corps 1987 Manual.* See Section 2.3.

Ordinary High Water Mark. As defined by Corps regulations (33 CFR 328.3(e)):

> The term *ordinary high water mark* means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

2.1.2 Limits of Section 404 CWA Jurisdiction

The following provides the regulatory definitions and criteria followed in determining the geographic extent or limit of potential EPA/Corps jurisdiction.

As described at 33 CFR Part 328.4, the geographic limits of relevant federal jurisdiction are defined in the following manner:

Non-Tidal Waters of the United States.

> The limits of jurisdiction in non-tidal waters: (1) In the absence of adjacent wetlands, the jurisdiction extends to the ordinary high water mark, or (2) when adjacent wetlands are present, the jurisdiction extends beyond the ordinary high water mark to the limit of the adjacent wetlands. (3) When the water of the United States consists only of wetlands the jurisdiction extends to the limit of the wetland. (33 CFR 328.4(c)).

> The term "adjacent" means bordering, contiguous, or neighboring. Wetlands separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are "adjacent wetlands." (33 CFR 328.3(c))

2.2 Section 10 of the Rivers and Harbors Act

2.2.1 Geographic Extent of Section 10 of the Rivers and Harbors Act Jurisdiction

As described by Corps regulation 33 CFR 322.1, Section 10 of the RHA of 1899 (33 U.S.C. 403) authorizes the Corps to regulate certain structures or work in or affecting navigable waters. Navigable waters are defined in 33 CFR 329.4:

> Navigable waters of the US are those waters subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or might be susceptible for use to transport interstate or foreign commerce.

Three factors must be examined when making a determination whether a waterbody is a navigable water (33 CFR 329.5): "… (a) past, present, or potential presence of interstate or foreign commerce; (b) physical capabilities for use by commerce…, and (c) defined geographic limits of the waterbody."

2.2.2 Limits of Section 10 RHA Jurisdiction for Rivers and Lakes

The geographic limits of relevant federal jurisdiction for a navigable river or lake, pursuant to RHA jurisdiction are defined in the following manner:

Rivers and Lakes: If a river or lake is determined to be "navigable" the regulatory jurisdiction extends laterally to the entire water surface and bed of a navigable lake or river, which includes all the land and waters below the ordinary high water mark. (33 CFR 329.11)

2.3 Wetlands Delineation Criteria

The *Corps 1987 Manual* identifies the key diagnostic criteria for determining the presence of wetlands. These are:

> *Wetland Hydrology*: Inundation or saturation to the surface during the growing season.
>
> *Hydric Soils:* Soils classified as hydric or that possess characteristics associated with reducing soil conditions.
>
> *Predominance of Wetland Vegetation:* Vegetation classified as facultative, facultative wet, or obligate according to its tolerance of saturated (i.e., anaerobic) soil conditions.

Specific criteria used to determine the presence or absence of wetland hydrology, soil, and vegetation conditions are described in the sections below.

2.3.1 Wetland Hydrology

The *Corps 1987 Manual* states that wetland hydrology conditions occur when a "site is inundated either permanently or periodically at mean water depths less than or equal to 6.6 feet, or the soil is saturated to the surface at some time during the growing season of the prevalent vegetation." Whether a site meets either of these criteria is determined by the presence of diagnostic indicators of wetland hydrology, which include the following:

Table 2. Wetland Hydrology Indicators
(*Corps 1987 Manual*)

Primary Indicators	Secondary Indicators
Watermarks	Oxidized Rhizospheres Associated with Living Roots
Drift Lines	Water-Stained Leaves
Water-Borne Sediment Deposits	FAC-Neutral Test
Drainage Patterns Within Wetlands	Local Soil Survey Data

A March 8, 1992, Corps memorandum entitled *Clarification and Interpretation of the 1987 Manual* provides further clarification:

> Areas which are seasonally inundated and/or saturated to the surface for a consecutive number of days for more than 12.5 percent of the growing season are wetlands, provided the soil and vegetation parameters are met. Areas wet between 5 percent and 12.5 percent of the growing season in most years may or may not be wetlands. Sites saturated to the surface for less than 5 percent of the growing season are non-wetlands.

Wetland hydrology indicators have also been further defined and described in the Corps 2008 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (Arid West Supplement).* These indicators are similar to the indicators listed above from the 1987 Corps *Manual* and are presented in the following table.

Table 3. Wetland Hydrology Indicators
(Arid West Supplement)

Primary Indicators (*any one indicator is sufficient to make a determination that wetland hydrology is present*)		**Secondary Indicators** (*two or more indicators are required to make a determination that wetland hydrology is present*)
Surface Water (A1)	Water-Stained Leaves (B9)	Water marks (B1) (Riverine)
High Water Table (A2)	Salt Crust (B11)	Sediment Deposits (B2) (Riverine)
Saturation (A3)	Biotic Crust (B12)	Drift Deposits (B3) (Riverine)
Water Marks (B1) (Nonriverine)	Aquatic Invertebrates (B13)	Drainage Patterns (B10)
Sediment Deposits (B2) (Nonriverine)	Hydrogen Sulfide Odor (C1)	Dry-Season Water Table (C2)
Drift Deposits (B3) (Nonriverine)	Oxidized Rhizospheres along Living Roots (C3)	Crayfish Burrows (C8)

Table 3. Wetland Hydrology Indicators
(Arid West Supplement)

Primary Indicators (*any one indicator is sufficient to make a determination that wetland hydrology is present*)		**Secondary Indicators** (*two or more indicators are required to make a determination that wetland hydrology is present*)
Surface Soil Cracks (B6)	Presence of Reduced Iron (C4)	Saturation Visible on Aerial Imagery (C9)
Inundation Visible on Aerial Imagery (B7)	Recent Iron Reduction in Tilled Soils (C6)	Shallow Aquitard (D3)
	Thin Muck Surface (C7)	FAC-Neutral Test (D5)

2.3.2 Hydric Soils

The *Corps 1987 Manual* states that the diagnostic environmental characteristics indicative of wetland soil conditions are met where "soils are present and have been classified as hydric, or they possess characteristics that are associated with reducing soil conditions." According to the *Manual*, indicators of soils developed under reducing conditions may include:

1. Organic soils (Histosols);
2. Histic epipedons;
3. Sulfidic material;
4. Aquic or peraquic moisture regime;
5. Reducing soil conditions;
6. Soil colors (chroma of 2 or less);
7. Soil appearing on hydric soils list; and
8. Iron and manganese concretions.

A February 20, 1992, Corps memorandum entitled *Regional Interpretation of the 1987 Manual* states that the most recent version of National Technical Committee for Hydric Soils (NTCHS) hydric soil criteria will be used (to make hydric soil determinations). These soil criteria specify at least 15 consecutive days of saturation or 7 days of inundation (flooding or ponding) during the growing season in most years.

The concept of hydric soils includes soils developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation. Soils that are sufficiently wet because of artificial measures are included in the concept of hydric soils. Also, soils in which the hydrology has been artificially modified are hydric if the soil, in an unaltered state, was hydric. Some series, designated as hydric, have phases that are not hydric depending on water table, flooding, and ponding characteristics. As indicated above, like the NRCS, the Corps has typically accepted guidance for the identification of hydric soils developed by the National Technical Committee for Hydric Soils (NTCHS). The NTCHS, a working group organized by NRCS, has developed criteria for identifying and mapping hydric soils throughout the United States (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/use/hydric/?cid=nrcs142p2_053959). The NTCHS definition of a hydric soil states:

> *Hydric soil* means a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part [of the soil profile]. This definition includes soils that developed under anaerobic conditions in the upper part but no longer experience these conditions due to hydrologic alteration such as those hydric soils that have been artificially drained or protected (e.g., ditches or levees).

The most recent (2012) version of the NTCHS hydric soils criteria identifies those soils that are likely to meet this definition. These criteria, which are accepted by most state and federal agencies, are as follows:

1. All Histels except Folistels and Histosols except Folists; or
2. Map unit components in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, or Andic, Cumulic, Pachic, or Vitrandic subgroups that:
    a. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States,[1] or
    b. Show evidence that the soil meets the definition of a hydric soil;
3. Map unit components that are frequently ponded for long duration or very long duration during the growing season that:
    a. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
    b. Show evidence that the soil meets the definition of a hydric soil; or
4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
    a. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
    b. Show evidence that the soils meet the definition of a hydric soil.

Terms used in the above definition are defined as follows:

- *Flooded* means a condition in which the soil surface is temporarily covered with flowing water from any source, such as streams overflowing their banks, runoff from adjacent or surrounding slopes, inflow from the high tides, or any combination of sources.
- *Frequently flooded, ponded, saturated:* a frequency class in which flooding, ponding, or saturation is likely to occur often under usual weather conditions (more than 50 percent chance in any year, or more than 50 times in 100 years).

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[1] United States Department of Agriculture, Natural Resources Conservation Service. 2010. *Field Indicators of Hydric Soils in the United States*, Version 7.0. L.M. Vasilas, G.W. Hurt, and C.V. Noble (eds.). USDA, NRCS, in cooperation with the National Technical Committee for Hydric Soils.

- *Long duration* means a duration class in which inundation for a single event ranges from 7 days to 1 month.
- *Map unit* means a collection of areas defined and named the same in terms of their soil components or miscellaneous areas or both.
- *Map unit components* means the collection of soils and miscellaneous areas found within a map unit.
- *Ponded* means a condition in which water stands in a closed depression. The water is removed only by percolation, evaporation, or transpiration.
- *Very long duration* means a duration class in which inundation for a single event is greater than 1 month.

On the basis of computer database searches for soils meeting the second criterion, NRCS has developed hydric soils lists for many parts of the country. Although they are useful for determining whether a particular soil series *has the potential to support current hydric soil conditions*, caution should be used when using these lists for site-specific hydric soil determinations. Many soils on the lists have ranges in water table depths and other characteristics that allow them to be either hydric or non-hydric depending on landscape position and other site-specific factors (e.g., soil clay content, depth to bedrock). Accordingly, hydric soils lists are good ancillary tools to facilitate wetland determinations, but are not a substitute for onsite investigations.

Field indicators of hydric soils are morphological properties known to be associated with soils that meet the definition of a hydric soil. Presence of one or more field indicator suggests that the processes associated with hydric soil formation have taken place on the site being observed. The field indicators are essential for hydric soil identification because once formed, they persist in the soil during both wet and dry seasonal periods. However, few hydric soil indicators identify soils at a site as being currently hydric in accordance with the NTCHS hydric soils criteria described above. Field indicators of hydric soil conditions include the following:

Table 4. Field Indicators of Hydric Soil Conditions
(Listing summarized from *Corps 1987 Manual* and Corps Guidance Documents)

1. Indicators of Historical Hydric Soil Conditions:	2. Indicators of Current Hydric Soil Conditions:
a. Histosols b. Histic epipedons; c. Soil colors (e.g., gleyed or low-chroma colors, soils with bright mottles (Redoximorphic features) and/or depleted soil matrix d. High organic content in surface of sandy soils e. Organic streaking in sandy soils f. Iron and manganese concretions g. Soil listed on county hydric soils list	a. Aquic or peraquic moisture regime (inundation and/or soil saturation for ≥7 continuous days) b. Reducing soil conditions (inundation and/or soil saturation for ≥ 7 continuous days) c. Sulfidic material (rotten egg smell)

The presence of one or more of the field indicators in “1 a, b c, and/or d” above suggests that historical processes associated with hydric soil development have taken place at a given site. These indicators are useful in determining if soils at a site were historically formed under hydric soil conditions because they persist in soils during both wet and dry periods and may remain for decades and even centuries after changes in site conditions occur that inhibit subsequent wetland development, such as the elimination of wetland hydrology (NRCS 1995). However, only the presence of field indicators “2 a, b, and/or c” confirms that hydric soils occur at a site during the period of observation.

Hydric soil indicators have also been further defined and described in the Corps 2008 *Arid West Supplement.* These indicators are similar to the indicators listed above from the 1987 Corps *Manual* and are presented in the following table.

Table 5. Hydric Soil Indicators
(*Arid West Supplement*)

Hydric Soil Indicators		**Indicators for Problematic Hydric Soils** **
Histosol (A1) *	Sandy Redox (S5)	1 cm Muck (A9)
Histic Epipedon (A2)	Stripped Matrix (S6)	2 cm Muck (A10)
Black Histic (A3)	Loamy Mucky Mineral (F1)	Reduced Vertic (F18)
Hydrogen Sulfide (A4)	Loamy Gleyed Matrix (F2)	Red Parent Material (TF2)
Stratified Layers (A5)	Depleted Matrix (F3)	** Indicators of hydrophytic vegetation and wetland hydrology must be present.
1 cm Muck (A9)	Redox Dark Surface (F6)	
Depleted Below Dark Surface (A11)	Depleted Dark Surface (F7)	
Thick Dark Surface (A12)	Redox Depressions (F8)	
Sandy Mucky Mineral (S1)	Vernal Pools (F9)	
Sandy Gleyed Matrix (S4)		
* Denotes number of hydric soil indicator described in detail in *Arid West Supplement.*		

2.3.3 Prevalence of Wetland Vegetation

The *Corps 1987 Manual* states that the wetland vegetation conditions are met when the prevalent vegetation (i.e., more than 50 percent of vegetation cover or tree basal area) consists of macrophytes that are typically adapted to sites having wetland hydrologic and soil conditions (e.g., periodic or continuous inundation or soil saturation). Hydrophytic vegetation is defined as “plant life growing in water or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content” (Cowardin *et al*. 1979). Hydrophytic vegetative species, due to morphological, physiological, and/or reproductive adaptation(s), have the ability to grow, effectively compete, reproduce, and/or persist in anaerobic soil conditions. Positive indicators of the presence of hydrophytic vegetation include:

1. More than 50 percent of the dominant species are rated as Obligate ("OBL"), Facultative Wet ("FACW"), or Facultative ("FAC") on lists of plant species that occur in wetlands (see Reed 1988);
2. Visual observations of plant species growing in sites of prolonged inundation or soil saturation; and

3. Reports in the technical literature indicating the prevalent vegetation is commonly found in saturated soils.

Hydrophytic vegetation indicators have been further defined and described in the Corps 2008 *Arid West Supplement.* These indicators include:

1. More than 50 percent of dominant plant species across all strata are OBL, FACW or FAC
2. Prevalence Index is ≤ 3.0 with indicators of hydric soils and wetland hydrology being present; and
3. Morphological adaptations

In classifying vegetation encountered in the Study Area, HBG relied on the April 2, 2014, *National Wetland Plant List: 2014 Wetland Ratings* (NWPL; Lichvar, et al.). The list is a comprehensive update of the *National List of Plant Species that Occur in Wetlands* (Reed 1988), and, as noted in the List's Abstract, "represents a collaborative effort between four Federal agencies, under the administrative responsibilities of the US Army Corps of Engineers, to update and administer the national list." Wetland ratings were developed for species for each of the 10 Corps regions. HBG used the wetland indicator status rankings for the Arid West Region. The new definitions of the NWPL wetland indicator status groups, presented below in Table 5, have been modified slightly from the previous definitions:

Table 6. 2014 National Wetland Plant List Indicator Definitions

Wetland Indicator Status Designations	Designation	Definition
Obligate Wetland (OBL)	Hydrophyte	Almost always occur in wetlands
Facultative Wetland (FACW)	Hydrophyte	Usually occur in wetlands, but may occur in non-wetlands
Facultative (FAC)	Hydrophyte	Occur in wetlands or non-wetlands
Facultative Upland (FACU)	Nonhydrophyte	Usually occur in non-wetlands, but may occur in wetlands
Upland (UPL)	Nonhydrophyte	Almost never occur in wetlands

Species that have an indicator status of OBL, FACW, or FAC are typically considered to be adapted for life in anaerobic soil conditions (Corps 1987) and are used as evidence of hydrophytic vegetation when they dominate plant community composition or cover. It is important to note that wetland indicator species assignments are approximations of wetland affinity based on a synthesis of submitted review comments, published botanical literature, and the field experience. For this reason and because many plants have properties that enable them to occur in a range of microhabitats (i.e., wetlands and non-wetlands), the presence of wetland indicator species is not unequivocal evidence of the presence of wetland hydrology and hydric soils. A positive indicator or indicators of wetlands should be emphasized, such as an assemblage of plants that can only be considered "hydrophytes" when they are growing in water or partly drained hydric soils (not effectively drained hydric soils) (Corps 1987). For the reasons stated above, the 1987 Corps *Manual* does not solely rely on the presence of hydrophytic vegetation to make wetland determinations.

2.3.4 Difficult Wetland Situations in the Arid West

Some wetlands can be difficult to identify because wetland indicators may be missing or difficult to identify due to natural processes or recent disturbances. In accordance with the 1987 Corps Manual, these situations are defined as either Atypical Situations or Problem Areas. The term Atypical Situation, defined in Section F and Appendix A of the 1987 Corps Manual, "refers to areas in which one or more parameters (vegetation, soil, and/or hydrology) have been sufficiently altered by recent human activities or natural events to preclude the presence of wetland indicators of the parameter." HBG has interpreted the term "Significantly Disturbed" as used on the Wetland Determination Data Form – Arid West Region to signify an Atypical Situation. Problem Areas, defined in Section G of the 1987 Corps Manual, "are wetland types in which wetland indicators of one or more parameters may be periodically lacking due to normal seasonal or annual variations in environmental conditions that result from causes other than human activities or catastrophic natural events." HBG has interpreted the term "Naturally Problematic" as used on the Wetland Determination Data Form – Arid West Region to signify a Problem Area. If a determination is made that an Atypical Situation or Problem Area exists, special procedures or additional analysis of factors affecting the site may need to be employed. Steps and procedures to address Atypical Situations and Problem Areas are outlined in Sections F and G of the 1987 Corps Manual and Section 5 of the *Arid West Supplement*.

2.4 Using an Ordinary High Water Mark to Establish CWA Jurisdictional Limits

The OHWM is the defining factor for jurisdiction for non-wetland, non-tidal waters of the US. (33 CFR 328.4(c)). And, because the OHWM should be representative of ordinary events that "occur on a regular or frequent basis" (See Section 2.4.2 and Appendix D; RGL 05-05(d)), the period of years for which the OHWM is assessed should be long enough to ensure that the range of surface water levels is representative, but also recent enough to incorporate changes in the watershed (e.g., dams, diversions) to ensure that an OHWM determination appropriately reflects hydrologic conditions and constraints as they now exist.[2]

Much Corps research exists for identifying the OHWM for non-tidal streams and rivers, particularly for intermittent and ephemeral streams in the Arid West.[3] In contrast to the high tide line, which is based upon the 19-year National Tidal Datum Epoch, the ordinary high water line for non-tidal streams is an approximation of the water level reached by the highest flows that are "ordinary" for a particular stream. The ordinary high water level for a given stream must have some probability of occurring regularly, and from a regulatory perspective, this probability of occurrence appears to range from 1 to 2 years in perennial channels to a probability of being reached or exceeded as rarely as once or twice per decade on average for ephemeral/intermittent channels in the Arid West (Lichvar et al, 2006, 2008).[4] [5] In other words, Corps guidance for streams suggests that a high water level that occurs as seldom as once every 10 years for a stream in the Arid West can be considered "ordinary" from a regulatory perspective in determining an OHWM.

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[2] EPA regulatory guidance in the preamble to its 404(b)(1) Guidelines, and regulatory guidance published by the Corps of Engineers clarify that Clean Water Act jurisdiction is intended "to regulate discharges of dredged or fill material into the aquatic system as it exists and not as it may have existed over a record period of time."

[3] See list at http://www.erdc.usace.army.mil/Media/FactSheets/FactSheetArticleView/tabid/9254/Article/486085/ordinary-high-water-mark-ohwm-research-development-and-training.aspx.

2.4.1 Ephemeral/Intermittent Channels in the Arid West

For the Arid West, Curtis and Lichvar (2010)[6] described ephemeral/ intermittent channels, such as may be found in the Study Area, and emphasizes that evaluation and characterization of channel composition - the low-flow channel, the active floodplain, and the low terrace – facilitates identification of the OHWM.

> The three distinctive hydrogeomorphic surfaces in many ephemeral and intermittent channels are the low-flow channel, the active floodplain, and the low terrace (Figure 1). The distinguishing feature of the low-flow channel is the frequent absence of vegetation cover. Common indicators signifying a recent discharge, such as ripples or mudcracks, may also be present on the streambed. During low-discharge events in many streams, the low-flow channel often fills with sediment and migrates within the active floodplain, incising a new low-flow channel. Conversely, the extent of the active floodplain is a consistent and reliable feature within the channel. It is formed by the geomorphically effective discharge — a low -to moderate-discharge event in the Arid West — and is frequently identified by a break in slope indicating the outer extent of ordinary high discharges. Depending on the time that has passed since the last ordinary high event, the active floodplain often has early to mid-community successional stage vegetation. The sediment texture is generally coarser grained than that in the surrounding floodplain units. The low terrace is inundated less frequently than the active channel. It is characterized by well-established, late-stage vegetation, and the surface may show indications of desert pavement or surface relief.

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[4] Lichvar, R.W., D. Finnegan, M. Ericsson, and W. Ochs. 2006. *Distribution of Ordinary High Water Mark (OHWM) Indicators and Their Reliability in Identifying the Limits of "Waters of the United States" in Arid Southwestern Channels*. ERDC/CRREL TR-06-5. (http://www.crrel.usace.army.mil/techpub/CRREL_Reports/reports/TR06-5.pdf).

[5] Lichvar, R.W. and S.M. McColley. 2008. *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual*. ERDC/CRREL TR-08-12. August. http://www.spk.usace.army.mil/Portals/12/documents/regulatory/pdf/Ordinary_High_Watermark_Manual_Aug_2008.pdf

[6] Curtis, K.E. and R.W. Lichvar. 2010. *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States*. ERDC/CRREL TN-10-1. July. http://www.spl.usace.army.mil/Portals/17/docs/regulatory/JD/UpdatedDatasheetforIDOHWM_ERDC_2010.pdf

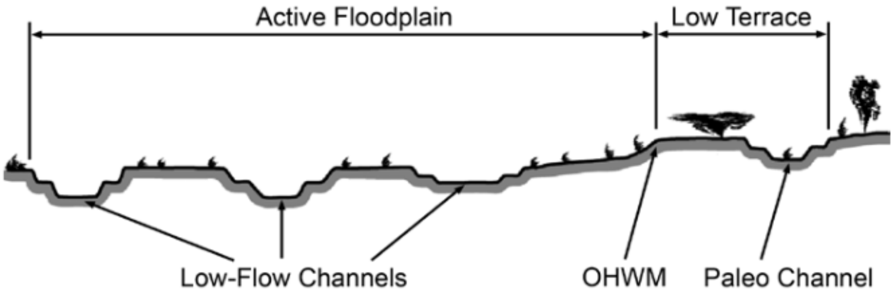

Figure 1. Example of a representative cross section identifying the hydrogeomorphic floodplain units in intermittent and ephemeral channels.

It is the consistent position of the boundary between the active floodplain and low terrace that is important to regulators. The low-flow channel, which migrates frequently and may be dry most of the time, is too undefined to be consistently delineated. However, characterizing each of these floodplain units helps develop an understanding of the channel dynamics that is crucial to identifying the OHWM.

2.4.1 Corps Regulatory Guidance Letter 05-05

Corps Regulatory Guidance Letter (RGL) 05-05 provides regulatory guidance to Corps staff nationwide regarding OHWM identification (Appendix D). This guidance, published December 7, 2005, quotes the definition for OHWM in 33 CFR 328.3(e) (see Section 2.1.1) and further states that:

a. In determining the location of the OHWM for non-tidal water bodies under the CWA (33 CFR 328.3(e)) or the Rivers and Harbors Act (33 CFR 329.11(a)(1)), districts should give priority to evaluating the physical characteristics of the area that are determined to be reliable indicators of the OHWM. Physical evidence to be evaluated includes those items listed in the definitions at 33 CFR Sections 328.3(e) and 329.11(a)(1). Because many types of water bodies occur with varying conditions, including topography, channel morphology and flow dynamics, districts may consider other physical characteristics indicative of the OHWM.

b. The following physical characteristics should be considered when making an OHWM determination, to the extent that they can be identified and are deemed reasonably reliable:

Natural line impressed on the bank	Leaf litter disturbed or washed away
Shelving	Scour
Changes in the character of soil	Deposition
Destruction of terrestrial vegetation	Multiple observed flow events
Presence of litter and debris	Bed and banks
Wracking	Water staining

Vegetation matted down, bent, or absent	Change in plant community
Sediment sorting	

This list of OHWM characteristics is not exhaustive. Physical characteristics that correspond to the line on the shore established by the fluctuations of water may vary depending on the type of water body and conditions of the area. There are no “required” physical characteristics that must be present to make an OHWM determination. However, if physical evidence alone will be used for the determination, districts should generally try to identify two or more characteristics, unless there is particularly strong evidence of one.

c. Where the physical characteristics are inconclusive, misleading, unreliable, or otherwise not evident, districts may determine the OHWM by using other appropriate means that consider the characteristics of the surrounding areas, provided those other means are reliable.[7] Such other reliable methods that may be indicative of the OHWM include, but are not limited to, lake and stream gage data, elevation data, spillway height, flood predictions, historic records of water flow, and statistical evidence.

d. When making OHWM determinations, districts should be careful to look at characteristics associated with ordinary high water events, which occur on a regular or frequent basis. Evidence resulting from extraordinary events, including major flooding and storm surges, is not indicative of the OHWM. For instance, a litter or wrack line resulting from a 200-year flood event would in most cases not be considered evidence of an OHWM.

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[7] In some cases, the physical characteristics may be misleading and would not be reliable for determining the OHWM. For example, water levels or flows may be manipulated by human intervention for power generation or water supply. For such cases, districts should consider using other appropriate means to determine the OHWM.

3.0 DELINEATION METHOD

The objective of this study was to determine the presence or absence of potential waters of the US regulated by the Corps and US EPA under Section 404 of the CWA and/or Section 10 of the rivers and Harbors Act. This study consisted of both preliminary and detailed field investigations, as detailed below in Sections 3.1.1 – 3.1.3, and, and data mapping followup at HBG's office.

3.1 Preliminary Investigations

Preliminary investigations consisted of identifying existing landforms within the Study Area (Appendix A, Figure 2) where waters of the US, including wetlands and other waters of the US, may potentially occur. These areas were identified during a March 2014 field reconnaissance and review of:

1. USGS topographic mapping (Figure 2 in Appendix A);
2. USGS National Hydrography Dataset (NHD) HUC 8 and HUC 12 mapping (Figures 3 and 4);
3. USGS NHD high-resolution mapping with flow arrows showing the direction and route of surface water flow (Figure 5);
4. March 2011 NAIP orthorectified aerial photography (Figure 6); and
5. NRCS Custom Soil Resources Report (Appendix B).

3.2 Detailed Field Investigations: Wetlands

Detailed field investigations to determine the presence or absence of wetlands were conducted on foot within the Study Area during May 2014 and February 2015 (Figure 2). Field data locations were memorialized as point features using a hand-held, Trimble XT global positioning system (GPS) unit with sub-meter accuracy after geoprocessing.

Field data regarding the presence or absence of wetland soil, hydrology and vegetation conditions were collected in accordance with the regulations, policy, and methodology described above in Section 2.0. Field data for Sampling Points were recorded on Wetland Determination Data Forms – Arid West Region (Appendix E).

3.3 Detailed Field Investigations: Other Waters

Detailed field investigations to determine the presence or absence of other waters of the US were conducted on-foot within the Study Area (Figure 2) during March 2014 and February 2015. Field data for Sample Points were recorded on OHWM Determination Data Forms (Appendix E). The location of potential other waters of the US within the Study Area was determined using physical characteristics as described in RGL 05-05 paragraphs (a) and (b) to define an OHWM (e.g., evidence of erosion, drift, sediment deposition, change in plant community). The location of field sampling points and the OHWM was documented in the field using a hand-held, Trimble XT global positioning system (GPS) unit with sub-meter accuracy after geoprocessing.

3.4 Mapping

Once field data collection was completed, recorded GPS data were incorporated into a Geographic Information System (GIS) and georeferenced in overlay fashion onto a USGS topographic base map and March 2011 NAIP digital aerial photograph. This aerial photograph was orthorectified to a 1:25,000 USGS topographic base following national mapping standards. Active linear drainage features were mapped as line features due to their narrow width. The maps of areas potentially subject to Corps jurisdiction are presented in Appendix A, Figure 6. The GIS data and mapping were used to assist in the analysis, identification and digitization of the location and geographic extent of areas that would potentially qualify as waters of the United States.

4.0 TECHNICAL FINDINGS

Sections 4.1 through 4.3 discuss technical findings regarding the presence or absence of the vegetation, soil, and hydrology indicators of wetland conditions observed within the Study Area. Section 4.4 discusses technical findings regarding the presence of physical characteristics indicative of an Ordinary High Water Mark (OHWM) within active ephemeral streams found within the Study Area. Field data are presented in Appendix E. The following table correlates the field data sample numbers in Appendix E with the sampling locations shown on the Figure 6 map sheets in Appendix A. Appendix F provides representative photographs and location mapping for field sample points and the overall Study Area.

Table 7. Data Point Location and Map Sheet Correlation Table

Appendix A, Figure 6 Map Sheet Number	Sampling Points Using Corps 2008 OHWM Data Sheets (Arid West)	Sampling Points Using Corps Wetland Determination Data Forms – Arid West Region
4	*R11 – R14; R22 – R27; R29 – R34; R40 – R41; R42 – R50; R51a – R51c; R52a – R52d;R53*	WR 52c
5	*R1 – R10;R11 – R14; R15 – R21; R22 – R27; R28; R29 – R34; R35 – R39; R40 – R41; R51a – R51c; R52a – R52d;*	WR 7a, WR 28, WR37, WR 38, WR 52c
8	*R54a – R54c*	WR 54a
14 (offsite)	*R55a, R55b*	--
Note: Shaded sampling point numbers are on overlapped portions of Sheets 4 and 5.		

4.1 Field Indicators of Wetland Vegetation

Study Area vegetation conditions were observed to be r*epresentative of the site during normal circumstances*. Normal circumstances are assumed for the Study Area based on: (1) onsite inspection, (2) review of WETS data (Appendix C), which indicate that precipitation conditions are typical of the past years of record, and (3) review of aerial photography and Landsat imagery over the past decade, which indicates that the vegetation has not been significantly disturbed. Vegetation was determined to *not be naturally problematic at the time of the field survey* given there have been no apparent shifts in soil or hydrology conditions within the past decade based on review of: (1) WETS data and (2) aerial photography and Landsat imagery.

Two vegetation types occur within the Study Area, creosote bush scrub and desert dry wash woodland. The majority of natural and manmade ephemeral drainages found within the Study Area occur within the creosote bush scrub vegetation type. The dominant plant species typical of this vegetation type – creosote bush (*Larrea tridentate*), burro bush (*Ambrosia dumosa*), and brittlebush (*Encelia farinosa*) – are classified as upland species for the Arid West by the 2014 *National Wetland Plant List* (Lichvar et al.).[8]

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[8] These plants are not listed in the wetland plant list; User Note 1 states: "Plant species not listed are considered UPL for wetland delineation purposes."

What appear to be remnants of desert dry wash woodland were observed in several locations within the Study Area. Although this vegetation type is typically associated with active drainages and commonly referred to as riparian vegetation, these woody shrub and tree species are classified as "upland" plant species for the Arid West by the 2014 *National Wetland Plant List* (Lichvar et al.). The National Wetlands Inventory classification indicates that the frequency of upland plants occurring within wetlands is about 1 percent. The dominant plant species typical of desert dry wash woodland – blue ironwood (*Olneya tesota*), palo verde (*Parkinsonia florida*), and smoke tree (*Psorothamnus spinosus*) – are not considered plants that can occur in wetland conditions. These plants occur in washes with braided channels that support dynamic flow. They possess a unique ability to survive in arid systems where ephemeral drainages convey limited periodic surface flows, as they can grow root systems that follow soil moisture to considerable depths. The presence of these phreatophytes is likely an indication of subsurface flow where they occur within the Study Area, given the lack of hydric soil and wetland hydrology indicators (see Sections 4.2 and 4.3). Given the patchy distribution of desert dry wash woodland as opposed to the large active drainage (R1) east of the Study Area (Appendix A, Figure 6, Sheet 5) with continuous desert dry wash woodland vegetation, it appears that stormwater runoff conditions and associated subsurface flows that would support desert dry wash woodland vegetation have changed within these areas either as a result of natural processes and / or various linear construction projects that have occurred upslope of the Study Area. These projects include the construction of major pipeline corridors, perimeter dirt access roads, and an interstate highway that traverse, in a perpendicular manner, the general direction of stormwater flow directed toward the Study Area.

On the basis of field observations within the Study Area, a dominance of wetland plant species or hydrophytes was not found. Given this technical finding, the criteria for wetland vegetation were not met as defined by current Corps' regulatory guidance, including the 2008 *Arid West Supplement.*

4.2 Field Indicators of Hydric Soils

Study Area soil conditions were observed to be *representative of the site during normal circumstances.* Normal circumstances are assumed for the Study Area based on: (1) onsite inspection, (2) review of WETS data (Appendix C) which indicates that precipitation conditions are typical of the past years of record, and (3) review of aerial photography and Landsat imagery over the past decade which indicate that the soils have not been significantly disturbed. Soil conditions were determined *not to be significantly disturbed* based on: (1) onsite inspection and (2) review of aerial photography and Landsat imagery over the past decade which indicates that the soils have not been significantly disturbed. The only exception is a small excavated drainage channel (Appendix A, Figure 6, Sheet 8). The potential determination of field indicators of hydric soils (wetland soils) was determined *not to be naturally problematic*.

Appendix B is an NRCS Custom Soil Resources Report with Study Area specific soil mapping and detailed soils descriptions. Onsite examination revealed that soils or substrates within both the natural and manmade streams and adjacent areas consist of alluvium primarily composed of well-drained sorted sands and gravel. On the basis of field observations within the Study Area

(Appendix E), soil indicators were not found that meet the hydric soils criteria defined by current Corps' regulatory guidance, including the 2008 *Arid West Supplement*.

4.3 Field Indicators of Wetland Hydrology Conditions

Study Area hydrology conditions were observed to be *representative of the site during normal circumstances*. Normal circumstances are assumed for the Study Area based on: (1) onsite inspection, (2) review of WETS data (Appendix C), which indicates that precipitation conditions are typical of the past years of record, and (3) review of aerial photography and Landsat imagery over the past decade, which indicates that the soils have not been significantly disturbed.

Hydrology conditions were determined to *not be significantly disturbed* based on: (1) onsite inspection and (2) review of aerial photography and Landsat imagery over the past decade, which indicates that the Study Area hydrology has not been significantly disturbed over the past decade. However, significant disturbance to the hydrology regime occurred more than a decade ago with the construction of buried pipelines, dirt access roads, and an interstate highway within the upslope watershed. Appendix A, Figures 3 and 4, show the location of USGS HUC 8 and 12 watersheds. Appendix A, Figure 5, provides USGS National Hydrography Dataset mapping of photo interpreted surface water flow patterns.

Field indicators of wetland hydrology conditions were determined to be naturally problematic.

Onsite observations revealed evidence of flooding within the low-lying streambeds or channels. The secondary hydrology indicators water marks (B1), sediment deposits (B2), and drift deposits (B3) were found associated with two distinctive landforms within the Study Area during field surveys: ephemeral stream and an excavated stream channel (Appendix E). These indicators, however, are not reflective of wetland conditions as they are typically formed during high rainfall events where flows last for hours, not days. Wetland hydrology conditions occur when the soil is flooded, ponded, or inundated for 14 consecutive days or more during the growing season (page 59, *Arid West Supplement*). No evidence of ponding or soil saturation for long to very long periods of time was observed. On the basis of the above-described soil observations, no evidence of a high water table was found within the upper 22 inches of soil. The lack of ponding and soil saturation conditions meeting the wetland hydrology criteria is a direct result of the well-drained alluvial soils.

On the basis of field observations within the Study Area, wetland hydrology indicators were not found that meet the wetland hydrology criteria defined by current Corps' regulatory guidance, including the 2008 *Arid West Supplement*.

4.4 Field Indicators of Ordinary High Water

For non-tidal waters of the United States, federal jurisdiction extends to the ordinary high water mark (OHWM) when no adjacent wetlands are present (33 CFR 328.4(c)(1)). The Corps definitions of OHWM applies to "waters of the United States" under the Clean Water Act (33 CFR 328.3(e)) and to "navigable waters of the United States" under the Rivers and Harbors Act

(33 CFR 329.11(a)(1)). These definitions are identical, and are defined as observable physical features, such as “a clean, natural line impressed on the bank” that result from fluctuations of water. The frequency and/or duration of such fluctuations are not defined. Importantly, however, the definitions state that the OHWM also is established by “other appropriate means that consider the characteristics of the surrounding areas” (citations above). The following describes the indicators of an OHWM found within the Study Area.

Although indicators of wetland hydrology conditions were not found within the Study Area, the hydrology field indicators observed during the wetlands evaluation provide evidence that active surface water flow occurs within natural ephemeral streams and excavated ephemeral stream drainages in the Study Area. The Appendix C WETS data confirm that above normal rainfall conditions occurred prior to the 2014 and 2015 site investigations. It is the above normal rainfall events that typically generate stream flow.

Appendix A, Figures 3 and 4, show the location of USGS HUC 8 and 12 watersheds. Appendix A, Figure 5, provides USGS National Hydrography Dataset mapping of photointerpreted surface water flow patterns.

As indicated in Section 2.0, an OHWM provides a technical basis for (a) determining the presence a potential water of the United States; and (b) defining the geographic extent of potential waters of the United States. Physical characteristics indicative of high water associated with surface water flows were found along the sides of channel banks or streambeds of active ephemeral stream channels and an excavated ephemeral stream drainage. The physical characteristics found included water marks (in the form of bank scour, erosion and/or shelving), sediment deposits (linear deposits of fine-grained sediment), drift deposits (flow deposited woody and soft tissue plant debris), and a distinctive no vegetation / vegetation line or border. Field data for the Study Area are presented in Appendix E. The map sheets in Appendix A, Figure 6 show the locations of the active ephemeral drainages found. Collectively groupings of these active channels provide indication of an active floodplain located at the downslope margin of an alluvial fan. The low flat relief made it difficult to define the active floodplain beyond the limits of the outer active channels within this floodplain. The locations of the active streambeds were documented on foot within the Study Area using a GPS instrument. The drainages were also documented downslope of the Study Area until no indicators of an OHWM could be found. It was apparent at the ends of these active streambeds that the former streambed had become filled with sediment and surface flow had ceased, likely infiltrated into the well-drained soil. There was no evidence of near surface flow or resurfacing of flows downslope.

On the basis of these technical findings, the active drainages depicted Figure 6 (Appendix A) have recognizable physical characteristics from which the lateral extent of surface water flow that occurs on a regular or frequent basis can be geographically delineated as OHWMs. Figure 6 is an indexed series of detailed map sheets of the Study Area, showing the active linear natural and manmade drainages and their measured OHWM widths that occur on a regular or frequent basis (i.e., potential jurisdictional areas).

5.0 AREAS POTENTIALLY SUBJECT TO FEDERAL JURISDICTION

This section presents the findings of this delineation with respect to the identification and geographic extent of habitat areas found that could potentially be regulated by the Corps and the US EPA as wetlands and or other waters of the US under Section 404 of the CWA and by the Corps under Section 10 of the RHA as navigable waters.

5.1 CWA Wetlands Jurisdiction

No areas were found within the Study Area that met the technical criteria for wetlands described in Section 2.3. The wetlands determination is based on an analysis of the technical findings in Sections 4.1 – 4.3, which summarize field evidence of the absence of the collective presence of hydric soil, wetland hydrology, and wetland vegetation indicators as required by the Corps' 1987 Manual, the *Arid West Supplement*, guidance documents, and Corps/US EPA regulations.

5.2 Other Waters of the US Jurisdiction

On the basis of the technical findings resulting from the field data analysis, it was determined that areas potentially subject to Corps and US EPA jurisdiction as other waters of the US occur within the Study Area. This determination was based on the presence of OHWMs found at the margins of streambeds / active floodplains, which are locally referred to as desert dry washes or arroyos. The OHWM determination is based on physical characteristics that represent stormwater flows that occur on a regular or frequent basis. Table 8 is a summary of these potential jurisdictional waters by NWI habitat type, type of water of the US, and length within the Study Area., Figure 6 in Appendix A provides mapping showing the locations of these potential jurisdictional waters. The "Corps Waters Upload Sheet" in Appendix G identifies the length and width of each potential water of the US.

Table 8. Potential Waters of the US Found Within the Study Area

Habitat Type[1]	**Corps / US EPA Type of Potential Waters of the US**	**Linear Feet**
Riverine	Other Waters of US	
Ephemeral Riverine Intermittent Streambed	Stream	40,349
Excavated Ephemeral Riverine Intermittent Streambed	Stream	1,583
Total		**41,932**

[1] Wetlands / Other waters of the US classified using the US Fish and Wildlife Service's *Classification System for Wetland and Deepwater Habitats* (Cowardin *et al*. 1979)

5.3 RHA Navigable Waters Jurisdiction

No streambed areas were found to be subject to Section 10 RHA jurisdiction. The streambeds identified are not navigable waters subject to the ebb and flow of the tide nor are they presently used, used in the past, or susceptible for use to transport interstate or foreign commerce.

6.0 CWA JURISDICTIONAL ANALYSIS

This section analyzes the potential for waters identified within the Study Area to constitute waters of the US subject to jurisdiction under the CWA. Following the analysis procedures in the Corps' Approved Jurisdictional Determination Form (Appendix G), it was determined that the potentially jurisdictional waters identified in Section 5.0 with OHWMs are isolated intrastate waters in that they lack a surface hydrologic connection to a Traditional Navigable Water either directly or indirectly through a Relatively Permanent Water or Non-Relatively Permanent Water. The potential jurisdictional waters assessed in the Review Area (aka Study Area) as outlined in the Appendix G "Corps Waters Upload Sheet" do not meet the test for jurisdictional isolated waters. These waters do not meet the "significant nexus" standard; they are not currently used, were not used in the past, and are not susceptible to use in interstate or foreign commerce; nor would "the use, degradation or destruction of" these waters affect interstate or foreign commerce. Figure 7 shows the location of these waters. Table 9 summarizes these findings.

Table 9. Waters Found to be Potentially Excluded from Jurisdiction Within the Study Area

Habitat Type[1]	**Corps / US EPA Potential Type of Waters of the US**	**Linear Feet**	**Rationale for Exclusion**	
Riverine			**Isolated Water**	**Lacks Interstate or Foreign Commerce Nexus**
Ephemeral Riverine Intermittent Streambed	Other Water	40,349	Yes	Yes
Excavated Ephemeral Riverine Intermittent Streambed	Other Water	1,583	Yes	Yes
Total		**41,932**		

[1] Wetlands / Other waters of the US classified using the US Fish and Wildlife Service's *Classification System for Wetland and Deepwater Habitats* (Cowardin *et al*. 1979)

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7.0 REFERENCES

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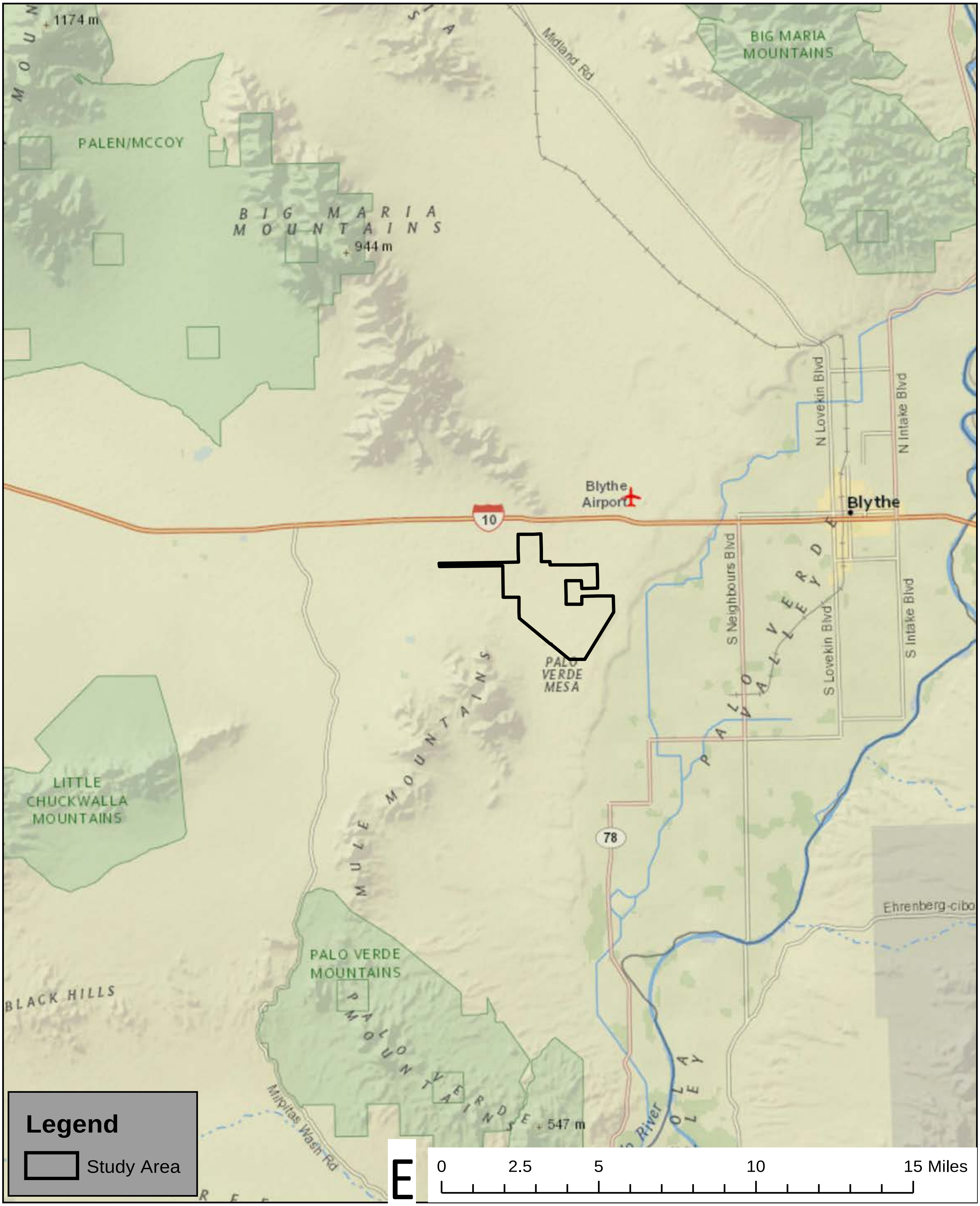
APPENDIX A

Figures

Figure 1	Regional Map
Figure 2	USGS Topographic Map of the Jurisdictional Study Area
Figure 3	Southern Mojave and Imperial Reservoir USGS HUC 8 Hydrologic Units
Figure 4	USGS HUC 12 Watershed Units
Figure 5	USGS NHD 1:25K High Resolution Mapping With Flow Arrows Showing Direction and Route of Surface Water Flow
Figure 6	Potential Waters of the US Subject to Corps/US EPA Section 404 Jurisdiction (Index Map and Map Sheets 1 – 17)
Figure 7	Location of Areas Potentially Excluded from Corps and US EPA Jurisdiction as Waters of the US



1174 m
BIG MARIA MOUNTAINS
Midland Rd
PALEN/MCCOY
BIG MARIA MOUNTAINS
944 m
N Lovekin Blvd
N Intake Blvd
Blythe Airport
Blythe
10
S Neighbours Blvd
S Lovekin Blvd
S Intake Blvd
PALO VERDE VALLEY
PALO VERDE MESA
MULE MOUNTAINS
LITTLE CHUCKWALLA MOUNTAINS
78
Ehrenberg-cibo
PALO VERDE MOUNTAINS
PALO VERDE MOUNTAINS
BLACK HILLS
547 m
Milpitas Wash Rd
River
VALLEY
Legend
Study Area
E
0
2.5
5
10
15 Miles

Figure 1. Regional Map, First Solar Site 5, Riverside County, California

Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

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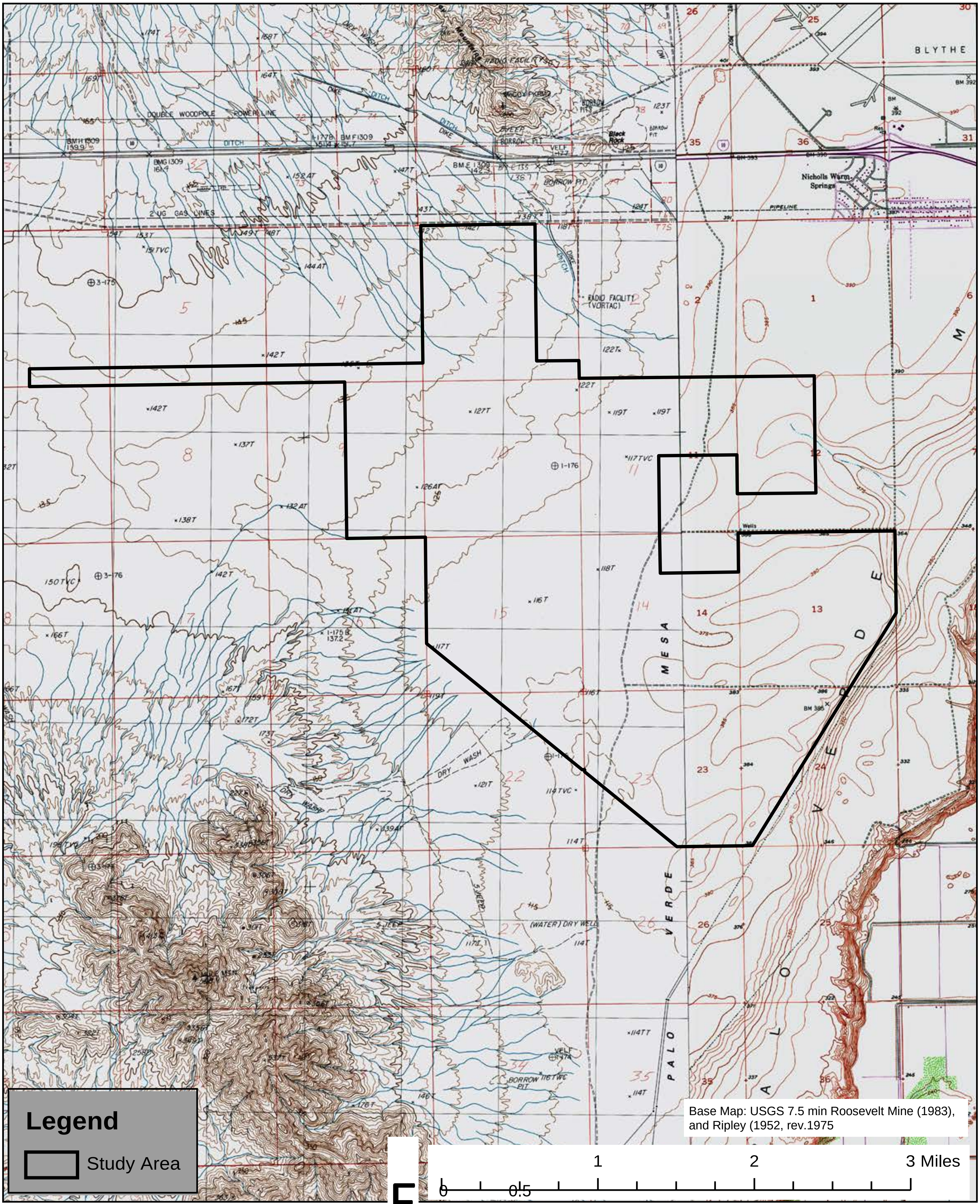
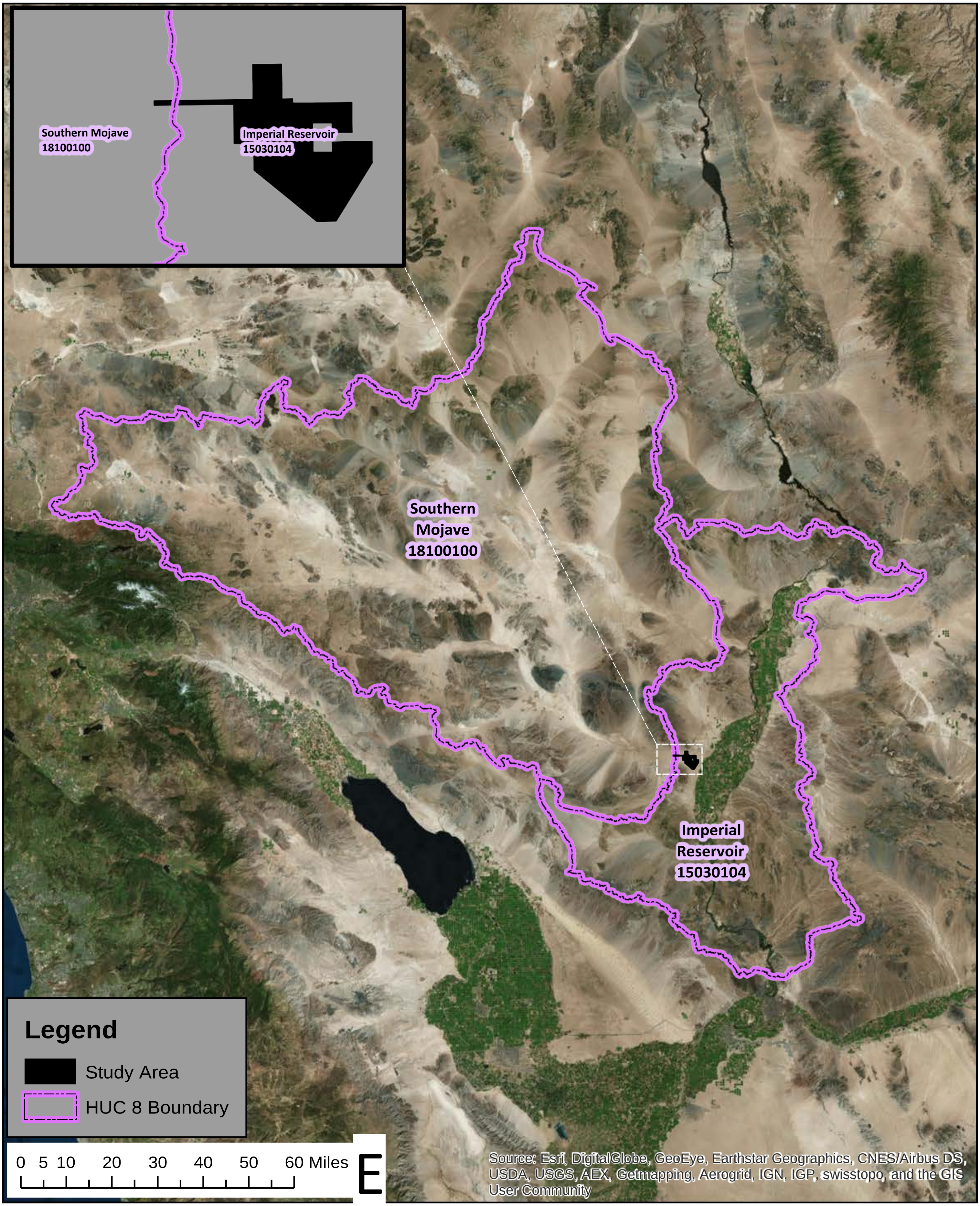

BLYTHE
Nicholls Warm Springs
DOUBLE WOODPOLE POWER LINE
DITCH
DIKE
RADIO FACILITY
BORROW PIT
Black Rock
PIPELINE
2 UG GAS LINES
RADIO FACILITY (VORTAC)
DRY WASH
(WATER) DRY WELL
MESA
VERDE
PALO
PALO VERDE
Legend
Study Area
1
2
3 Miles
0
0.5
E

Base Map: USGS 7.5 min Roosevelt Mine (1983), and Ripley (1952, rev.1975

Figure 2. USGS Topographic Map of the Jurisdictional Study Area

Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

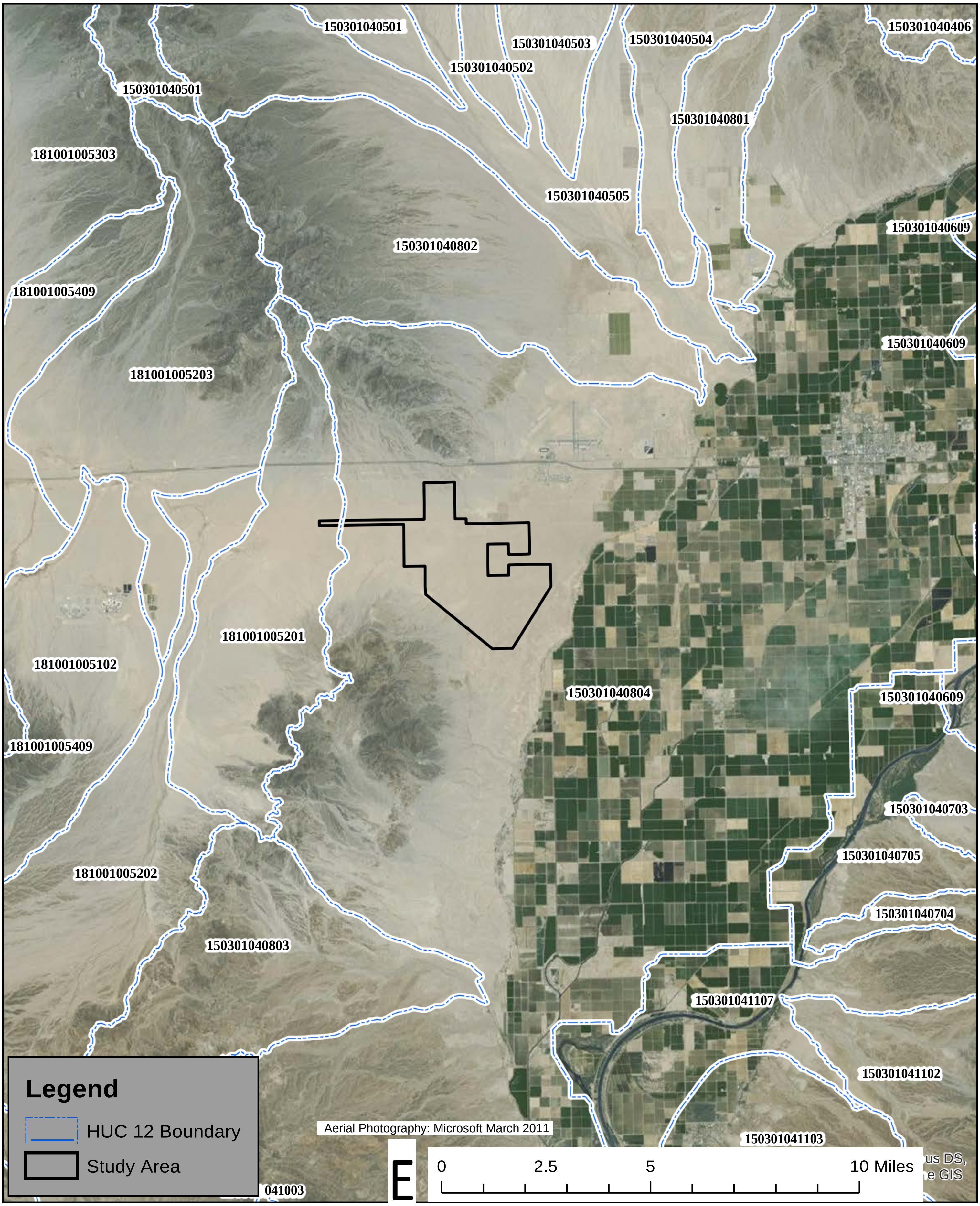

Southern Mojave
18100100
Imperial Reservoir
15030104
Southern Mojave
18100100
Imperial Reservoir
15030104
Legend
Study Area
HUC 8 Boundary
0 5 10 20 30 40 50 60 Miles
E

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Figure 3. Southern Mojave and Imperial Reservoir USGS Hydrologic Units

Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS



150301040501
150301040503
150301040504
150301040406
150301040502
150301040501
150301040801
181001005303
150301040505
150301040609
150301040802
181001005409
150301040609
181001005203
181001005201
181001005102
150301040804
150301040609
181001005409
150301040703
150301040705
181001005202
150301040704
150301040803
150301041107
150301041102
150301041103
041003
Legend
HUC 12 Boundary
Study Area
Aerial Photography: Microsoft March 2011
0
2.5
5
10 Miles
us DS,
e GIS

Figure 4. USGS HUC 12 Watershed Units

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Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

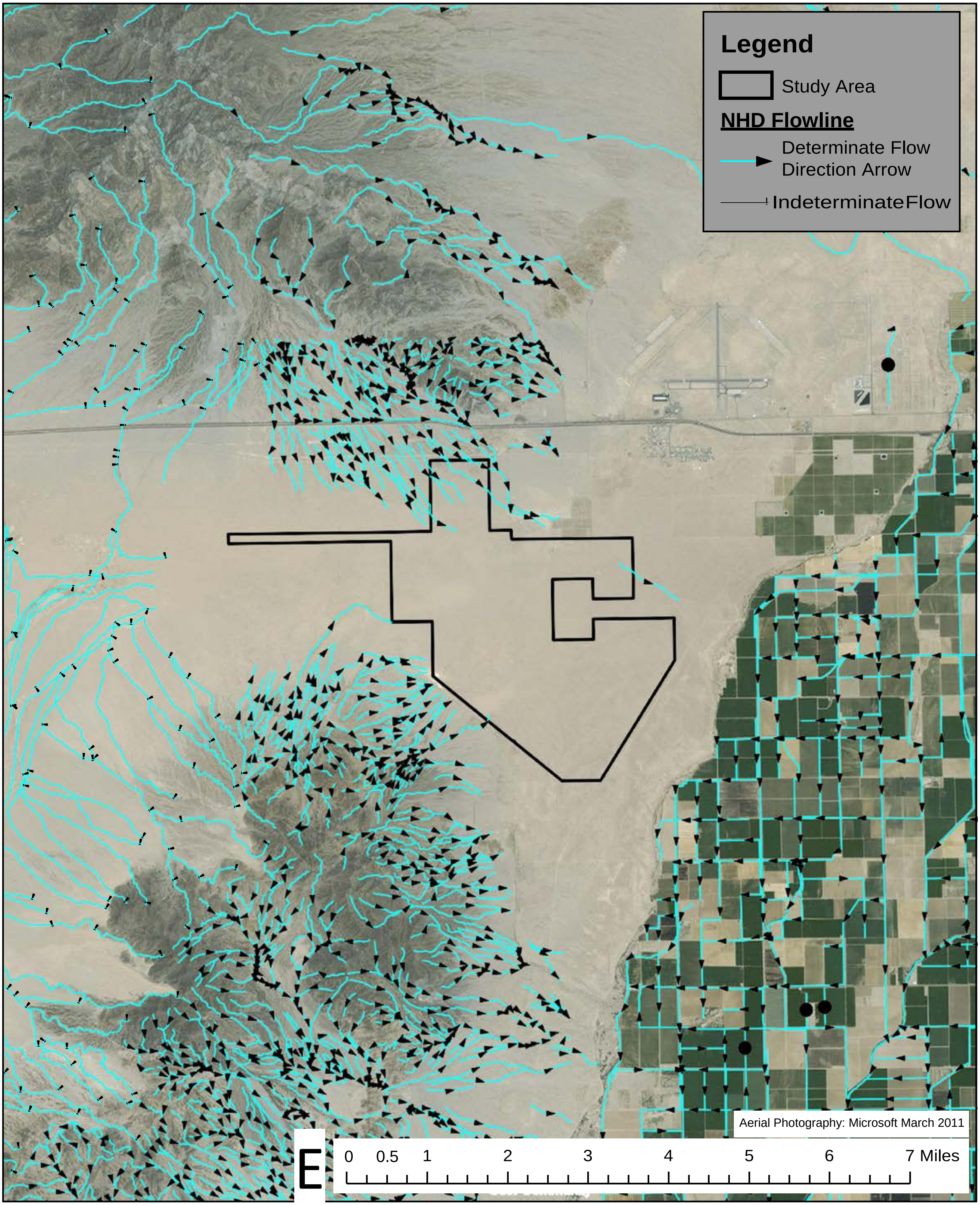
Legend
Study Area
NHD Flowline
Determinate Flow Direction Arrow
Indeterminate Flow
Aerial Photography: Microsoft March 2011
0 0.5 1 2 3 4 5 6 7 Miles

Figure 5. USGS NHD 1:25K High Resolution Mapping With Flow Arrows Showing Direction and Route of Surface Water Flow

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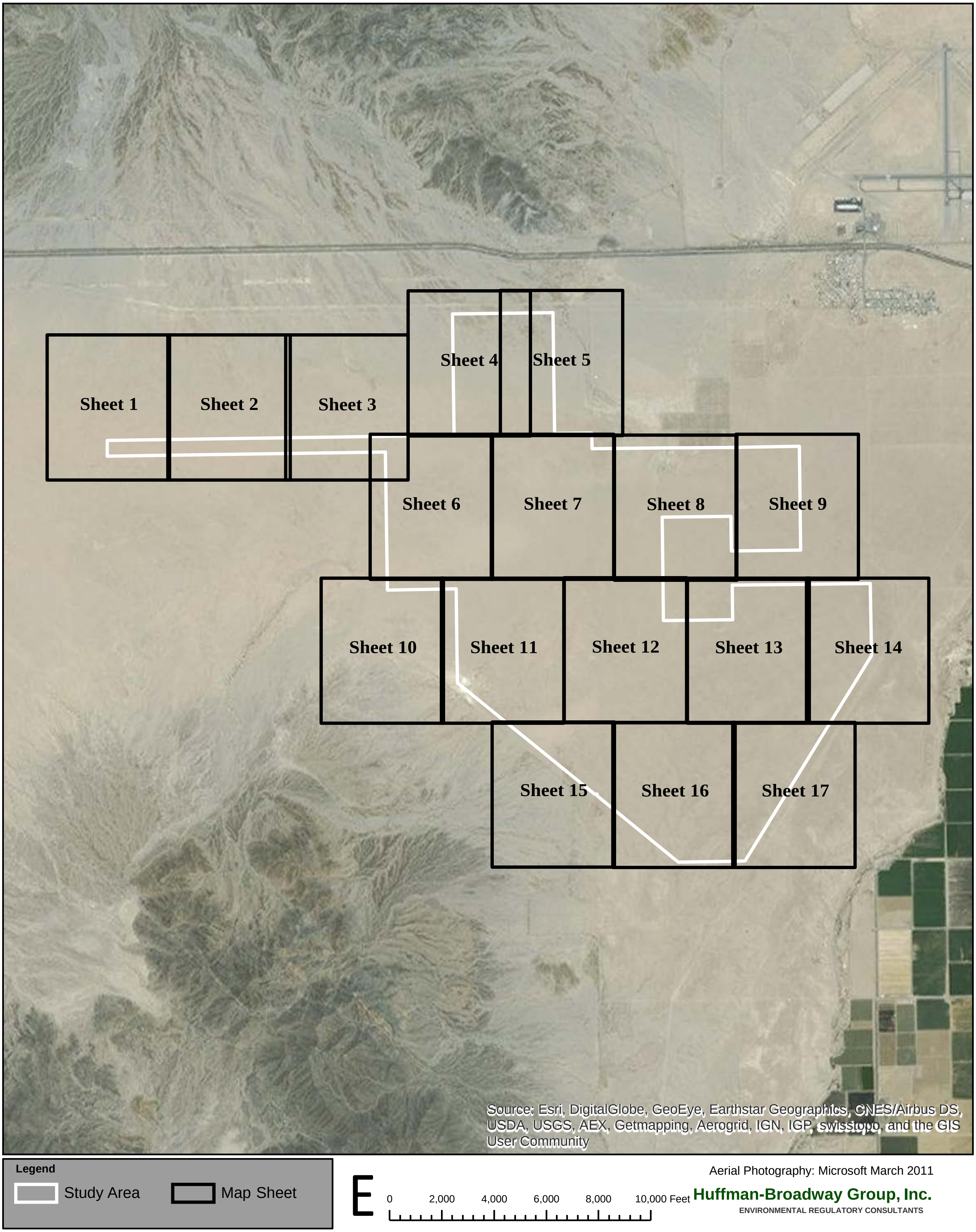
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California


Sheet 1
Sheet 2
Sheet 3
Sheet 4
Sheet 5
Sheet 6
Sheet 7
Sheet 8
Sheet 9
Sheet 10
Sheet 11
Sheet 12
Sheet 13
Sheet 14
Sheet 15
Sheet 16
Sheet 17
Legend
Study Area
Map Sheet
E
0
2,000
4,000
6,000
8,000
10,000 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Aerial Photography: Microsoft March 2011

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Figure 6. Potential Waters/Wetlands Subject to Corps/US EPA Section 404 Jurisdiction, Index Map

Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
1 inch = 600 feet
0 100 200 300 400 500 Feet
Aerial Photography: Microsoft March 2011
Huffman-Broadway Group, Inc.
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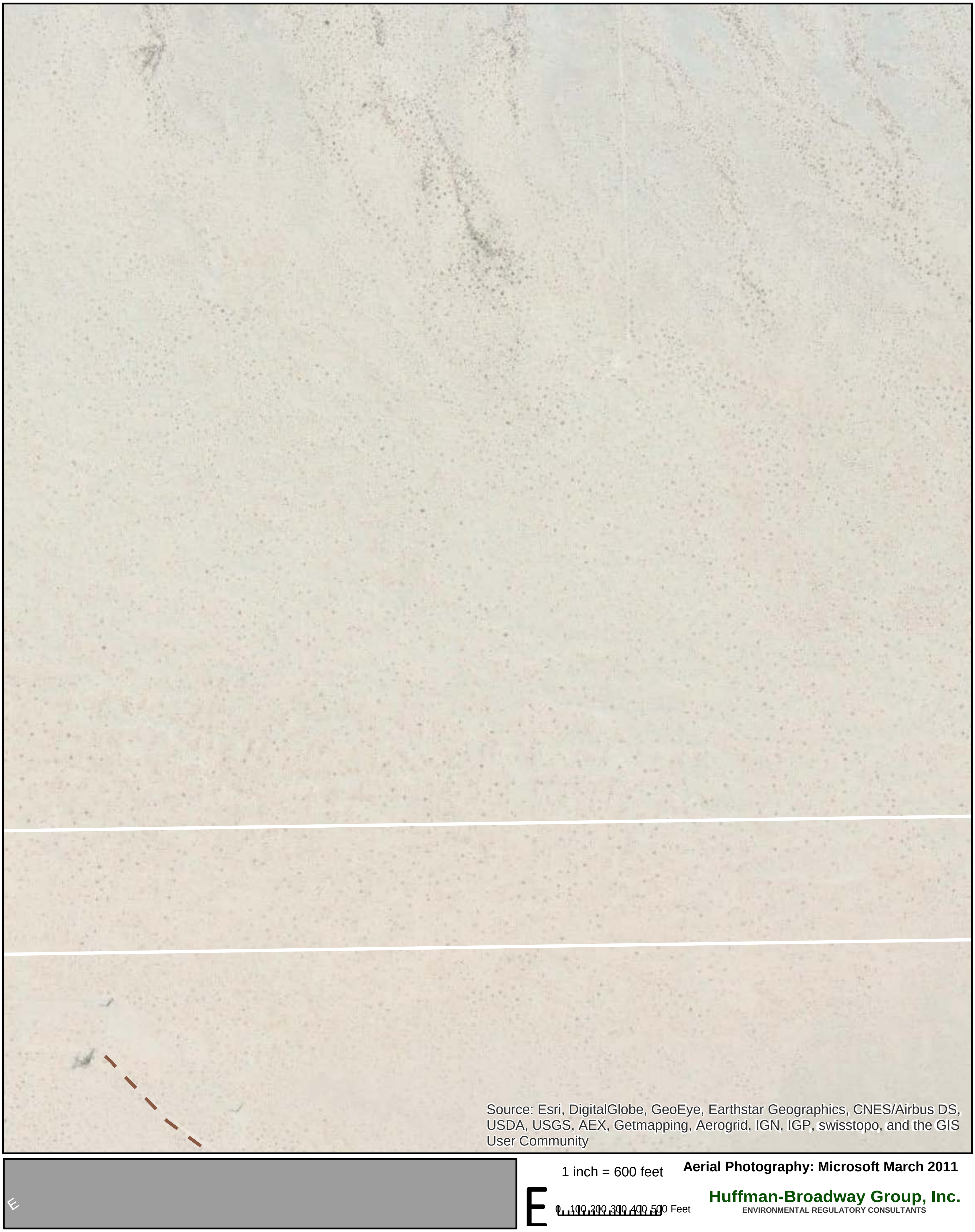
Figure 6. Potential Waters of the US Subject to Corps/US EPA Section 404 Jurisdiction, Sheet 1
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
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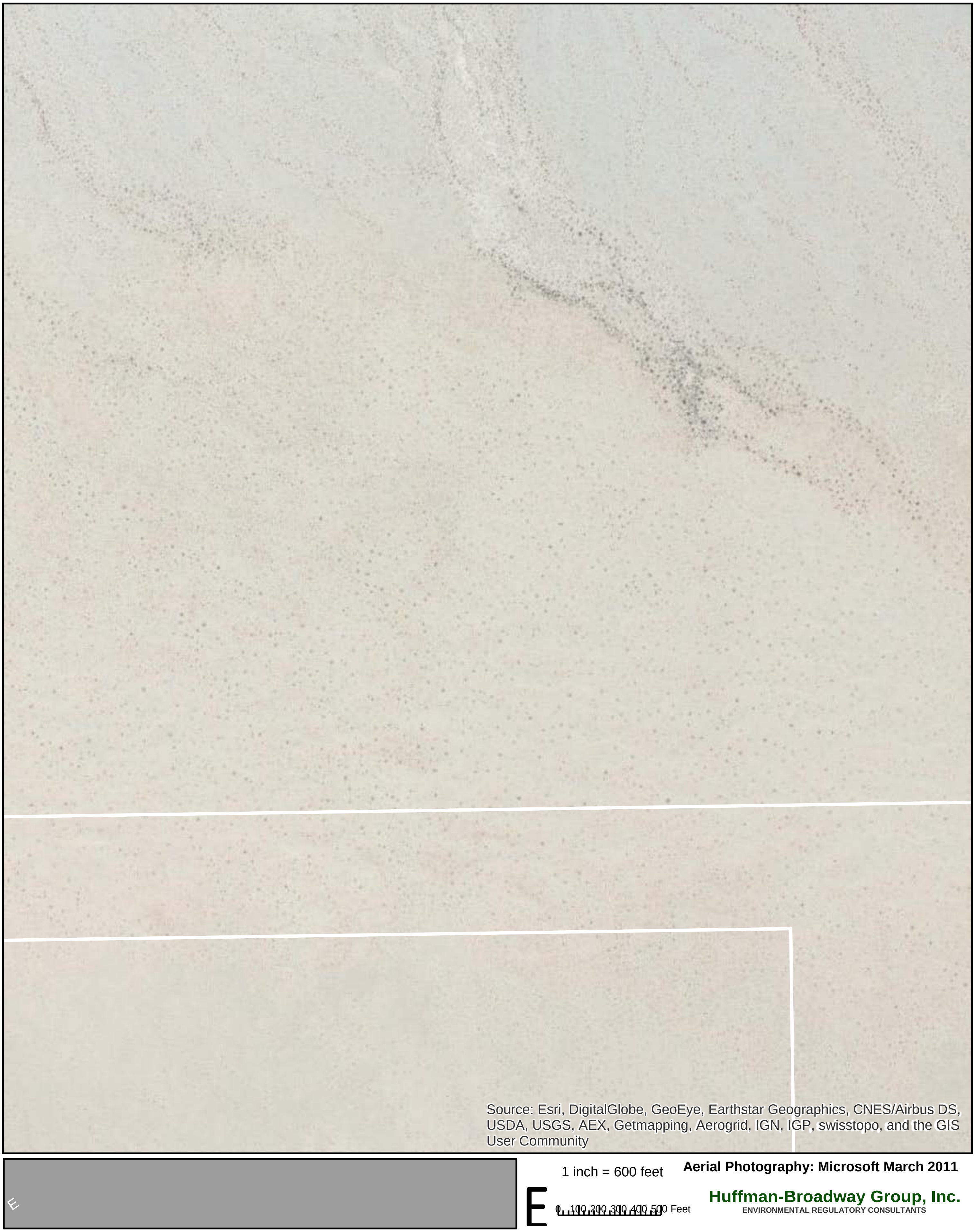
Figure 6. Potential Waters of the US Subject to Corps/US EPA Section 404 Jurisdiction, Sheet 2
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
E
1 inch = 600 feet
E
0 100 200 300 400 500 Feet

Aerial Photography: Microsoft March 2011

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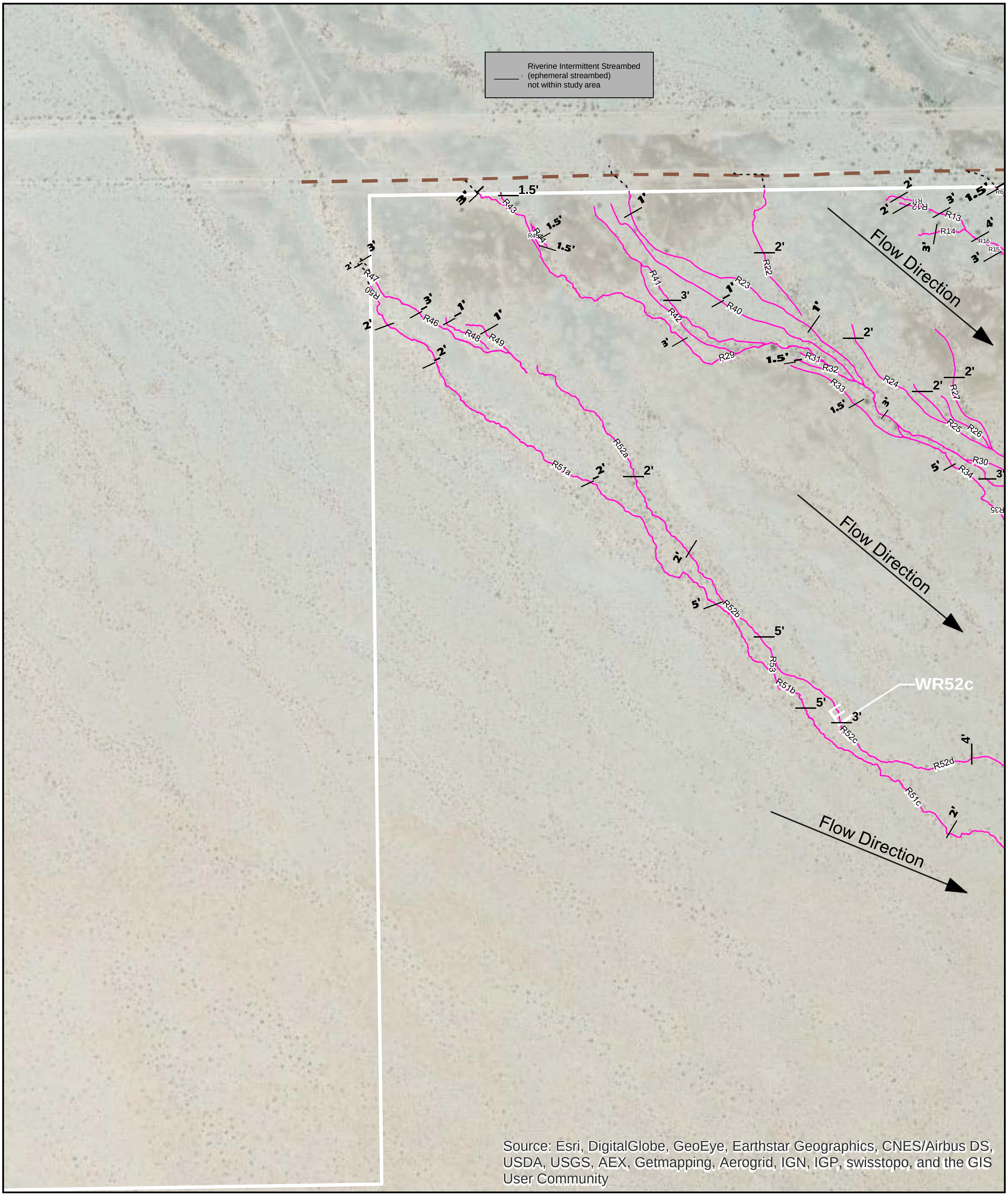
Figure 6. Potential Waters of the US Subject to Corps/US EPA Section 404 Jurisdiction, Sheet 3
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California


Riverine Intermittent Streambed
(ephemeral streambed)
not within study area
Flow Direction
Flow Direction
Flow Direction
R43
R44
R45
R47
R50
R46
R48
R49
R41
R42
R40
R23
R22
R29
R31
R32
R33
R24
R27
R25
R26
R30
R34
R35
R11
R12
R13
R14
R16
R15
R6
R52a
R51a
R52b
R53
R51b
R52c
R52d
R51c
WR52c
1.5'
3'
2'
1'
4'
5'

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

▭ Study Area

WR38 Wetland Sample Data Point

Dirt Roadway (barrier to surface water hydrology)

Potential Waters of the US Subject to Corps / US EPA Section 404 CWA Jurisdiction:

Riverine Intermittent Streambed (ephemeral stream)

Excavated Riverine Intermittent Streambed (excavated ephemeral stream)

1 inch = 600 feet

0 100 200 300 400 500 Feet

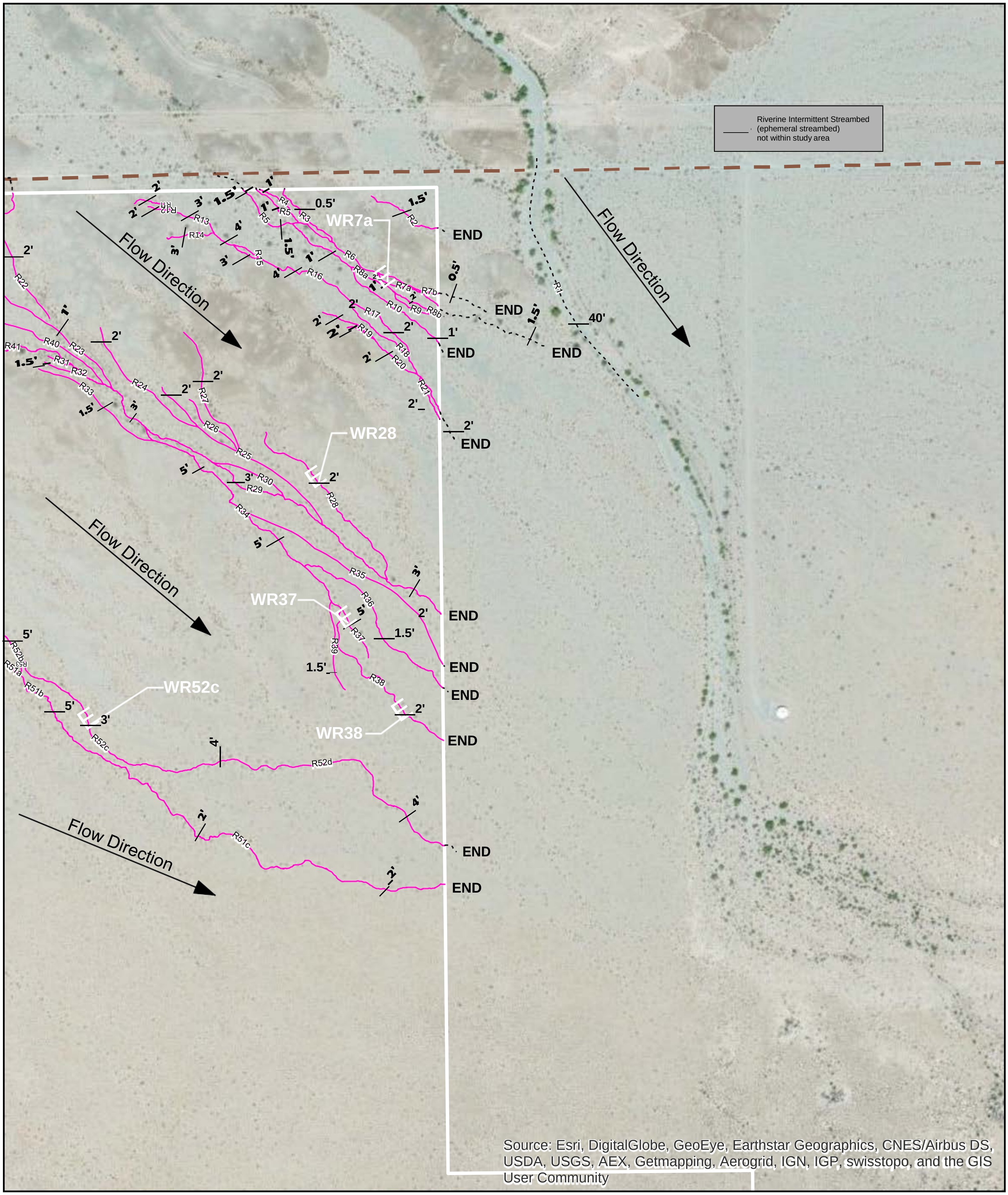
Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.

ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 6. Potential Waters of the US Subject to Corps/US EPA Section 404 Jurisdiction, Sheet 4

Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California


Riverine Intermittent Streambed (ephemeral streambed) not within study area
Flow Direction
Flow Direction
Flow Direction
Flow Direction
WR7a
WR28
WR37
WR52c
WR38
END
END
END
END
END
END
END
END
END
END
END
R1
R2
R3
R4
R5
R6
R7a
R7b
R8a
R8b
R9
R10
R12
R13
R14
R15
R16
R17
R18
R19
R20
R21
R22
R23
R24
R25
R26
R27
R28
R29
R30
R31
R32
R33
R34
R35
R36
R37
R38
R39
R40
R41
R51a
R51b
R51c
R52b
R52c
R52d
R53
0.5'
1'
1.5'
2'
3'
4'
5'
40'

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

▭ Study Area

WR38 Wetland Sample Data Point

Dirt Roadway (barrier to surface water hydrology)

Potential Waters of the US Subject to Corps / US EPA Section 404 CWA Jurisdiction:

Riverine Intermittent Streambed (ephemeral stream)

Excavated Riverine Intermittent Streambed (excavated ephemeral stream)

1 inch = 600 feet

0 100 200 300 400 500 Feet

Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 6. Potential Waters of the US Subject to Corps/US EPA Section 404 Jurisdiction, Sheet 5

Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

1 inch = 600 feet

0 100 200 300 400 500 Feet

Aerial Photography: Microsoft March 2011

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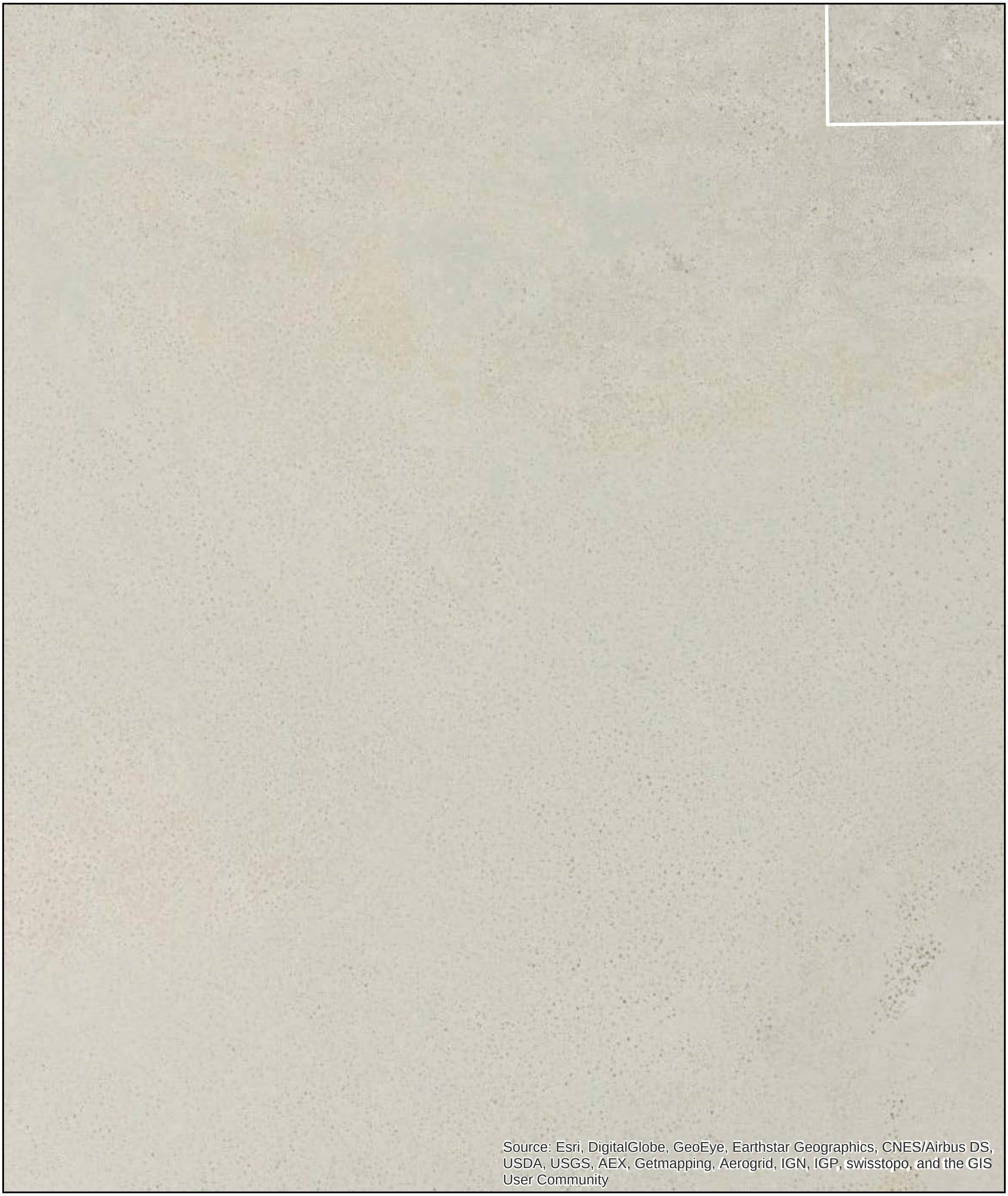
Figure 6. Potential Waters of the US Subject to Corps/US EPA Section 404 Jurisdiction, Sheet 6
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

1 inch = 600 feet

0 100 200 300 400 500 Feet

Aerial Photography: Microsoft March 2011

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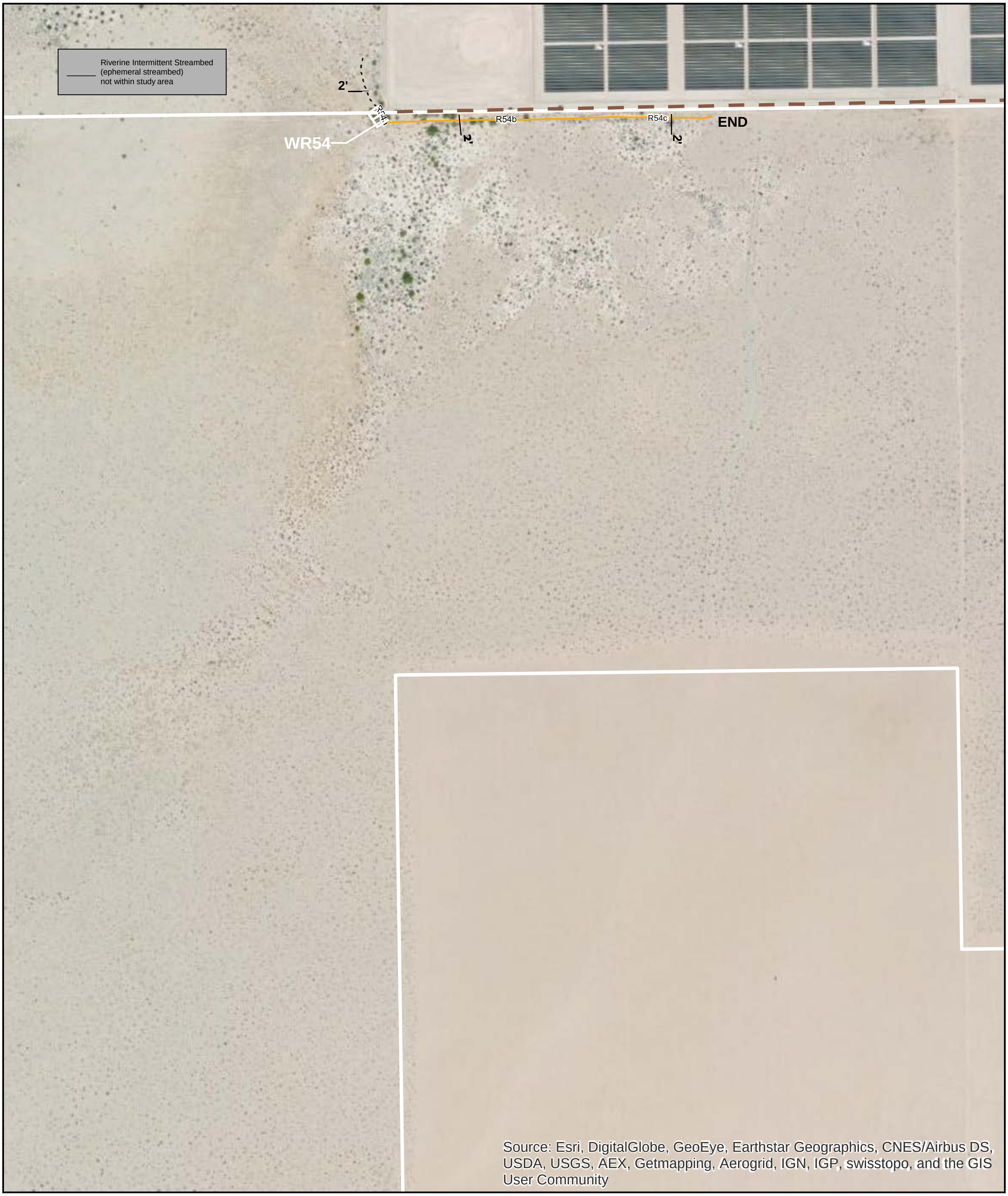
Figure 6. Potential Waters of the US Subject to Corps/US EPA Section 404 Jurisdiction, Sheet 7

Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California


Riverine Intermittent Streambed (ephemeral streambed) not within study area
2'
R54
WR54
R54b
R54c
2'
2'
END

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

1 inch = 600 feet

0 100 200 300 400 500 Feet

Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 6. Potential Waters of the US Subject to Corps/US EPA Section 404 Jurisdiction, Sheet 8
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

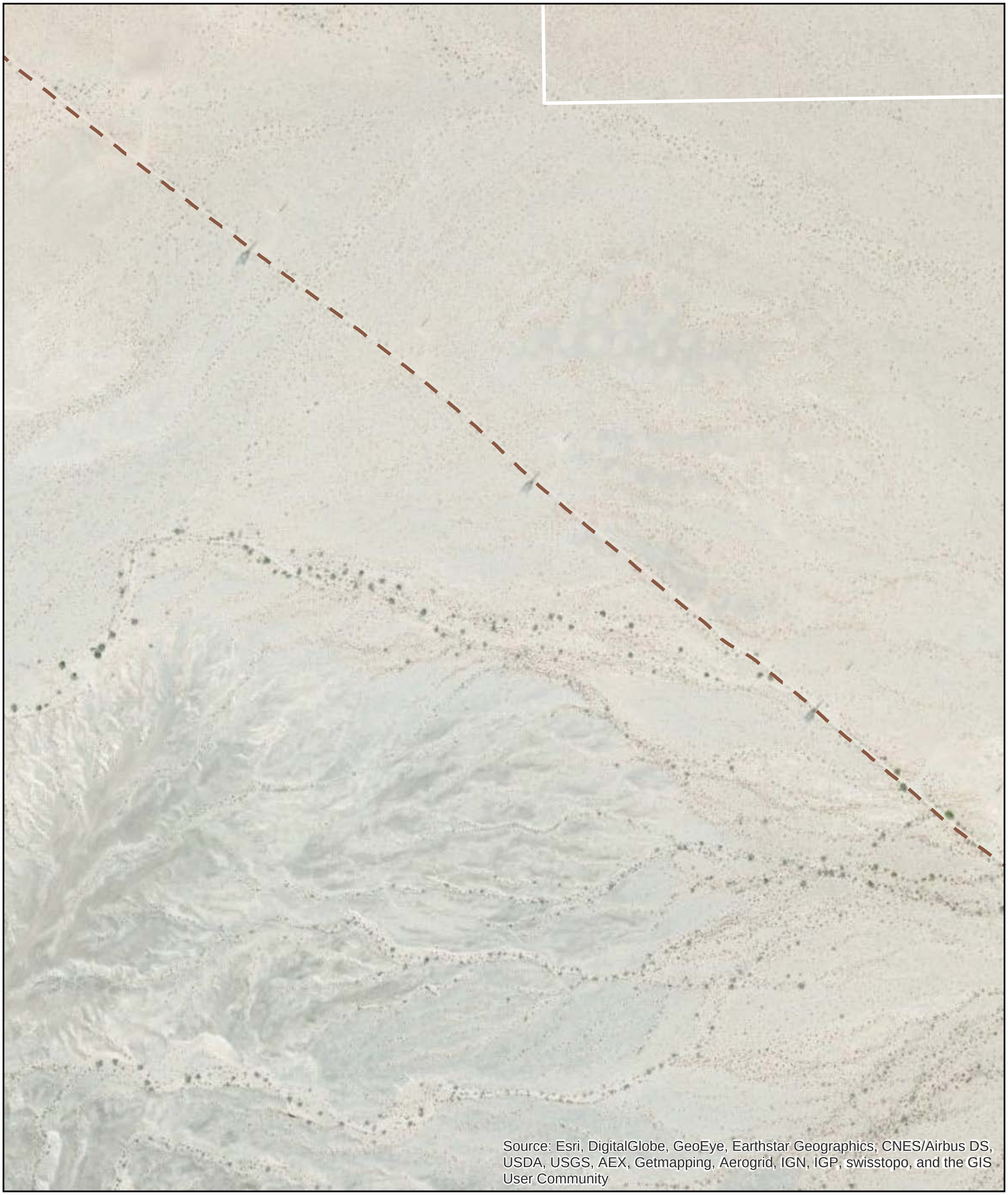
1 inch = 600 feet

0 100 200 300 400 500 Feet

Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 6. Potential Waters of the US Subject to Corps/US EPA Section 404 Jurisdiction, Sheet 9
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

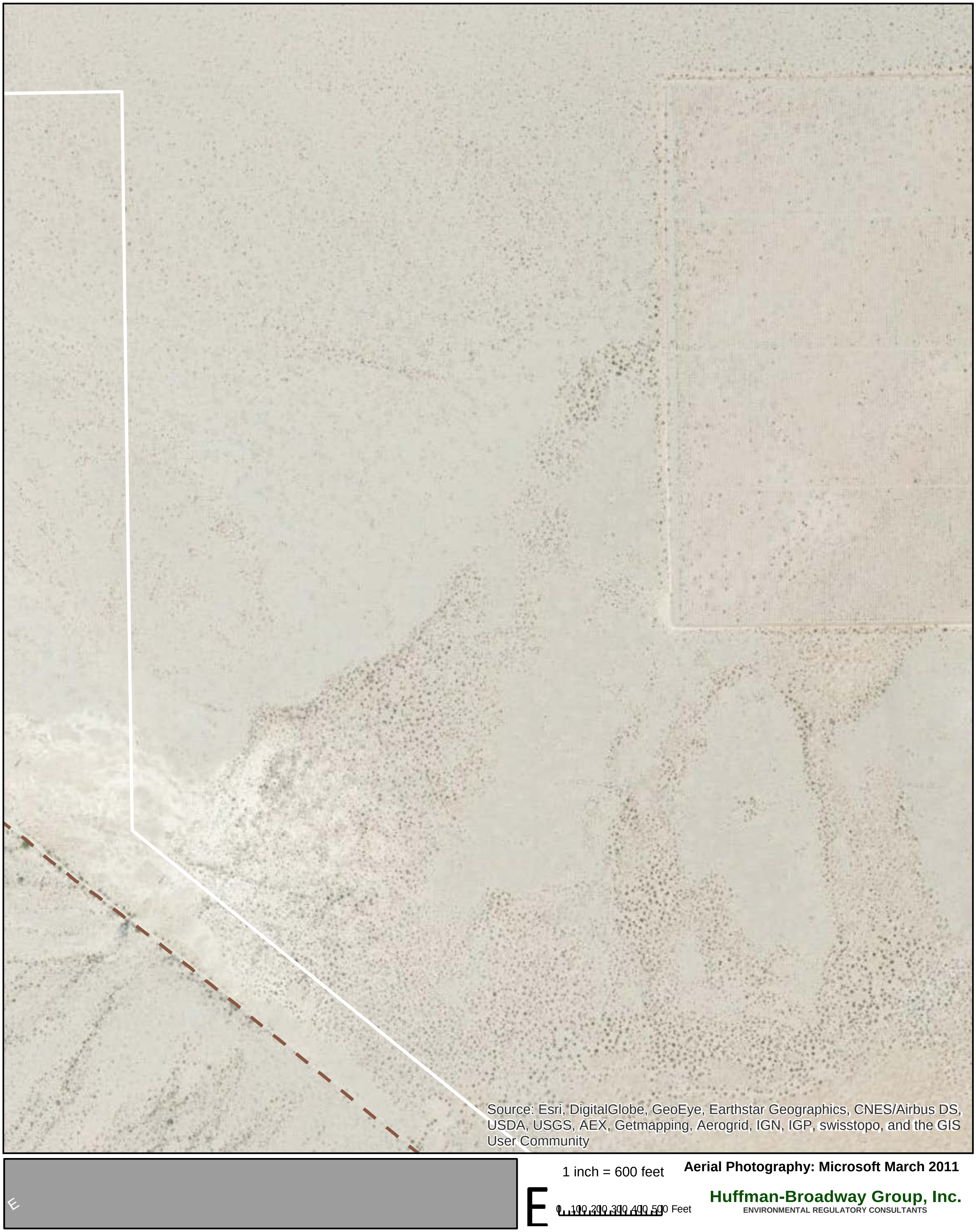


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 6. Potential Waters of the US Subject to Corps/US EPA Section 404 Jurisdiction, Sheet 10
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

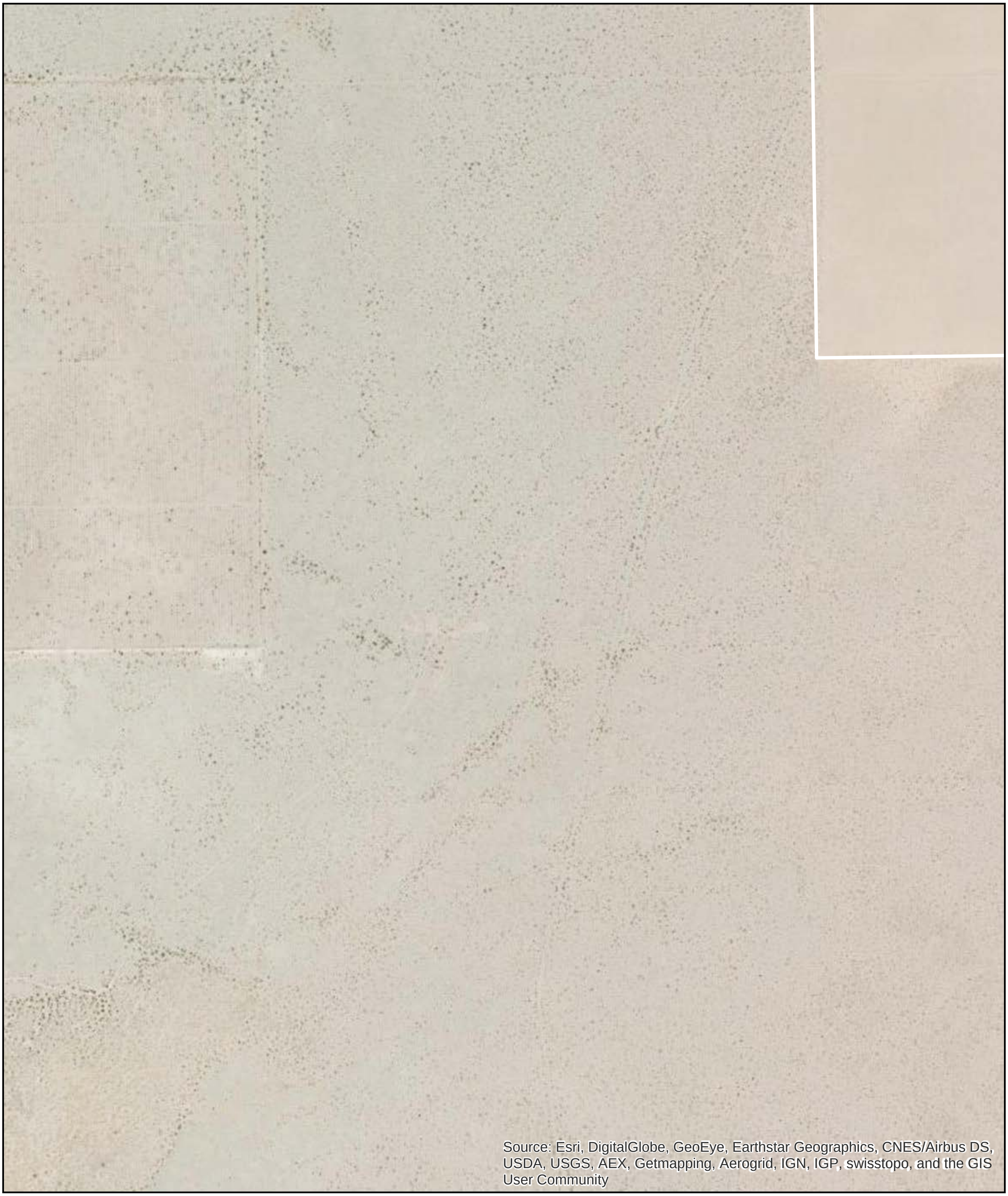


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 6. Potential Waters of the US Subject to Corps/US EPA Section 404 Jurisdiction, Sheet 11
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

1 inch = 600 feet

0 100 200 300 400 500 Feet

Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 6. Potential Waters of the US Subject to Corps/US EPA Section 404 Jurisdiction, Sheet 12

Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

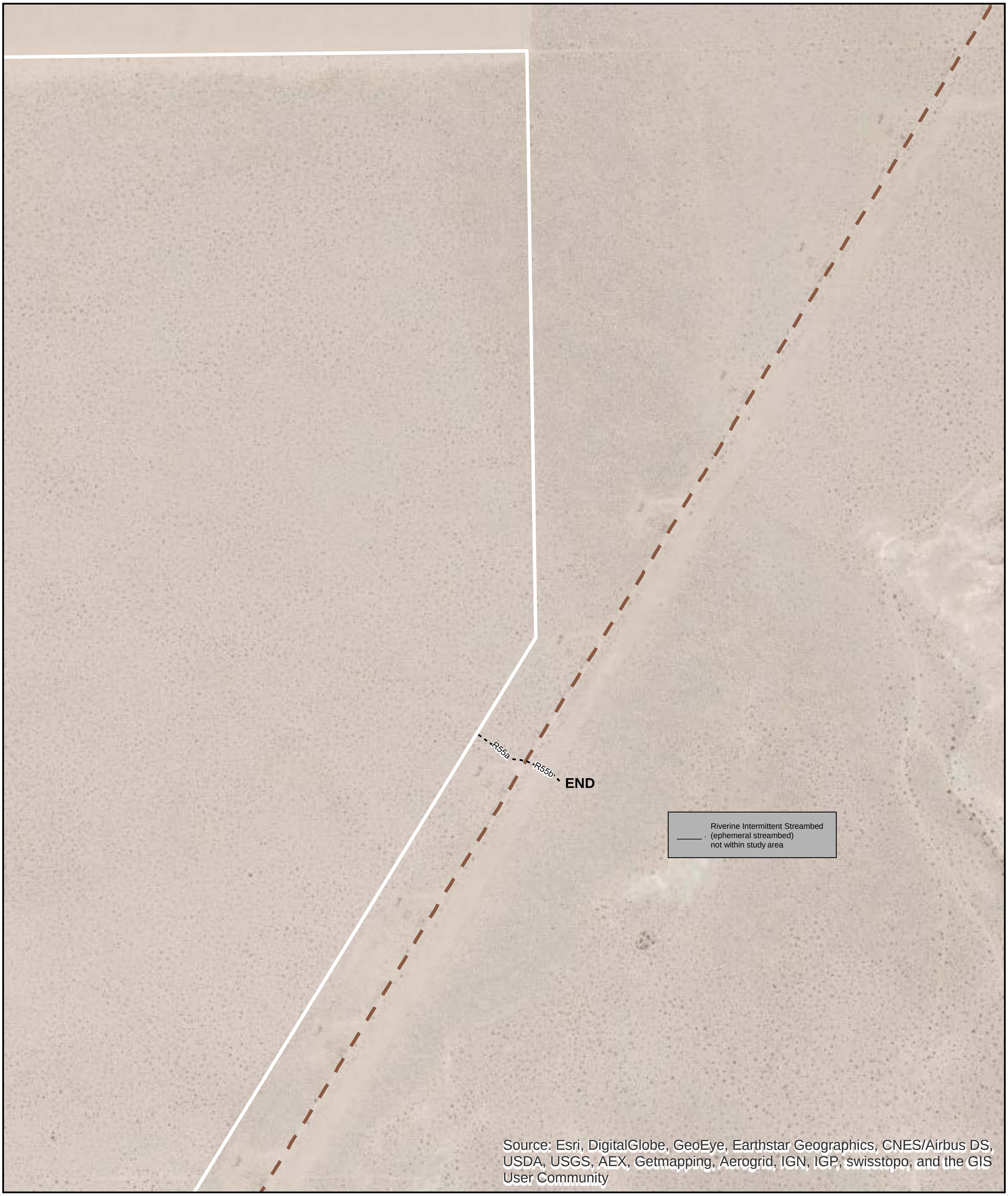
1 inch = 600 feet

0 100 200 300 400 500 Feet

Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 6. Potential Waters of the US Subject to Corps/US EPA Section 404 Jurisdiction, Sheet 13
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California


R55a
R55b
END
Riverine Intermittent Streambed (ephemeral streambed) not within study area

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

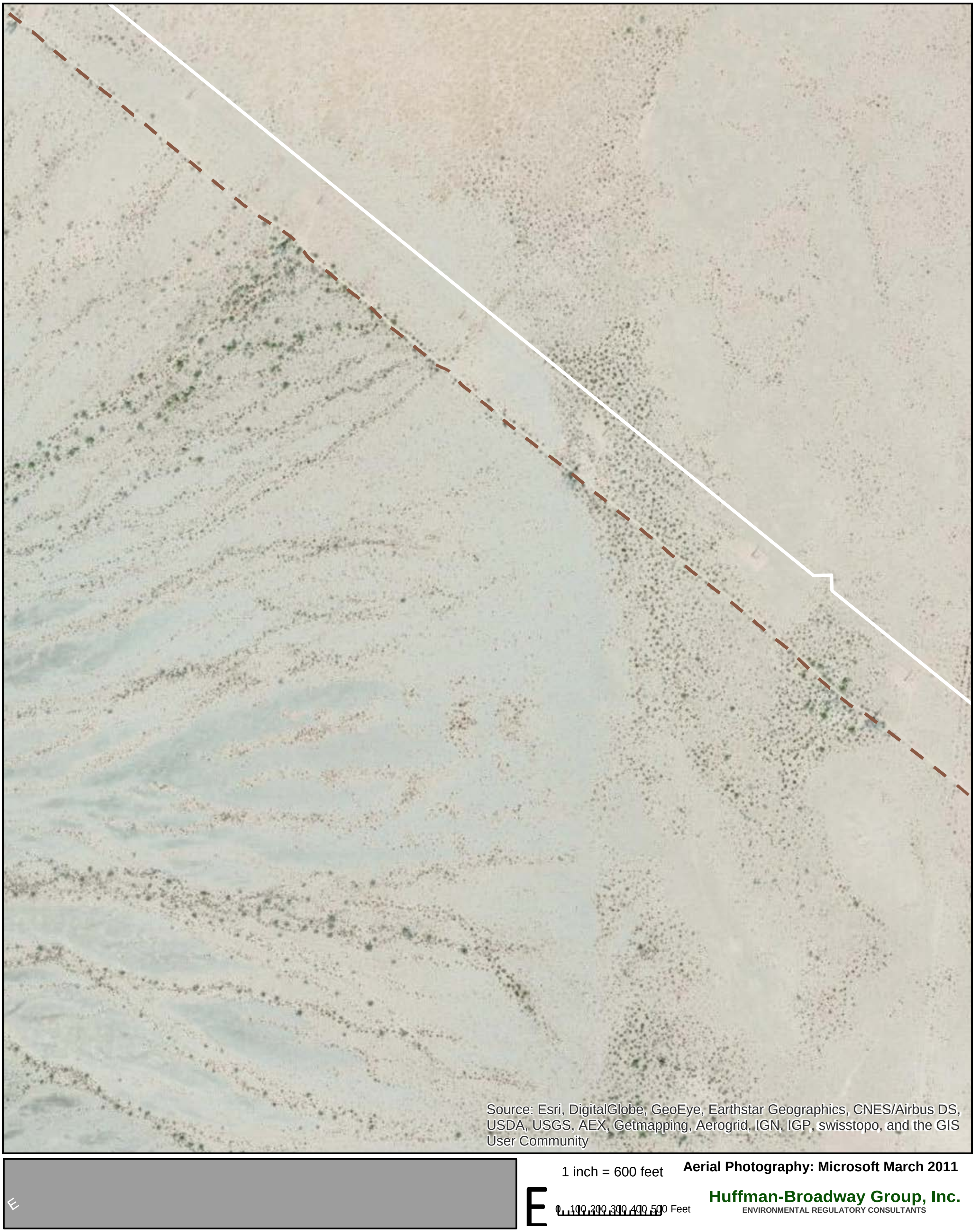
1 inch = 600 feet

0 100 200 300 400 500 Feet

Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 6. Potential Waters of the US Subject to Corps/US EPA Section 404 Jurisdiction, Sheet 14
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

1 inch = 600 feet

Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
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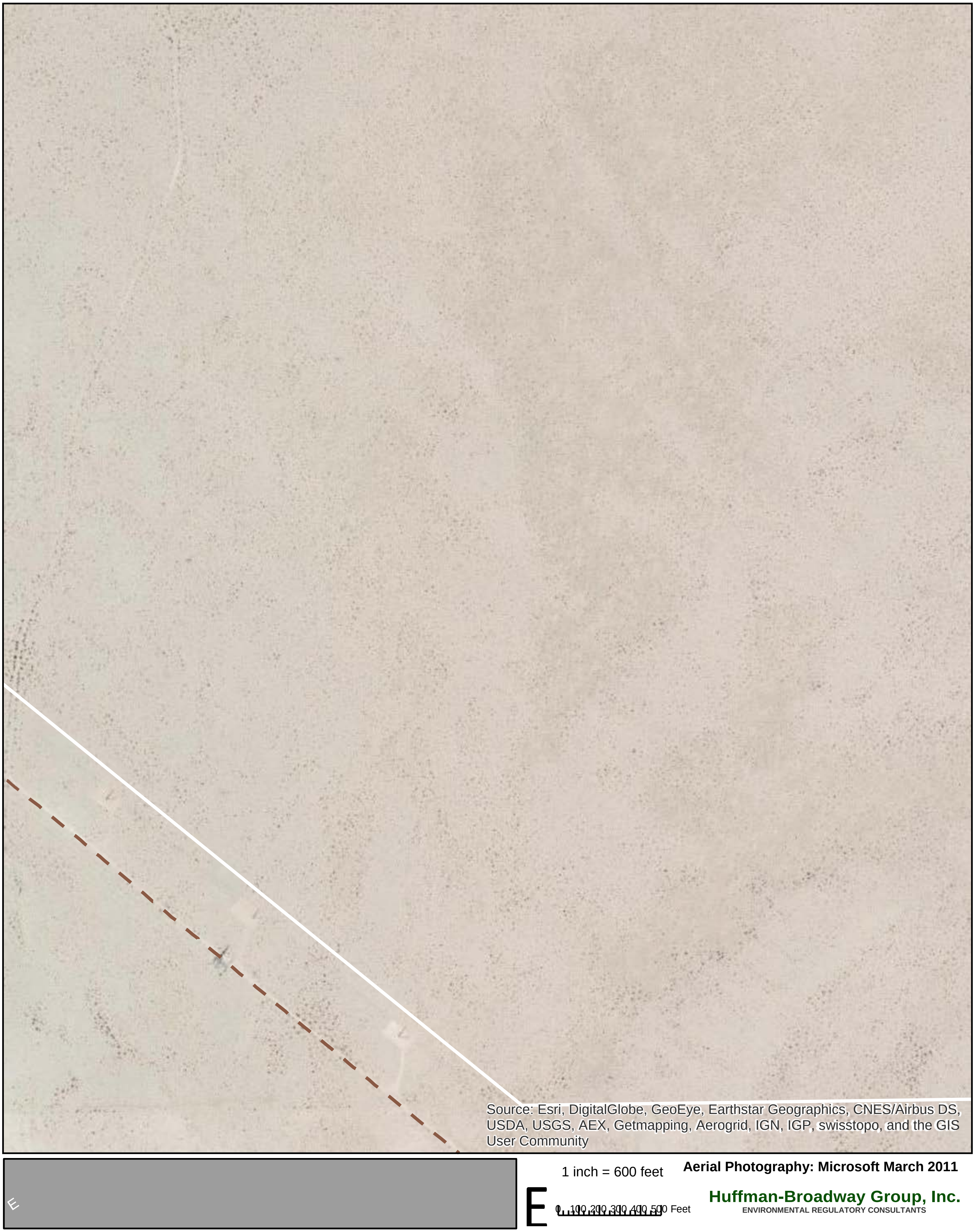
Figure 6. Potential Waters of the US Subject to Corps/US EPA Section 404 Jurisdiction, Sheet 15

Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California



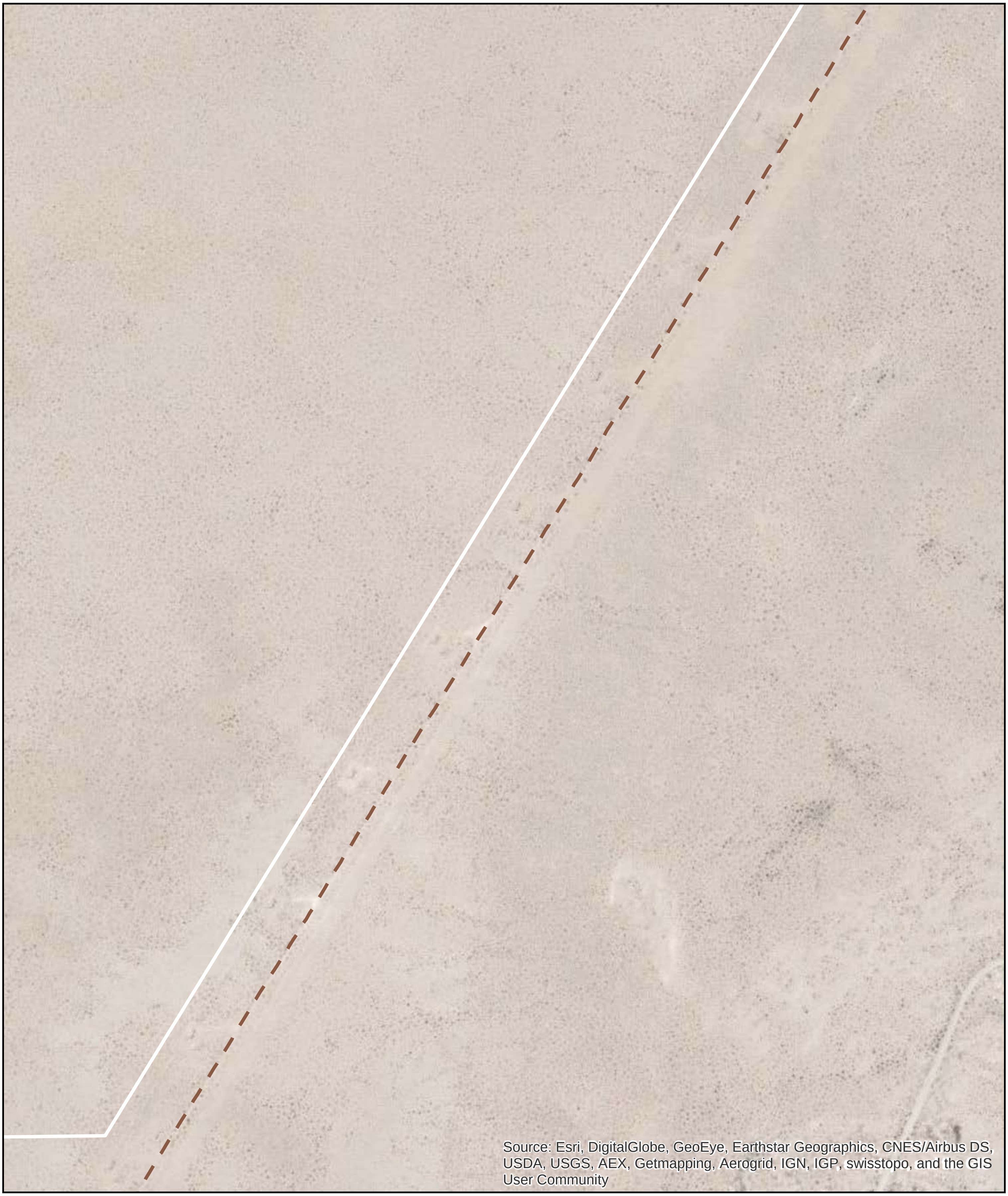
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 6. Potential Waters of the US Subject to Corps/US EPA Section 404 Jurisdiction, Sheet 16

Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

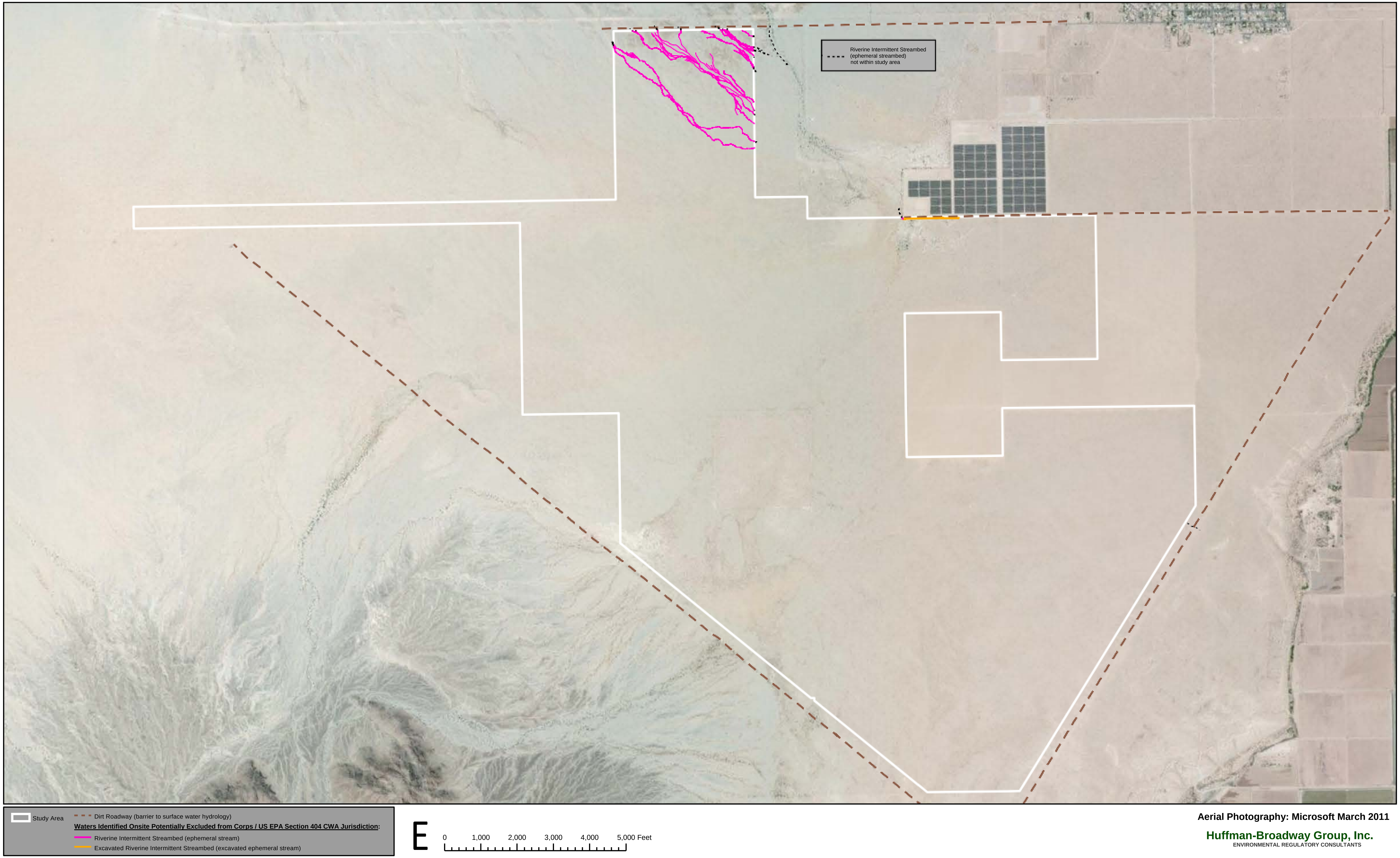
1 inch = 600 feet

0 100 200 300 400 500 Feet

Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 6. Potential Waters of the US Subject to Corps/US EPA Section 404 Jurisdiction, Sheet 17
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California


Riverine Intermittent Streambed
(ephemeral streambed)
not within study area
Study Area
Dirt Roadway (barrier to surface water hydrology)
Waters Identified Onsite Potentially Excluded from Corps / US EPA Section 404 CWA Jurisdiction:
Riverine Intermittent Streambed (ephemeral stream)
Excavated Riverine Intermittent Streambed (excavated ephemeral stream)
E
0
1,000
2,000
3,000
4,000
5,000 Feet

Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 7. Location of Areas Potentially Excluded from Corps and US EPA Jurisdiction as Waters of the US
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

APPENDIX B

NRCS Custom Soils Report

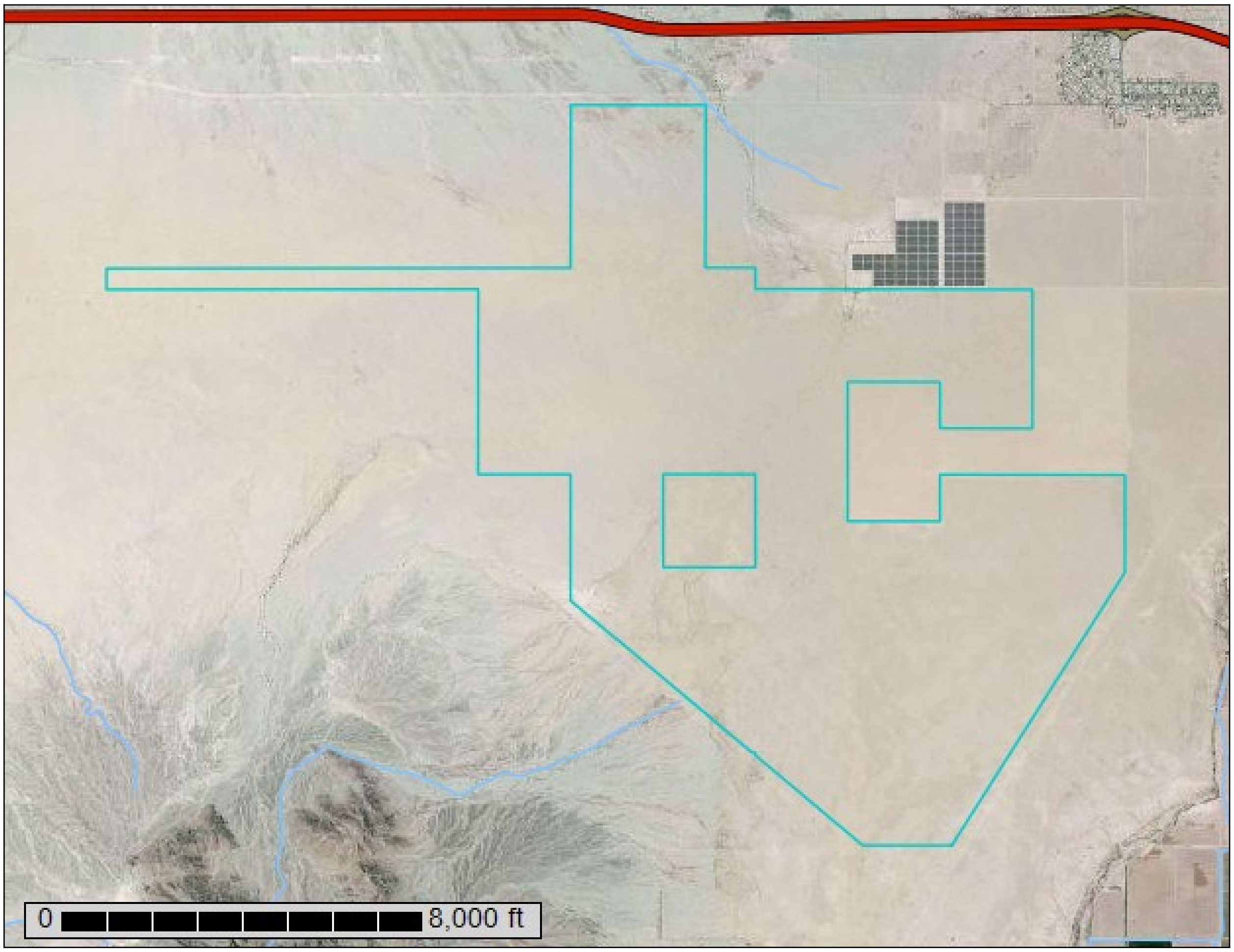
United States
Department of
Agriculture

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Colorado Desert Area, California, and Palo Verde Area, California

Desert Quartzite Study Area



April 27, 2015

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means

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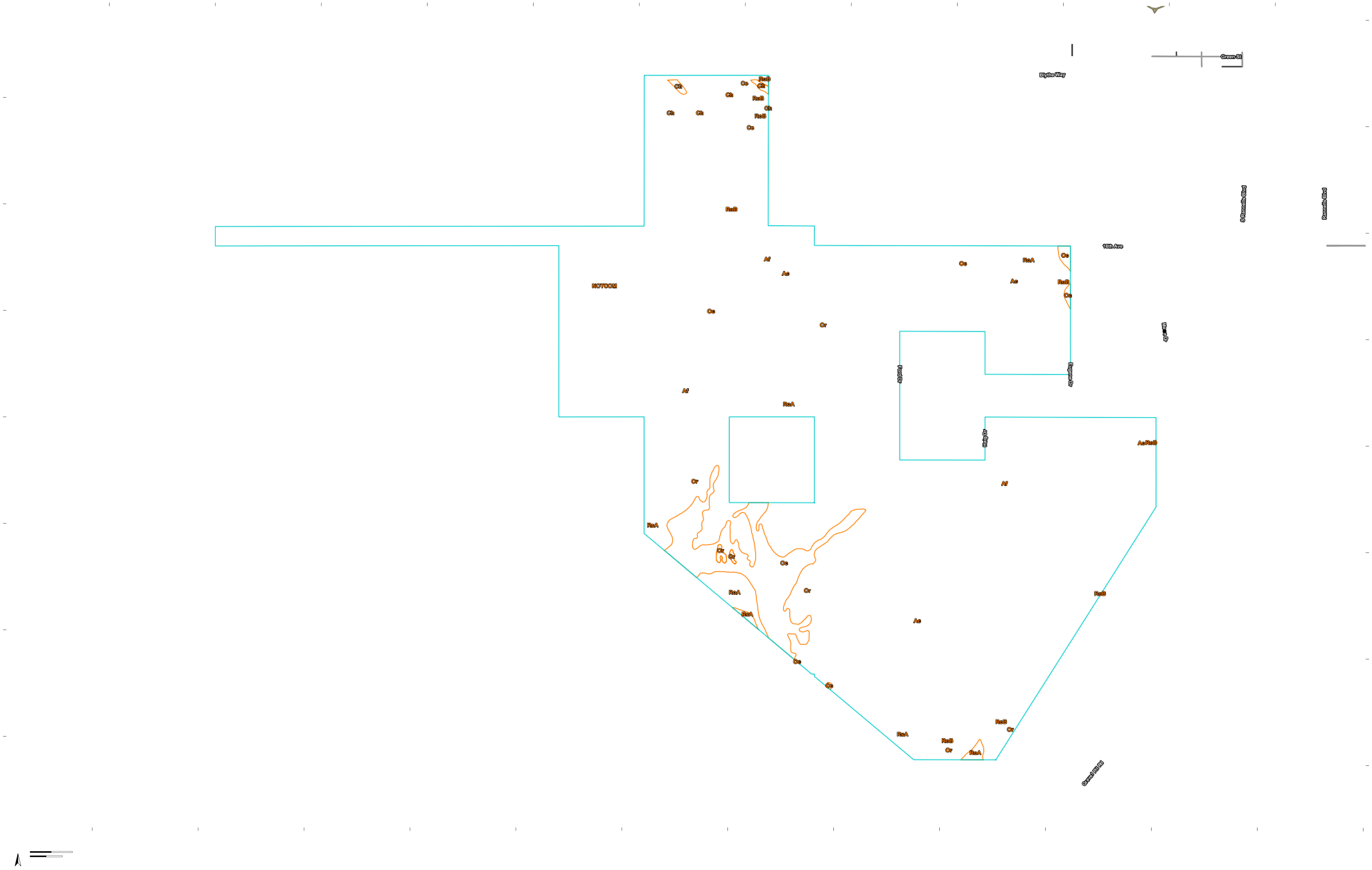
Contents

Preface..2
Soil Map..5
  Soil Map..6
  Legend..7
  Map Unit Legend..8
  Map Unit Descriptions..8
    Colorado Desert Area, California..11
      NOTCOM—No Digital Data Available..11
    Palo Verde Area, California..12
      Ac—Aco gravelly loamy sand..12
      Af—Aco sandy loam..13
      Ce—Carrizo gravelly sand..14
      Ch—Chuckawalla very gravelly silt loam..15
      Oc—Orita fine sand..16
      Or—Orita gravelly fine sandy loam..17
      RoA—Rositas fine sand, 0 to 2 percent slopes..19
      RoB—Rositas fine sand, 2 to 9 percent slopes..20
      RsA—Rositas gravelly loamy sand, 0 to 2 percent slopes..21
References..23

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.


Green St
Blythe Way
Ch
Ce
RoB
Ch
Ch
RoB
Ch
Ch
Ch
RoB
Ce
S Rannells Blvd
Rannells Blvd
RoB
16th Ave
Af
Ce
RoA
Ac
NOTCOM
Ac
RoB
Ce
Ce
Or
Ford Dr
Af
RoA
AcRoB
Or
Af
RsA
Or
Or
Oe
Or
RoA
RsA
Ac
RoB
Oe
Oe
RoB
Or
RsA
RoB
Or
RsA

MAP LEGEND

Area of Interest (AOI)

- □ Area of Interest (AOI)

Soils

- □ Soil Map Unit Polygons
- 〰 Soil Map Unit Lines
- ■ Soil Map Unit Points

Special Point Features

- Blowout
- ⊠ Borrow Pit
- Clay Spot
- ◇ Closed Depression
- ✕ Gravel Pit
- ∴ Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- ◎ Miscellaneous Water
- ○ Perennial Water
- ∨ Rock Outcrop
- + Saline Spot
- ⁘ Sandy Spot
- Severely Eroded Spot
- ◇ Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- △ Other
- Special Line Features

Water Features

- 〰 Streams and Canals

Transportation

- +++ Rails
- 〰 Interstate Highways
- 〰 US Routes
- 〰 Major Roads
- 〰 Local Roads

Background

- ▨ Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Colorado Desert Area, California
Survey Area Data: Version 4, Sep 17, 2014

Soil Survey Area: Palo Verde Area, California
Survey Area Data: Version 6, Sep 9, 2014

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 13, 2011—Apr 17, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Colorado Desert Area, California (CA803)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
NOTCOM	No Digital Data Available	556.3	11.5%
Subtotals for Soil Survey Area		**556.3**	**11.5%**
Totals for Area of Interest		**4,843.2**	**100.0%**

Palo Verde Area, California (CA681)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Ac	Aco gravelly loamy sand	1,028.4	21.2%
Af	Aco sandy loam	1,459.1	30.1%
Ce	Carrizo gravelly sand	97.4	2.0%
Ch	Chuckawalla very gravelly silt loam	63.7	1.3%
Oc	Orita fine sand	358.2	7.4%
Or	Orita gravelly fine sandy loam	678.0	14.0%
RoA	Rositas fine sand, 0 to 2 percent slopes	162.1	3.3%
RoB	Rositas fine sand, 2 to 9 percent slopes	408.1	8.4%
RsA	Rositas gravelly loamy sand, 0 to 2 percent slopes	31.9	0.7%
Subtotals for Soil Survey Area		**4,287.0**	**88.5%**
Totals for Area of Interest		**4,843.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Colorado Desert Area, California

NOTCOM—No Digital Data Available

Map Unit Composition

Notcom: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Notcom

Properties and qualities

Palo Verde Area, California

Ac—Aco gravelly loamy sand

Map Unit Setting

National map unit symbol: hkwq
Elevation: 300 to 700 feet
Mean annual precipitation: 4 inches
Mean annual air temperature: 72 degrees F
Frost-free period: 290 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Aco and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aco

Setting

Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 3 inches: gravelly loamy sand
H2 - 3 to 18 inches: coarse sandy loam
H3 - 18 to 46 inches: sandy loam
H4 - 46 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A

Minor Components

Rositas, gravelly loamy sand

Percent of map unit: 8 percent

Aco, sandy loam

Percent of map unit: 7 percent

Af—Aco sandy loam

Map Unit Setting

National map unit symbol: hkwr
Elevation: 300 to 700 feet
Frost-free period: 290 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Aco and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aco

Setting

Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 3 inches: sandy loam
H2 - 3 to 18 inches: coarse sandy loam
H3 - 18 to 46 inches: sandy loam
H4 - 46 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A

Minor Components

Rositas, fine sand
Percent of map unit: 8 percent

Aco, gravelly loamy sand
Percent of map unit: 7 percent

Ce—Carrizo gravelly sand

Map Unit Setting

National map unit symbol: hkwt
Elevation: 300 to 450 feet
Mean annual precipitation: 2 to 8 inches
Mean annual air temperature: 72 degrees F
Frost-free period: 290 to 310 days
Farmland classification: Not prime farmland

Map Unit Composition

Carrizo and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Carrizo

Setting
Landform: Arroyos
Landform position (two-dimensional): Toeslope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Mixed sandy and gravelly alluvium

Typical profile
H1 - 0 to 37 inches: gravelly sand
H2 - 37 to 47 inches: very cobbly sandy loam
H3 - 47 to 60 inches: very cobbly sandy loam

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)

Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 8s
Hydrologic Soil Group: A

Minor Components

Chuckawala

Percent of map unit: 5 percent

Rositas

Percent of map unit: 5 percent

Badland

Percent of map unit: 5 percent

Ch—Chuckawalla very gravelly silt loam

Map Unit Setting

National map unit symbol: hkwv
Elevation: 400 to 1,000 feet
Mean annual precipitation: 4 inches
Mean annual air temperature: 72 degrees F
Frost-free period: 290 to 310 days
Farmland classification: Not prime farmland

Map Unit Composition

Chuckawalla and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Chuckawalla

Setting

Landform: Fan remnants
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 2 inches: gravelly silt loam
H2 - 2 to 7 inches: gravelly silty clay loam
H3 - 7 to 16 inches: very gravelly clay loam
H4 - 16 to 60 inches: very cobbly fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Moderately saline to strongly saline (15.0 to 30.0 mmhos/cm)
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B

Minor Components

Rock land

Percent of map unit: 5 percent

Carrizo

Percent of map unit: 5 percent

Badland

Percent of map unit: 5 percent

Oc—Orita fine sand

Map Unit Setting

National map unit symbol: hkxb
Elevation: 370 to 500 feet
Mean annual precipitation: 4 inches
Mean annual air temperature: 72 degrees F
Frost-free period: 290 days
Farmland classification: Prime farmland if irrigated and reclaimed of excess salts and sodium

Map Unit Composition

Orita and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orita

Setting

Landform: Fan remnants
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear

Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 12 inches: fine sand
H2 - 12 to 22 inches: fine sandy loam
H3 - 22 to 68 inches: gravelly clay loam
H4 - 68 to 80 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 6 percent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Available water storage in profile: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C

Minor Components

Orita, gravelly fine sandy loam

Percent of map unit: 8 percent

Carrizo, gravelly sand

Percent of map unit: 7 percent

Or—Orita gravelly fine sandy loam

Map Unit Setting

National map unit symbol: hkxd
Elevation: 370 to 500 feet
Mean annual precipitation: 4 inches
Mean annual air temperature: 72 degrees F
Frost-free period: 290 days
Farmland classification: Prime farmland if irrigated and reclaimed of excess salts and sodium

Map Unit Composition

Orita and similar soils: 85 percent
Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orita

Setting

Landform: Fan remnants
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 4 inches: Error
H2 - 4 to 10 inches: gravelly fine sandy loam
H3 - 10 to 22 inches: gravelly sand
H4 - 22 to 68 inches: gravelly fine sandy loam
H5 - 68 to 80 inches: gravelly clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 6 percent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B

Minor Components

Aco, gravelly loamy sand

Percent of map unit: 5 percent

Carrizo, gravelly sand

Percent of map unit: 5 percent

Orita, gravelly fine sandy loam

Percent of map unit: 5 percent

RoA—Rositas fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hkxj
Elevation: 220 to 500 feet
Mean annual precipitation: 2 to 4 inches
Mean annual air temperature: 72 degrees F
Frost-free period: 290 to 310 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Rositas and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rositas

Setting

Landform: Sand sheets
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian sands

Typical profile

H1 - 0 to 3 inches: loamy fine sand
H2 - 3 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Available water storage in profile: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A

Minor Components

Gilman

Percent of map unit: 3 percent

Aco

Percent of map unit: 3 percent

Carrizo

Percent of map unit: 3 percent

Gilman, valley location

Percent of map unit: 3 percent

Indio

Percent of map unit: 3 percent

RoB—Rositas fine sand, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: hkxk
Elevation: 220 to 500 feet
Mean annual precipitation: 2 to 4 inches
Mean annual air temperature: 72 degrees F
Frost-free period: 290 to 310 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Rositas and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rositas

Setting

Landform: Sand sheets
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Riser
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Eolian sands

Typical profile

H1 - 0 to 3 inches: fine sand
H2 - 3 to 72 inches: fine sand

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups
Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A

Minor Components

Unnamed, low dunes
Percent of map unit: 8 percent

Unnamed, gravelly surface pavement
Percent of map unit: 7 percent

RsA—Rositas gravelly loamy sand, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: hkxm
Elevation: 220 to 500 feet
Mean annual precipitation: 3 inches
Mean annual air temperature: 72 degrees F
Frost-free period: 290 to 310 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Rositas and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rositas

Setting
Landform: Sand sheets on stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian sands over mixed alluvium

Typical profile
H1 - 0 to 10 inches: gravelly loamy sand
H2 - 10 to 72 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A

Minor Components

Unnamed, steeper slopes

Percent of map unit: 8 percent

Aco

Percent of map unit: 7 percent

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APPENDIX C

WETS Precipitation Analysis

Summary of WETS Analysis
WETS Station Data, 1971 – 2014
Monthly Total Precipitation Data, January 2013 – January 2015

Summary of Results Obtained from WETS Analysis		
Month	Total Rainfall for Month	Normal Rainfall Determination (normal, above (>) or below (<))
1/2013	0.77 in	> normal
2/2013	0.01 in	< normal
3/2013	0.03 in	< normal
4/2013	0.00 in	< normal
5/2013	0.00 in	< normal
6/2013	0.00 in	normal
7/2013	0.54 in	> normal
8/2013	0.66 in	normal
9/2013	0.57 in	> normal
10/2013	0.01 in	normal
11/2013	0.74 in	> normal
12/2013	0.01 in	normal
1/2014	0.00 in	< normal
2/2014	0.07 in	< normal
3/2014	0.04 in	normal
4/2014	0.00 in	normal
5/2014	0.01 in	< normal
6/2014	0.00 in	normal
7/2014	0.00 in	< normal
8/2014	0.58 in	normal
9/2014	0.11 in	normal
10/2014	0.03 in	normal
11/2014	0.00 in	< normal
12/2014	0.78 in	> normal
1/2015	0.57 in	> normal

```
WETS Station : BLYTHE AP, CA158                  Creation Date: 10/09/2014
Latitude:  3337      Longitude:  11443        Elevation:  00395
State FIPS/County(FIPS):  06065     County Name: Riverside
Start yr. - 1971   End yr. - 2000
---------------------------------------------------------------------|
          |       Temperature      |           Precipitation            |
          |       (Degrees F.)     |              (Inches)              |
          |----------------------|------------------------------------|
          |       |       |       |         |   30% chance     |avg |      |
          |       |       |       |         |    will have     |# of| avg  |
          |-------|-------|-------|         |------------------|days| total|
  Month   |  avg  |  avg  |  avg  |   avg   | less     | more     |w/.1| snow |
          | daily | daily |       |         | than     | than     |  or| fall |
          |  max  |  min  |       |         |          |          |more|      |
---------------------------------------------------------------------|
January   |  66.6 |  41.7 |  54.2 |   0.46 |   0.03 |   0.51 |  1 |  0.0 |
February  |  72.0 |  45.7 |  58.9 |   0.55 |   0.04 |   0.61 |  1 |  0.0 |
March     |  77.6 |  50.2 |  63.9 |   0.45 |   0.03 |   0.52 |  1 |  0.0 |
April     |  85.7 |  56.2 |  71.0 |   0.14 |   0.00 |   0.09 |  1 |  0.0 |
May       |  93.9 |  63.9 |  78.9 |   0.03 |   0.00 |   0.03 |  0 |  0.0 |
June      | 104.1 |  72.6 |  88.4 |   0.01 |     NA |     NA |  0 |  0.0 |
July      | 107.2 |  80.2 |  93.7 |   0.32 |   0.00 |   0.33 |  1 |  0.0 |
August    | 105.4 |  79.5 |  92.5 |   0.66 |   0.07 |   0.80 |  1 |  0.0 |
September |  99.6 |  72.4 |  86.0 |   0.50 |   0.00 |   0.50 |  1 |  0.0 |
October   |  88.0 |  60.0 |  74.0 |   0.23 |   0.00 |   0.19 |  0 |  0.0 |
November  |  74.7 |  47.4 |  61.1 |   0.19 |   0.00 |   0.16 |  0 |  0.0 |
December  |  66.0 |  40.9 |  53.5 |   0.48 |   0.01 |   0.47 |  1 |  0.0 |
----------|-------|-------|-------|---------|---------|---------|----|------|
----------|-------|-------|-------|--------|--------|--------|----|------|
  Annual  | ----- | ----- | ----- | ------ |   2.87 |   4.74 | -- | ---- |
----------|-------|-------|-------|--------|--------|--------|----|------|
  Average |  86.7 |  59.2 |  73.0 | ------ | ------ | ------ | -- | ---- |
----------|-------|-------|-------|--------|--------|--------|----|------|
  Average | ----- | ----- | ----- |   4.02 | ------ | ------ |  9 |  0.0 |
----------|-------|-------|-------|---------|---------|---------|----|------|
---------------------------------------------------------------------|

GROWING SEASON DATES

---------------------------------------------------------------------------
                     |                     Temperature
---------------------|-----------------------------------------------------
      Probability    | 24 F or higher  | 28 F or higher  | 32 F or higher
---------------------|-----------------|-----------------|-----------------
                     |           Beginning and Ending Dates
                     |             Growing Season Length
                     |
       50 percent *  |                 |                 |
                     |                 |                 |
                     |                 |                 |
       70 percent *  |                 |                 |
                     |                 |                 |
                     |                 |                 |
---------------------------------------------------------------------------

 * Percent chance of the growing season occurring between the Beginning
   and Ending dates.

total  1948-2014  prcp
```

```
Station : CA158, BLYTHE AP
-------   Unit = inches

yr  jan   feb   mar   apr   may   jun   jul   aug   sep   oct   nov   dec  annl
------- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----
48                                     0.05  0.90  0.49  1.33  0.00  0.24  3.01
49 2.48  0.00  0.01  0.02  0.00  0.00  0.00  0.18  0.00  0.23  0.00  0.07  2.99
50 0.00  0.05  0.00  0.00  0.00  0.00  0.24  0.00  0.02  0.00  0.00  0.00  0.31
51 0.54  0.00  0.00  0.73  0.07  0.00  0.19  5.92  0.00  0.41  0.69  0.13  8.68
52 0.40  0.18  0.59  0.65  0.00  0.91  0.25  0.05  0.10  0.00  0.33  1.42  4.88
53 0.00  0.10  0.10  0.00  0.00  0.00  0.07  0.06  0.00  0.00  0.00  0.26  0.59
54 0.70  0.00  0.76  0.01  0.00  0.00  0.14  0.46  0.20  0.16  0.00  0.00  2.43
55 1.05  0.00  0.00  0.02  0.00  0.00  0.04  1.14  0.00  0.00  0.01  0.00  2.26
56 0.00  0.07  0.00  0.00  0.00  0.00  1.03  0.00  0.01  0.00  0.00  0.00  1.11
57 0.97  0.03  0.00  0.13  0.00  0.00  0.32  0.48  0.00  1.53  0.05  0.13  3.64
58 0.12  1.35  0.60  0.25  0.02  0.00  0.02  0.57  0.01  0.09  0.03  0.00  3.06
59 0.07  0.36  0.00  0.00  0.00  0.01  0.07  1.30  0.07  0.38  0.00  1.95  4.21
60 0.42  0.17  0.21  0.03  0.00  0.00  0.12  0.09  1.03  0.02  0.25  0.00  2.34
61 0.13  0.00  0.00  0.00  0.00  0.00  0.04  0.50  0.00  0.00  0.12  0.75  1.54
62 0.79  0.26  0.09  0.00  0.00  0.00  0.02  0.48  0.00  0.00  0.00  0.57  2.21
63 0.55  0.23  0.20  0.00  0.00  0.00  0.00  1.05  1.03  1.17  0.41  0.00  4.64
64 0.00  0.22  0.33  0.08  0.00  0.00  0.08  0.00  0.00  0.00  0.30  0.12  1.13
65 0.14  0.09  0.23  3.00  0.01  0.00  0.00  0.35  0.00  0.00  0.81  1.44  6.07
66 1.08  0.02  0.15  0.03  0.00  0.00  0.61  0.13  0.18  1.09  0.02  0.19  3.50
67 0.26  0.00  0.22  0.00  0.00  0.00  0.00  1.16  1.04  0.00  0.70  0.87  4.25
68 0.00  0.12  0.25  0.06  0.00  0.00  0.38  0.05  0.00  0.32  0.03  0.11  1.32
69 1.00  0.01  0.03  0.00  0.00  0.00  1.05  0.17  0.60  0.17  0.47  0.05  3.55
70 0.11  0.66  1.11  0.01  0.00  0.00  0.00  0.73  0.00  0.00  0.00  0.03  2.65
71 0.00  0.00  0.00  0.05  0.00  0.00  0.01  1.07  0.97  0.06  0.00  0.08  2.24
72 0.00  0.00  0.00  0.00  0.00  0.10  0.21  0.30  0.01  1.89  0.38  0.03  2.92
73 0.07  0.96  1.12  0.00  0.00  0.00  0.00  0.38  0.00  0.00  0.05  0.00  2.58
74 0.71  0.00  0.19  0.00  0.00  0.00  0.12  0.11  0.00  0.89  0.00  0.70  2.72
75 0.05  0.11  0.07  0.32  0.00  0.00  0.76  0.00  0.56  0.00  0.01  0.04  1.92
76 0.00  1.78  0.00  0.91  0.00  0.00  0.14  0.00  2.14  0.05  0.02  0.18  5.22
77 0.16  0.01  0.12  0.01  0.09  0.01  0.17  1.10  0.70  0.06  0.00  0.40  2.83
78 1.73  1.07  0.22  0.10  0.04  0.00  0.06  0.99  0.00  1.42  0.43  0.89  6.95
79 1.44  0.06  0.81  0.00  0.12  0.00  0.36  2.09  0.52  0.06  0.00  0.18  5.64
80 0.84  1.57  0.65  0.24  0.00  0.00  0.10  0.72  0.18  0.03  0.00  0.02  4.35
81 0.05  0.19  1.01  0.00  0.07  0.04  0.00  1.77  0.03              0.00  3.16
82 0.13  0.26  0.87  0.00  0.12  0.00  0.49  1.25  0.51  0.00  0.28  1.26  5.17
83 0.13  0.37  1.75  0.00  0.00  0.00  0.00  2.07  0.88  0.00  0.03  0.73  5.96
84 0.06  0.00  0.00  0.00  0.02  0.00  2.44  0.11  0.00  0.00  0.10  3.33  6.06
85 0.27  0.29  0.03  0.06  0.00  0.00  0.00  0.00  1.61  0.90  1.84  0.07  5.07
86 0.07  0.40  0.19  0.02  0.00  0.00  0.11  0.05  0.90  0.50  0.69  0.75  3.68
87 0.00  0.03  0.00  0.05  0.00  0.03  1.40  0.00  0.01  0.42  0.71 M0.68  3.33
88 0.42  0.61  0.02  0.98  0.00  0.00  0.00  0.83  0.00  0.07  0.00  0.00  2.93
89 1.08  0.00  0.06  0.00  0.00  0.00  0.32  0.15  0.01  0.00  0.00  0.00  1.62
90 0.14  0.01  0.21  0.00  0.02  0.00  0.22  1.47  0.13  0.06  0.00        2.26
91       0.76  1.24  0.00  0.00  0.00  0.01  0.28  1.52  0.14  0.04  0.31  4.30
92 0.78  1.59  2.15  0.28  0.03  0.00  0.00  1.93  0.00  0.20  0.00  2.20  9.16
93 2.33  2.19  0.17  0.00  0.00  0.00  0.00  0.00  0.00  0.05  0.87  0.01  5.62
94 0.01  0.29  0.68  0.02  0.12  0.00  0.69  0.14  0.00  0.00  0.06  1.23  3.24
95 2.29  0.32  0.49  0.09        0.00  0.05  1.37  0.08  0.00  0.00  0.00  4.69
96 0.10  0.27  0.09  0.00  0.22  0.00  0.00  0.00  0.85  0.01  0.04  0.01  1.59
97 0.47  0.00  0.00  0.06  0.00  0.00  0.61  0.03  2.05  0.01  0.03  1.06  4.32
98 0.28  3.03  1.29  0.01  0.01  0.00  0.05  0.47  0.52  0.04  0.16  0.21  6.07
99 0.00  0.34  0.00  1.00  0.04  0.00  1.20  0.00  0.74  0.00  0.00  0.00  3.32
 0 0.00  0.08  0.38  0.00  0.00  0.01  0.00  1.03  0.00  0.00 M0.00  0.00  1.50
 1 0.81  0.67  1.55  0.01  0.00  0.00  0.00 M0.00  0.00  0.00  0.11  0.03  3.18
 2 0.00  0.00  0.04  0.00  0.00  0.00  0.00  0.00  0.75  0.04  0.03  0.00  0.86
 3 0.11  1.08  0.28  0.08  0.00  0.00  0.06  0.00  0.07  0.00  0.33  0.00  2.01
 4 0.02  0.57  0.81  0.06  0.00  0.00  0.00  0.02  0.12  1.02  0.31  0.57  3.50
 5 1.55  2.83  0.21  0.00  0.00  0.00  0.00  1.35  0.00  0.85  0.00  0.00  6.79
 6 0.00  0.00  0.25  0.00  0.00  0.20  0.15  1.46  1.44  0.04  0.00  0.00  3.54
 7 0.16  0.07  0.53  0.00  0.00  0.00  0.00  0.00  0.06  0.00  1.11  0.00  1.93
 8 0.77  0.02  0.00  0.00  0.18  0.00  0.27  0.15  0.06  0.00  0.24  0.65  2.34
 9 0.02  0.43  0.00  0.00  0.03  0.01  0.07  0.02  0.03  0.00  0.00  0.85  1.46
10 2.12  0.90  0.67  0.01  0.00  0.00  0.00  0.03  0.00  0.26  0.00  0.54  4.53
11 0.00  1.17  0.06  0.00  0.00  0.00  1.64  0.00  0.08  0.12  0.29  0.60  3.96
12 0.00  0.01  0.19  0.14  0.00  0.00  1.88  1.05  0.07  0.27  0.00  0.86  4.47
13 0.77  0.01  0.03  0.00  0.00  0.00  0.54  0.66  0.57  0.02  0.74  0.01  3.35
14 0.00  0.07  0.04  0.00  0.01  0.00 M0.00  0.49  0.11 M0.02              0.74
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```

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For January 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	56	32	44	66	41	53	-9	82	1981	24	1976	0.00	0.0	0	21	0
2	61	37	49	66	41	54	-5	80	1981	27	2015	0.00	0.0	0	16	0
3	63	39	51	66	41	54	-3	78	1997	21	1974	0.00	0.0	0	14	0
4	61	33	47	66	41	54	-7	80	1981	23	1950	0.00	0.0	0	18	0
5	62	29	46	66	41	54	-8	79	1981	22	1972	0.00	0.0	0	19	0
6	63	37	50	66	42	54	-4	80	1962	25	1950	0.00	0.0	0	15	0
7	66	39	53	67	42	54	-1	85	1962	24	1971	0.00	0.0	0	12	0
8	74	43	59	67	42	54	5	84	1962	20	1971	0.00	0.0	0	6	0
9	72	45	59	67	42	54	5	80	1962	25	1971	0.00	0.0	0	6	0
10	63	46	55	67	42	54	1	80	1962	26	1971	0.00	0.0	0	10	0
11	54	33	44	67	42	55	-11	80	1986	27	1950	0.00	0.0	0	21	0
12	53	35	44	67	42	55	-11	79	1983	26	1962	0.00	0.0	0	21	0
13	52	25	39	67	42	55	-16	78	1996	25	2013	0.00	0.0	0	26	0
14	48	32	40	68	42	55	-15	80	1983	25	2007	0.00	0.0	0	25	0
15	54	34	44	68	42	55	-11	78	2014*	28	1987	0.00	0.0	0	21	0
16	63	38	51	68	42	55	-4	83	1976	29	1964	0.00	0.0	0	14	0
17	69	38	54	68	42	55	-1	82	2011*	25	2007	0.00	0.0	0	11	0
18	70	41	56	68	43	55	1	85	1971	30	2002	0.00	0.0	0	9	0
19	71	40	56	68	43	55	1	84	1971	29	1990	0.00	0.0	0	9	0
20	73	39	56	68	43	55	1	83	1971	30	2008	0.00	0.0	0	9	0
21	75	41	58	68	43	56	2	80	2009	30	1973	0.00	0.0	0	7	0
22	76	40	58	69	43	56	2	79	1994	31	1987	0.00	0.0	0	7	0
23	73	45	59	69	43	56	3	82	1950	30	1972	0.00	0.0	0	6	0
24	71	56	64	69	43	56	8	82	1951	29	1996	0.00	0.0	0	1	0
25	71	57	64	69	43	56	8	89	1951	31	1972	0.32	0.0	0	1	0
26	64	57	61	69	43	56	5	81	2003	30	2002	0.45	0.0	0	4	0
27	70	51	61	69	43	56	5	79	2003	29	1972	0.00	0.0	0	4	0
28	60	44	52	69	43	56	-4	80	2014*	29	1972	0.00	0.0	0	13	0
29	63	41	52	69	43	56	-4	81	1953	30	1975	0.00	0.0	0	13	0
30	66	40	53	70	43	56	-3	83	2003	26	1949	0.00	0.0	0	12	0
31	70	43	57	70	44	57	0	86	2003	30	1972	0.00	0.0	0	8	0

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For February 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year:_Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	73	41	57	70	44	57	0	84	2003	28	2002	0.00	0.0	0	8	0
2	75	49	62	70	44	57	5	85	1963	31	1951	0.00	0.0	0	3	0
3	74	56	65	70	44	57	8	84	1963	23	1972	0.00	0.0	0	0	0
4	76	50	63	70	44	57	6	84	1963	26	2011	0.00	0.0	0	2	0
5	75	48	62	70	44	57	5	87	1983	33	1956	0.00	0.0	0	3	0
6	74	51	63	70	44	57	6	88	1963	30	1989	0.00	0.0	0	2	0
7	74	45	60	71	44	57	3	89	1996	31	1989	0.00	0.0	0	5	0
8	65	48	57	71	44	58	-1	88	1963	35	2002	0.00	0.0	0	8	0
9	62	42	52	71	45	58	-6	86	1996	30	1949	0.00	0.0	0	13	0
10	62	37	50	71	45	58	-8	87	1951	32	1986	0.00	0.0	0	15	0
11	62	44	53	71	45	58	-5	90	1957	33	1986	0.00	0.0	0	12	0
12	62	37	50	71	45	58	-8	85	1971	29	1965	0.00	0.0	0	15	0
13	70	36	53	72	45	58	-5	90	1957	31	1972	0.00	0.0	0	12	0
14	77	40	59	72	45	59	0	87	2015	31	1966	0.00	0.0	0	6	0
15	77	51	64	72	46	59	5	86	2014*	26	1990	0.00	0.0	0	1	0
16	79	46	63	72	46	59	4	87	1981	22	1990	0.00	0.0	0	2	0
17	77	41	59	72	46	59	0	88	1981	31	1956	0.00	0.0	0	6	0
18	75	42	59	73	46	59	0	93	1981	35	1967	0.00	0.0	0	6	0
19	67	45	56	73	46	60	-4	90	1981	31	1956	0.00	0.0	0	9	0
20	57	41	49	73	47	60	-11	86	1981	32	1990	0.01	0.0	0	16	0
21	62	35	49	73	47	60	-11	92	1977	32	1953	0.00	0.0	0	16	0
22	65	36	51	73	47	60	-9	88	1982	32	1955	0.00	0.0	0	14	0
23	72	36	54	74	47	60	-6	87	2002	31	1953	0.00	0.0	0	11	0
24	65	44	55	74	47	61	-6	90	1986	34	1996	0.00	0.0	0	10	0
25	67	42	55	74	48	61	-6	93	1986	32	1960	0.00	0.0	0	10	0
26	70	36	53	74	48	61	-8	92	1986	35	1977	0.00	0.0	0	12	0
27	69	48	59	75	48	61	-2	93	1986	30	1996	0.00	0.0	0	6	0
28	76	45	61	75	48	61	0	93	1986	31	1962	0.00	0.0	0	4	0

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For March 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	81	48	65	75	48	62	3	90	1986	34	1962	0.00	0.0	0	0	0
2	84	47	66	75	48	62	4	89	2009*	36	1997	0.00	0.0	0	0	1
3	82	51	67	76	49	62	5	90	1986	31	1971	0.00	0.0	0	0	2
4	80	52	66	76	49	62	4	88	1986	31	2002	0.00	0.0	0	0	1
5	80	49	65	76	49	63	2	91	1986	33	2002	0.00	0.0	0	0	0
6	81	51	66	76	49	63	3	92	1986	36	1977	0.00	0.0	0	0	1
7	75	48	62	77	49	63	-1	90	1960	37	1982	0.00	0.0	0	3	0
8	66	52	59	77	49	63	-4	91	1957	35	1969	0.03	0.0	0	6	0
9	71	47	59	77	50	63	-4	92	2004	34	1964	0.00	0.0	0	6	0
10	75	48	62	77	50	64	-2	95	1997	41	2010*	0.00	0.0	0	3	0
11	81	47	64	78	50	64	0	93	1997	38	1969	0.00	0.0	0	1	0
12	87	47	67	78	50	64	3	92	2007*	37	1990	0.00	0.0	0	0	2
13	91	51	71	78	50	64	7	95	2007	30	1956	0.00	0.0	0	0	6
14	95	54	75	78	50	64	11	95	2013	38	1952	0.00	0.0	0	0	10
15	93	55	74	79	50	64	10	94	2004	34	1977	0.00	0.0	0	0	9
16	95	59	77	79	51	65	12	98	2007	36	1963	0.00	0.0	0	0	12
17	90	56	73	79	51	65	8	99	2007	36	2002	0.00	0.0	0	0	8
18	87	56	72	79	51	65	7	94	1997	37	1979	0.00	0.0	0	0	7
19	89	57	73	79	51	65	8	96	1997	39	1977	0.00	0.0	0	0	8
20	88	56	72	80	51	65	7	99	2004	41	2012	0.00	0.0	0	0	7
21	87	63	75	80	51	66	9	100	2004	40	1987	0.00	0.0	0	0	10
22	86	59	73	80	51	66	7	98	2004	39	2006*	0.00	0.0	0	0	8
23	76	58	67	80	51	66	1	95	1956	43	2011*	0.00	0.0	0	0	2
24	81	48	65	81	51	66	-1	95	1956	37	1995	0.00	0.0	0	0	0
25	85	47	66	81	52	66	0	96	1981	41	1964	0.00	0.0	0	0	1
26	90	57	74	81	52	66	8	96	1988	40	1995	0.00	0.0	0	0	9
27	89	58	74	81	52	67	7	100	1986	36	1975	0.00	0.0	0	0	9
28	86	55	71	82	52	67	4	95	1986	40	1972	0.00	0.0	0	0	6
29	88	57	73	82	52	67	6	95	1971	37	1972	0.00	0.0	0	0	8
30	91	68	80	82	52	67	13	100	1971	38	1998	0.00	0.0	0	0	15
31	89	58	74	82	53	67	7	100	2011	38	1972	0.00	0.0	0	0	9

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For April 2013

Choose another month / year: Month ▼ Year ▼ GO

Reports from: BLYTHE, CA [BLH]

Choose another location: Postal Code or City GO

(Lat: 33.62 Lon:-114.72)

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	83	53	68	83	53	68	0	99	2011*	44	2010*	0.00	0.0	0	0	3
2	87	58	73	83	53	68	5	98	1966	40	1975	0.00	0.0	0	0	8
3	92	57	75	83	53	68	7	101	1961	40	1975	0.00	0.0	0	0	10
4	92	59	76	83	53	68	8	106	1961	41	1977	0.00	0.0	0	0	11
5	90	59	75	84	53	69	6	100	1989	42	1983	0.00	0.0	0	0	10
6	91	58	75	84	54	69	6	103	1989	43	2006	0.00	0.0	0	0	10
7	89	63	76	84	54	69	7	105	1989	44	1964	0.00	0.0	0	0	11
8	78	64	71	84	54	69	2	107	1989	42	1999	0.00	0.0	0	0	6
9	79	58	69	85	54	70	-1	102	1989	42	2011	0.00	0.0	0	0	4
10	82	59	71	85	55	70	1	101	1960	38	1975	0.00	0.0	0	0	6
11	91	49	70	85	55	70	0	99	2014*	44	2001	0.00	0.0	0	0	5
12	90	56	73	86	55	70	3	100	1990	44	1967	0.00	0.0	0	0	8
13	95	59	77	86	55	71	6	103	1985	40	1983	0.00	0.0	0	0	12
14	90	61	76	86	56	71	5	104	2002	46	1983	0.00	0.0	0	0	11
15	83	59	71	86	56	71	0	104	1962	46	2012	0.00	0.0	0	0	6
16	76	54	65	87	56	71	-6	104	1984	41	2009	0.00	0.0	0	0	0
17	76	56	66	87	57	72	-6	103	1987	44	1976	0.00	0.0	0	0	1
18	77	56	67	87	57	72	-5	104	1954	41	1963	0.00	0.0	0	0	2
19	85	51	68	88	57	72	-4	106	1980	44	1968	0.00	0.0	0	0	3
20	93	53	73	88	58	73	0	103	1980	46	1995	0.00	0.0	0	0	8
21	96	56	76	88	58	73	3	105	2012	42	1967	0.00	0.0	0	0	11
22	97	62	80	89	58	73	7	106	2012	41	1970	0.00	0.0	0	0	15
23	90	63	77	89	58	74	3	106	1949	44	2010*	0.00	0.0	0	0	12
24	92	56	74	89	59	74	0	105	1996	46	1964	0.00	0.0	0	0	9
25	88	60	74	89	59	74	0	102	1987	46	1989	0.00	0.0	0	0	9
26	93	60	77	90	59	75	2	106	1996	48	1971	0.00	0.0	0	0	12
27	99	61	80	90	60	75	5	106	1987	45	1963	0.00	0.0	0	0	15
28	102	65	84	90	60	75	9	106	1992	44	1970	0.00	0.0	0	0	19
29	106	67	87	91	60	76	11	107	1992	45	1984	0.00	0.0	0	0	22
30	102	69	86	91	61	76	10	105	1992	46	1967	0.00	0.0	0	0	21

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For May 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	96	67	82	91	61	76	6	105	1985	49	1990	0.00	0.0	0	0	17
2	91	68	80	92	61	76	4	105	1966	48	1967	0.00	0.0	0	0	15
3	95	61	78	92	62	77	1	103	2014*	50	1991	0.00	0.0	0	0	13
4	98	61	80	92	62	77	3	105	2004	49	1999	0.00	0.0	0	0	15
5	88	66	77	93	62	77	0	105	1997	45	1964	0.00	0.0	0	0	12
6	84	62	73	93	62	78	-5	108	1987	47	1988	0.00	0.0	0	0	8
7	81	60	71	93	63	78	-7	108	1989	46	1988	0.00	0.0	0	0	6
8	84	55	70	93	63	78	-8	109	2001	49	1964	0.00	0.0	0	0	5
9	89	59	74	94	63	79	-5	108	2001	50	1982	0.00	0.0	0	0	9
10	96	66	81	94	64	79	2	109	1960	48	1977	0.00	0.0	0	0	16
11	100	67	84	94	64	79	5	113	1960	50	1982	0.00	0.0	0	0	19
12	103	69	86	95	64	79	7	112	1996	50	1980	0.00	0.0	0	0	21
13	106	69	88	95	64	80	8	108	1996	50	1962	0.00	0.0	0	0	23
14	107	74	91	95	64	80	11	107	2013*	50	1998	0.00	0.0	0	0	26
15	101	63	82	96	65	80	2	107	2012*	53	1962	0.00	0.0	0	0	17
16	102	68	85	96	65	80	5	109	1997	52	1953	0.00	0.0	0	0	20
17	95	67	81	96	65	81	0	110	1997	53	1977	0.00	0.0	0	0	16
18	95	62	79	96	65	81	-2	110	1970	54	1977	0.00	0.0	0	0	14
19	99	66	83	97	66	81	2	113	2008	49	2011	0.00	0.0	0	0	18
20	96	72	84	97	66	81	3	111	2008	51	1949	0.00	0.0	0	0	19
21	101	65	83	97	66	82	1	110	2005	47	1975	0.00	0.0	0	0	18
22	103	71	87	98	66	82	5	113	2000	45	1971	0.00	0.0	0	0	22
23	96	65	81	98	66	82	-1	110	2001	50	1971	0.00	0.0	0	0	16
24	96	61	79	98	67	82	-3	112	2001	51	2010	0.00	0.0	0	0	14
25	97	65	81	99	67	83	-2	113	1951	51	1980	0.00	0.0	0	0	16
26	97	65	81	99	67	83	-2	112	1974	52	1996	0.00	0.0	0	0	16
27	95	68	82	99	67	83	-1	114	1951	50	1962	0.00	0.0	0	0	17
28	97	68	83	99	67	83	0	114	1983	52	1971	0.00	0.0	0	0	18
29	102	73	88	100	68	84	4	114	2000	43	1971	0.00	0.0	0	0	23
30	99	73	86	100	68	84	2	113	1984	56	1988	0.00	0.0	0	0	21
31	101	74	88	100	68	84	4	112	2012*	55	1991	0.00	0.0	0	0	23

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For June 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	109	74	92	101	68	84	8	114	2012	46	1980	0.00	0.0	0	0	27
2	109	74	92	101	68	85	7	112	1960	56	1983	0.00	0.0	0	0	27
3	104	73	89	101	69	85	4	113	1996	55	1971	0.00	0.0	0	0	24
4	104	73	89	102	69	85	4	114	1996	56	1998	0.00	0.0	0	0	24
5	107	72	90	102	69	85	5	116	1957	55	1999	0.00	0.0	0	0	25
6	112	74	93	102	69	86	7	114	2002	59	1993	0.00	0.0	0	0	28
7	114	77	96	102	70	86	10	117	1985	52	1993	0.00	0.0	0	0	31
8	108	84	96	103	70	86	10	118	1955	58	1998	0.00	0.0	0	0	31
9	107	73	90	103	70	87	3	118	1955	57	1995	0.00	0.0	0	0	25
10	110	73	92	103	70	87	5	116	1994	60	1969	0.00	0.0	0	0	27
11	106	77	92	104	71	87	5	114	1956	56	1976	0.00	0.0	0	0	27
12	108	77	93	104	71	87	6	116	1956	62	1998	0.00	0.0	0	0	28
13	108	77	93	104	71	88	5	115	1979	56	1998	0.00	0.0	0	0	28
14	106	78	92	104	72	88	4	117	1966	59	1997	0.00	0.0	0	0	27
15	107	77	92	105	72	88	4	117	2000	54	1962	0.00	0.0	0	0	27
16	107	74	91	105	72	89	2	116	1971	58	1990	0.00	0.0	0	0	26
17	108	73	91	105	73	89	2	116	1981	57	1995	0.00	0.0	0	0	26
18	108	74	91	106	73	89	2	118	1981	60	1995	0.00	0.0	0	0	26
19	104	73	89	106	73	90	-1	117	1961	61	1975	0.00	0.0	0	0	24
20	105	73	89	106	74	90	-1	118	1981	58	1975	0.00	0.0	0	0	24
21	106	74	90	106	74	90	0	116	2008*	64	1975	0.00	0.0	0	0	25
22	107	72	90	106	74	90	0	119	1960	65	2010*	0.00	0.0	0	0	25
23	105	76	91	107	75	91	0	118	1961	63	1998	0.00	0.0	0	0	26
24	102	74	88	107	75	91	-3	118	1994	63	1998	0.00	0.0	0	0	23
25	103	72	88	107	75	91	-3	122	1970	66	1991	0.00	0.0	0	0	23
26	107	79	93	107	76	92	1	122	1990	61	1965	0.00	0.0	0	0	28
27	110	78	94	107	76	92	2	121	1973	62	1996	0.00	0.0	0	0	29
28	120	83	102	108	76	92	10	123	1994	67	1991	0.00	0.0	0	0	37
29	119	90	105	108	77	92	13	121	1994	67	1997	0.00	0.0	0	0	40
30	115	86	101	108	77	92	9	119	1972	68	1997	0.00	0.0	0	0	36

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For July 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	115	90	103	108	77	93	10	118	1972	62	1982	0.00	0.0	0	0	38
2	112	87	100	108	78	93	7	119	2001	66	1995	0.00	0.0	0	0	35
3	116	89	103	108	78	93	10	119	1985	67	1979	0.00	0.0	0	0	38
4	110	86	98	108	78	93	5	121	1989	67	1956	0.00	0.0	0	0	33
5	104	86	95	108	79	93	2	118	1981	69	1987	0.00	0.0	0	0	30
6	109	82	96	108	79	94	2	117	1965	67	1994	0.00	0.0	0	0	31
7	114	85	100	108	79	94	6	117	1985	70	2005	0.00	0.0	0	0	35
8	115	86	101	109	79	94	7	119	1985	73	1949	0.00	0.0	0	0	36
9	107	86	97	109	80	94	3	118	1958	70	1987	0.00	0.0	0	0	32
10	103	83	93	109	80	94	-1	118	1973	72	1986	0.00	0.0	0	0	28
11	95	75	85	109	80	94	-9	118	1958	69	1974	0.21	0.0	0	0	20
12	104	78	91	109	80	94	-3	118	1985	71	2000	0.00	0.0	0	0	26
13	108	82	95	109	80	94	1	119	2005	66	1962	0.00	0.0	0	0	30
14	111	86	99	109	81	95	4	118	2003	73	2011*	0.00	0.0	0	0	34
15	113	87	100	109	81	95	5	117	2006*	71	2001	0.00	0.0	0	0	35
16	110	86	98	108	81	95	3	119	1960	69	1993	0.00	0.0	0	0	33
17	109	81	95	108	81	95	0	121	2005	64	1983	0.00	0.0	0	0	30
18	112	83	98	108	81	95	3	118	2005	67	1987	0.00	0.0	0	0	33
19	103	87	95	108	81	95	0	119	1961	62	1987	0.00	0.0	0	0	30
20	99	77	88	108	81	95	-7	118	1978	70	1993	0.09	0.0	0	0	23
21	89	76	83	108	81	95	-12	118	2006	69	1973	0.24	0.0	0	0	18
22	100	78	89	108	81	95	-6	120	2006	69	1995	0.00	0.0	0	0	24
23	103	82	93	108	81	95	-2	117	1981	69	1987	0.00	0.0	0	0	28
24	108	85	97	108	81	95	2	117	1980	73	1995	0.00	0.0	0	0	32
25	100	87	94	108	82	95	-1	117	2000	71	1993	0.00	0.0	0	0	29
26	104	87	96	108	82	95	1	118	1995	71	1986	0.00	0.0	0	0	31
27	109	87	98	108	82	95	3	120	1998	72	1993	0.00	0.0	0	0	33
28	110	84	97	108	82	95	2	123	1995	68	1987	0.00	0.0	0	0	32
29	108	76	92	108	82	95	-3	116	1972	64	1987	0.00	0.0	0	0	27
30	108	81	95	108	82	95	0	117	1995	73	1948	0.00	0.0	0	0	30
31	111	80	96	108	81	95	1	120	1972	72	2001	0.00	0.0	0	0	31

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For August 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	111	84	98	108	81	95	3	120	1972	70	1959	0.00	0.0	0	0	33
2	107	77	92	108	81	94	-2	118	1995	70	1976	0.00	0.0	0	0	27
3	108	76	92	107	81	94	-2	118	1998	68	1976	0.00	0.0	0	0	27
4	108	78	93	107	81	94	-1	118	1969	67	1976	0.00	0.0	0	0	28
5	103	78	91	107	81	94	-3	118	2000	70	1976	0.00	0.0	0	0	26
6	106	84	95	107	81	94	1	118	1995	66	1976	0.00	0.0	0	0	30
7	107	80	94	107	81	94	0	117	1980	68	1988	0.00	0.0	0	0	29
8	108	74	91	107	81	94	-3	119	1980	69	1999	0.00	0.0	0	0	26
9	107	73	90	107	81	94	-4	115	1995	68	2009	0.00	0.0	0	0	25
10	104	73	89	107	81	94	-5	116	2003	67	1949	0.00	0.0	0	0	24
11	105	72	89	107	81	94	-5	116	1962	70	1999	0.00	0.0	0	0	24
12	108	71	90	107	81	94	-4	116	1962	69	1949	0.00	0.0	0	0	25
13	107	74	91	107	81	94	-3	119	1960	66	1993	0.00	0.0	0	0	26
14	109	76	93	107	81	94	-1	117	1962	65	1968	0.00	0.0	0	0	28
15	111	86	99	107	80	94	5	115	1962	64	1993	0.00	0.0	0	0	34
16	114	85	100	107	80	94	6	116	1992	67	1980	0.00	0.0	0	0	35
17	113	85	99	107	80	94	5	116	1992	67	1980	0.00	0.0	0	0	34
18	110	88	99	107	80	93	6	115	1992	64	1976	0.00	0.0	0	0	34
19	108	88	98	107	80	93	5	114	1973	66	1976	0.00	0.0	0	0	33
20	112	83	98	107	80	93	5	113	1992	68	1980	0.00	0.0	0	0	33
21	110	85	98	107	80	93	5	116	1969	69	2014	0.00	0.0	0	0	33
22	105	81	93	107	79	93	0	116	1972	68	2014*	0.02	0.0	0	0	28
23	105	81	93	107	79	93	0	116	2011*	64	1968	0.00	0.0	0	0	28
24	100	76	88	106	79	93	-5	119	1985	66	1968	0.30	0.0	0	0	23
25	86	77	82	106	79	93	-11	115	1985	68	1973	0.02	0.0	0	0	17
26	93	72	83	106	79	93	-10	115	2011	66	1951	0.27	0.0	0	0	18
27	101	78	90	106	79	92	-2	115	2005	67	1973	0.00	0.0	0	0	25
28	106	83	95	106	78	92	3	118	1998	65	1973	0.00	0.0	0	0	30
29	99	83	91	106	78	92	-1	118	1948	66	1975	0.05	0.0	0	0	26
30	98	81	90	106	78	92	-2	116	1998	62	1957	0.00	0.0	0	0	25
31	103	83	93	106	78	92	1	119	1950	62	1992	0.00	0.0	0	0	28

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For September 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	105	83	94	105	78	91	3	121	1950	64	1966	0.00	0.0	0	0	29
2	108	80	94	105	77	91	3	118	1948	64	2000	0.01	0.0	0	0	29
3	106	78	92	105	77	91	1	118	1948	65	1964	0.00	0.0	0	0	27
4	100	81	91	105	77	91	0	115	1948	61	1985	0.12	0.0	0	0	26
5	109	78	94	105	76	91	3	113	1955	59	1976	0.00	0.0	0	0	29
6	109	79	94	104	76	90	4	114	1955	66	1992	0.01	0.0	0	0	29
7	95	78	87	104	76	90	-3	112	1994	60	1985	0.00	0.0	0	0	22
8	97	76	87	104	75	90	-3	116	1979	65	2010	0.25	0.0	0	0	22
9	100	75	88	104	75	89	-1	114	1993	62	1961	0.18	0.0	0	0	23
10	89	74	82	103	75	89	-7	114	1990	63	2005	0.00	0.0	0	0	17
11	96	73	85	103	74	89	-4	115	1990	61	1985	0.00	0.0	0	0	20
12	100	77	89	103	74	88	1	113	1971	59	1985	0.00	0.0	0	0	24
13	103	77	90	102	74	88	2	112	1971	58	1985	0.00	0.0	0	0	25
14	106	76	91	102	73	88	3	113	1971	60	2005	0.00	0.0	0	0	26
15	108	78	93	102	73	87	6	113	2000	61	2005	0.00	0.0	0	0	28
16	108	79	94	101	73	87	7	110	1962	61	1970	0.00	0.0	0	0	29
17	109	79	94	101	72	87	7	112	1962	61	1977	0.00	0.0	0	0	29
18	101	75	88	101	72	86	2	111	1980	57	1985	0.00	0.0	0	0	23
19	102	68	85	100	71	86	-1	113	1962	56	1985	0.00	0.0	0	0	20
20	103	68	86	100	71	85	1	108	1962	53	1971	0.00	0.0	0	0	21
21	102	73	88	99	70	85	3	108	2009*	59	1986	0.00	0.0	0	0	23
22	89	69	79	99	70	84	-5	110	1966	55	1988	0.00	0.0	0	0	14
23	96	66	81	99	70	84	-3	111	1966	56	2007	0.00	0.0	0	0	16
24	99	63	81	98	69	84	-3	109	2002	54	1986	0.00	0.0	0	0	16
25	98	70	84	98	69	83	1	110	1963	59	1993	0.00	0.0	0	0	19
26	86	64	75	97	68	83	-8	110	2010	53	1971	0.00	0.0	0	0	10
27	86	61	74	97	68	82	-8	110	2010	54	1971	0.00	0.0	0	0	9
28	91	60	76	96	67	82	-6	108	2009	55	1982	0.00	0.0	0	0	11
29	94	56	75	96	67	81	-6	110	1980	56	2013	0.00	0.0	0	0	10
30	96	59	78	96	66	81	-3	109	1980	51	2005	0.00	0.0	0	0	13

M = Missing

Actual Conditions For October 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	95	62	79	95	66	81	-2	111	1980	53	1971	0.00	0.0	0	0	14
2	94	63	79	95	66	80	-1	111	1980	52	1971	0.00	0.0	0	0	14
3	92	67	80	94	65	80	0	107	1987	49	2002	0.00	0.0	0	0	15
4	85	67	76	94	65	79	-3	107	1987	53	2002	0.00	0.0	0	0	11
5	85	65	75	93	64	79	-4	108	1987	52	2009	0.00	0.0	0	0	10
6	91	58	75	93	64	78	-3	110	1987	49	2009	0.00	0.0	0	0	10
7	89	56	73	93	63	78	-5	108	1987	49	2009	0.00	0.0	0	0	8
8	93	56	75	92	63	78	-3	106	1996	51	2011	0.00	0.0	0	0	10
9	76	59	68	92	63	77	-9	106	1996	46	1949	0.00	0.0	0	0	3
10	75	54	65	91	62	77	-12	107	1991	48	1949	0.01	0.0	0	0	0
11	82	50	66	91	62	76	-10	105	1965	M	M	0.00	0.0	0	0	1
12	84	53	69	91	61	76	-7	105	1999	50	2000	0.00	0.0	0	0	4
13	86	54	70	90	61	76	-6	106	1950	47	1969	0.00	0.0	0	0	5
14	85	60	73	90	61	75	-2	103	1961	50	1994	0.00	0.0	0	0	8
15	86	55	71	89	60	75	-4	103	1950	52	1986	0.00	0.0	0	0	6
16	83	59	71	89	60	74	-3	102	1958	49	1980	0.00	0.0	0	0	6
17	84	50	67	89	59	74	-7	M	M	46	1994	0.00	0.0	0	0	2
18	89	52	71	88	59	74	-3	104	2003	41	1971	0.00	0.0	0	0	6
19	89	51	70	88	59	73	-3	104	2003	41	1971	0.00	0.0	0	0	5
20	89	53	71	87	58	73	-2	103	2003	42	1949	0.00	0.0	0	0	6
21	91	52	72	87	58	73	-1	104	2003	44	1949	0.00	0.0	0	0	7
22	92	53	73	87	58	72	1	104	2003	44	1996	0.00	0.0	0	0	8
23	91	57	74	86	57	72	2	101	2003	39	1996	0.00	0.0	0	0	9
24	89	56	73	86	57	71	2	102	1959	42	1996	0.00	0.0	0	0	8
25	89	54	72	86	57	71	1	98	1965	44	1975	0.00	0.0	0	0	7
26	93	56	75	85	56	71	4	98	1965	41	1971	0.00	0.0	0	0	10
27	91	56	74	85	56	70	4	M	M	45	1971	0.00	0.0	0	0	9
28	79	61	70	84	55	70	0	98	1965	44	1996	0.00	0.0	0	0	5
29	73	50	62	84	55	69	-7	97	1965	33	1971	0.00	0.0	0	3	0
30	75	51	63	84	55	69	-6	95	1966	27	1971	0.00	0.0	0	2	0
31	78	46	62	83	54	69	-7	97	1966	29	1971	0.00	0.0	0	3	0

M = Missing

Actual Conditions For November 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	81	49	65	83	54	68	-3	95	1997	42	1972	0.00	0.0	0	0	0
2	82	49	66	82	53	68	-2	93	1997	38	1971	0.00	0.0	0	0	1
3	83	50	67	82	53	67	0	M	M	40	1979	0.00	0.0	0	0	2
4	78	47	63	81	53	67	-4	M	M	38	1956	0.00	0.0	0	2	0
5	73	52	63	81	52	67	-4	94	1980	43	1994	0.00	0.0	0	2	0
6	77	46	62	80	52	66	-4	94	1988	M	M	0.00	0.0	0	3	0
7	84	50	67	80	52	66	1	M	M	41	1993	0.00	0.0	0	0	2
8	83	46	65	80	51	65	0	92	1991	M	M	0.00	0.0	0	0	0
9	82	49	66	79	51	65	1	89	1995	41	2000	0.00	0.0	0	0	1
10	84	49	67	79	50	64	3	89	1980	M	M	0.00	0.0	0	0	2
11	88	52	70	78	50	64	6	M	M	36	1950	0.00	0.0	0	0	5
12	90	55	73	78	49	64	9	91	1999	32	1950	0.00	0.0	0	0	8
13	88	62	75	77	49	63	12	93	1999	35	1985	0.00	0.0	0	0	10
14	83	52	68	77	49	63	5	91	1999	32	2000	0.00	0.0	0	0	3
15	85	57	71	76	48	62	9	90	1999	39	1994	0.00	0.0	0	0	6
16	74	48	61	76	48	62	-1	88	1995	35	2000	0.00	0.0	0	4	0
17	73	47	60	75	47	61	-1	89	1995	35	1958	0.00	0.0	0	5	0
18	78	50	64	75	47	61	3	M	M	34	1958	0.00	0.0	0	1	0
19	75	49	62	74	47	60	2	M	M	35	1958	0.00	0.0	0	3	0
20	75	53	64	74	46	60	4	87	2006	27	1994	0.00	0.0	0	1	0
21	72	53	63	73	46	60	3	87	1950	33	1994	0.19	0.0	0	2	0
22	58	50	54	73	45	59	-5	88	1950	35	1992	0.52	0.0	0	11	0
23	59	50	55	72	45	59	-4	86	1949	M	M	0.03	0.0	0	10	0
24	64	49	57	72	45	58	-1	87	1995	34	1971	0.00	0.0	0	8	0
25	69	46	58	71	44	58	0	87	1950	32	1952	0.00	0.0	0	7	0
26	71	47	59	71	44	58	1	87	1995	M	M	0.00	0.0	0	6	0
27	71	51	61	71	44	57	4	86	1954	M	M	0.00	0.0	0	4	0
28	71	46	59	70	43	57	2	83	1949	30	1994	0.00	0.0	0	6	0
29	72	46	59	70	43	56	3	83	1953	33	1976	0.00	0.0	0	6	0
30	73	49	61	69	43	56	5	M	M	32	1975	0.00	0.0	0	4	0

M = Missing

Actual Conditions For December 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	74	49	62	69	43	56	6	M	M	33	1952	0.00	0.0	0	3	0
2	68	44	56	69	42	55	1	82	1959	30	1991	0.00	0.0	0	9	0
3	78	45	62	68	42	55	7	83	1958	32	1991	0.00	0.0	0	3	0
4	64	44	54	68	42	55	-1	M	M	M	M	0.00	0.0	0	11	0
5	56	37	47	68	42	55	-8	80	1962	M	M	0.00	0.0	0	18	0
6	57	33	45	67	41	54	-9	81	1966	32	1972	0.00	0.0	0	20	0
7	63	35	49	67	41	54	-5	79	1995	M	M	0.00	0.0	0	16	0
8	55	39	47	67	41	54	-7	78	1996	29	1978	0.00	0.0	0	18	0
9	52	34	43	66	41	54	-11	80	1962	26	1978	0.00	0.0	0	22	0
10	56	32	44	66	41	54	-10	82	1950	25	1971	0.00	0.0	0	21	0
11	62	34	48	66	41	53	-5	81	1958	31	1994	0.00	0.0	0	17	0
12	71	42	57	66	41	53	4	M	M	24	1971	0.00	0.0	0	8	0
13	67	43	55	66	40	53	2	80	1995	30	1985	0.00	0.0	0	10	0
14	69	45	57	66	40	53	4	78	1952	29	2001	0.00	0.0	0	8	0
15	71	43	57	65	40	53	4	81	1977	24	1971	0.00	0.0	0	8	0
16	76	47	62	65	40	53	9	85	1980	26	2005	0.00	0.0	0	3	0
17	72	47	60	65	40	53	7	82	1998	29	2005	0.00	0.0	0	5	0
18	70	49	60	65	40	53	7	77	1950	30	1968	0.00	0.0	0	5	0
19	68	51	60	65	40	53	7	76	1999	25	1968	0.00	0.0	0	5	0
20	67	47	57	65	40	53	4	79	1950	29	2006*	0.01	0.0	0	8	0
21	67	41	54	65	40	53	1	76	1950	29	1968	0.00	0.0	0	11	0
22	67	38	53	65	40	53	0	77	1955	24	1968	0.00	0.0	0	12	0
23	69	43	56	65	40	53	3	82	1955	27	1968	0.00	0.0	0	9	0
24	73	44	59	65	40	53	6	81	2005	30	1968	0.00	0.0	0	6	0
25	73	50	62	65	41	53	9	77	1980	30	1953	0.00	0.0	0	3	0
26	72	42	57	65	41	53	4	79	1980	30	2002	0.00	0.0	0	8	0
27	71	39	55	65	41	53	2	80	1980	25	1987	0.00	0.0	0	10	0
28	64	39	52	65	41	53	-1	80	1980	27	1988	0.00	0.0	0	13	0
29	69	40	55	65	41	53	2	87	1980	28	2003	0.00	0.0	0	10	0
30	67	37	52	66	41	53	-1	83	1980	27	1988	0.00	0.0	0	13	0
31	68	34	51	66	41	53	-2	79	1980	26	1988	0.00	0.0	0	14	0

M = Missing

Actual Conditions For January 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	70	35	53	66	41	53	0	82	1981	24	1976	0.00	0.0	0	12	0
2	73	41	57	66	41	54	3	80	1981	28	1979	0.00	0.0	0	8	0
3	71	39	55	66	41	54	1	78	1997	21	1974	0.00	0.0	0	10	0
4	69	43	56	66	41	54	2	80	1981	23	1950	0.00	0.0	0	9	0
5	69	49	59	66	41	54	5	79	1981	22	1972	0.00	0.0	0	6	0
6	67	40	54	66	42	54	0	80	1962	25	1950	0.00	0.0	0	11	0
7	65	37	51	67	42	54	-3	85	1962	24	1971	0.00	0.0	0	14	0
8	67	38	53	67	42	54	-1	84	1962	20	1971	0.00	0.0	0	12	0
9	68	38	53	67	42	54	-1	80	1962	25	1971	0.00	0.0	0	12	0
10	69	39	54	67	42	54	0	80	1962	26	1971	0.00	0.0	0	11	0
11	71	40	56	67	42	55	1	80	1986	27	1950	0.00	0.0	0	9	0
12	75	44	60	67	42	55	5	79	1983	26	1962	0.00	0.0	0	5	0
13	74	48	61	67	42	55	6	78	1996	M	M	0.00	0.0	0	4	0
14	78	49	64	68	42	55	9	80	1983	M	M	0.00	0.0	0	1	0
15	78	48	63	68	42	55	8	M	M	28	1987	0.00	0.0	0	2	0
16	80	47	64	68	42	55	9	83	1976	29	1964	0.00	0.0	0	1	0
17	79	46	63	68	42	55	8	M	M	M	M	0.00	0.0	0	2	0
18	75	44	60	68	43	55	5	85	1971	30	2002	0.00	0.0	0	5	0
19	71	41	56	68	43	55	1	84	1971	29	1990	0.00	0.0	0	9	0
20	74	38	56	68	43	55	1	83	1971	M	M	0.00	0.0	0	9	0
21	78	43	61	68	43	56	5	M	M	30	1973	0.00	0.0	0	4	0
22	76	48	62	69	43	56	6	79	1994	31	1987	0.00	0.0	0	3	0
23	75	41	58	69	43	56	2	82	1950	30	1972	0.00	0.0	0	7	0
24	72	51	62	69	43	56	6	82	1951	29	1996	0.00	0.0	0	3	0
25	76	52	64	69	43	56	8	89	1951	31	1972	0.00	0.0	0	1	0
26	75	46	61	69	43	56	5	81	2003	30	2002	0.00	0.0	0	4	0
27	78	53	66	69	43	56	10	79	2003	29	1972	0.00	0.0	0	0	1
28	80	44	62	69	43	56	6	M	M	29	1972	0.00	0.0	0	3	0
29	78	47	63	69	43	56	7	81	1953	30	1975	0.00	0.0	0	2	0
30	82	53	68	70	43	56	12	83	2003	26	1949	0.00	0.0	0	0	3
31	71	54	63	70	44	57	6	86	2003	30	1972	0.00	0.0	0	2	0

M = Missing

Actual Conditions For February 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	64	43	54	70	44	57	-3	84	2003	28	2002	0.00	0.0	0	11	0
2	62	37	50	70	44	57	-7	85	1963	31	1951	0.00	0.0	0	15	0
3	65	44	55	70	44	57	-2	84	1963	23	1972	0.00	0.0	0	10	0
4	64	39	52	70	44	57	-5	84	1963	M	M	0.00	0.0	0	13	0
5	68	49	59	70	44	57	2	87	1983	33	1956	0.00	0.0	0	6	0
6	70	46	58	70	44	57	1	88	1963	30	1989	0.00	0.0	0	7	0
7	70	45	58	71	44	57	1	89	1996	31	1989	0.00	0.0	0	7	0
8	74	47	61	71	44	58	3	88	1963	35	2002	0.00	0.0	0	4	0
9	80	46	63	71	45	58	5	86	1996	30	1949	0.00	0.0	0	2	0
10	82	50	66	71	45	58	8	87	1951	32	1986	0.00	0.0	0	0	1
11	80	56	68	71	45	58	10	90	1957	33	1986	0.00	0.0	0	0	3
12	81	49	65	71	45	58	7	85	1971	29	1965	0.00	0.0	0	0	0
13	82	47	65	72	45	58	7	90	1957	31	1972	0.00	0.0	0	0	0
14	84	46	65	72	45	59	6	86	1957	31	1966	0.00	0.0	0	0	0
15	86	47	67	72	46	59	8	M	M	26	1990	0.00	0.0	0	0	2
16	81	53	67	72	46	59	8	87	1981	22	1990	0.00	0.0	0	0	2
17	85	46	66	72	46	59	7	88	1981	31	1956	0.00	0.0	0	0	1
18	84	50	67	73	46	59	8	93	1981	35	1967	0.00	0.0	0	0	2
19	84	50	67	73	46	60	7	90	1981	31	1956	0.00	0.0	0	0	2
20	77	54	66	73	47	60	6	86	1981	32	1990	0.00	0.0	0	0	1
21	77	51	64	73	47	60	4	92	1977	32	1953	0.00	0.0	0	1	0
22	77	45	61	73	47	60	1	88	1982	32	1955	0.00	0.0	0	4	0
23	82	46	64	74	47	60	4	87	2002	31	1953	0.00	0.0	0	1	0
24	81	47	64	74	47	61	3	90	1986	34	1996	0.00	0.0	0	1	0
25	79	48	64	74	48	61	3	93	1986	32	1960	0.00	0.0	0	1	0
26	80	50	65	74	48	61	4	92	1986	35	1977	0.00	0.0	0	0	0
27	82	52	67	75	48	61	6	93	1986	30	1996	0.00	0.0	0	0	2
28	82	61	72	75	48	61	11	93	1986	31	1962	0.07	0.0	0	0	7

M = Missing

Actual Conditions For March 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

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Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	70	54	62	75	48	62	0	90	1986	34	1962	0.04	0.0	0	3	0
2	71	45	58	75	48	62	-4	M	M	36	1997	0.00	0.0	0	7	0
3	77	48	63	76	49	62	1	90	1986	31	1971	0.00	0.0	0	2	0
4	80	56	68	76	49	62	6	88	1986	31	2002	0.00	0.0	0	0	3
5	83	55	69	76	49	63	6	91	1986	33	2002	0.00	0.0	0	0	4
6	86	59	73	76	49	63	10	92	1986	36	1977	0.00	0.0	0	0	8
7	84	58	71	77	49	63	8	90	1960	37	1982	0.00	0.0	0	0	6
8	82	62	72	77	49	63	9	91	1957	35	1969	0.00	0.0	0	0	7
9	83	55	69	77	50	63	6	92	2004	34	1964	0.00	0.0	0	0	4
10	86	47	67	77	50	64	3	95	1997	M	M	0.00	0.0	0	0	2
11	79	54	67	78	50	64	3	93	1997	38	1969	0.00	0.0	0	0	2
12	79	53	66	78	50	64	2	M	M	37	1990	0.00	0.0	0	0	1
13	81	52	67	78	50	64	3	M	M	30	1956	0.00	0.0	0	0	2
14	86	55	71	78	50	64	7	M	M	38	1952	0.00	0.0	0	0	6
15	88	55	72	79	50	64	8	94	2004	34	1977	0.00	0.0	0	0	7
16	86	59	73	79	51	65	8	M	M	36	1963	0.00	0.0	0	0	8
17	93	51	72	79	51	65	7	M	M	36	2002	0.00	0.0	0	0	7
18	77	56	67	79	51	65	2	94	1997	37	1979	0.00	0.0	0	0	2
19	81	50	66	79	51	65	1	96	1997	39	1977	0.00	0.0	0	0	1
20	81	46	64	80	51	65	-1	99	2004	M	M	0.00	0.0	0	1	0
21	86	47	67	80	51	66	1	100	2004	40	1987	0.00	0.0	0	0	2
22	84	52	68	80	51	66	2	98	2004	39	2006*	0.00	0.0	0	0	3
23	86	53	70	80	51	66	4	95	1956	M	M	0.00	0.0	0	0	5
24	91	54	73	81	51	66	7	95	1956	37	1995	0.00	0.0	0	0	8
25	91	54	73	81	52	66	7	96	1981	41	1964	0.00	0.0	0	0	8
26	79	59	69	81	52	66	3	96	1988	40	1995	0.00	0.0	0	0	4
27	76	49	63	81	52	67	-4	100	1986	36	1975	0.00	0.0	0	2	0
28	82	50	66	82	52	67	-1	95	1986	40	1972	0.00	0.0	0	0	1
29	88	51	70	82	52	67	3	95	1971	37	1972	0.00	0.0	0	0	5
30	83	60	72	82	52	67	5	100	1971	38	1998	0.00	0.0	0	0	7
31	84	52	68	82	53	67	1	M	M	38	1972	0.00	0.0	0	0	3

M = Missing

Actual Conditions For April 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	77	54	66	83	53	68	-2	M	M	M	M	0.00	0.0	0	0	1
2	71	50	61	83	53	68	-7	98	1966	40	1975	0.00	0.0	0	4	0
3	76	48	62	83	53	68	-6	101	1961	40	1975	0.00	0.0	0	3	0
4	81	46	64	83	53	68	-4	106	1961	41	1977	0.00	0.0	0	1	0
5	79	51	65	84	53	69	-4	100	1989	42	1983	0.00	0.0	0	0	0
6	86	58	72	84	54	69	3	103	1989	43	2006	0.00	0.0	0	0	7
7	90	53	72	84	54	69	3	105	1989	44	1964	0.00	0.0	0	0	7
8	95	56	76	84	54	69	7	107	1989	42	1999	0.00	0.0	0	0	11
9	98	59	79	85	54	70	9	102	1989	M	M	0.00	0.0	0	0	14
10	99	62	81	85	55	70	11	101	1960	38	1975	0.00	0.0	0	0	16
11	99	67	83	85	55	70	13	M	M	44	2001	0.00	0.0	0	0	18
12	91	58	75	86	55	70	5	100	1990	44	1967	0.00	0.0	0	0	10
13	92	58	75	86	55	71	4	103	1985	40	1983	0.00	0.0	0	0	10
14	87	63	75	86	56	71	4	104	2002	46	1983	0.00	0.0	0	0	10
15	91	54	73	86	56	71	2	104	1962	M	M	0.00	0.0	0	0	8
16	95	61	78	87	56	71	7	104	1984	M	M	0.00	0.0	0	0	13
17	92	60	76	87	57	72	4	103	1987	44	1976	0.00	0.0	0	0	11
18	85	65	75	87	57	72	3	104	1954	41	1963	0.00	0.0	0	0	10
19	89	66	78	88	57	72	6	106	1980	44	1968	0.00	0.0	0	0	13
20	94	67	81	88	58	73	8	103	1980	46	1995	0.00	0.0	0	0	16
21	99	65	82	88	58	73	9	M	M	42	1967	0.00	0.0	0	0	17
22	93	65	79	89	58	73	6	M	M	41	1970	0.00	0.0	0	0	14
23	88	58	73	89	58	74	-1	106	1949	M	M	0.00	0.0	0	0	8
24	91	58	75	89	59	74	1	105	1996	46	1964	0.00	0.0	0	0	10
25	91	65	78	89	59	74	4	102	1987	46	1989	0.00	0.0	0	0	13
26	77	58	68	90	59	75	-7	106	1996	48	1971	0.00	0.0	0	0	3
27	83	50	67	90	60	75	-8	106	1987	45	1963	0.00	0.0	0	0	2
28	90	56	73	90	60	75	-2	106	1992	44	1970	0.00	0.0	0	0	8
29	87	70	79	91	60	76	3	107	1992	45	1984	0.00	0.0	0	0	14
30	88	68	78	91	61	76	2	105	1992	46	1967	0.00	0.0	0	0	13

M = Missing

Actual Conditions For May 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	93	66	80	91	61	76	4	105	1985	49	1990	0.00	0.0	0	0	15
2	99	60	80	92	61	76	4	105	1966	48	1967	0.00	0.0	0	0	15
3	103	63	83	92	62	77	6	M	M	50	1991	0.00	0.0	0	0	18
4	103	66	85	92	62	77	8	105	2004	49	1999	0.00	0.0	0	0	20
5	98	65	82	93	62	77	5	105	1997	45	1964	0.00	0.0	0	0	17
6	80	61	71	93	62	78	-7	108	1987	47	1988	0.00	0.0	0	0	6
7	84	52	68	93	63	78	-10	108	1989	46	1988	0.00	0.0	0	0	3
8	87	57	72	93	63	78	-6	109	2001	49	1964	0.00	0.0	0	0	7
9	93	61	77	94	63	79	-2	108	2001	50	1982	0.00	0.0	0	0	12
10	94	63	79	94	64	79	0	109	1960	48	1977	0.00	0.0	0	0	14
11	83	65	74	94	64	79	-5	113	1960	50	1982	0.00	0.0	0	0	9
12	91	60	76	95	64	79	-3	112	1996	50	1980	0.00	0.0	0	0	11
13	92	70	81	95	64	80	1	108	1996	50	1962	0.00	0.0	0	0	16
14	95	69	82	95	64	80	2	M	M	50	1998	0.00	0.0	0	0	17
15	101	62	82	96	65	80	2	M	M	53	1962	0.00	0.0	0	0	17
16	106	66	86	96	65	80	6	109	1997	52	1953	0.00	0.0	0	0	21
17	107	70	89	96	65	81	8	110	1997	53	1977	0.00	0.0	0	0	24
18	104	71	88	96	65	81	7	110	1970	54	1977	0.00	0.0	0	0	23
19	98	69	84	97	66	81	3	M	M	M	M	0.00	0.0	0	0	19
20	89	63	76	97	66	81	-5	M	M	51	1949	0.00	0.0	0	0	11
21	86	54	70	97	66	82	-12	110	2005	47	1975	0.00	0.0	0	0	5
22	88	63	76	98	66	82	-6	113	2000	45	1971	0.00	0.0	0	0	11
23	91	67	79	98	66	82	-3	110	2001	50	1971	0.01	0.0	0	0	14
24	94	63	79	98	67	82	-3	112	2001	M	M	0.00	0.0	0	0	14
25	100	68	84	99	67	83	1	113	1951	51	1980	0.00	0.0	0	0	19
26	106	73	90	99	67	83	7	112	1974	52	1996	0.00	0.0	0	0	25
27	107	74	91	99	67	83	8	114	1951	50	1962	0.00	0.0	0	0	26
28	107	74	91	99	67	83	8	114	1983	52	1971	0.00	0.0	0	0	26
29	104	74	89	100	68	84	5	114	2000	43	1971	0.00	0.0	0	0	24
30	106	72	89	100	68	84	5	113	1984	56	1988	0.00	0.0	0	0	24
31	108	75	92	100	68	84	8	M	M	55	1991	0.00	0.0	0	0	27

M = Missing

Blythe, CA

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Table Graph Details

Actual Conditions For June 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	103	74	89	101	68	84	5	114	2012	46	1980	0.00	0.0	0	0	24
2	110	71	91	101	68	85	6	112	1960	56	1983	0.00	0.0	0	0	26
3	102	70	86	101	69	85	1	113	1996	55	1971	0.00	0.0	0	0	21
4	105	72	89	102	69	85	4	114	1996	56	1998	0.00	0.0	0	0	24
5	106	68	87	102	69	85	2	116	1957	55	1999	0.00	0.0	0	0	22
6	108	68	88	102	69	86	2	114	2002	59	1993	0.00	0.0	0	0	23
7	103	69	86	102	70	86	0	117	1985	52	1993	0.00	0.0	0	0	21
8	108	72	90	103	70	86	4	118	1955	58	1998	0.00	0.0	0	0	25
9	110	75	93	103	70	87	6	118	1955	57	1995	0.00	0.0	0	0	28
10	105	82	94	103	70	87	7	116	1994	60	1969	0.00	0.0	0	0	29
11	107	74	91	104	71	87	4	114	1956	56	1976	0.00	0.0	0	0	26
12	109	73	91	104	71	87	4	116	1956	62	1998	0.00	0.0	0	0	26
13	109	75	92	104	71	88	4	115	1979	56	1998	0.00	0.0	0	0	27
14	102	70	86	104	72	88	-2	117	1966	59	1997	0.00	0.0	0	0	21
15	103	71	87	105	72	88	-1	117	2000	54	1962	0.00	0.0	0	0	22
16	105	74	90	105	72	89	1	116	1971	58	1990	0.00	0.0	0	0	25
17	102	76	89	105	73	89	0	116	1981	57	1995	0.00	0.0	0	0	24
18	98	68	83	106	73	89	-6	118	1981	60	1995	0.00	0.0	0	0	18
19	104	70	87	106	73	90	-3	117	1961	61	1975	0.00	0.0	0	0	22
20	109	73	91	106	74	90	1	118	1981	58	1975	0.00	0.0	0	0	26
21	109	79	94	106	74	90	4	116	2008*	64	1975	0.00	0.0	0	0	29
22	108	77	93	106	74	90	3	119	1960	65	2010*	0.00	0.0	0	0	28
23	106	70	88	107	75	91	-3	118	1961	63	1998	0.00	0.0	0	0	23
24	107	77	92	107	75	91	1	118	1994	63	1998	0.00	0.0	0	0	27
25	107	73	90	107	75	91	-1	122	1970	66	1991	0.00	0.0	0	0	25
26	106	79	93	107	76	92	1	122	1990	61	1965	0.00	0.0	0	0	28
27	103	74	89	107	76	92	-3	121	1973	62	1996	0.00	0.0	0	0	24
28	106	76	91	108	76	92	-1	123	1994	67	1991	0.00	0.0	0	0	26
29	107	81	94	108	77	92	2	121	1994	67	1997	0.00	0.0	0	0	29
30	109	81	95	108	77	92	3	119	1972	68	1997	0.00	0.0	0	0	30

M = Missing

Blythe, CA

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Table Graph Details

Actual Conditions For July 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

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Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	109	85	97	108	77	93	4	118	1972	62	1982	0.00	0.0	0	0	32
2	108	81	95	108	78	93	2	119	2001	66	1995	0.00	0.0	0	0	30
3	108	86	97	108	78	93	4	119	1985	67	1979	0.00	0.0	0	0	32
4	103	86	95	108	78	93	2	121	1989	67	1956	0.00	0.0	0	0	30
5	106	86	96	108	79	93	3	118	1981	69	1987	0.00	0.0	0	0	31
6	109	83	96	108	79	94	2	117	1965	67	1994	0.00	0.0	0	0	31
7	111	82	97	108	79	94	3	117	1985	70	2005	0.00	0.0	0	0	32
8	110	87	99	109	79	94	5	119	1985	73	1949	0.00	0.0	0	0	34
9	103	84	94	109	80	94	0	118	1958	70	1987	0.00	0.0	0	0	29
10	109	84	97	109	80	94	3	118	1973	72	1986	0.00	0.0	0	0	32
11	107	78	93	109	80	94	-1	118	1958	69	1974	0.00	0.0	0	0	28
12	109	77	93	109	80	94	-1	118	1985	71	2000	0.00	0.0	0	0	28
13	112	86	99	109	80	94	5	119	2005	66	1962	0.00	0.0	0	0	34
14	104	86	95	109	81	95	0	118	2003	73	2011*	0.00	0.0	0	0	30
15	106	80	93	109	81	95	-2	117	2006*	71	2001	0.00	0.0	0	0	28
16	110	82	96	108	81	95	1	119	1960	69	1993	0.00	0.0	0	0	31
17	108	77	93	108	81	95	-2	121	2005	64	1983	0.00	0.0	0	0	28
18	105	80	93	108	81	95	-2	118	2005	67	1987	0.00	0.0	0	0	28
19	106	82	94	108	81	95	-1	119	1961	62	1987	0.00	0.0	0	0	29
20	105	77	91	108	81	95	-4	118	1978	70	1993	0.00	0.0	0	0	26
21	109	75	92	108	81	95	-3	118	2006	69	1973	0.00	0.0	0	0	27
22	112	75	94	108	81	95	-1	120	2006	69	1995	0.00	0.0	0	0	29
23	116	86	101	108	81	95	6	117	1981	69	1987	0.00	0.0	0	0	36
24	116	87	102	108	81	95	7	117	1980	73	1995	0.00	0.0	0	0	37
25	111	91	101	108	82	95	6	117	2000	71	1993	0.00	0.0	0	0	36
26	109	89	99	108	82	95	4	118	1995	71	1986	0.00	0.0	0	0	34
27	101	84	93	108	82	95	-2	120	1998	72	1993	0.00	0.0	0	0	28
28	108	84	96	108	82	95	1	123	1995	68	1987	0.00	0.0	0	0	31
29	109	84	97	108	82	95	2	116	1972	64	1987	0.00	0.0	0	0	32
30	113	87	100	108	82	95	5	117	1995	73	1948	0.00	0.0	0	0	35
31	114	89	102	108	81	95	7	120	1972	72	2001	0.00	0.0	0	0	37

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For August 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	110	87	99	108	81	95	4	120	1972	70	1959	0.00	0.0	0	0	34
2	96	79	88	108	81	94	-6	118	1995	70	1976	0.00	0.0	0	0	23
3	98	76	87	107	81	94	-7	118	1998	68	1976	0.00	0.0	0	0	22
4	97	71	84	107	81	94	-10	118	1969	67	1976	0.00	0.0	0	0	19
5	107	71	89	107	81	94	-5	118	2000	70	1976	0.00	0.0	0	0	24
6	106	75	91	107	81	94	-3	118	1995	66	1976	0.00	0.0	0	0	26
7	105	72	89	107	81	94	-5	117	1980	68	1988	0.00	0.0	0	0	24
8	104	74	89	107	81	94	-5	119	1980	69	1999	0.00	0.0	0	0	24
9	105	78	92	107	81	94	-2	115	1995	68	2009	0.00	0.0	0	0	27
10	107	83	95	107	81	94	1	116	2003	67	1949	0.00	0.0	0	0	30
11	109	86	98	107	81	94	4	116	1962	70	1999	0.00	0.0	0	0	33
12	101	82	92	107	81	94	-2	116	1962	69	1949	0.02	0.0	0	0	27
13	99	75	87	107	81	94	-7	119	1960	66	1993	0.06	0.0	0	0	22
14	105	83	94	107	81	94	0	117	1962	65	1968	0.00	0.0	0	0	29
15	107	82	95	107	80	94	1	115	1962	64	1993	0.00	0.0	0	0	30
16	108	85	97	107	80	94	3	116	1992	67	1980	0.00	0.0	0	0	32
17	111	88	100	107	80	94	6	116	1992	67	1980	0.00	0.0	0	0	35
18	98	82	90	107	80	93	-3	115	1992	64	1976	0.03	0.0	0	0	25
19	106	82	94	107	80	93	1	114	1973	66	1976	0.00	0.0	0	0	29
20	101	80	91	107	80	93	-2	113	1992	68	1980	0.15	0.0	0	0	26
21	99	69	84	107	80	93	-9	116	1969	69	2014	0.32	0.0	0	0	19
22	92	68	80	107	79	93	-13	116	1972	68	2014*	0.00	0.0	0	0	15
23	100	74	87	107	79	93	-6	116	2011*	64	1968	0.00	0.0	0	0	22
24	103	72	88	106	79	93	-5	119	1985	66	1968	0.00	0.0	0	0	23
25	104	81	93	106	79	93	0	115	1985	68	1973	0.00	0.0	0	0	28
26	103	83	93	106	79	93	0	115	2011	66	1951	0.00	0.0	0	0	28
27	104	79	92	106	79	92	0	115	2005	67	1973	0.00	0.0	0	0	27
28	109	79	94	106	78	92	2	118	1998	65	1973	0.00	0.0	0	0	29
29	111	76	94	106	78	92	2	118	1948	66	1975	0.00	0.0	0	0	29
30	112	76	94	106	78	92	2	116	1998	62	1957	0.00	0.0	0	0	29
31	111	80	96	106	78	92	4	119	1950	62	1992	0.00	0.0	0	0	31

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For September 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	108	80	94	105	78	91	3	121	1950	64	1966	0.00	0.0	0	0	29
2	110	77	94	105	77	91	3	118	1948	64	2000	0.00	0.0	0	0	29
3	109	77	93	105	77	91	2	118	1948	65	1964	0.00	0.0	0	0	28
4	107	80	94	105	77	91	3	115	1948	61	1985	0.00	0.0	0	0	29
5	102	83	93	105	76	91	2	113	1955	59	1976	0.00	0.0	0	0	28
6	103	83	93	104	76	90	3	114	1955	66	1992	0.00	0.0	0	0	28
7	100	83	92	104	76	90	2	112	1994	60	1985	0.00	0.0	0	0	27
8	98	79	89	104	75	90	-1	116	1979	65	2010	0.01	0.0	0	0	24
9	91	76	84	104	75	89	-5	114	1993	62	1961	0.03	0.0	0	0	19
10	100	77	89	103	75	89	0	114	1990	63	2005	0.00	0.0	0	0	24
11	104	75	90	103	74	89	1	115	1990	61	1985	0.00	0.0	0	0	25
12	107	74	91	103	74	88	3	113	1971	59	1985	0.00	0.0	0	0	26
13	107	75	91	102	74	88	3	112	1971	58	1985	0.00	0.0	0	0	26
14	107	83	95	102	73	88	7	113	1971	60	2005	0.00	0.0	0	0	30
15	110	83	97	102	73	87	10	113	2000	61	2005	0.00	0.0	0	0	32
16	101	80	91	101	73	87	4	110	1962	61	1970	0.02	0.0	0	0	26
17	98	80	89	101	72	87	2	112	1962	61	1977	0.00	0.0	0	0	24
18	103	80	92	101	72	86	6	111	1980	57	1985	0.00	0.0	0	0	27
19	99	74	87	100	71	86	1	113	1962	56	1985	0.00	0.0	0	0	22
20	102	77	90	100	71	85	5	108	1962	53	1971	0.00	0.0	0	0	25
21	101	75	88	99	70	85	3	108	2009*	59	1986	0.00	0.0	0	0	23
22	101	71	86	99	70	84	2	110	1966	55	1988	0.00	0.0	0	0	21
23	104	73	89	99	70	84	5	111	1966	56	2007	0.00	0.0	0	0	24
24	105	74	90	98	69	84	6	109	2002	54	1986	0.00	0.0	0	0	25
25	105	75	90	98	69	83	7	110	1963	59	1993	0.00	0.0	0	0	25
26	99	83	91	97	68	83	8	110	2010	53	1971	0.05	0.0	0	0	26
27	93	70	82	97	68	82	0	110	2010	54	1971	0.00	0.0	0	0	17
28	87	64	76	96	67	82	-6	108	2009	55	1982	0.00	0.0	0	0	11
29	90	63	77	96	67	81	-4	110	1980	56	2013	0.00	0.0	0	0	12
30	93	63	78	96	66	81	-3	109	1980	51	2005	0.00	0.0	0	0	13

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For October 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	95	65	80	95	66	81	-1	111	1980	53	1971	0.00	0.0	0	0	15
2	93	68	81	95	66	80	1	111	1980	52	1971	0.00	0.0	0	0	16
3	98	64	81	94	65	80	1	107	1987	49	2002	0.00	0.0	0	0	16
4	101	64	83	94	65	79	4	107	1987	53	2002	0.00	0.0	0	0	18
5	100	65	83	93	64	79	4	108	1987	52	2009	0.00	0.0	0	0	18
6	94	64	79	93	64	78	1	110	1987	49	2009	0.00	0.0	0	0	14
7	87	74	81	93	63	78	3	108	1987	49	2009	0.00	0.0	0	0	16
8	79	68	74	92	63	78	-4	106	1996	51	2011	0.02	0.0	0	0	9
9	92	67	80	92	63	77	3	106	1996	46	1949	0.01	0.0	0	0	15
10	93	66	80	91	62	77	3	107	1991	48	1949	0.00	0.0	0	0	15
11	96	68	82	91	62	76	6	105	1965	50	2013	0.00	0.0	0	0	17
12	99	64	82	91	61	76	6	105	1999	50	2000	0.00	0.0	0	0	17
13	92	64	78	90	61	76	2	106	1950	47	1969	0.00	0.0	0	0	13
14	93	57	75	90	61	75	0	103	1961	50	1994	0.00	0.0	0	0	10
15	91	61	76	89	60	75	1	103	1950	52	1986	0.00	0.0	0	0	11
16	89	61	75	89	60	74	1	102	1958	49	1980	0.00	0.0	0	0	10
17	92	69	81	89	59	74	7	101	2011*	46	1994	0.00	0.0	0	0	16
18	93	66	80	88	59	74	6	104	2003	41	1971	0.00	0.0	0	0	15
19	94	64	79	88	59	73	6	104	2003	41	1971	0.00	0.0	0	0	14
20	92	65	79	87	58	73	6	103	2003	42	1949	0.00	0.0	0	0	14
21	92	67	80	87	58	73	7	104	2003	44	1949	0.00	0.0	0	0	15
22	94	64	79	87	58	72	7	104	2003	44	1996	0.00	0.0	0	0	14
23	95	64	80	86	57	72	8	101	2003	39	1996	0.00	0.0	0	0	15
24	95	64	80	86	57	71	9	102	1959	42	1996	0.00	0.0	0	0	15
25	96	66	81	86	57	71	10	98	1965	44	1975	0.00	0.0	0	0	16
26	88	66	77	85	56	71	6	98	1965	41	1971	0.00	0.0	0	0	12
27	87	62	75	85	56	70	5	99	2008	45	1971	0.00	0.0	0	0	10
28	89	55	72	84	55	70	2	98	1965	44	1996	0.00	0.0	0	0	7
29	91	55	73	84	55	69	4	97	1965	33	1971	0.00	0.0	0	0	8
30	91	58	75	84	55	69	6	95	1966	27	1971	0.00	0.0	0	0	10
31	89	59	74	83	54	69	5	97	1966	29	1971	0.00	0.0	0	0	9

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For November 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year:_Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	78	60	69	83	54	68	1	95	1997	42	1972	0.00	0.0	0	0	4
2	74	52	63	82	53	68	-5	93	1997	38	1971	0.00	0.0	0	2	0
3	75	53	64	82	53	67	-3	95	2010	40	1979	0.00	0.0	0	1	0
4	78	60	69	81	53	67	2	94	2010*	38	1956	0.00	0.0	0	0	4
5	84	54	69	81	52	67	2	94	1980	43	1994	0.00	0.0	0	0	4
6	87	51	69	80	52	66	3	94	1988	42	2011	0.00	0.0	0	0	4
7	86	53	70	80	52	66	4	92	2007	41	1993	0.00	0.0	0	0	5
8	89	54	72	80	51	65	7	92	1991	40	2011	0.00	0.0	0	0	7
9	88	54	71	79	51	65	6	89	1995	41	2000	0.00	0.0	0	0	6
10	88	53	71	79	50	64	7	89	1980	39	2010	0.00	0.0	0	0	6
11	83	54	69	78	50	64	5	88	2013*	36	1950	0.00	0.0	0	0	4
12	79	54	67	78	49	64	3	91	1999	32	1950	0.00	0.0	0	0	2
13	78	52	65	77	49	63	2	93	1999	35	1985	0.00	0.0	0	0	0
14	77	55	66	77	49	63	3	91	1999	32	2000	0.00	0.0	0	0	1
15	81	50	66	76	48	62	4	90	1999	39	1994	0.00	0.0	0	0	1
16	67	53	60	76	48	62	-2	88	1995	35	2000	0.00	0.0	0	5	0
17	70	43	57	75	47	61	-4	89	1995	35	1958	0.00	0.0	0	8	0
18	71	44	58	75	47	61	-3	87	2008*	34	1958	0.00	0.0	0	7	0
19	73	41	57	74	47	60	-3	87	2008*	35	1958	0.00	0.0	0	8	0
20	74	43	59	74	46	60	-1	87	2006	27	1994	0.00	0.0	0	6	0
21	75	51	63	73	46	60	3	87	1950	33	1994	0.00	0.0	0	2	0
22	76	44	60	73	45	59	1	88	1950	35	1992	0.00	0.0	0	5	0
23	74	53	64	72	45	59	5	86	1949	35	2010	0.00	0.0	0	1	0
24	74	45	60	72	45	58	2	87	1995	34	1971	0.00	0.0	0	5	0
25	71	43	57	71	44	58	-1	87	1950	32	1952	0.00	0.0	0	8	0
26	76	44	60	71	44	58	2	87	1995	34	2010	0.00	0.0	0	5	0
27	80	47	64	71	44	57	7	86	1954	26	2010	0.00	0.0	0	1	0
28	78	45	62	70	43	57	5	83	1949	30	1994	0.00	0.0	0	3	0
29	77	43	60	70	43	56	4	83	1953	33	1976	0.00	0.0	0	5	0
30	77	49	63	69	43	56	7	82	2008	32	1975	0.00	0.0	0	2	0

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For December 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	72	47	60	69	43	56	4	82	2008*	33	1952	0.00	0.0	0	5	0
2	67	57	62	69	42	55	7	82	1959	30	1991	0.00	0.0	0	3	0
3	64	57	61	68	42	55	6	83	1958	32	1991	0.08	0.0	0	4	0
4	73	54	64	68	42	55	9	80	2012*	35	2009*	0.00	0.0	0	1	0
5	73	52	63	68	42	55	8	80	1962	31	2009	0.00	0.0	0	2	0
6	76	58	67	67	41	54	13	81	1966	32	1972	0.00	0.0	0	0	2
7	78	51	65	67	41	54	11	79	1995	29	2011*	0.00	0.0	0	0	0
8	76	54	65	67	41	54	11	78	1996	29	1978	0.00	0.0	0	0	0
9	77	52	65	66	41	54	11	80	1962	26	1978	0.00	0.0	0	0	0
10	78	46	62	66	41	54	8	82	1950	25	1971	0.00	0.0	0	3	0
11	72	50	61	66	41	53	8	81	1958	31	1994	0.00	0.0	0	4	0
12	70	46	58	66	41	53	5	82	2010*	24	1971	0.03	0.0	0	7	0
13	66	43	55	66	40	53	2	80	1995	30	1985	0.00	0.0	0	10	0
14	65	39	52	66	40	53	-1	78	1952	29	2001	0.00	0.0	0	13	0
15	64	40	52	65	40	53	-1	81	1977	24	1971	0.00	0.0	0	13	0
16	61	40	51	65	40	53	-2	85	1980	26	2005	0.28	0.0	0	14	0
17	60	47	54	65	40	53	1	82	1998	29	2005	0.39	0.0	0	11	0
18	63	49	56	65	40	53	3	77	1950	30	1968	0.00	0.0	0	9	0
19	63	43	53	65	40	53	0	76	1999	25	1968	0.00	0.0	0	12	0
20	61	42	52	65	40	53	-1	79	1950	29	2006*	0.00	0.0	0	13	0
21	62	46	54	65	40	53	1	76	1950	29	1968	0.00	0.0	0	11	0
22	71	45	58	65	40	53	5	77	1955	24	1968	0.00	0.0	0	7	0
23	73	56	65	65	40	53	12	82	1955	27	1968	0.00	0.0	0	0	0
24	65	42	54	65	40	53	1	81	2005	30	1968	0.00	0.0	0	11	0
25	65	44	55	65	41	53	2	77	1980	30	1953	0.00	0.0	0	10	0
26	59	40	50	65	41	53	-3	79	1980	30	2002	0.00	0.0	0	15	0
27	59	40	50	65	41	53	-3	80	1980	25	1987	0.00	0.0	0	15	0
28	56	31	44	65	41	53	-9	80	1980	27	1988	0.00	0.0	0	21	0
29	58	29	44	65	41	53	-9	87	1980	28	2003	0.00	0.0	0	21	0
30	60	31	46	66	41	53	-7	83	1980	27	1988	0.00	0.0	0	19	0
31	50	35	43	66	41	53	-10	79	1980	26	1988	0.00	0.0	0	22	0

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For January 2015

Choose another month / year: Month ▼ Year ▼ GO

Reports from: BLYTHE, CA [BLH]

Choose another location: Postal Code or City GO

(Lat: 33.62 Lon:-114.72)

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	51	27	39	66	41	53	-14	82	1981	24	1976	0.00	0.0	0	26	0
2	57	27	42	66	41	54	-12	80	1981	27	2015	0.00	0.0	0	23	0
3	58	29	44	66	41	54	-10	78	1997	21	1974	0.00	0.0	0	21	0
4	62	31	47	66	41	54	-7	80	1981	23	1950	0.00	0.0	0	18	0
5	69	40	55	66	41	54	1	79	1981	22	1972	0.00	0.0	0	10	0
6	74	42	58	66	42	54	4	80	1962	25	1950	0.00	0.0	0	7	0
7	75	43	59	67	42	54	5	85	1962	24	1971	0.00	0.0	0	6	0
8	76	51	64	67	42	54	10	84	1962	20	1971	0.00	0.0	0	1	0
9	75	46	61	67	42	54	7	80	1962	25	1971	0.00	0.0	0	4	0
10	71	53	62	67	42	54	8	80	1962	26	1971	0.00	0.0	0	3	0
11	69	49	59	67	42	55	4	80	1986	27	1950	0.05	0.0	0	6	0
12	70	55	63	67	42	55	8	79	1983	26	1962	0.00	0.0	0	2	0
13	70	51	61	67	42	55	6	78	1996	25	2013	0.00	0.0	0	4	0
14	70	51	61	68	42	55	6	80	1983	25	2007	0.00	0.0	0	4	0
15	71	42	57	68	42	55	2	78	2014*	28	1987	0.00	0.0	0	8	0
16	73	44	59	68	42	55	4	83	1976	29	1964	0.00	0.0	0	6	0
17	72	43	58	68	42	55	3	82	2011*	25	2007	0.00	0.0	0	7	0
18	74	42	58	68	43	55	3	85	1971	30	2002	0.00	0.0	0	7	0
19	73	44	59	68	43	55	4	84	1971	29	1990	0.00	0.0	0	6	0
20	75	43	59	68	43	55	4	83	1971	30	2008	0.00	0.0	0	6	0
21	74	52	63	68	43	56	7	80	2009	30	1973	0.00	0.0	0	2	0
22	68	47	58	69	43	56	2	79	1994	31	1987	0.00	0.0	0	7	0
23	69	41	55	69	43	56	-1	82	1950	30	1972	0.00	0.0	0	10	0
24	77	45	61	69	43	56	5	82	1951	29	1996	0.00	0.0	0	4	0
25	75	49	62	69	43	56	6	89	1951	31	1972	0.00	0.0	0	3	0
26	61	51	56	69	43	56	0	81	2003	30	2002	0.19	0.0	0	9	0
27	69	53	61	69	43	56	5	79	2003	29	1972	0.01	0.0	0	4	0
28	71	50	61	69	43	56	5	80	2014*	29	1972	0.00	0.0	0	4	0
29	71	57	64	69	43	56	8	81	1953	30	1975	0.00	0.0	0	1	0
30	67	56	62	70	43	56	6	83	2003	26	1949	0.32	0.0	0	3	0
31	69	53	61	70	44	57	4	86	2003	30	1972	0.00	0.0	0	4	0

M = Missing

APPENDIX D

Corps Regulatory Guidance Letter 05-05

Ordinary High Water Mark Identification

US Army Corps of Engineers

REGULATORY GUIDANCE LETTER

No. 05-05 **Date: 7 December 2005**

SUBJECT: Ordinary High Water Mark Identification

1. Purpose and Applicability

a. **Purpose.** To provide guidance for identifying the ordinary high water mark.

b. **Applicability.** This applies to jurisdictional determinations for non-tidal waters under Section 404 of the Clean Water Act and under Sections 9 and 10 of the Rivers and Harbors Act of 1899.

2. General Considerations

a. **Regulation and Policy.** Pursuant to regulations and inter-agency agreement,[1] the U.S. Army Corps of Engineers (Corps) determines, on a case-by case basis, the extent of geographic jurisdiction for the purpose of administering its regulatory program. For purposes of Section 404 of the Clean Water Act (CWA), the lateral limits of jurisdiction over non-tidal water bodies extend to the ordinary high water mark (OHWM), in the absence of adjacent wetlands. When adjacent wetlands are present, CWA jurisdiction extends beyond the OHWM to the limits of the adjacent wetlands. For purposes of Sections 9 and 10 of the Rivers and Harbors Act of 1899, the lateral extent of Federal jurisdiction, which is limited to the traditional navigable waters of the United States, extends to the OHWM, whether or not adjacent wetlands extend landward of the OHWM.

Corps regulations define the term “ordinary high water mark” for purposes of the CWA lateral jurisdiction at 33 CFR 328.3(e), which states:

> “The term *ordinary high water mark* means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.”

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[1] Memorandum of Agreement between the Department of the Army and Environmental Protection Agency Concerning the Determination of the Geographical Jurisdiction of the Section 404 Program and the Application of the Exemptions under Section 404(f) of the Clean Water Act, January 19, 1989

This definition is virtually identical to the definition of the term “ordinary high water mark” found at 33 CFR Section 329.11(a)(1), describing the lateral extent of Federal jurisdiction over non-tidal traditional navigable waters of the United States subject to Sections 9 and 10 of the Rivers and Harbors Act of 1899 (RHA). When the definition from 33 CFR Section 329.11(a)(1) was reproduced at 33 CFR 328.3(e), the semi-colons of the former definition were mistakenly changed to commas in the latter definition. Consequently, the definition of “ordinary high water mark” in Part 328 is not as clear in meaning as is the definition of the same term in Part 329, even though the two definitions were to serve the same basic purpose (i.e., establishing the lateral extent of jurisdiction, in the absence of adjacent wetlands).[2]

Both definitions of the term “ordinary high water mark” begin by discussing physical characteristics that indicate the location of the OHWM on the shore of a water body. Furthermore, both OHWM definitions conclude with the statement the OHWM can be determined using “other appropriate means that consider the characteristics of the surrounding areas”.[3] Prior to this Regulatory Guidance Letter (RGL), neither the Corps nor the U.S. Environmental Protection Agency has issued any additional clarifying national guidance for use by Corps regulatory program staff in identifying the location of the OHWM for the CWA on a case-by-case basis.[4]

b. **Practice.** In making OHWM determinations, Corps districts generally rely on physical evidence to ascertain the lateral limits of jurisdiction, to whatever extent physical evidence can be found and such evidence is deemed reasonably reliable. Physical indicators include the features listed in the definitions at 33 CFR Sections 328.3(e) and 329.11(a)(1) and other appropriate means that consider the characteristics of the surrounding areas. In addition, districts use other methods for estimating the line on the shore established by the fluctuations of water, including, but not limited to, lake and stream gage data, flood predictions, historic records of water flow, and statistical evidence. To the maximum extent practicable, districts generally use more than one physical indicator or other means for determining the OHWM.

3. Guidance.

a. In determining the location of the OHWM for non-tidal water bodies under the CWA or the RHA, districts should give priority to evaluating the physical characteristics of the area that are determined to be reliable indicators of the OHWM. Physical evidence to be evaluated includes those items listed in the definitions at 33 CFR Sections 328.3(e) and 329.11(a)(1). Because many types of water bodies occur with varying conditions, including topography, channel morphology and flow dynamics, districts may consider other physical characteristics indicative of the OHWM.

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[2] CWA jurisdiction extends laterally landward of the OHWM to include all adjacent wetlands wherever such adjacent wetlands are present. This guidance addresses situations where no such adjacent wetlands exist.

[3] Changes in the limits of waters of the U.S. are addressed in 33 CFR 328.5.

[4] On 3 June 1983 the Corps of Engineers’ Chief Counsel distributed legal guidance to all Corps district and division counsel offices regarding certain legal questions relating to the geographic jurisdiction of Section 10 of the Rivers and Harbors Act of 1899, including questions relating to the OHWM.

b. The following physical characteristics should be considered when making an OHWM determination, to the extent that they can be identified and are deemed reasonably reliable:

Natural line impressed on the bank
Shelving
Changes in the character of soil
Destruction of terrestrial vegetation
Presence of litter and debris
Wracking
Vegetation matted down, bent, or absent
Sediment sorting
Leaf litter disturbed or washed away
Scour
Deposition
Multiple observed flow events
Bed and banks
Water staining
Change in plant community

This list of OHWM characteristics is not exhaustive. Physical characteristics that correspond to the line on the shore established by the fluctuations of water may vary depending on the type of water body and conditions of the area. There are no “required” physical characteristics that must be present to make an OHWM determination. However, if physical evidence alone will be used for the determination, districts should generally try to identify two or more characteristics, unless there is particularly strong evidence of one.

c. Where the physical characteristics are inconclusive, misleading, unreliable, or otherwise not evident, districts may determine the OHWM by using other appropriate means that consider the characteristics of the surrounding areas, provided those other means are reliable.[5] Such other reliable methods that may be indicative of the OHWM include, but are not limited to, lake and stream gage data, elevation data, spillway height, flood predictions, historic records of water flow, and statistical evidence.

d. When making OHWM determinations, districts should be careful to look at characteristics associated with ordinary high water events, which occur on a regular or frequent basis. Evidence resulting from extraordinary events, including major flooding and storm surges, is not indicative of the OHWM. For instance, a litter or wrack line resulting from a 200-year flood event would in most cases not be considered evidence of an OHWM.

e. Districts will document in writing the physical characteristics used to establish the OHWM for CWA and/or RHA jurisdiction. If physical characteristics are inconclusive, misleading, unreliable, or not evident, the Districts’ written documentation will include information about the physical characteristics (or lack thereof) and other appropriate means that consider the characteristics of the surrounding areas, which it used to determine the OHWM.

f. To complete an approved jurisdictional determination, districts will have complete and accurate documentation that substantiates the Corps decision. At a minimum, decisions will be documented using the standardized jurisdictional determination information sheet established by

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[5] In some cases, the physical characteristics may be misleading and would not be reliable for determining the OHWM. For example, water levels or flows may be manipulated by human intervention for power generation or water supply. For such cases, districts should consider using other appropriate means to determine the OHWM.

Headquarters and provided to the districts on August 13, 2004 (or as further amended by Headquarters). Documentation will allow for a reasonably accurate replication of the determination at a future date. In this regard, documentation will normally include information such as data sheets, site visit memoranda, maps, sketches, and, in some cases, surveys and photographs documenting the OHWM.

4. **Duration.** This guidance remains in effect unless revised or rescinded.

DON T. RILEY
Major General, US Army
Director of Civil Works

APPENDIX E

Field Data

OHWM Field Data Sheets (Arid West)

HBG OHWM Field Data Sheet (Arid West)

HGB Team # **1**	Project Name: ***Desert Quartzite***	HBG Sub-Basin # **n/a**	HUC 12 # **150301040804**

Drainage Data											Comments
Date (M / D / Y)	GPS Unit #	Sample Point #	Map Sheet Ref #	OHW Width	Active (A) or Inactive (I) Channel	Up (U) / or Down (D) Slope from Road	Photo (Y/N)	Below OHWM	At OHWM	Above OHWM	Use note pages at back of notebook for comments. Put comment number in block below.
05/05/14	8	R1	5	40.0 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R2	5	1.5 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R3	5	0.5 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R4	5	1.0 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R5	5	1.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R6	5	1.5 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R7a	5	2.0 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	

Reference: D = Drainage; M = Manmade; MD = Major Drainage; R = River

Potential Geomorphic OHWM Indicators

(A) Below OHW	(B) At OHW	(C) Above OHW
1) In-stream dunes 2) Crested ripples 3) Flaser bedding 4) Harrow marks 5) Gravel sheets to rippled sands 6) Meander bars 7) Sand tongues 8) Muddy point bars 9) Long gravel bars 10) Cobble bars behind obstructions 11) Scour holes downstream of obstructions 12) Obstacle marks 13) Stepped-bed morphology in gravel 14) Narrow berms and levees 15) Streaming lineations 16) Dessication/mud cracks 17) Armored mud balls 18) Knick Points	1) Valley flat 2) Active floodplain 3) Benches: low, mid, most prominent 4) Highest surface of channel bars 5) Top of point bars 6) Break in bank slope 7) Upper limit of sand-sized particles 8) Change in particle size distribution 9) Staining of rocks 10) Exposed root hairs below intact soil layer 11) Silt deposits 12) Litter (organic debris, small twigs and leaves) 13) Drift (organic debris, larger than twigs)	1) Desert pavement 2) Rock varnish 3) Clast weathering 4) Salt splitting 5) Carbonate etching 6) Depositional topography 7) Caliche rubble 8) Soil development 9) Surface color/tone 10) Drainage development 11) Surface relief 12) Surface rounding

Potential Vegetation OHWM Indicators

	(D) Below OHW	(E) At OHW	(F) Above OHW
Hydroriparian indicators	1) Herbaceous marsh species 2) Pioneer tree seedlings 3) Sparse, low vegetation 4) Annual herbs, hydromesic ruderals 5) Perennial herbs, hydromesic clonals	1) Annual herbs, hydromesic ruderals 2) Perennial herbs, hydromesic clonals 3) Pioneer tree seedlings 4) Pioneer tree saplings	1) Annual herbs, xeric ruderals 2) Perennial herbs, non-clonal 3) Perennial herbs, clonal and non-clonal co-dominant 4) Mature pioneer trees, no young trees 5) Mature pioneer trees w/upland species 6) Late-successional species
Mesoriparian indicators	6) Pioneer tree seedlings 7) Sparse, low vegetation 8) Pioneer tree saplings 9) Xeroriparian species	5) Sparse, low vegetation Annual herbs, hydromesic 6) ruderals 7) Perennial herbs, hydromesic clonals 8) Pioneer tree seedlings 9) Pioneer tree saplings 10) Xeroriparian species 11) Annual herbs, xeric ruderals	7) Xeroriparian species 8) Annual herbs, xeric ruderals 9) Perennial herbs, non-clonal 10) Perennial herbs, clonal and non-clonal codominent 11) Mature pioneer trees, no young trees 12) Mature pioneer trees, xeric understory 13) Mature pioneer trees w/upland species 14) Late-successional species 15) Upland species
Xeroriparian indicators	10) Sparse, low vegetation 11) Xeroriparian species 12) Annual herbs, xeric ruderals	12) Sparse, low vegetation 13) Xeroriparian species 14) Annual herbs, xeric ruderals	16) Annual herbs, xeric ruderals 17) Mature pioneer trees w/upland species 18) Upland species

HBG OHWM Field Data Sheet (Arid West)

HGB Team # **1**

Project Name: ***Desert Quartzite***

HBG Sub-Basin # **n/a**

HUC 12 # **150301040804**

Drainage Data											Comments
Date (M / D / Y)	GPS Unit #	Sample Point #	Map Sheet Ref #	OHW Width	Active (A) or Inactive (I) Channel	Up (U) / or Down (D) Slope from Road	Photo (Y/N)	Below OHWM	At OHWM	Above OHWM	Use note pages at back of notebook for comments. Put comment number in block below.
05/05/14	8	R7b	5	0.5 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R8a	5	1.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R8b	5	2.0 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R9	5	1.5 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R10	5	1.0 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R11	5	2.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R12	5	2.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	

Reference: D = Drainage; M = Manmade; MD = Major Drainage; R = River

Potential Geomorphic OHWM Indicators

(A) Below OHW	(B) At OHW	(C) Above OHW
1) In-stream dunes 2) Crested ripples 3) Flaser bedding 4) Harrow marks 5) Gravel sheets to rippled sands 6) Meander bars 7) Sand tongues 8) Muddy point bars 9) Long gravel bars 10) Cobble bars behind obstructions 11) Scour holes downstream of obstructions 12) Obstacle marks 13) Stepped-bed morphology in gravel 14) Narrow berms and levees 15) Streaming lineations 16) Dessication/mud cracks 17) Armored mud balls 18) Knick Points	1) Valley flat 2) Active floodplain 3) Benches: low, mid, most prominent 4) Highest surface of channel bars 5) Top of point bars 6) Break in bank slope 7) Upper limit of sand-sized particles 8) Change in particle size distribution 9) Staining of rocks 10) Exposed root hairs below intact soil layer 11) Silt deposits 12) Litter (organic debris, small twigs and leaves) 13) Drift (organic debris, larger than twigs)	1) Desert pavement 2) Rock varnish 3) Clast weathering 4) Salt splitting 5) Carbonate etching 6) Depositional topography 7) Caliche rubble 8) Soil development 9) Surface color/tone 10) Drainage development 11) Surface relief 12) Surface rounding

Potential Vegetation OHWM Indicators

	(D) Below OHW	(E) At OHW	(F) Above OHW
Hydroriparian indicators	1) Herbaceous marsh species 2) Pioneer tree seedlings 3) Sparse, low vegetation 4) Annual herbs, hydromesic ruderals 5) Perennial herbs, hydromesic clonals	1) Annual herbs, hydromesic ruderals 2) Perennial herbs, hydromesic clonals 3) Pioneer tree seedlings 4) Pioneer tree saplings	1) Annual herbs, xeric ruderals 2) Perennial herbs, non-clonal 3) Perennial herbs, clonal and non-clonal co-dominant 4) Mature pioneer trees, no young trees 5) Mature pioneer trees w/upland species 6) Late-successional species
Mesoriparian indicators	6) Pioneer tree seedlings 7) Sparse, low vegetation 8) Pioneer tree saplings 9) Xeroriparian species	5) Sparse, low vegetation Annual herbs, hydromesic 6) ruderals 7) Perennial herbs, hydromesic clonals 8) Pioneer tree seedlings 9) Pioneer tree saplings 10) Xeroriparian species 11) Annual herbs, xeric ruderals	7) Xeroriparian species 8) Annual herbs, xeric ruderals 9) Perennial herbs, non-clonal 10) Perennial herbs, clonal and non-clonal codominent 11) Mature pioneer trees, no young trees 12) Mature pioneer trees, xeric understory 13) Mature pioneer trees w/upland species 14) Late-successional species 15) Upland species
Xeroriparian indicators	10) Sparse, low vegetation 11) Xeroriparian species 12) Annual herbs, xeric ruderals	12) Sparse, low vegetation 13) Xeroriparian species 14) Annual herbs, xeric ruderals	16) Annual herbs, xeric ruderals 17) Mature pioneer trees w/upland species 18) Upland species

HBG OHWM Field Data Sheet (Arid West)

HGB Team # 1

Project Name: *Desert Quartzite*

HBG Sub-Basin # n/a

HUC 12 # 150301040804

Drainage Data											Comments
Date (M / D / Y)	GPS Unit #	Sample Point #	Map Sheet Ref #	OHW Width	Active (A) or Inactive (I) Channel	Up (U) / or Down (D) Slope from Road	Photo (Y/N)	Below OHWM	At OHWM	Above OHWM	Use note pages at back of notebook for comments. Put comment number in block below.
05/05/14	8	R13	5	3.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R14	5	3.0 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R15	5	3.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R16	5	4.0 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R17	5	2.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R18	5	2.0 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R19	5	2.0 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	

Reference: D = Drainage; M = Manmade; MD = Major Drainage; R = River

Potential Geomorphic OHWM Indicators

(A) Below OHW	(B) At OHW	(C) Above OHW
1) In-stream dunes 2) Crested ripples 3) Flaser bedding 4) Harrow marks 5) Gravel sheets to rippled sands 6) Meander bars 7) Sand tongues 8) Muddy point bars 9) Long gravel bars 10) Cobble bars behind obstructions 11) Scour holes downstream of obstructions 12) Obstacle marks 13) Stepped-bed morphology in gravel 14) Narrow berms and levees 15) Streaming lineations 16) Dessication/mud cracks 17) Armored mud balls 18) Knick Points	1) Valley flat 2) Active floodplain 3) Benches: low, mid, most prominent 4) Highest surface of channel bars 5) Top of point bars 6) Break in bank slope 7) Upper limit of sand-sized particles 8) Change in particle size distribution 9) Staining of rocks 10) Exposed root hairs below intact soil layer 11) Silt deposits 12) Litter (organic debris, small twigs and leaves) 13) Drift (organic debris, larger than twigs)	1) Desert pavement 2) Rock varnish 3) Clast weathering 4) Salt splitting 5) Carbonate etching 6) Depositional topography 7) Caliche rubble 8) Soil development 9) Surface color/tone 10) Drainage development 11) Surface relief 12) Surface rounding

Potential Vegetation OHWM Indicators

	(D) Below OHW	(E) At OHW	(F) Above OHW
Hydroriparian indicators	1) Herbaceous marsh species 2) Pioneer tree seedlings 3) Sparse, low vegetation 4) Annual herbs, hydromesic ruderals 5) Perennial herbs, hydromesic clonals	1) Annual herbs, hydromesic ruderals 2) Perennial herbs, hydromesic clonals 3) Pioneer tree seedlings 4) Pioneer tree saplings	1) Annual herbs, xeric ruderals 2) Perennial herbs, non-clonal 3) Perennial herbs, clonal and non-clonal co-dominant 4) Mature pioneer trees, no young trees 5) Mature pioneer trees w/upland species 6) Late-successional species
Mesoriparian indicators	6) Pioneer tree seedlings 7) Sparse, low vegetation 8) Pioneer tree saplings 9) Xeroriparian species	5) Sparse, low vegetation Annual herbs, hydromesic 6) ruderals 7) Perennial herbs, hydromesic clonals 8) Pioneer tree seedlings 9) Pioneer tree saplings 10) Xeroriparian species 11) Annual herbs, xeric ruderals	7) Xeroriparian species 8) Annual herbs, xeric ruderals 9) Perennial herbs, non-clonal 10) Perennial herbs, clonal and non-clonal codominent 11) Mature pioneer trees, no young trees 12) Mature pioneer trees, xeric understory 13) Mature pioneer trees w/upland species 14) Late-successional species 15) Upland species
Xeroriparian indicators	10) Sparse, low vegetation 11) Xeroriparian species 12) Annual herbs, xeric ruderals	12) Sparse, low vegetation 13) Xeroriparian species 14) Annual herbs, xeric ruderals	16) Annual herbs, xeric ruderals 17) Mature pioneer trees w/upland species 18) Upland species

HBG OHWM Field Data Sheet (Arid West)

HGB Team # 1	Project Name: *Desert Quartzite*	HBG Sub-Basin # n/a	HUC 12 # 150301040804

Drainage Data											Comments
Date (M / D / Y)	GPS Unit #	Sample Point #	Map Sheet Ref #	OHW Width	Active (A) or Inactive (I) Channel	Up (U) / or Down (D) Slope from Road	Photo (Y/N)	Below OHWM	At OHWM	Above OHWM	Use note pages at back of notebook for comments. Put comment number in block below.
05/05/14	8	R20	5	2.0 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R21	5	2.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R22	5	2.0 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R23	5	1.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R24	5	2.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R25	5	2.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R26	5	2.0 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	

Reference: D = Drainage; M = Manmade; MD = Major Drainage; R = River

Potential Geomorphic OHWM Indicators

(A) Below OHW	(B) At OHW	(C) Above OHW
1) In-stream dunes 2) Crested ripples 3) Flaser bedding 4) Harrow marks 5) Gravel sheets to rippled sands 6) Meander bars 7) Sand tongues 8) Muddy point bars 9) Long gravel bars 10) Cobble bars behind obstructions 11) Scour holes downstream of obstructions 12) Obstacle marks 13) Stepped-bed morphology in gravel 14) Narrow berms and levees 15) Streaming lineations 16) Dessication/mud cracks 17) Armored mud balls 18) Knick Points	1) Valley flat 2) Active floodplain 3) Benches: low, mid, most prominent 4) Highest surface of channel bars 5) Top of point bars 6) Break in bank slope 7) Upper limit of sand-sized particles 8) Change in particle size distribution 9) Staining of rocks 10) Exposed root hairs below intact soil layer 11) Silt deposits 12) Litter (organic debris, small twigs and leaves) 13) Drift (organic debris, larger than twigs)	1) Desert pavement 2) Rock varnish 3) Clast weathering 4) Salt splitting 5) Carbonate etching 6) Depositional topography 7) Caliche rubble 8) Soil development 9) Surface color/tone 10) Drainage development 11) Surface relief 12) Surface rounding

Potential Vegetation OHWM Indicators

	(D) Below OHW	(E) At OHW	(F) Above OHW
Hydroriparian indicators	1) Herbaceous marsh species 2) Pioneer tree seedlings 3) Sparse, low vegetation 4) Annual herbs, hydromesic ruderals 5) Perennial herbs, hydromesic clonals	1) Annual herbs, hydromesic ruderals 2) Perennial herbs, hydromesic clonals 3) Pioneer tree seedlings 4) Pioneer tree saplings	1) Annual herbs, xeric ruderals 2) Perennial herbs, non-clonal 3) Perennial herbs, clonal and non-clonal co-dominant 4) Mature pioneer trees, no young trees 5) Mature pioneer trees w/upland species 6) Late-successional species
Mesoriparian indicators	6) Pioneer tree seedlings 7) Sparse, low vegetation 8) Pioneer tree saplings 9) Xeroriparian species	5) Sparse, low vegetation Annual herbs, hydromesic 6) ruderals 7) Perennial herbs, hydromesic clonals 8) Pioneer tree seedlings 9) Pioneer tree saplings 10) Xeroriparian species 11) Annual herbs, xeric ruderals	7) Xeroriparian species 8) Annual herbs, xeric ruderals 9) Perennial herbs, non-clonal 10) Perennial herbs, clonal and non-clonal codominent 11) Mature pioneer trees, no young trees 12) Mature pioneer trees, xeric understory 13) Mature pioneer trees w/upland species 14) Late-successional species 15) Upland species
Xeroriparian indicators	10) Sparse, low vegetation 11) Xeroriparian species 12) Annual herbs, xeric ruderals	12) Sparse, low vegetation 13) Xeroriparian species 14) Annual herbs, xeric ruderals	16) Annual herbs, xeric ruderals 17) Mature pioneer trees w/upland species 18) Upland species

HBG OHWM Field Data Sheet (Arid West)

HGB Team # **1**	Project Name: ***Desert Quartzite***	HBG Sub-Basin # **n/a**	HUC 12 # **150301040804**

Drainage Data											Comments
Date (M / D / Y)	GPS Unit #	Sample Point #	Map Sheet Ref #	OHW Width	Active (A) or Inactive (I) Channel	Up (U) / or Down (D) Slope from Road	Photo (Y/N)	Below OHWM	At OHWM	Above OHWM	Use note pages at back of notebook for comments. Put comment number in block below.
05/05/14	8	R27	5	2.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R28	5	2.0 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R29	5	3.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R30	5	2.0 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R31	5	1.5 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R32	5	1.5 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R33	5	1.5 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	

Reference: D = Drainage; M = Manmade; MD = Major Drainage; R = River

Potential Geomorphic OHWM Indicators

(A) Below OHW	(B) At OHW	(C) Above OHW
1) In-stream dunes 2) Crested ripples 3) Flaser bedding 4) Harrow marks 5) Gravel sheets to rippled sands 6) Meander bars 7) Sand tongues 8) Muddy point bars 9) Long gravel bars 10) Cobble bars behind obstructions 11) Scour holes downstream of obstructions 12) Obstacle marks 13) Stepped-bed morphology in gravel 14) Narrow berms and levees 15) Streaming lineations 16) Dessication/mud cracks 17) Armored mud balls 18) Knick Points	1) Valley flat 2) Active floodplain 3) Benches: low, mid, most prominent 4) Highest surface of channel bars 5) Top of point bars 6) Break in bank slope 7) Upper limit of sand-sized particles 8) Change in particle size distribution 9) Staining of rocks 10) Exposed root hairs below intact soil layer 11) Silt deposits 12) Litter (organic debris, small twigs and leaves) 13) Drift (organic debris, larger than twigs)	1) Desert pavement 2) Rock varnish 3) Clast weathering 4) Salt splitting 5) Carbonate etching 6) Depositional topography 7) Caliche rubble 8) Soil development 9) Surface color/tone 10) Drainage development 11) Surface relief 12) Surface rounding

Potential Vegetation OHWM Indicators

	(D) Below OHW	(E) At OHW	(F) Above OHW
Hydroriparian indicators	1) Herbaceous marsh species 2) Pioneer tree seedlings 3) Sparse, low vegetation 4) Annual herbs, hydromesic ruderals 5) Perennial herbs, hydromesic clonals	1) Annual herbs, hydromesic ruderals 2) Perennial herbs, hydromesic clonals 3) Pioneer tree seedlings 4) Pioneer tree saplings	1) Annual herbs, xeric ruderals 2) Perennial herbs, non-clonal 3) Perennial herbs, clonal and non-clonal co-dominant 4) Mature pioneer trees, no young trees 5) Mature pioneer trees w/upland species 6) Late-successional species
Mesoriparian indicators	6) Pioneer tree seedlings 7) Sparse, low vegetation 8) Pioneer tree saplings 9) Xeroriparian species	5) Sparse, low vegetation Annual herbs, hydromesic 6) ruderals 7) Perennial herbs, hydromesic clonals 8) Pioneer tree seedlings 9) Pioneer tree saplings 10) Xeroriparian species 11) Annual herbs, xeric ruderals	7) Xeroriparian species 8) Annual herbs, xeric ruderals 9) Perennial herbs, non-clonal 10) Perennial herbs, clonal and non-clonal codominent 11) Mature pioneer trees, no young trees 12) Mature pioneer trees, xeric understory 13) Mature pioneer trees w/upland species 14) Late-successional species 15) Upland species
Xeroriparian indicators	10) Sparse, low vegetation 11) Xeroriparian species 12) Annual herbs, xeric ruderals	12) Sparse, low vegetation 13) Xeroriparian species 14) Annual herbs, xeric ruderals	16) Annual herbs, xeric ruderals 17) Mature pioneer trees w/upland species 18) Upland species

HBG OHWM Field Data Sheet (Arid West)

HGB Team # 1

Project Name: *Desert Quartzite*

HBG Sub-Basin # n/a

HUC 12 # 150301040804

Drainage Data											Comments
Date (M / D / Y)	GPS Unit #	Sample Point #	Map Sheet Ref #	OHW Width	Active (A) or Inactive (I) Channel	Up (U) / or Down (D) Slope from Road	Photo (Y/N)	Below OHWM	At OHWM	Above OHWM	Use note pages at back of notebook for comments. Put comment number in block below.
05/05/14	8	R34	5	5.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R35	5	2.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R36	5	1.5 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R37	5	5.0 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R38	5	2.0 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R39	5	1.5 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R40	4 & 5	1.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	

Reference: D = Drainage; M = Manmade; MD = Major Drainage; R = River

Potential Geomorphic OHWM Indicators

(A) Below OHW	(B) At OHW	(C) Above OHW
1) In-stream dunes 2) Crested ripples 3) Flaser bedding 4) Harrow marks 5) Gravel sheets to rippled sands 6) Meander bars 7) Sand tongues 8) Muddy point bars 9) Long gravel bars 10) Cobble bars behind obstructions 11) Scour holes downstream of obstructions 12) Obstacle marks 13) Stepped-bed morphology in gravel 14) Narrow berms and levees 15) Streaming lineations 16) Dessication/mud cracks 17) Armored mud balls 18) Knick Points	1) Valley flat 2) Active floodplain 3) Benches: low, mid, most prominent 4) Highest surface of channel bars 5) Top of point bars 6) Break in bank slope 7) Upper limit of sand-sized particles 8) Change in particle size distribution 9) Staining of rocks 10) Exposed root hairs below intact soil layer 11) Silt deposits 12) Litter (organic debris, small twigs and leaves) 13) Drift (organic debris, larger than twigs)	1) Desert pavement 2) Rock varnish 3) Clast weathering 4) Salt splitting 5) Carbonate etching 6) Depositional topography 7) Caliche rubble 8) Soil development 9) Surface color/tone 10) Drainage development 11) Surface relief 12) Surface rounding

Potential Vegetation OHWM Indicators

	(D) Below OHW	(E) At OHW	(F) Above OHW
Hydroriparian indicators	1) Herbaceous marsh species 2) Pioneer tree seedlings 3) Sparse, low vegetation 4) Annual herbs, hydromesic ruderals 5) Perennial herbs, hydromesic clonals	1) Annual herbs, hydromesic ruderals 2) Perennial herbs, hydromesic clonals 3) Pioneer tree seedlings 4) Pioneer tree saplings	1) Annual herbs, xeric ruderals 2) Perennial herbs, non-clonal 3) Perennial herbs, clonal and non-clonal co-dominant 4) Mature pioneer trees, no young trees 5) Mature pioneer trees w/upland species 6) Late-successional species
Mesoriparian indicators	6) Pioneer tree seedlings 7) Sparse, low vegetation 8) Pioneer tree saplings 9) Xeroriparian species	5) Sparse, low vegetation Annual herbs, hydromesic 6) ruderals 7) Perennial herbs, hydromesic clonals 8) Pioneer tree seedlings 9) Pioneer tree saplings 10) Xeroriparian species 11) Annual herbs, xeric ruderals	7) Xeroriparian species 8) Annual herbs, xeric ruderals 9) Perennial herbs, non-clonal 10) Perennial herbs, clonal and non-clonal codominent 11) Mature pioneer trees, no young trees 12) Mature pioneer trees, xeric understory 13) Mature pioneer trees w/upland species 14) Late-successional species 15) Upland species
Xeroriparian indicators	10) Sparse, low vegetation 11) Xeroriparian species 12) Annual herbs, xeric ruderals	12) Sparse, low vegetation 13) Xeroriparian species 14) Annual herbs, xeric ruderals	16) Annual herbs, xeric ruderals 17) Mature pioneer trees w/upland species 18) Upland species

HBG OHWM Field Data Sheet (Arid West)

HGB Team # 1

Project Name: *Desert Quartzite*

HBG Sub-Basin # n/a

HUC 12 # 150301040804

Drainage Data											Comments
Date (M / D / Y)	GPS Unit #	Sample Point #	Map Sheet Ref #	OHW Width	Active (A) or Inactive (I) Channel	Up (U) / or Down (D) Slope from Road	Photo (Y/N)	Below OHWM	At OHWM	Above OHWM	Use note pages at back of notebook for comments. Put comment number in block below.
05/05/14	8	R41	4 & 5	1.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R42	4 & 5	3.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R43	4	1.5 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R44	4	1.5 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R45	4	1.5 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R46	4	3.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	
05/05/14	8	R47	4	2.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18	B: 6, 10, 11, 12	C: 10, 12	
								D: 3	E: 10, 12	F: 16, 17, 18	

Reference: D = Drainage; M = Manmade; MD = Major Drainage; R = River

Potential Geomorphic OHWM Indicators

(A) Below OHW	(B) At OHW	(C) Above OHW
1) In-stream dunes 2) Crested ripples 3) Flaser bedding 4) Harrow marks 5) Gravel sheets to rippled sands 6) Meander bars 7) Sand tongues 8) Muddy point bars 9) Long gravel bars 10) Cobble bars behind obstructions 11) Scour holes downstream of obstructions 12) Obstacle marks 13) Stepped-bed morphology in gravel 14) Narrow berms and levees 15) Streaming lineations 16) Dessication/mud cracks 17) Armored mud balls 18) Knick Points	1) Valley flat 2) Active floodplain 3) Benches: low, mid, most prominent 4) Highest surface of channel bars 5) Top of point bars 6) Break in bank slope 7) Upper limit of sand-sized particles 8) Change in particle size distribution 9) Staining of rocks 10) Exposed root hairs below intact soil layer 11) Silt deposits 12) Litter (organic debris, small twigs and leaves) 13) Drift (organic debris, larger than twigs)	1) Desert pavement 2) Rock varnish 3) Clast weathering 4) Salt splitting 5) Carbonate etching 6) Depositional topography 7) Caliche rubble 8) Soil development 9) Surface color/tone 10) Drainage development 11) Surface relief 12) Surface rounding

Potential Vegetation OHWM Indicators

	(D) Below OHW	(E) At OHW	(F) Above OHW
Hydroriparian indicators	1) Herbaceous marsh species 2) Pioneer tree seedlings 3) Sparse, low vegetation 4) Annual herbs, hydromesic ruderals 5) Perennial herbs, hydromesic clonals	1) Annual herbs, hydromesic ruderals 2) Perennial herbs, hydromesic clonals 3) Pioneer tree seedlings 4) Pioneer tree saplings	1) Annual herbs, xeric ruderals 2) Perennial herbs, non-clonal 3) Perennial herbs, clonal and non-clonal co-dominant 4) Mature pioneer trees, no young trees 5) Mature pioneer trees w/upland species 6) Late-successional species
Mesoriparian indicators	6) Pioneer tree seedlings 7) Sparse, low vegetation 8) Pioneer tree saplings 9) Xeroriparian species	5) Sparse, low vegetation Annual herbs, hydromesic 6) ruderals 7) Perennial herbs, hydromesic clonals 8) Pioneer tree seedlings 9) Pioneer tree saplings 10) Xeroriparian species 11) Annual herbs, xeric ruderals	7) Xeroriparian species 8) Annual herbs, xeric ruderals 9) Perennial herbs, non-clonal 10) Perennial herbs, clonal and non-clonal codominent 11) Mature pioneer trees, no young trees 12) Mature pioneer trees, xeric understory 13) Mature pioneer trees w/upland species 14) Late-successional species 15) Upland species
Xeroriparian indicators	10) Sparse, low vegetation 11) Xeroriparian species 12) Annual herbs, xeric ruderals	12) Sparse, low vegetation 13) Xeroriparian species 14) Annual herbs, xeric ruderals	16) Annual herbs, xeric ruderals 17) Mature pioneer trees w/upland species 18) Upland species

HBG OHWM Field Data Sheet (Arid West)

HGB Team # **1**	Project Name: ***Desert Quartzite***	HBG Sub-Basin # **n/a**	HUC 12 # **150301040804**

Drainage Data												Comments
Date (M / D / Y)	Time (24-Hour)	GPS Unit #	Sample Point #	Map Sheet Ref #	OHW Width	Active (A) or Inactive (I) Channel	Up (U) / or Down (D) Slope from Road	Photo (Y/N)	Below OHWM	At OHWM	Above OHWM	Use note pages at back of notebook for comments. Put comment number in block below.
05/05/14	n/a	8	R48	4	1.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	n/a	8	R49	4	1.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	n/a	8	R50	4	2.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	n/a	8	R51a	4	2.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	n/a	8	R51b	5	5.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	n/a	8	R51c	5	2.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	n/a	8	R52a	4	2.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	

Reference: D = Drainage; M = Manmade; MD = Major Drainage; R = River

Potential Geomorphic OHWM Indicators

(A) Below OHW	(B) At OHW	(C) Above OHW
1) In-stream dunes 2) Crested ripples 3) Flaser bedding 4) Harrow marks 5) Gravel sheets to rippled sands 6) Meander bars 7) Sand tongues 8) Muddy point bars 9) Long gravel bars 10) Cobble bars behind obstructions 11) Scour holes downstream of obstructions 12) Obstacle marks 13) Stepped-bed morphology in gravel 14) Narrow berms and levees 15) Streaming lineations 16) Dessication/mud cracks 17) Armored mud balls 18) Knick Points	1) Valley flat 2) Active floodplain 3) Benches: low, mid, most prominent 4) Highest surface of channel bars 5) Top of point bars 6) Break in bank slope 7) Upper limit of sand-sized particles 8) Change in particle size distribution 9) Staining of rocks 10) Exposed root hairs below intact soil layer 11) Silt deposits 12) Litter (organic debris, small twigs and leaves) 13) Drift (organic debris, larger than twigs)	1) Desert pavement 2) Rock varnish 3) Clast weathering 4) Salt splitting 5) Carbonate etching 6) Depositional topography 7) Caliche rubble 8) Soil development 9) Surface color/tone 10) Drainage development 11) Surface relief 12) Surface rounding

Potential Vegetation OHWM Indicators

	(D) Below OHW	(E) At OHW	(F) Above OHW
Hydroriparian indicators	1) Herbaceous marsh species 2) Pioneer tree seedlings 3) Sparse, low vegetation 4) Annual herbs, hydromesic ruderals 5) Perennial herbs, hydromesic clonals	1) Annual herbs, hydromesic ruderals 2) Perennial herbs, hydromesic clonals 3) Pioneer tree seedlings 4) Pioneer tree saplings	1) Annual herbs, xeric ruderals 2) Perennial herbs, non-clonal 3) Perennial herbs, clonal and non-clonal co-dominant 4) Mature pioneer trees, no young trees 5) Mature pioneer trees w/upland species 6) Late-successional species
Mesoriparian indicators	6) Pioneer tree seedlings 7) Sparse, low vegetation 8) Pioneer tree saplings 9) Xeroriparian species	5) Sparse, low vegetation Annual herbs, hydromesic 6) ruderals 7) Perennial herbs, hydromesic clonals 8) Pioneer tree seedlings 9) Pioneer tree saplings 10) Xeroriparian species 11) Annual herbs, xeric ruderals	7) Xeroriparian species 8) Annual herbs, xeric ruderals 9) Perennial herbs, non-clonal 10) Perennial herbs, clonal and non-clonal codominent 11) Mature pioneer trees, no young trees 12) Mature pioneer trees, xeric understory 13) Mature pioneer trees w/upland species 14) Late-successional species 15) Upland species
Xeroriparian indicators	10) Sparse, low vegetation 11) Xeroriparian species 12) Annual herbs, xeric ruderals	12) Sparse, low vegetation 13) Xeroriparian species 14) Annual herbs, xeric ruderals	16) Annual herbs, xeric ruderals 17) Mature pioneer trees w/upland species 18) Upland species

HBG OHWM Field Data Sheet (Arid West)

HGB Team # 1	Project Name: *Desert Quartzite*	HBG Sub-Basin # n/a	HUC 12 # 150301040804

Drainage Data											Comments
Date (M / D / Y)	GPS Unit #	Sample Point #	Map Sheet Ref #	OHW Width	Active (A) or Inactive (I) Channel	Up (U) / or Down (D) Slope from Road	Photo (Y/N)	Below OHWM	At OHWM	Above OHWM	Use note pages at back of notebook for comments. Put comment number in block below.
05/05/14	8	R52b	4 & 5	5.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R52c	5	3.0 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R52d	4	4.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R53	4 & 5	5.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R54a	8	2.0 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R54b	8	2.0 ft	A	D	N	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	
05/05/14	8	R54c	8	2.0 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	

Reference: D = Drainage ; M = Manmade; MD = Major Drainage; R = River

Potential Geomorphic OHWM Indicators

(A) Below OHW	(B) At OHW	(C) Above OHW
1) In-stream dunes 2) Crested ripples 3) Flaser bedding 4) Harrow marks 5) Gravel sheets to rippled sands 6) Meander bars 7) Sand tongues 8) Muddy point bars 9) Long gravel bars 10) Cobble bars behind obstructions 11) Scour holes downstream of obstructions 12) Obstacle marks 13) Stepped-bed morphology in gravel 14) Narrow berms and levees 15) Streaming lineations 16) Dessication/mud cracks 17) Armored mud balls 18) Knick Points	1) Valley flat 2) Active floodplain 3) Benches: low, mid, most prominent 4) Highest surface of channel bars 5) Top of point bars 6) Break in bank slope 7) Upper limit of sand-sized particles 8) Change in particle size distribution 9) Staining of rocks 10) Exposed root hairs below intact soil layer 11) Silt deposits 12) Litter (organic debris, small twigs and leaves) 13) Drift (organic debris, larger than twigs)	1) Desert pavement 2) Rock varnish 3) Clast weathering 4) Salt splitting 5) Carbonate etching 6) Depositional topography 7) Caliche rubble 8) Soil development 9) Surface color/tone 10) Drainage development 11) Surface relief 12) Surface rounding

Potential Vegetation OHWM Indicators

	(D) Below OHW	(E) At OHW	(F) Above OHW
Hydroriparian indicators	1) Herbaceous marsh species 2) Pioneer tree seedlings 3) Sparse, low vegetation 4) Annual herbs, hydromesic ruderals 5) Perennial herbs, hydromesic clonals	1) Annual herbs, hydromesic ruderals 2) Perennial herbs, hydromesic clonals 3) Pioneer tree seedlings 4) Pioneer tree saplings	1) Annual herbs, xeric ruderals 2) Perennial herbs, non-clonal 3) Perennial herbs, clonal and non-clonal co-dominant 4) Mature pioneer trees, no young trees 5) Mature pioneer trees w/upland species 6) Late-successional species
Mesoriparian indicators	6) Pioneer tree seedlings 7) Sparse, low vegetation 8) Pioneer tree saplings 9) Xeroriparian species	5) Sparse, low vegetation Annual herbs, hydromesic 6) ruderals 7) Perennial herbs, hydromesic clonals 8) Pioneer tree seedlings 9) Pioneer tree saplings 10) Xeroriparian species 11) Annual herbs, xeric ruderals	7) Xeroriparian species 8) Annual herbs, xeric ruderals 9) Perennial herbs, non-clonal 10) Perennial herbs, clonal and non-clonal codominent 11) Mature pioneer trees, no young trees 12) Mature pioneer trees, xeric understory 13) Mature pioneer trees w/upland species 14) Late-successional species 15) Upland species
Xeroriparian indicators	10) Sparse, low vegetation 11) Xeroriparian species 12) Annual herbs, xeric ruderals	12) Sparse, low vegetation 13) Xeroriparian species 14) Annual herbs, xeric ruderals	16) Annual herbs, xeric ruderals 17) Mature pioneer trees w/upland species 18) Upland species

HBG OHWM Field Data Sheet (Arid West)

HGB Team # 1

Project Name: *Desert Quartzite*

HBG Sub-Basin # n/a

HUC 12 # 150301040804

Drainage Data												Comments
Date (M / D / Y)	Time (24-Hour)	GPS Unit #	Sample Point #	Map Sheet Ref #	OHW Width	Active (A) or Inactive (I) Channel	Up (U) / or Down (D) Slope from Road	Photo (Y/N)	Below OHWM	At OHWM	Above OHWM	Use note pages at back of notebook for comments. Put comment number in block below.
05/06/14	n/a	8	R55a	14	1.5 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	*Beginning of stream drainage; abuts, but is outside of study area; abruptly ends as shown with no evidence of shallow groundwater flow beyond end point.*
05/06/14	n/a	8	R55b	14	3.0 ft	A	D	Y	A: 1, 7, 10, 11, 12, 15, 18 D: 3	B: 6, 10, 11, 12 E: 10, 12	C: 10, 12 F: 16, 17, 18	*End of stream drainage; abuts, but is outside of study area*

Reference: D = Drainage ; M = Manmade; MD = Major Drainage; R = River

Potential Geomorphic OHWM Indicators

(A) Below OHW	(B) At OHW	(C) Above OHW
1) In-stream dunes	1) Valley flat	1) Desert pavement
2) Crested ripples	2) Active floodplain	2) Rock varnish
3) Flaser bedding	3) Benches: low, mid, most prominent	3) Clast weathering
4) Harrow marks	4) Highest surface of channel bars	4) Salt splitting
5) Gravel sheets to rippled sands	5) Top of point bars	5) Carbonate etching
6) Meander bars	6) Break in bank slope	6) Depositional topography
7) Sand tongues	7) Upper limit of sand-sized particles	7) Caliche rubble
8) Muddy point bars	8) Change in particle size distribution	8) Soil development
9) Long gravel bars	9) Staining of rocks	9) Surface color/tone
10) Cobble bars behind obstructions	10) Exposed root hairs below intact soil layer	10) Drainage development
11) Scour holes downstream of obstructions	11) Silt deposits	11) Surface relief
12) Obstacle marks	12) Litter (organic debris, small twigs and leaves)	12) Surface rounding
13) Stepped-bed morphology in gravel	13) Drift (organic debris, larger than twigs)	
14) Narrow berms and levees		
15) Streaming lineations		
16) Dessication/mud cracks		
17) Armored mud balls		
18) Knick Points		

Potential Vegetation OHWM Indicators

	(D) Below OHW	(E) At OHW	(F) Above OHW
Hydroriparian indicators	1) Herbaceous marsh species 2) Pioneer tree seedlings 3) Sparse, low vegetation 4) Annual herbs, hydromesic ruderals 5) Perennial herbs, hydromesic clonals	1) Annual herbs, hydromesic ruderals 2) Perennial herbs, hydromesic clonals 3) Pioneer tree seedlings 4) Pioneer tree saplings	1) Annual herbs, xeric ruderals 2) Perennial herbs, non-clonal 3) Perennial herbs, clonal and non-clonal co-dominant 4) Mature pioneer trees, no young trees 5) Mature pioneer trees w/upland species 6) Late-successional species
Mesoriparian indicators	6) Pioneer tree seedlings 7) Sparse, low vegetation 8) Pioneer tree saplings 9) Xeroriparian species	5) Sparse, low vegetation Annual herbs, hydromesic 6) ruderals 7) Perennial herbs, hydromesic clonals 8) Pioneer tree seedlings 9) Pioneer tree saplings 10) Xeroriparian species 11) Annual herbs, xeric ruderals	7) Xeroriparian species 8) Annual herbs, xeric ruderals 9) Perennial herbs, non-clonal 10) Perennial herbs, clonal and non-clonal codominent 11) Mature pioneer trees, no young trees 12) Mature pioneer trees, xeric understory 13) Mature pioneer trees w/upland species 14) Late-successional species 15) Upland species
Xeroriparian indicators	10) Sparse, low vegetation 11) Xeroriparian species 12) Annual herbs, xeric ruderals	12) Sparse, low vegetation 13) Xeroriparian species 14) Annual herbs, xeric ruderals	16) Annual herbs, xeric ruderals 17) Mature pioneer trees w/upland species 18) Upland species

Wetland Determination Data Forms – Arid West Region

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Possible Solar Farm Project City/County: Blythe/ Riverside Sampling Date: 2-13-15

Applicant/Owner: Client is First Solar State: CA Sampling Point: W 7a Investigator(s): TH

Section, Township, Range:

Landform (hillslope, terrace, etc.): Fan Remnant Local relief (concave, convex, none): none Slope (%): < 2%

Subregion (LRR): LRR D Lat: 33.6016568498 Long: -114.767078005 Datum: WGS84

Soil Map Unit Name: Chuckawalla very gravelly silt loam NWI classification: -

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are “Normal Circumstances” present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No ✓	**Is the Sampled Area within a Wetland?** **Yes ____ No ✓**
Hydric Soil Present?	Yes ____ No ✓	
Wetland Hydrology Present?	Yes ____ No ✓	

Remarks:

Secondary hydrology indicators present in ephemeral streams. Flows are short lived for hours not days and give a false positive wetland indicator. See hydrology remarks.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1. None			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1. None			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 1' x 1')			
1. Bromus rubens	3	Y	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	3		
Woody Vine Stratum (Plot size: ____)			
1. None			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 97 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of: Multiply by:

OBL species ____ x 1 = __ FACW species

____ x 2 = ____ FAC species

____ x 3 = ____ FACU species ____

__ x 4 = ____ UPL species

__ x 5 = ____ Column Totals: __ (A)

____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

__ Dominance Test is >50%

__ Prevalence Index is s;3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ____ No ✓**

Remarks:

SOIL

Sampling Point: W 7a

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-22	7.5YR4/4	100					GSCL	gravely alluvium; some stratification of gravel and sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Stratified Layers (A5) (**LRR C**)
__ 1 cm Muck (A9) (**LRR D**)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)

Sandy Redox (S5)
Stripped Matrix (S6)
Loamy Mucky Mineral (F1)
Loamy Gleyed Matrix (F2)
Depleted Matrix (F3)
Redox Dark Surface (F6)
Depleted Dark Surface (F7)
Redox Depressions (F8)
Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

__ 1 cm Muck (A9) (**LRR C**)
__ 2 cm Muck (A10) (**LRR B**)
__ Reduced Vertic (F18)
__ Red Parent Material (TF2)
__ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soil Present? Yes ____ **No** ✓

Remarks:

Soil is well drained

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1) (**Nonriverine**)
__ Sediment Deposits (B2) (**Nonriverine**)
__ Drift Deposits (B3) (**Nonriverine**)
__ Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Water-Stained Leaves (B9)

Salt Crust (B11)
Biotic Crust (B12)
Aquatic Invertebrates (B13)
Hydrogen Sulfide Odor (C1)
Oxidized Rhizospheres along Living Roots (C3)
Presence of Reduced Iron (C4)
Recent Iron Reduction in Tilled Soils (C6)
Thin Muck Surface (C7)
Other (Explain in Remarks)

Secondary Indicators (2 or more required)

✓ Water Marks (B1) (**Riverine**)
✓ Sediment Deposits (B2) (**Riverine**)
✓ Drift Deposits (B3) (**Riverine**)
Drainage Patterns (B10)
Dry-Season Water Table (C2)
Crayfish Burrows (C8)
Saturation Visible on Aerial Imagery (C9)
Shallow Aquitard (D3)
FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____
Water Table Present? Yes ____ No ✓ Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? Yes ____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

NA

Remarks:

The secondary indicators are not reflective of wetland conditions as they are typically formed during high rainfall events where flows last for hours not days. Wetland hydrology conditions occur when the soil is flooded, ponded, or inundated for 14 consecutive days or more during the growing season (page 59; 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)).

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Possible Solar Farm Project City/County: Blythe/ Riverside Sampling Date: 2-13-15

Applicant/Owner: Client is First Solar State: CA Sampling Point: W-R28 Investigator(s): TH

Section, Township, Range: ______

Landform (hillslope, terrace, etc.): Arroyos Local relief (concave, convex, none): none Slope (%): < 2%

Subregion (LRR): LRR D Lat: 33.5988807676 Long: -114.768189595 Datum: WGS84

Soil Map Unit Name: Carrizo gravelly sand NWI classification: -

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___ No ✓	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** ✓
Hydric Soil Present?	Yes ___ No ✓	
Wetland Hydrology Present?	Yes ___ No ✓	

Remarks:

Secondary hydrology indicators present in ephemeral streams. Flows are short lived for hours not days and give a false positive wetland indicator. See hydrology remarks.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ______)			
1. None			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 3' x 3')			
1. Ambrosia dumosa	5	Y	UPL
2.			
3.			
4.			
5.			
= Total Cover	5		
Herb Stratum (Plot size: ______)			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover			
Woody Vine Stratum (Plot size: ______)			
1. None			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 95 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of: Multiply by:

OBL species ______ x 1 = ___

FACW species ______ x 2 = ___

FAC species ______ x 3 = ___

FACU species ______ x 4 = ___

UPL species ______ x 5 = ___

Column Totals: ___ (A) ______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is s;3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ___ **No** ✓

Remarks:

Vegetation on top edge of low terrace or bench.

SOIL

Sampling Point: W-R28

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-22	10YR4/3	100					DS	gravely coarse sand alluvium; stratification of gravel and sand and sand layers

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)

Sandy Redox (S5)
Stripped Matrix (S6)
Loamy Mucky Mineral (F1)
Loamy Gleyed Matrix (F2)
Depleted Matrix (F3)
Redox Dark Surface (F6)
Depleted Dark Surface (F7)
Redox Depressions (F8)
Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______
Depth (inches): ______

Hydric Soil Present? Yes ______ **No** ✓

Remarks:

Soil is well drained

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)

Salt Crust (B11)
Biotic Crust (B12)
Aquatic Invertebrates (B13)
Hydrogen Sulfide Odor (C1)
Oxidized Rhizospheres along Living Roots (C3)
Presence of Reduced Iron (C4)
Recent Iron Reduction in Tilled Soils (C6)
Thin Muck Surface (C7)
Other (Explain in Remarks)

Secondary Indicators (2 or more required)

✓ Water Marks (B1) (**Riverine**)
✓ Sediment Deposits (B2) (**Riverine**)
Drift Deposits (B3) (**Riverine**)
Drainage Patterns (B10)
Dry-Season Water Table (C2)
Crayfish Burrows (C8)
Saturation Visible on Aerial Imagery (C9)
Shallow Aquitard (D3)
FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______
Water Table Present? Yes ______ No ✓ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ______ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

NA

Remarks:

The secondary indicators are not reflective of wetland conditions as they are typically formed during high rainfall events where flows last for hours not days. Wetland hydrology conditions occur when the soil is flooded, ponded, or inundated for 14 consecutive days or more during the growing season (page 59; 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)).

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Possible Solar Farm Project City/County: Blythe/ Riverside Sampling Date: 2-13-15

Applicant/Owner: Client is First Solar State: CA Sampling Point: W-R37 Investigator(s): TH

Section, Township, Range: ____

Landform (hillslope, terrace, etc.): Sand Sheets Local relief (concave, convex, none): none Slope (%): < 2%

Subregion (LRR): LRR D Lat: 33.5972083273 Long: -114.767831292 Datum: WGS84

Soil Map Unit Name: Rositas fine sand, 2 to 9 percent slopes: Ce = Carrizo gravelly sand NWI classification: -

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No ✓	**Is the Sampled Area within a Wetland?**	**Yes ____ No ✓**
Hydric Soil Present?	Yes ____ No ✓		
Wetland Hydrology Present?	Yes ____ No ✓		

Remarks:

Secondary hydrology indicators present in ephemeral streams. Flows are short lived for hours not days and give a false positive wetland indicator. See hydrology remarks.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1. None			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1. None			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: 1' x 1')			
1. Bromus rubens	5	Y	U
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	5		
Woody Vine Stratum (Plot size: ____)			
1. None			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 95 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of: Multiply by:

OBL species ____ x 1 = __ FACW species ____ x 2 = ____ FAC species ____ x 3 = ____ FACU species ____ x 4 = ____ UPL species ____ x 5 = ____ Column Totals: ____ (A) ____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

__ Dominance Test is >50%

__ Prevalence Index is s;3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ____ No ✓**

Remarks:

SOIL

Sampling Point: W-R37

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-22	7.5YR5/6	100					Sand	fine sand; surrounded by gravely coarser sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
Sandy Redox (S5)
Stripped Matrix (S6)
Loamy Mucky Mineral (F1)
Loamy Gleyed Matrix (F2)
Depleted Matrix (F3)
Redox Dark Surface (F6)
Depleted Dark Surface (F7)
Redox Depressions (F8)
Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______________
Depth (inches): ______________

Hydric Soil Present? Yes ___ **No** ✓

Remarks:

Soil is well drained

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
Salt Crust (B11)
Biotic Crust (B12)
Aquatic Invertebrates (B13)
Hydrogen Sulfide Odor (C1)
Oxidized Rhizospheres along Living Roots (C3)
Presence of Reduced Iron (C4)
Recent Iron Reduction in Tilled Soils (C6)
Thin Muck Surface (C7)
Other (Explain in Remarks)

Secondary Indicators (2 or more required)

✓ Water Marks (B1) (**Riverine**)
✓ Sediment Deposits (B2) (**Riverine**)
Drift Deposits (B3) (**Riverine**)
Drainage Patterns (B10)
Dry-Season Water Table (C2)
Crayfish Burrows (C8)
Saturation Visible on Aerial Imagery (C9)
Shallow Aquitard (D3)
FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ______
Water Table Present? Yes ___ No ✓ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ___ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

NA

Remarks:

The secondary indicators are not reflective of wetland conditions as they are typically formed during high rainfall events where flows last for hours not days. Wetland hydrology conditions occur when the soil is flooded, ponded, or inundated for 14 consecutive days or more during the growing season (page 59; 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)).

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Possible Solar Farm Project City/County: Blythe/ Riverside Sampling Date: 2-13-15
Applicant/Owner: Client is First Solar State: CA Sampling Point: W R38
Investigator(s): TH Section, Township, Range:
Landform (hillslope, terrace, etc.): Fan Remnant Local relief (concave, convex, none): none Slope (%): < 2%
Subregion (LRR): LRR D Lat: 33.6016568498 Long: -114.767078005 Datum: WGS84 Soil
Map Unit Name: Chuckawalla very gravelly silt loam NWI classification: -
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No (If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No
Are Vegetation, Soil, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes No ✓	**Is the Sampled Area within a Wetland?** **Yes** **No** ✓
Hydric Soil Present?	Yes No ✓	
Wetland Hydrology Present?	Yes No ✓	

Remarks:

Secondary hydrology indicators present in ephemeral streams. Flows are short lived for hours not days and give a false positive wetland indicator. See hydrology remarks.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1. None			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1. Ambrosia dumosa	5	Y	U
2.			
3.			
4.			
5.			
	5 = Total Cover		
Herb Stratum (Plot size: 1' x 1')			
1. Bromus rubens	2	Y	UPL
2. Pleuraphis rigida	5	Y	UPL
3.			
4.			
5.			
6.			
7.			
8.			
	7 = Total Cover		
Woody Vine Stratum (Plot size:)			
1. None			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 88 % Cover of Biotic Crust

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of: Multiply by:
OBL species x 1 = FACW species
x 2 = FAC species
x 3 = FACU species
x 4 = UPL species
x 5 = Column Totals: (A)
(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

Dominance Test is >50%
Prevalence Index is s;3.0[1]
Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
– Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** **No** ✓

Remarks:

SOIL

Sampling Point: W R38

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-22	7.5YR4/4	100					GSCL	gravely alluvium; some stratification of gravel and sand ⊞

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)

Sandy Redox (S5)
Stripped Matrix (S6)
Loamy Mucky Mineral (F1)
Loamy Gleyed Matrix (F2)
Depleted Matrix (F3)
Redox Dark Surface (F6)
Depleted Dark Surface (F7)
Redox Depressions (F8)
Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ______ No ✓

Remarks:

Soil is well drained

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)

Salt Crust (B11)
Biotic Crust (B12)
Aquatic Invertebrates (B13)
Hydrogen Sulfide Odor (C1)
Oxidized Rhizospheres along Living Roots (C3)
Presence of Reduced Iron (C4)
Recent Iron Reduction in Tilled Soils (C6)
Thin Muck Surface (C7)
Other (Explain in Remarks)

Secondary Indicators (2 or more required)

✓ Water Marks (B1) (**Riverine**)
✓ Sediment Deposits (B2) (**Riverine**)
Drift Deposits (B3) (**Riverine**)
Drainage Patterns (B10)
Dry-Season Water Table (C2)
Crayfish Burrows (C8)
Saturation Visible on Aerial Imagery (C9)
Shallow Aquitard (D3)
FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ____________
Water Table Present? Yes ______ No ✓ Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ____________

Wetland Hydrology Present? Yes ______ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

NA

Remarks:

The secondary indicators are not reflective of wetland conditions as they are typically formed during high rainfall events where flows last for hours not days. Wetland hydrology conditions occur when the soil is flooded, ponded, or inundated for 14 consecutive days or more during the growing season (page 59; 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)).

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Possible Solar Farm Project City/County: Blythe/ Riverside Sampling Date: 2-13-15

Applicant/Owner: Client is First Solar State: CA Sampling Point: W-R52c Investigator(s): TH

Section, Township, Range: ______

Landform (hillslope, terrace, etc.): Fan Remnant Local relief (concave, convex, none): none Slope (%): < 2%

Subregion (LRR): LRR D Lat: 33.5961521464 Long: -114.771981989 Datum: WGS84

Soil Map Unit Name: Chuckawalla very gravelly silt loam NWI classification: -

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ______ (If no, explain in Remarks.)

Are Vegetation______, Soil______, or Hydrology______significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ______

Are Vegetation______, Soil______, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes______ No ✓

Hydric Soil Present? Yes______ No ✓

Wetland Hydrology Present? Yes______ No ✓

Is the Sampled Area within a Wetland? **Yes______ No ✓**

Remarks:

Secondary hydrology indicators present in ephemeral streams. Flows are short lived for hours not days and give a false positive wetland indicator. See hydrology remarks.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
= Total Cover			

Sapling/Shrub Stratum (Plot size: 3' x 3')	Absolute % Cover	Dominant Species?	Indicator Status
1. Ambrosia dumosa	5	Y	UPL
2.			
3.			
4.			
5.			
= Total Cover	5		

Herb Stratum (Plot size: 3' x 3')	Absolute % Cover	Dominant Species?	Indicator Status
1. Bromus rubens	3	Y	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	3		

Woody Vine Stratum (Plot size: ______)	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 92 % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes______ No ✓**

Remarks:

SOIL

Sampling Point: W-R52c

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-22	7.5YR4/4	100					GSCL	gravely alluvium; some stratification of gravel and sand ⊞

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)

Sandy Redox (S5)
Stripped Matrix (S6)
Loamy Mucky Mineral (F1)
Loamy Gleyed Matrix (F2)
Depleted Matrix (F3)
Redox Dark Surface (F6)
Depleted Dark Surface (F7)
Redox Depressions (F8)
Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ___ **No** ✓

Remarks:

Soil is well drained

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)

Salt Crust (B11)
Biotic Crust (B12)
Aquatic Invertebrates (B13)
Hydrogen Sulfide Odor (C1)
Oxidized Rhizospheres along Living Roots (C3)
Presence of Reduced Iron (C4)
Recent Iron Reduction in Tilled Soils (C6)
Thin Muck Surface (C7)
Other (Explain in Remarks)

Secondary Indicators (2 or more required)

✓ Water Marks (B1) (**Riverine**)
✓ Sediment Deposits (B2) (**Riverine**)
Drift Deposits (B3) (**Riverine**)
Drainage Patterns (B10)
Dry-Season Water Table (C2)
Crayfish Burrows (C8)
Saturation Visible on Aerial Imagery (C9)
Shallow Aquitard (D3)
FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ______
Water Table Present? Yes ___ No ✓ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ___ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

NA

Remarks:

The secondary indicators are not reflective of wetland conditions as they are typically formed during high rainfall events where flows last for hours not days. Wetland hydrology conditions occur when the soil is flooded, ponded, or inundated for 14 consecutive days or more during the growing season (page 59; 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)).

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Possible Solar Farm Project City/County: Blythe/ Riverside Sampling Date: 2-13-15

Applicant/Owner: Client is First Solar State: CA Sampling Point: W R54a Investigator(s): TH

Section, Township, Range: ____

Landform (hillslope, terrace, etc.): Fan Remnant Local relief (concave, convex, none): none Slope (%): < 2%

Subregion (LRR): LRR D Lat: 33.588761 Long: -114.753424 Datum: WGS84 Soil Map Unit Name: Aco gravelly loamy sand NWI classification: -

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ✓ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No ✓

Hydric Soil Present? Yes ____ No ✓

Wetland Hydrology Present? Yes ____ No ✓

Is the Sampled Area within a Wetland? Yes ____ No ✓

Remarks:

Secondary hydrology indicators present in ephemeral streams. Flows are short lived for hours not days and give a false positive wetland indicator. See hydrology remarks.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1. None			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1. None			
2.			
3.			
4.			
5.			
= Total Cover	5		
Herb Stratum (Plot size: 5' x 5')			
1. Bromus rubens	1	N	UPL
2. Pleuraphis rigida	5	Y	UPL
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	6		
Woody Vine Stratum (Plot size: ____)			
1. None			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 94 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of: Multiply by:

OBL species ____ x 1 = ____ FACW species

____ x 2 = ____ FAC species

____ x 3 = ____ FACU species ____

____ x 4 = ____ UPL species

____ x 5 = ____ Column Totals: ____ (A)

____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is s;3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

_ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

SOIL

Sampling Point: W R54a

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-22	7.5YR4/6	100					GS	gravely sand; some stratification of gravel and sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)

Sandy Redox (S5)
Stripped Matrix (S6)
Loamy Mucky Mineral (F1)
Loamy Gleyed Matrix (F2)
Depleted Matrix (F3)
Redox Dark Surface (F6)
Depleted Dark Surface (F7)
Redox Depressions (F8)
Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ______ **No** ✓

Remarks:

Soil is well drained

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)

Salt Crust (B11)
Biotic Crust (B12)
Aquatic Invertebrates (B13)
Hydrogen Sulfide Odor (C1)
Oxidized Rhizospheres along Living Roots (C3)
Presence of Reduced Iron (C4)
Recent Iron Reduction in Tilled Soils (C6)
Thin Muck Surface (C7)
Other (Explain in Remarks)

Secondary Indicators (2 or more required)

✓ Water Marks (B1) (**Riverine**)
✓ Sediment Deposits (B2) (**Riverine**)
Drift Deposits (B3) (**Riverine**)
Drainage Patterns (B10)
Dry-Season Water Table (C2)
Crayfish Burrows (C8)
Saturation Visible on Aerial Imagery (C9)
Shallow Aquitard (D3)
FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______
Water Table Present? Yes ______ No ✓ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ______ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

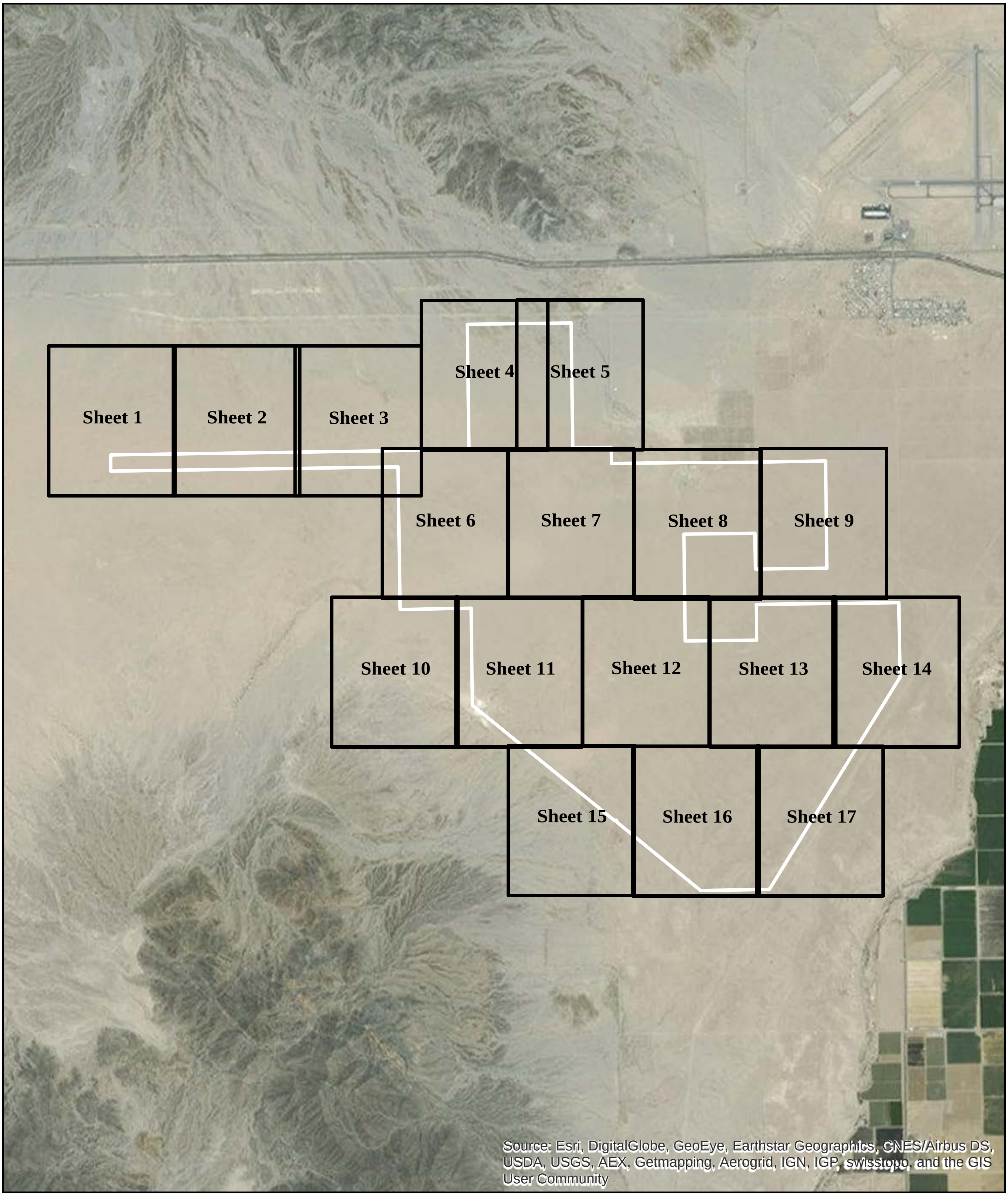
NA

Remarks:

The secondary indicators are not reflective of wetland conditions as they are typically formed during high rainfall events where flows last for hours not days. Wetland hydrology conditions occur when the soil is flooded, ponded, or inundated for 14 consecutive days or more during the growing season (page 59; 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)).

APPENDIX F

Onsite Photographs


Sheet 1
Sheet 2
Sheet 3
Sheet 4
Sheet 5
Sheet 6
Sheet 7
Sheet 8
Sheet 9
Sheet 10
Sheet 11
Sheet 12
Sheet 13
Sheet 14
Sheet 15
Sheet 16
Sheet 17

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Legend

Study Area

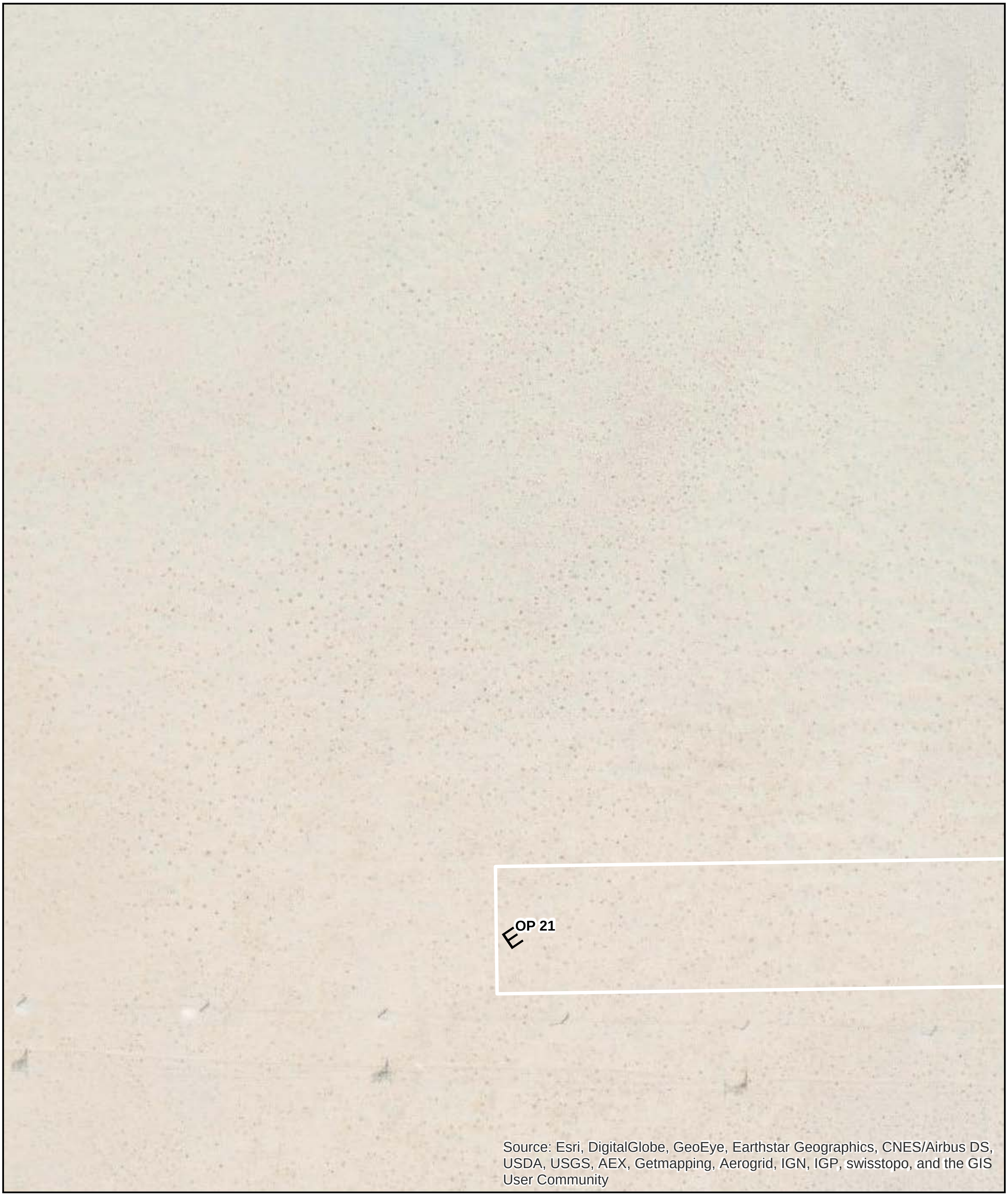
Map Sheet

0
2,000
4,000
6,000
8,000
10,000 Feet

Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Photo Point Locations, Index Map
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Photo Point Locations, Sheet 1

Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

1 inch = 600 feet

0 100 200 300 400 500 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Aerial Photography: Microsoft March 2011

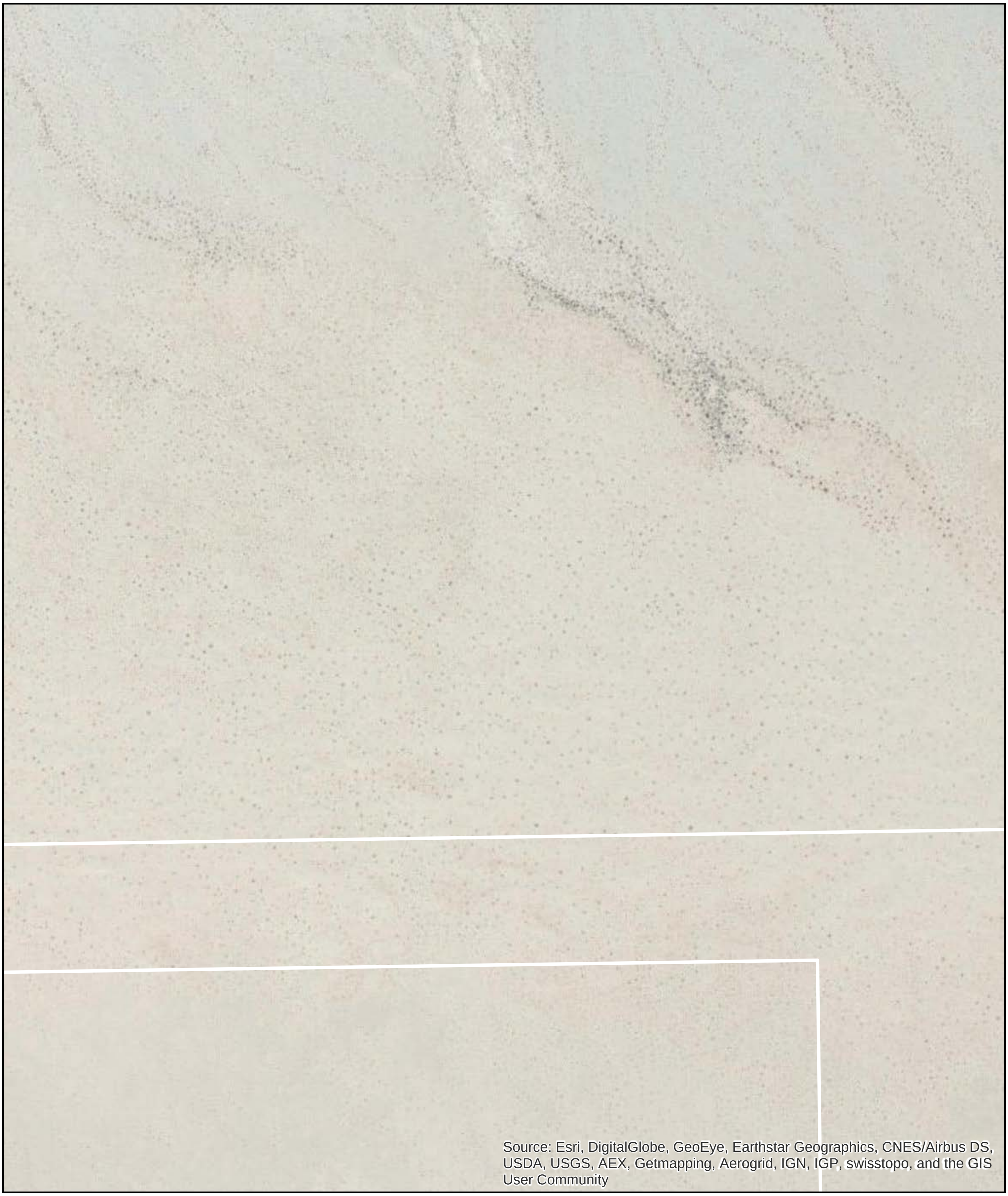
Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

1 inch = 600 feet

0 100 200 300 400 500 Feet

Photo Point Locations, Sheet 2

Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

E
E

Aerial Photography: Microsoft March 2011

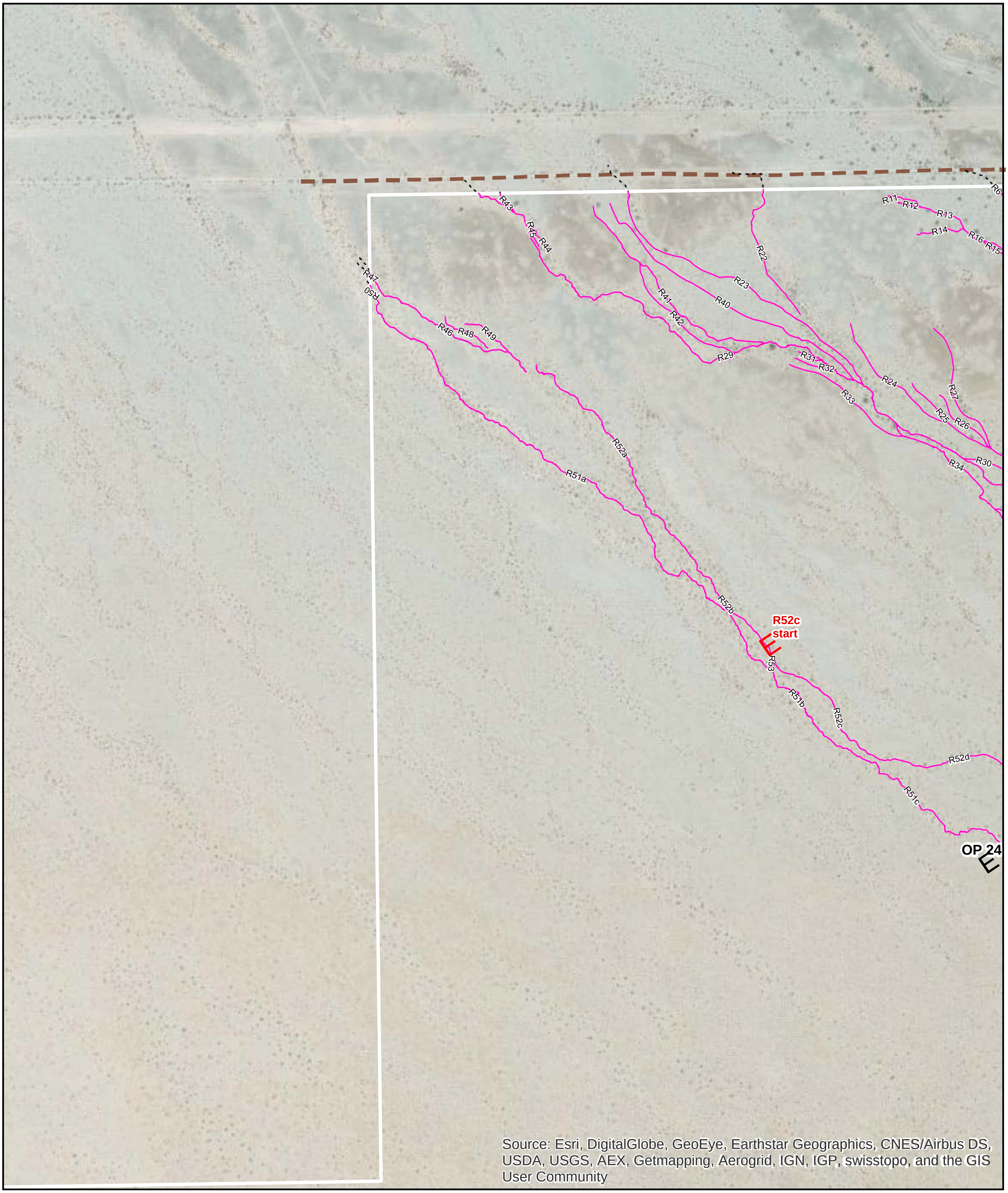
Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Photo Point Locations, Sheet 3
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

E

1 inch = 600 feet

0 100 200 300 400 500 Feet


R6
R11
R12
R13
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R15
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R40
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R42
R46
R48
R49
R29
R31
R32
R33
R24
R27
R25
R26
R30
R34
R52a
R51a
R52b
R52c
start
R53
R51b
R52c
R52d
R51c
OP 24

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

▭ Study Area	Riverine Intermittent Streambed (ephemeral stream)
Dirt Roadway (barrier to surface water hydrology)	Excavated Riverine Intermittent Streambed (excavated ephemeral stream)
OP 1 General Overview Site Photograph	_ _ _ Riverine Intermittent Streambed (ephemeral streambed) not within study area
R7a start Representative Stream Photograph	

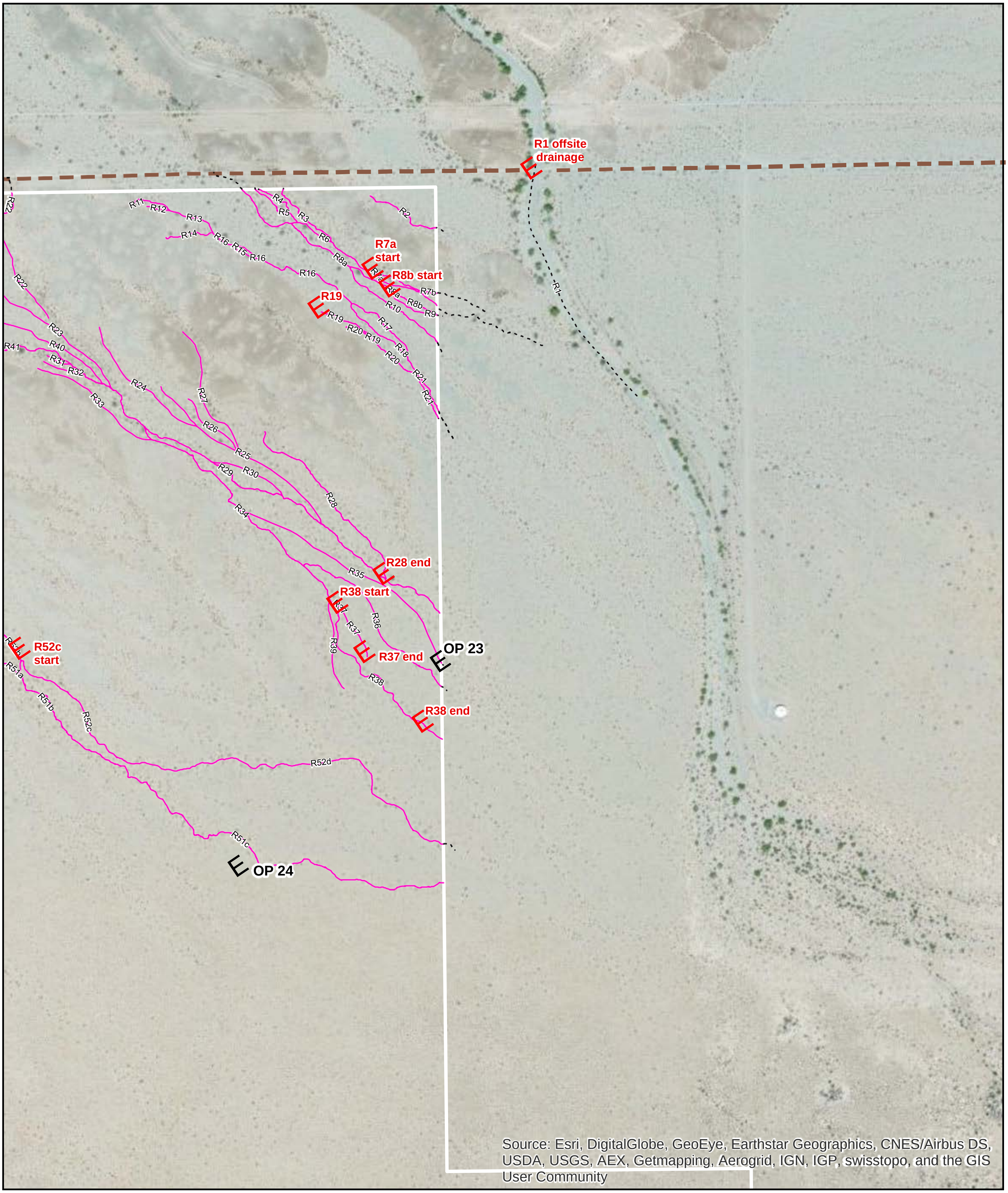
Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Photo Point Locations, Sheet 4
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

1 inch = 600 feet

0 100 200 300 400 500 Feet


R1 offsite drainage
R1
R22
R11
R12
R13
R14
R16
R15
R16
R16
R4
R5
R3
R6
R2
R7a start
R8a
R8b start
R7b
R8b
R9
R10
R19
R19
R17
R20
R19
R18
R20
R21
R21
R22
R23
R40
R41
R31
R32
R33
R24
R27
R26
R25
R29
R30
R28
R34
R35
R28 end
R38 start
R36
R37
R39
R37 end
OP 23
R38
R38 end
R52c start
R51a
R51b
R52c
R52d
R51c
OP 24

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

▭ Study Area

– – Dirt Roadway (barrier to surface water hydrology)

E OP 1 General Overview Site Photograph

E R7a start Representative Stream Photograph

— Riverine Intermittent Streambed (ephemeral stream)

— Excavated Riverine Intermittent Streambed (excavated ephemeral stream)

_ _ _ Riverine Intermittent Streambed (ephemeral streambed) not within study area

Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Photo Point Locations, Sheet 5
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

1 inch = 600 feet

0 100 200 300 400 500 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Aerial Photography: Microsoft March 2011

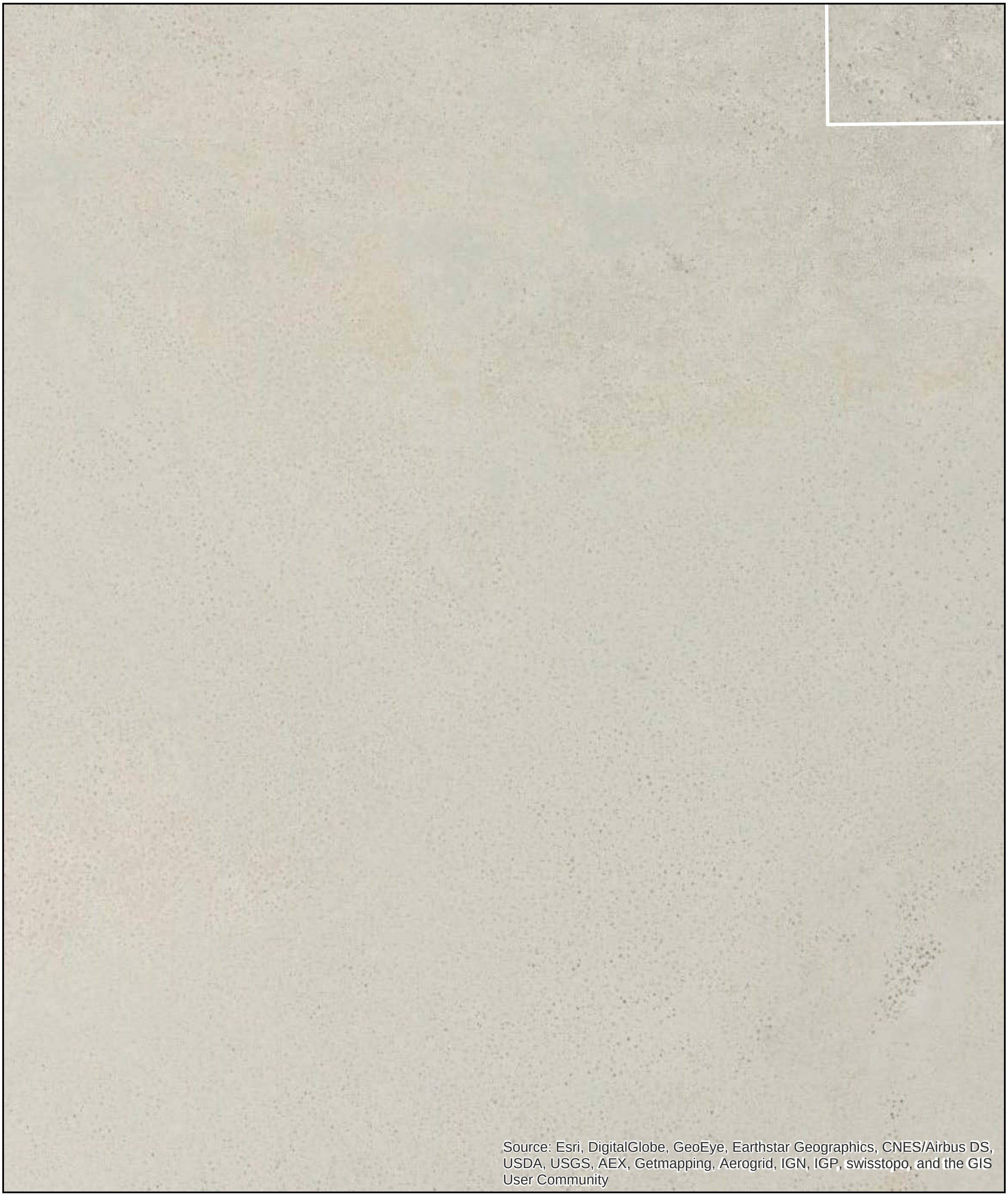
Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Photo Point Locations, Sheet 6
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

E

1 inch = 600 feet

0 100 200 300 400 500 Feet



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

E
E

Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

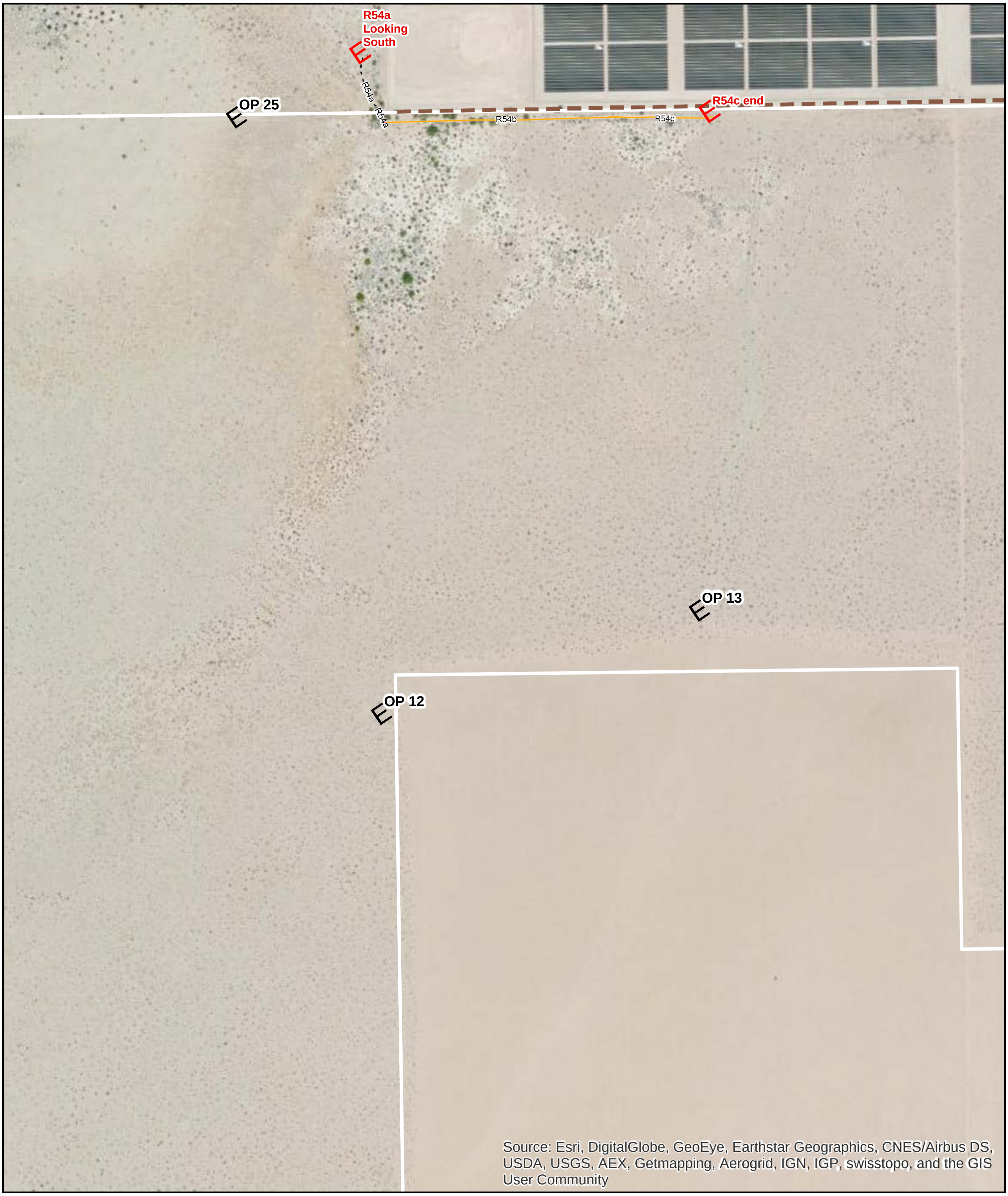
E

1 inch = 600 feet

0 100 200 300 400 500 Feet

Photo Point Locations, Sheet 7

Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

▭ Study Area
▬ Dirt Roadway (barrier to surface water hydrology)
General Overview Site Photograph
Representative Stream Photograph
▬ Riverine Intermittent Streambed (ephemeral stream)
▬ Excavated Riverine Intermittent Streambed (excavated ephemeral stream)
_ _ Riverine Intermittent Streambed (ephemeral streambed) not within study area

Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Photo Point Locations, Sheet 8

Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

1 inch = 600 feet

0 100 200 300 400 500 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

▭ Study Area

▬ ▬ Dirt Roadway (barrier to surface water hydrology)

OP 1 General Overview Site Photograph

R7a start Representative Stream Photograph

▬ Riverine Intermittent Streambed (ephemeral stream)

▬ Excavated Riverine Intermittent Streambed (excavated ephemeral stream)

_ _ _ Riverine Intermittent Streambed (ephemeral streambed) not within study area

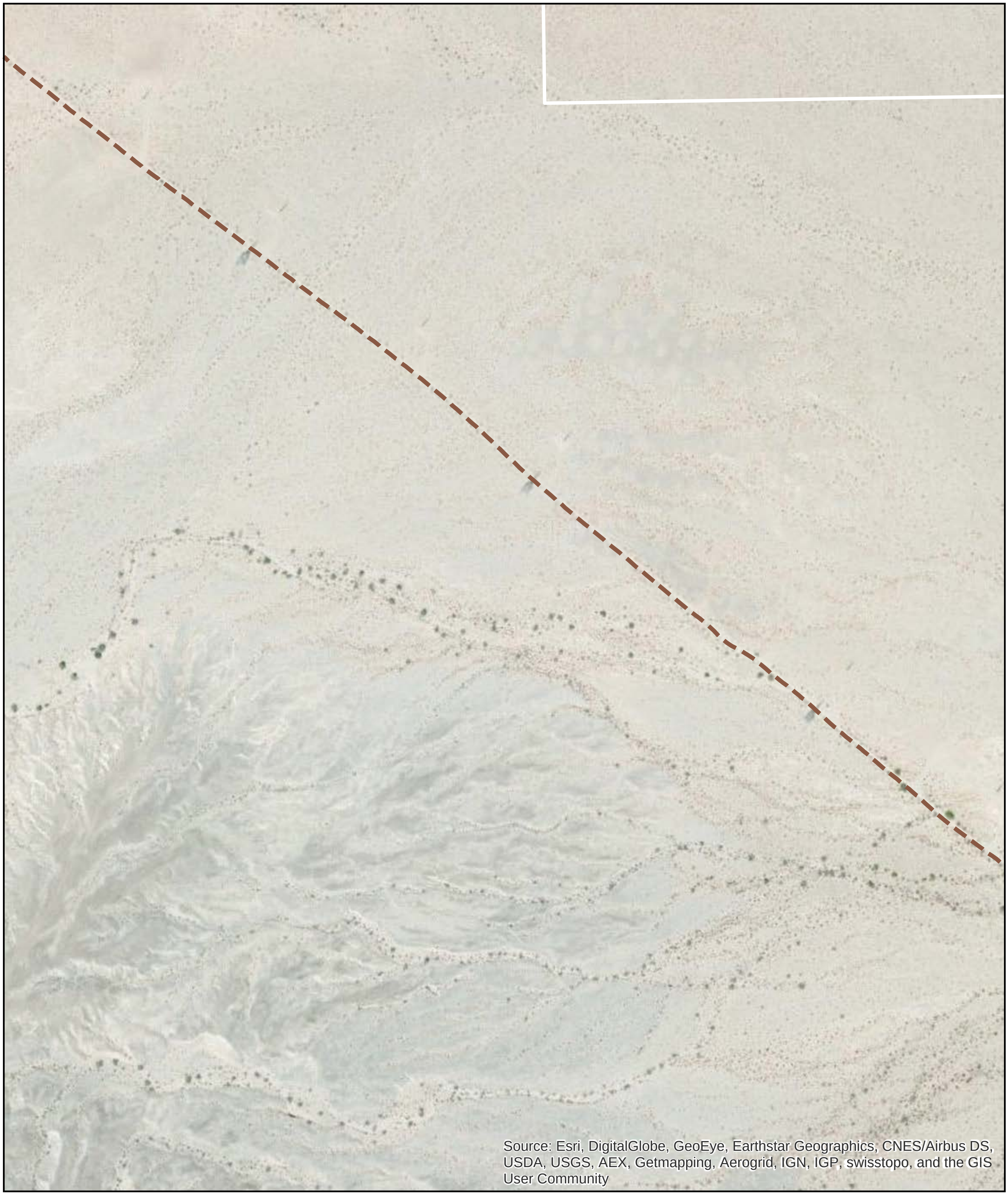
Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Photo Point Locations, Sheet 9

Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

0 100 200 300 400 500 Feet
1 inch = 600 feet



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

E

E

Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.

ENVIRONMENTAL REGULATORY CONSULTANTS

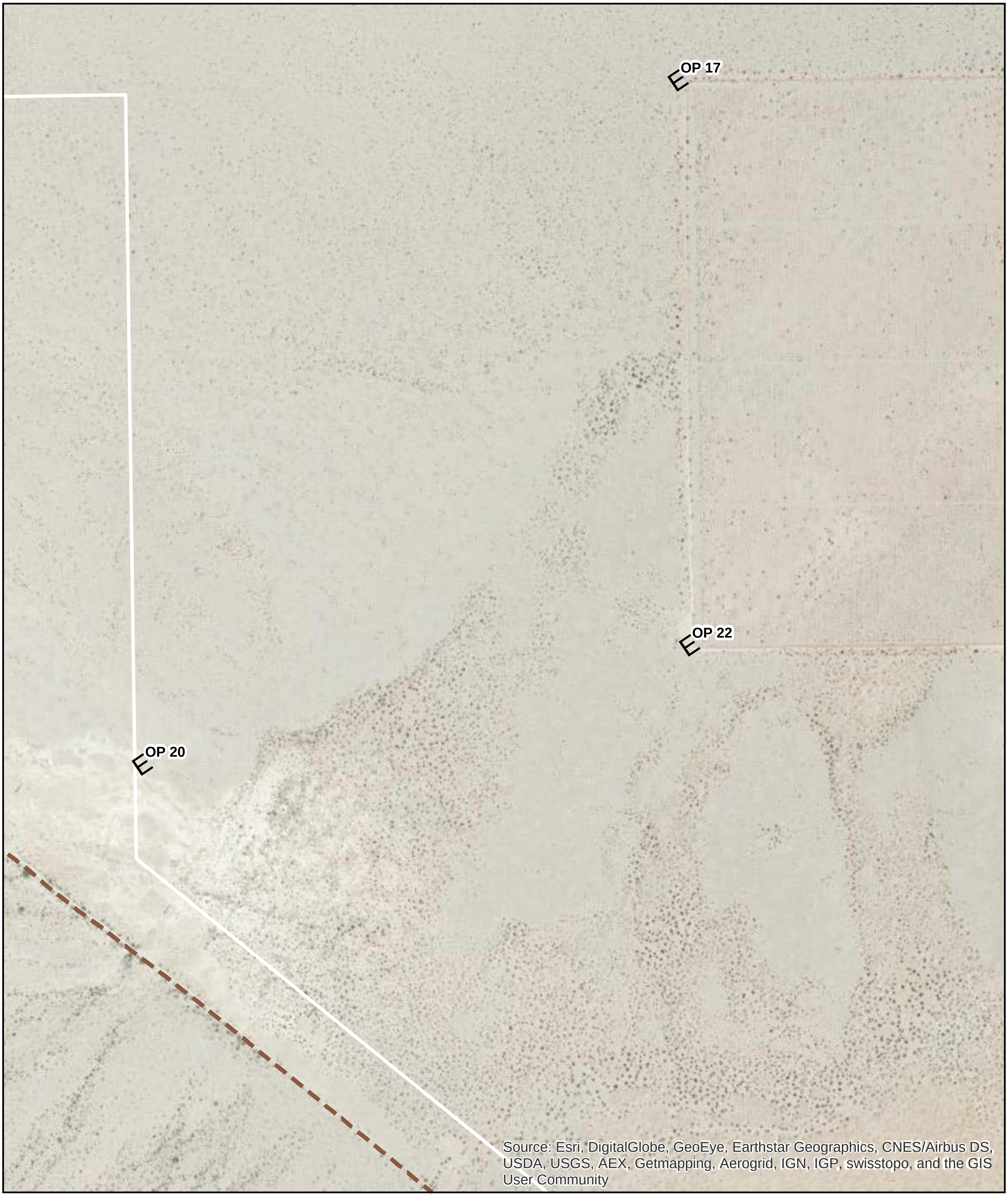
E

1 inch = 600 feet

0 100 200 300 400 500 Feet

Photo Point Locations, Sheet 10

Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Aerial Photography: Microsoft March 2011

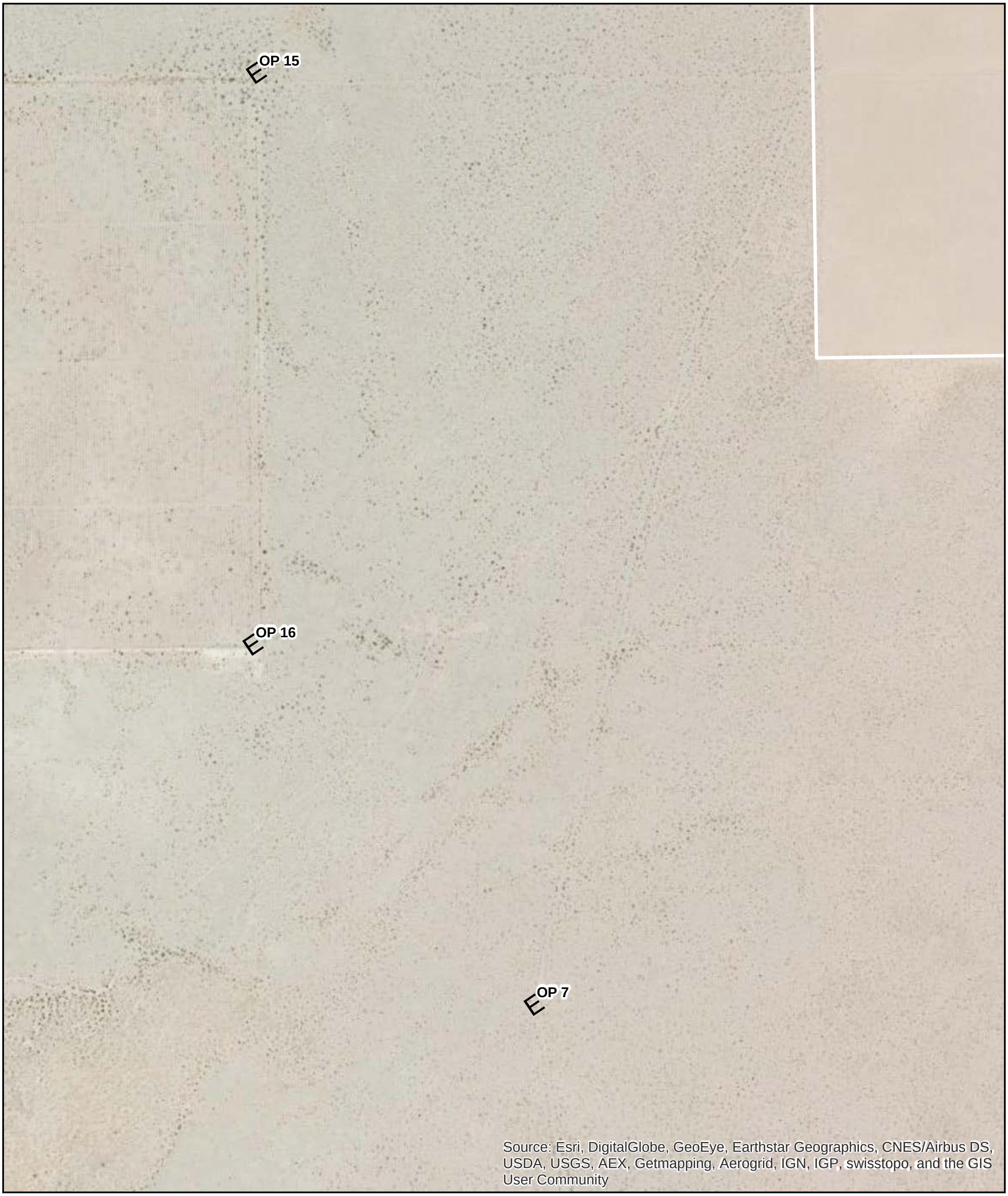
Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Photo Point Locations, Sheet 11

Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

1 inch = 600 feet

0 100 200 300 400 500 Feet



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Aerial Photography: Microsoft March 2011

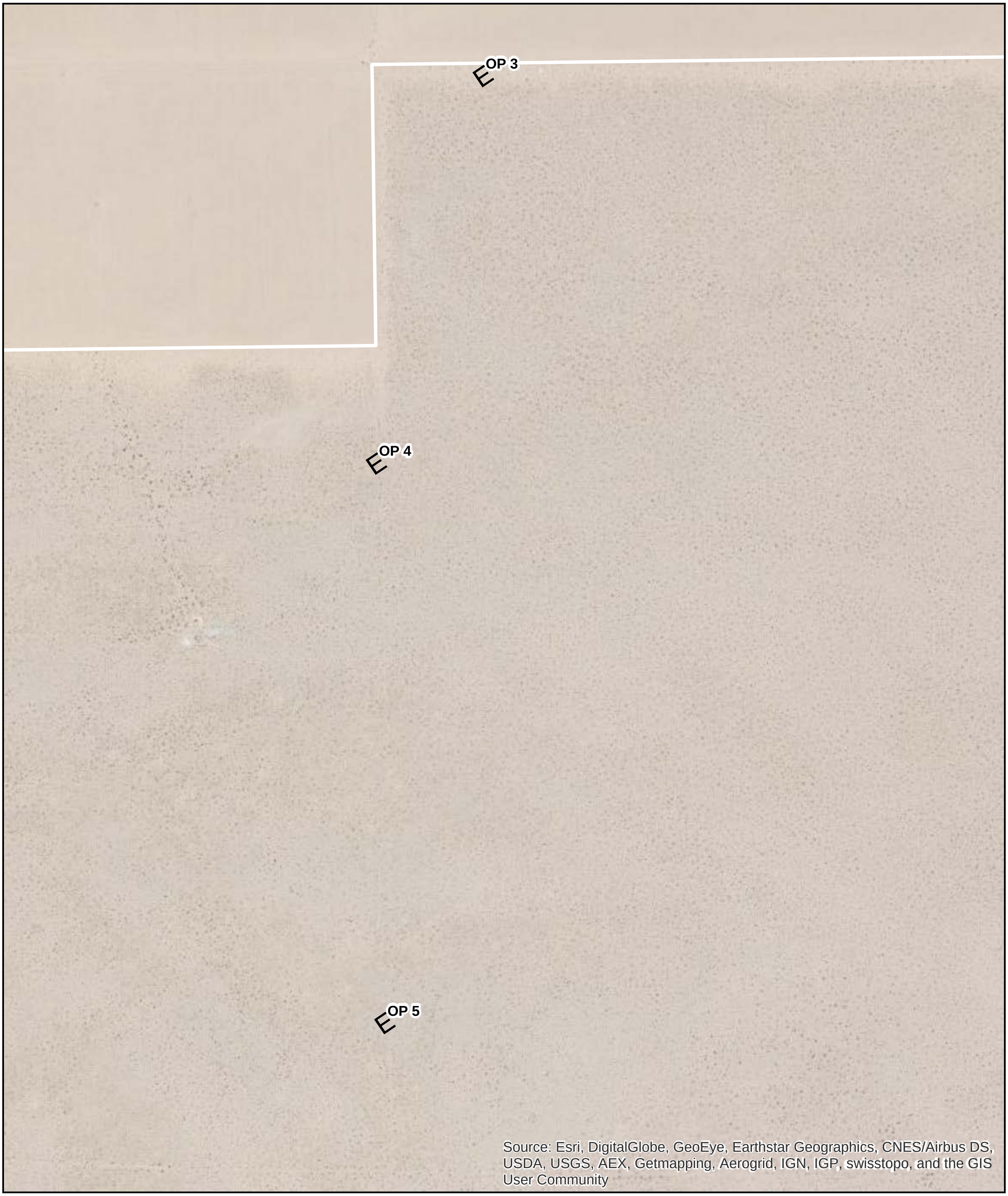
Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

1 inch = 600 feet

0 100 200 300 400 500 Feet

Photo Point Locations, Sheet 12

Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Aerial Photography: Microsoft March 2011

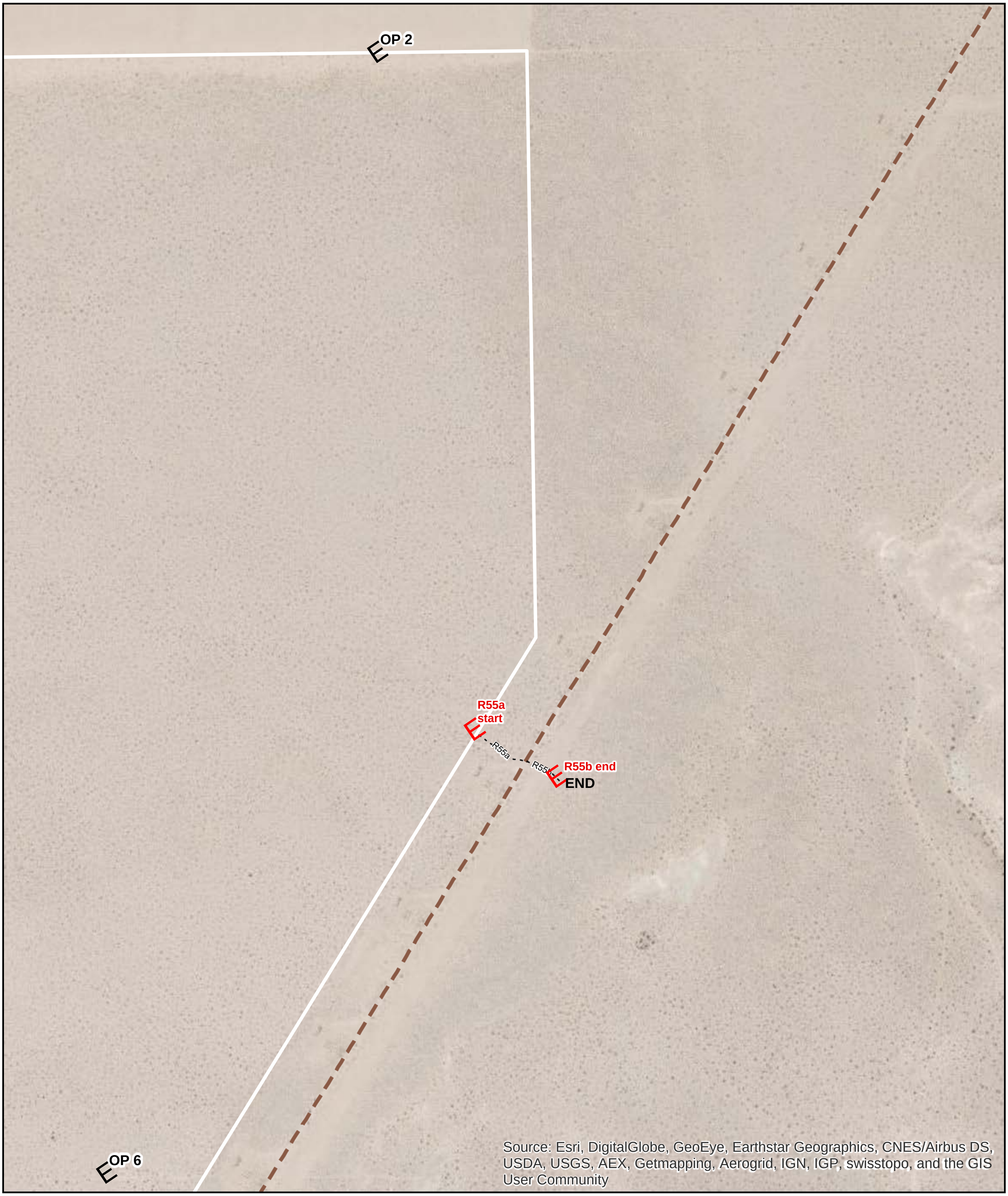
Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Photo Point Locations, Sheet 13

Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

1 inch = 600 feet

0 100 200 300 400 500 Feet



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Aerial Photography: Microsoft March 2011

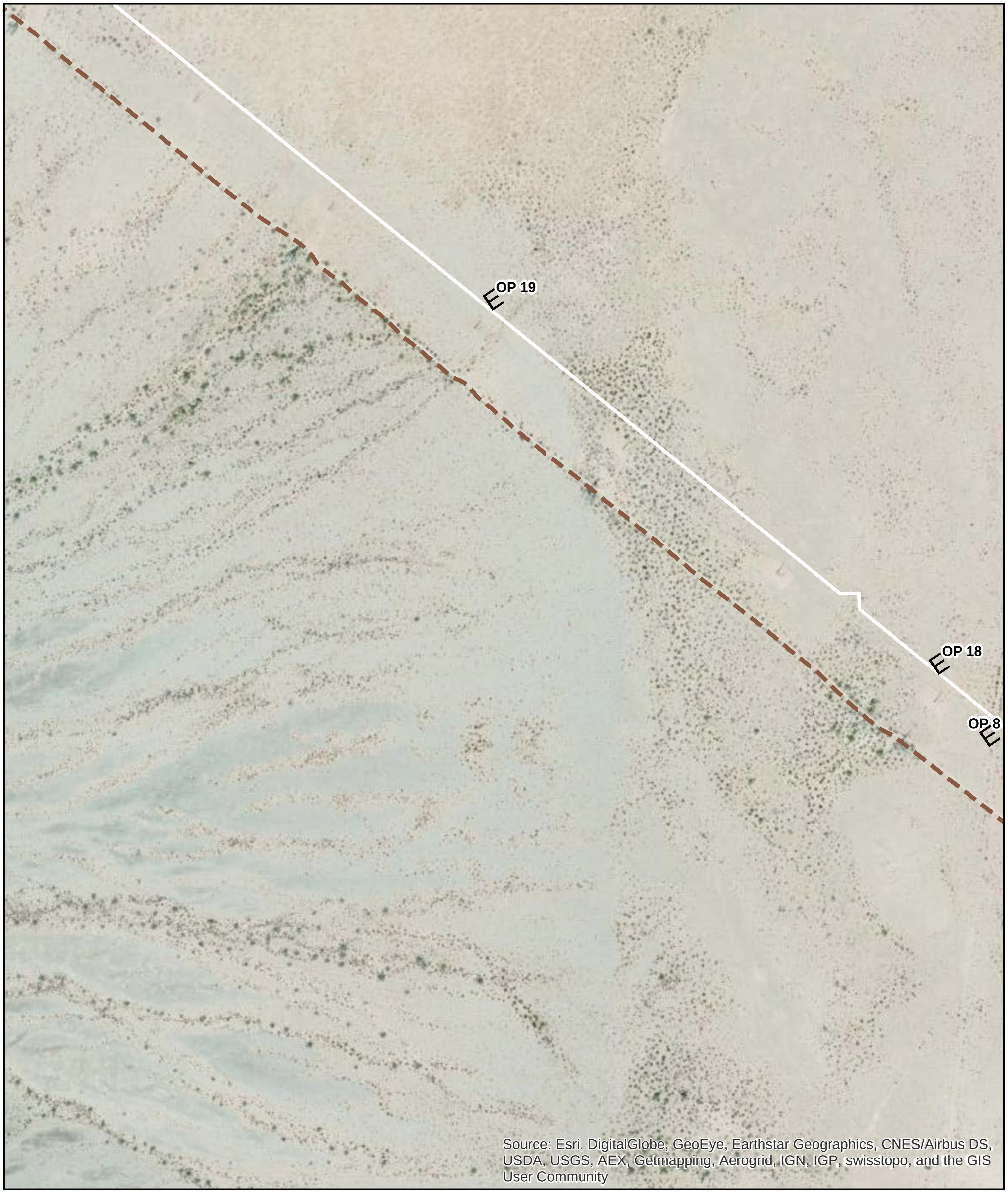
Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Photo Point Locations, Sheet 14

Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

1 inch = 600 feet

0 100 200 300 400 500 Feet



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

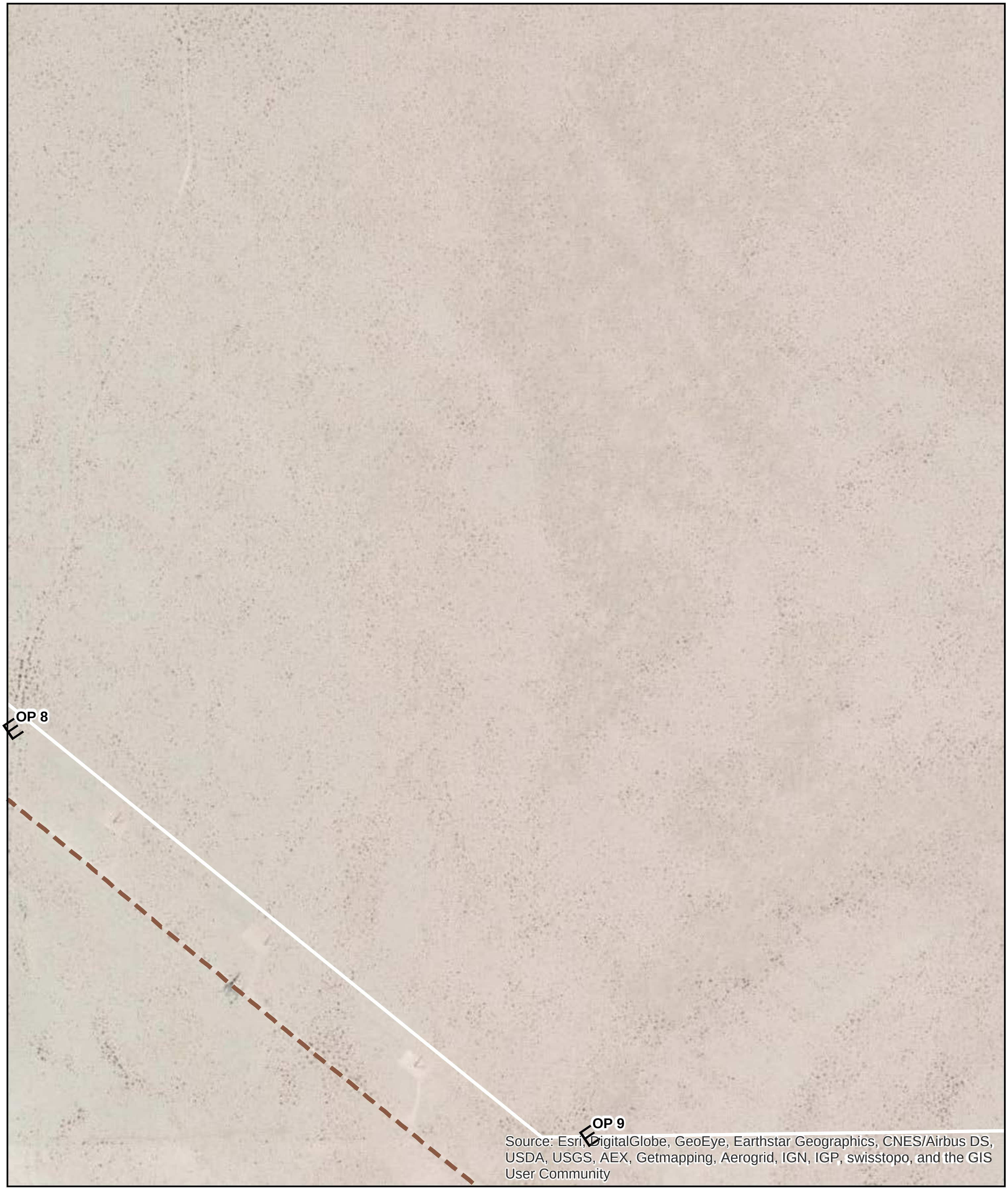
Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

1 inch = 600 feet

0 100 200 300 400 500 Feet

Photo Point Locations, Sheet 15
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

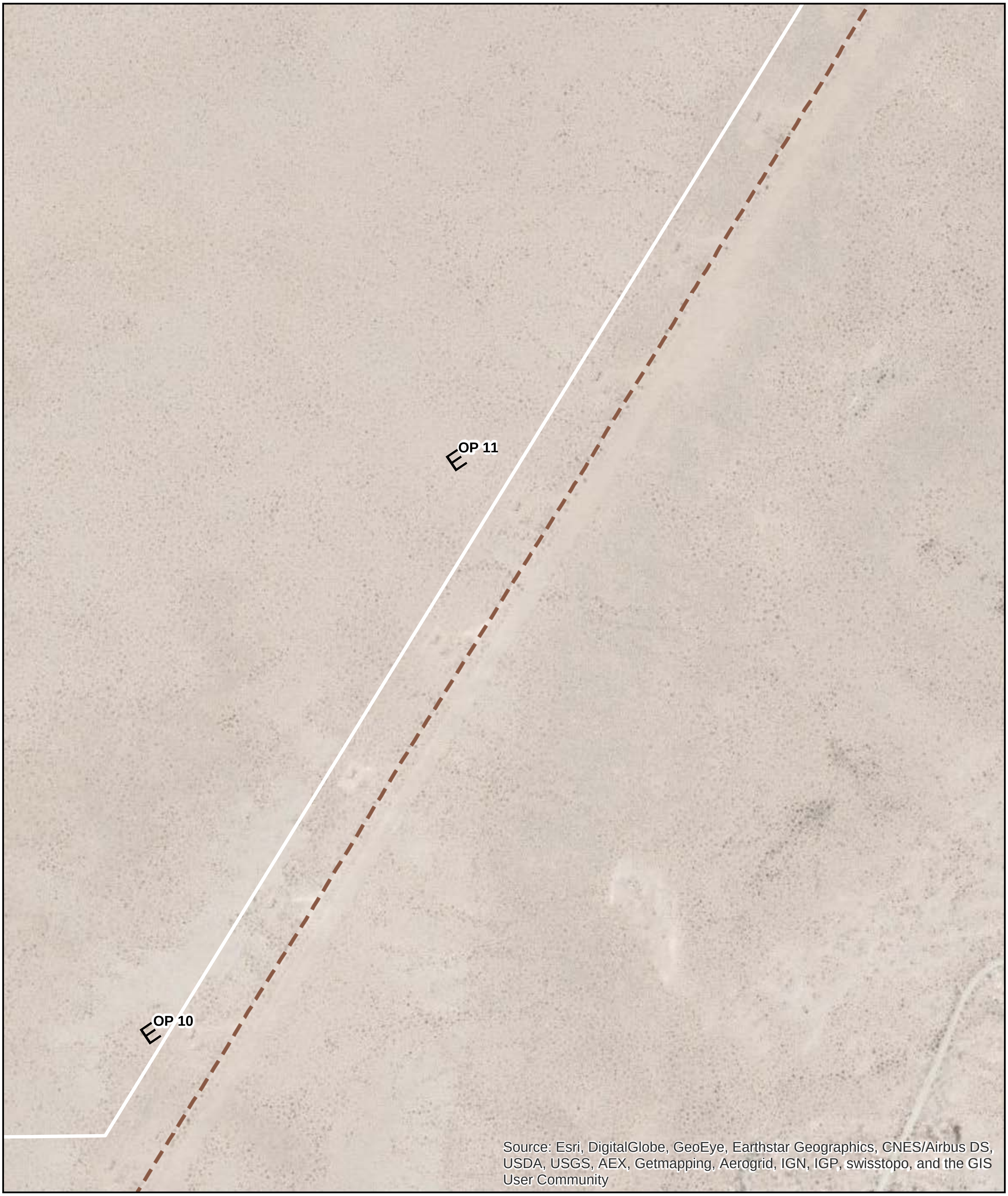
Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Photo Point Locations, Sheet 16
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

1 inch = 600 feet

0 100 200 300 400 500 Feet



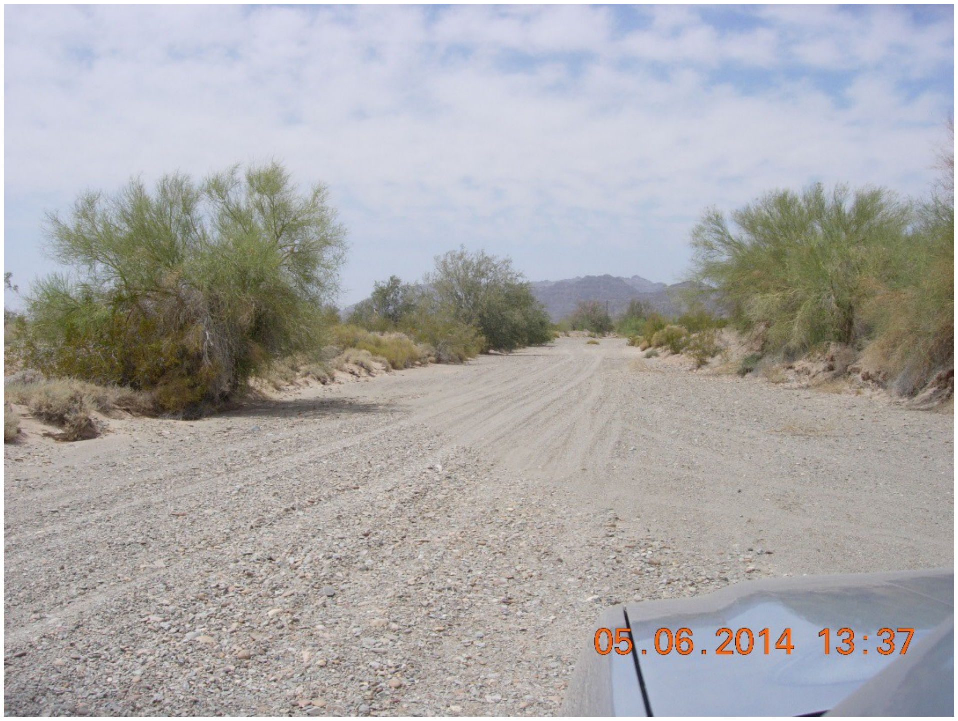
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Aerial Photography: Microsoft March 2011

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Photo Point Locations, Sheet 17
Desert Quartzite Solar Farm Project,
Blythe, Riverside County, California

1 inch = 600 feet
0 100 200 300 400 500 Feet


05.06.2014 13:37

R1 Offsite Drainage

25'
05.08.2014 08:10

R7A Start

05.08.2014 08:08

R8B Start

05.08.2014 07:59

R19 Start

05.07.2014 14:37

R28 End

05.07.2014 12:24

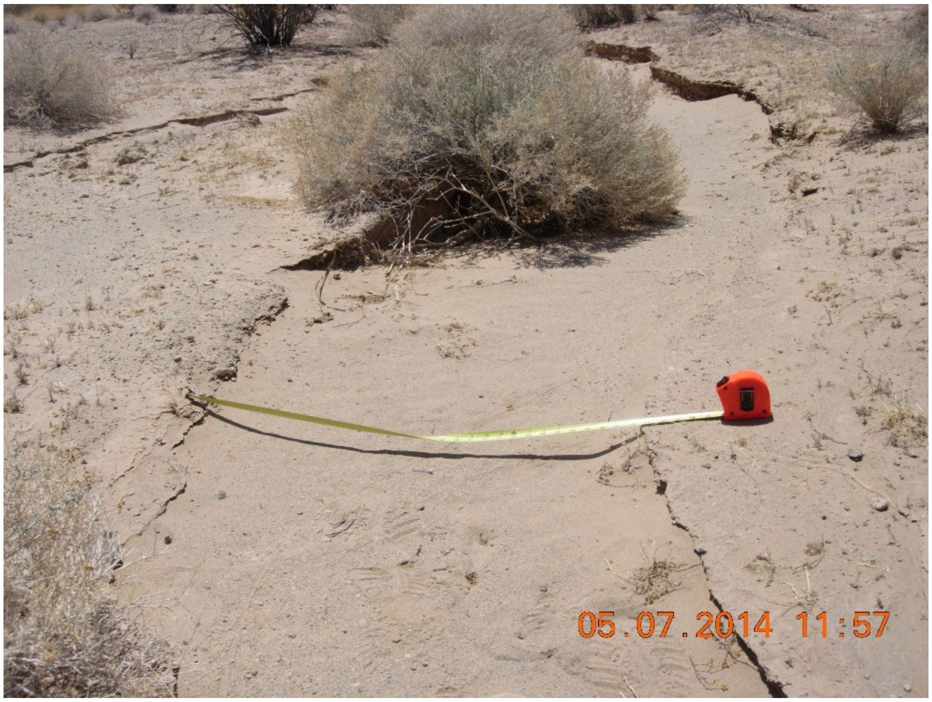
R37 End

05.07.2014 11:23

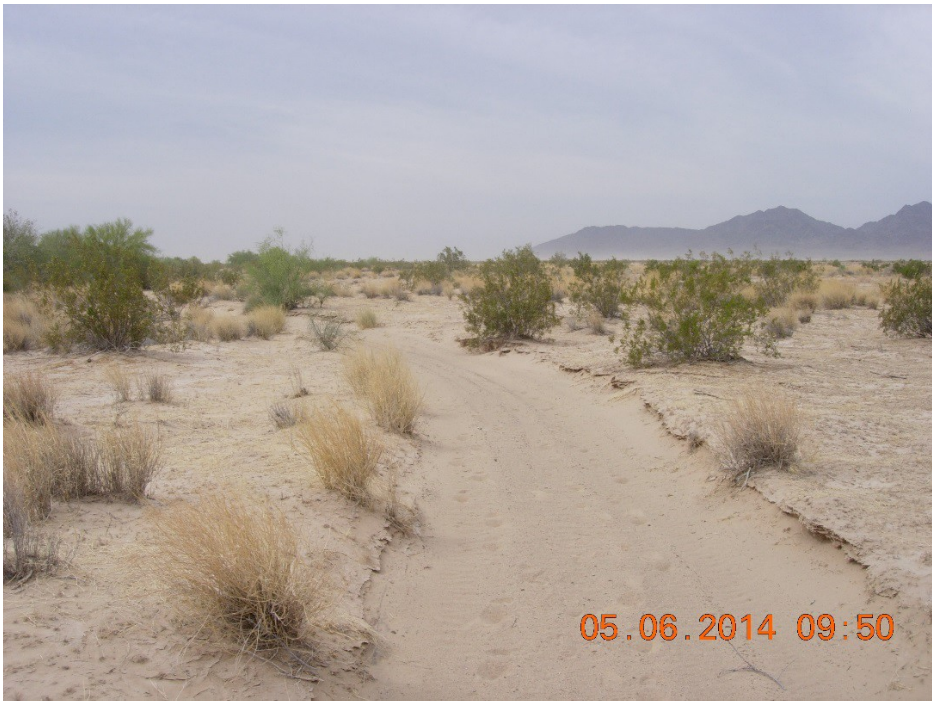
R38 End

05.07.2014 11:15

R38 Start


05.07.2014 11:57

R52C Start


05.06.2014 09:50

R54A Looking South

05.06.2014 10:19

R54C End

05.05.2014 15:31

R55A Start

05.05.2014 15:36

R55B End

05.05.2014 14:59

OP 2

05.05.2014 15:06

OB 3

05.05.2014 15:13

OP 4 East

05.05.2014 15:13

OP 4 West

05.05.2014 15:18

OP 5 East

05.05.2014 15:18

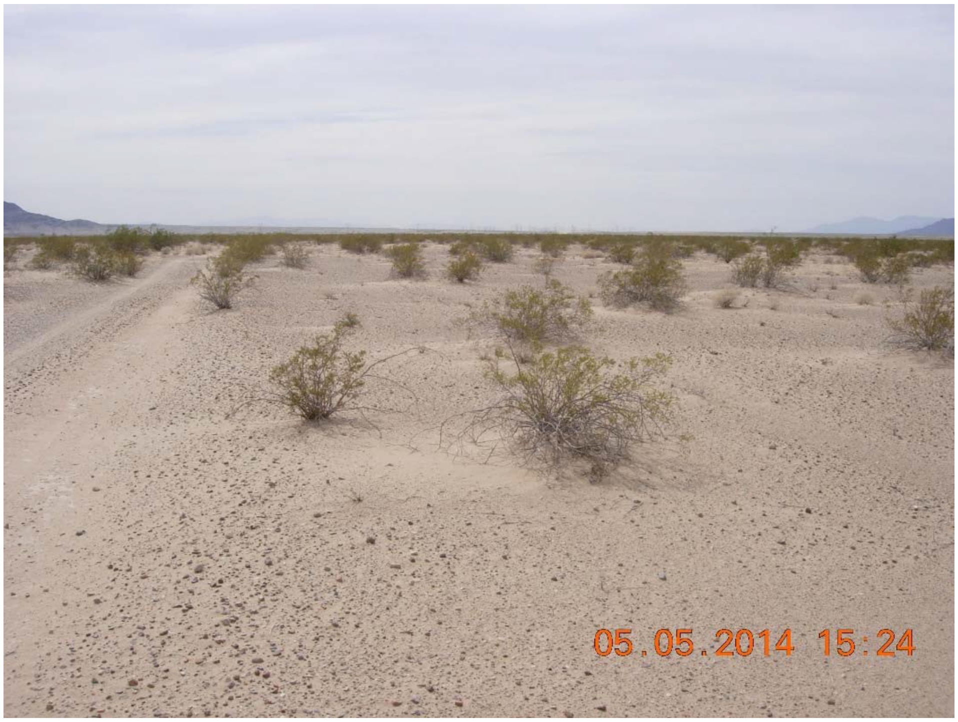
OP 5 West

05.05.2014 15:24

OP 6 East

05.05.2014 15:24

OP 6 North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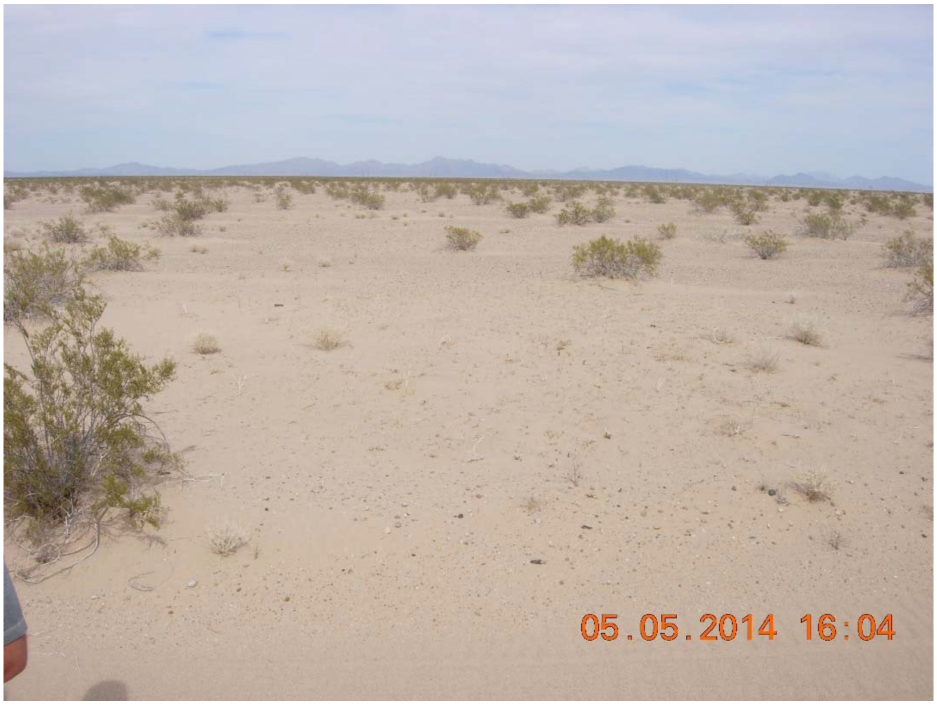
OP 6 West


05.05.2014 16:04

OP 7 East

05.05.2014 16:09

OP 8 East

05.05.2014 16:04

OP 8 West

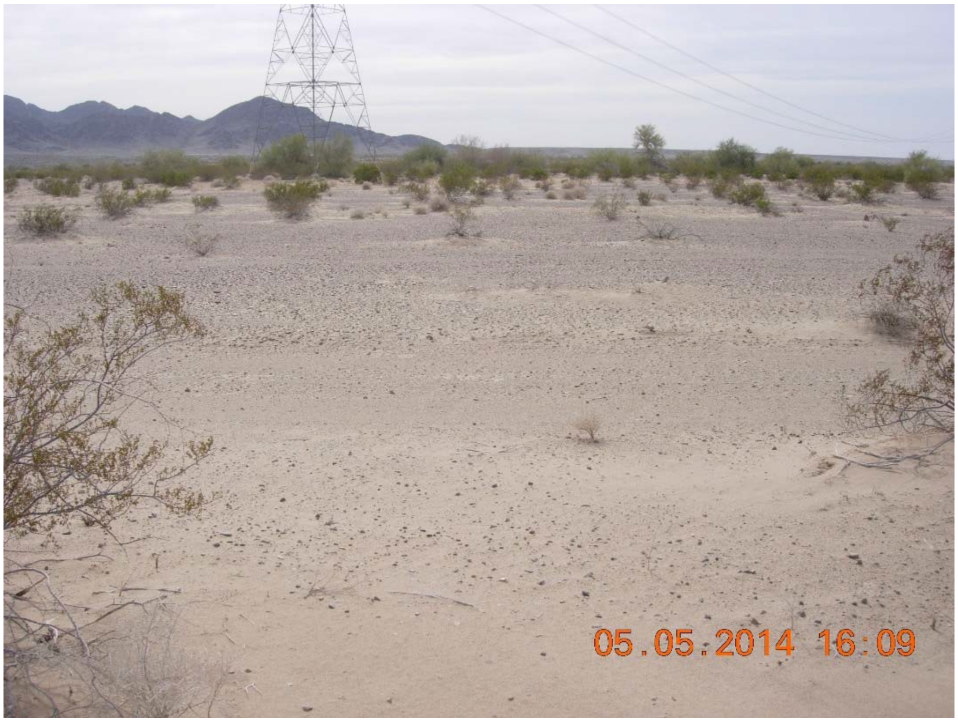

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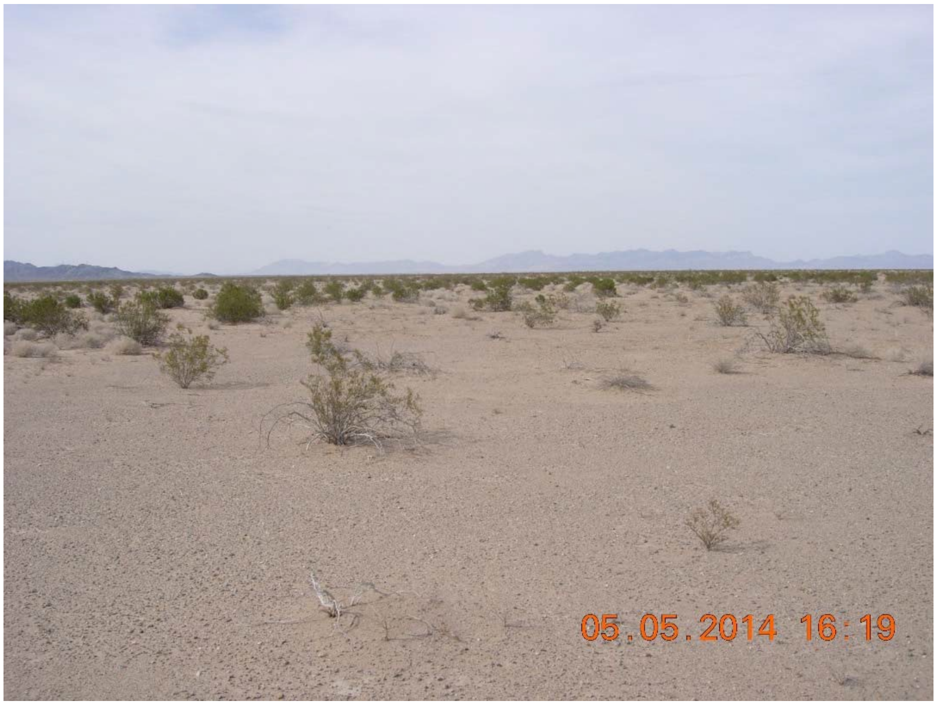
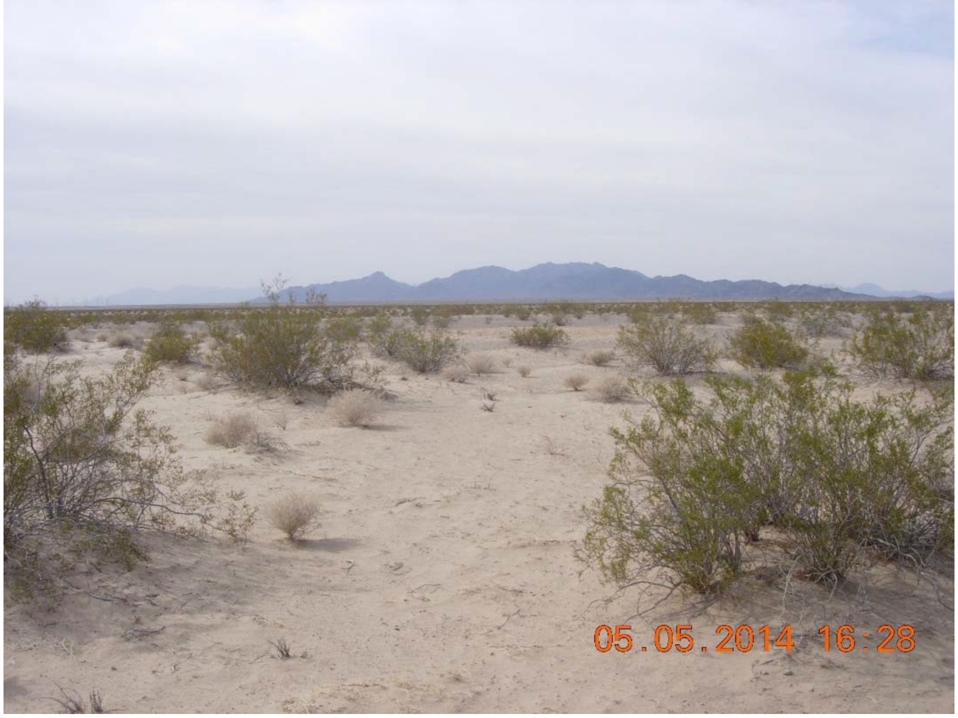
Figure 1OP 8


05.05.2014 16:19

OP 9 North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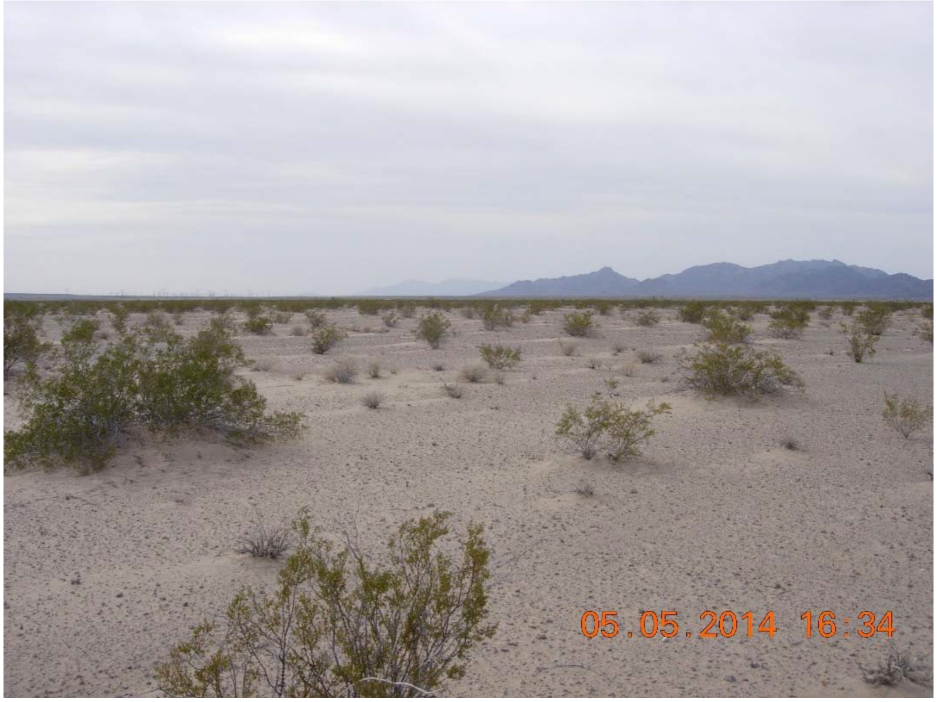
OP 10 NW


05.05.2014 16:34

OP 11

05.05.2014 16:54

OP 12

05.05.2014 17:00

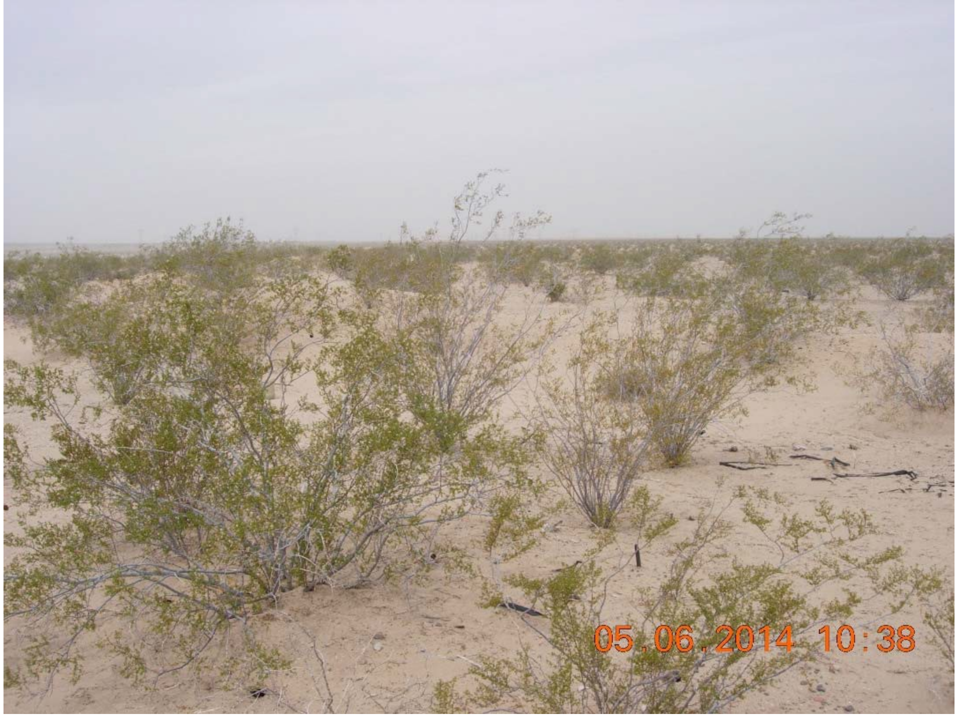
OP 1*3*

05.05.2014 17:06

OP 14 South

05.06.2014 10:38

OP 15 South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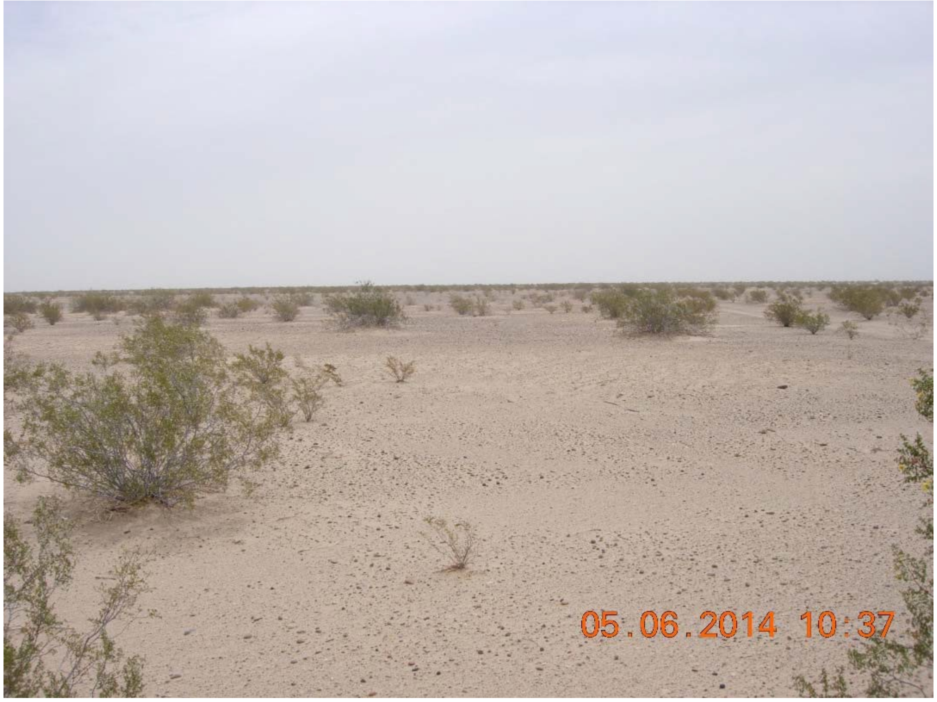
OP 15 West


05.06.2014 10:37

OP 15 East

05.06.2014 10:37

OP 15

05.06.2014 10:45

OP 16 NE

05.06.2014 10:56

OP 17 North

05.06.2014 10:46

OP 17 South

05.06.2014 10:56

OP 17 West

05.06.2014 10:46

OP 17

05.06.2014 11:11

OP 18 North

05.06.2014 11:20

OP 19

05.06.2014 11:48

OP 20

05.06.2014 12:17

OP 21

05.06.2014 14:20

OP 22

05.07.2014 11:23

OP 23

05.07.2014 12:24

OP 24

05.07.2014 11:12

OP 25

APPENDIX G

Corps-Approved Jurisdictional Determination Form and Waters Upload Sheet

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD):

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Los Angeles District

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State: CA County/parish/borough: Riverside City: Blythe
Center coordinates of site (lat/long in degree decimal format): Lat. 114.756497° **N**, Long. 33.57895° **W**.
Universal Transverse Mercator: 11
Name of nearest waterbody: Colorado River;

Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Colorado River
Name of watershed or Hydrologic Unit Code (HUC): HUC 12 Cinnabar Wash-Palo Verde Valley; 150301040804

☐ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☐ Office (Desk) Determination. Date:
☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Pick List** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: No; Waters not used or susceptal for use to transport interstate or foreign commenrce..

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Pick List** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      ☐ TNWs, including territorial seas
      ☐ Wetlands adjacent to TNWs
      ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      ☐ Non-RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      ☐ Impoundments of jurisdictional waters
      ☒ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: 41,932 linear feet: 0.5 - 5.0 width (ft) and/or 2.24 acres.
      Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Pick List**
      Elevation of established OHWM (if known):Varies; empemeral riverine streambeds.

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: **Waters identified with OHWM lack hydrologic connection (surface or near surface) with no direct or indirect conection to TNW.**.

---

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
Identify TNW: .

Summarize rationale supporting determination: .

2. Wetland adjacent to TNW
Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: **Pick List**
Drainage area: **Pick List**
Average annual rainfall: inches
Average annual snowfall: inches

(ii) Physical Characteristics:
(a) Relationship with TNW:
☐ Tributary flows directly into TNW.
☐ Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **Pick List** river miles from TNW.
Project waters are **Pick List** river miles from RPW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Project waters are **Pick List** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain: NO intrastate waters only.

Identify flow route to TNW[5]: .
Tributary stream order, if known: .

---

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is:
☐ Natural
☐ Artificial (man-made). Explain: Constructed Drainage ditch..
☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):
☐ Silts
☐ Cobbles
☐ Bedrock
☐ Other. Explain: .
☐ Sands
☐ Gravel
☐ Vegetation. Type/% cover:
☐ Concrete
☐ Muck

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: .
Presence of run/riffle/pool complexes. Explain: .
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:
Tributary provides for: **Pick List**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime: .
Other information on duration and volume: .

Surface flow is: **Pick List.** Characteristics: No information available.

Subsurface flow: **Pick List**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☐ Bed and banks
☐ OHWM[6] (check all indicators that apply):
  ☐ clear, natural line impressed on the bank
  ☐ changes in the character of soil
  ☐ shelving
  ☐ vegetation matted down, bent, or absent
  ☐ leaf litter disturbed or washed away
  ☐ sediment deposition
  ☐ water staining
  ☐ other (list):
  ☐ the presence of litter and debris
  ☐ destruction of terrestrial vegetation
  ☐ the presence of wrack line
  ☐ sediment sorting
  ☐ scour
  ☐ multiple observed or predicted flow events
  ☐ abrupt change in plant community
☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
☐ High Tide Line indicated by:
  ☐ oil or scum line along shore objects
  ☐ fine shell or debris deposits (foreshore)
  ☐ physical markings/characteristics
  ☐ tidal gauges
  ☐ other (list):
☐ Mean High Water Mark indicated by:
  ☐ survey to available datum;
  ☐ physical markings;
  ☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: .
Identify specific pollutants, if known: .

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[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.

[7] Ibid.

(iv) Biological Characteristics. Channel supports (check all that apply):
☐ Riparian corridor. Characteristics (type, average width): .
☐ Wetland fringe. Characteristics: Ditch acting as a wetland and a tributary.
☐ Habitat for:
  ☐ Federally Listed species. Explain findings: .
  ☐ Fish/spawn areas. Explain findings: .
  ☐ Other environmentally-sensitive species. Explain findings: .
  ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:
(a) General Wetland Characteristics:
Properties:
Wetland size: acres
Wetland type. Explain: .
Wetland quality. Explain: .
Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:
Flow is: **Pick List**. Explain: .

Surface flow is**: Pick List**
Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .
☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:
☐ Directly abutting
☐ Not directly abutting
  ☐ Discrete wetland hydrologic connection. Explain: .
  ☐ Ecological connection. Explain: .
  ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW
Project wetlands are **Pick List** river miles from TNW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Flow is from: **Pick List.**
Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) Chemical Characteristics:
Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .
Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):
☐ Riparian buffer. Characteristics (type, average width): .
☐ Vegetation type/percent cover. Explain:plaustrine emergent vegetation.
☐ Habitat for:
  ☐ Federally Listed species. Explain findings: .
  ☐ Fish/spawn areas. Explain findings: .
  ☐ Other environmentally-sensitive species. Explain findings: .
  ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)
All wetland(s) being considered in the cumulative analysis: **Pick List**
Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   ☐ TNWs: linear feet width (ft), Or, acres.
   ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   ☐ Tributaries of TNW where tributaries have continuous flow “seasonally” (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: **.**

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **.**

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]

☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

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[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] **Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.***

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: **.**
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
☒ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☒ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: **.**
☒ Other: (explain, if not covered above): **These waters do not meet the "Significant Nexus" standard; they are not currently used, were not used in the past, and are not susceptible to use in interstate or foreign commerce; nor would "the use, degradation or destruction of" these waters affect interstate or foreign commerce..**

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☒ Non-wetland waters (i.e., rivers, streams): **41,932**linear feet, **0.5 - 5.0** width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: .
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☒ U.S. Geological Survey Hydrologic Atlas: .
☒ USGS NHD data.
☒ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name:Roosevelt Mine (1983), and Ripley (1952, rev.1975) USGS 7.5-minute quadrangles.
☒ USDA Natural Resources Conservation Service Soil Survey. Citation:2015 NRCS On-line Soil Resources Report.
☐ National wetlands inventory map(s). Cite name: .
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps:None.
☐ 100-year Floodplain Elevation is:None(National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date):March 2011.
or ☒ Other (Name & Date):On-site Photos taken 2014.
☐ Previous determination(s). File no. and date of response letter: .
☒ Applicable/supporting case law:Rapanos.
☐ Applicable/supporting scientific literature: .
☒ Other information (please specify):see waters upload sheet attached..

B. ADDITIONAL COMMENTS TO SUPPORT JD: .

Corps Waters Upload Sheet

Waters_Name	Cowardin_Code	HGM_Code	Area (acres)	Linear (ft)	Waters Types	Latitude(dd nad83)	Longitude dd nad83)	Local_Waterway	width (OHWM) (ft)
R2	R6	RIVERINE	0.0132231	384	ISOLATED	33.60256320670	-114.76691263900	Cinnabar Wash-Palo Verde Valley	1.50
R3	R6	RIVERINE	0.0043159	376	ISOLATED	33.60255814590	-114.76851577800	Cinnabar Wash-Palo Verde Valley	0.50
R4	R6	RIVERINE	0.0047291	206	ISOLATED	33.60280524950	-114.76892049600	Cinnabar Wash-Palo Verde Valley	1.00
R5	R6	RIVERINE	0.0061524	268	ISOLATED	33.60272309850	-114.76896205900	Cinnabar Wash-Palo Verde Valley	1.00
R6	R6	RIVERINE	0.0397039	1153	ISOLATED	33.60183865080	-114.76741373600	Cinnabar Wash-Palo Verde Valley	1.50
R7a	R6	RIVERINE	0.0115243	251	ISOLATED	33.60165684980	-114.76707800500	Cinnabar Wash-Palo Verde Valley	2.00
R7b	R6	RIVERINE	0.0009871	86	ISOLATED	33.60156200000	-114.76657600000	Cinnabar Wash-Palo Verde Valley	0.50
R8a	R6	RIVERINE	0.0139118	606	ISOLATED	33.60198603230	-114.76794349000	Cinnabar Wash-Palo Verde Valley	1.00
R8b	R6	RIVERINE	0.0106061	231	ISOLATED	33.60143463590	-114.76681366800	Cinnabar Wash-Palo Verde Valley	2.00
R9	R6	RIVERINE	0.0089532	260	ISOLATED	33.60135891520	-114.76687288000	Cinnabar Wash-Palo Verde Valley	1.50
R10	R6	RIVERINE	0.0130624	569	ISOLATED	33.60134752140	-114.76711955300	Cinnabar Wash-Palo Verde Valley	1.00
R11	R6	RIVERINE	0.0089532	195	ISOLATED	33.60277794910	-114.77085859900	Cinnabar Wash-Palo Verde Valley	2.00
R12	R6	RIVERINE	0.0049587	108	ISOLATED	33.60269549950	-114.77077110100	Cinnabar Wash-Palo Verde Valley	2.00
R13	R6	RIVERINE	0.0171488	249	ISOLATED	33.60257235130	-114.77024036000	Cinnabar Wash-Palo Verde Valley	3.00
R14	R6	RIVERINE	0.0158402	230	ISOLATED	33.60237028370	-114.77030893100	Cinnabar Wash-Palo Verde Valley	3.00
R15	R6	RIVERINE	0.0097107	141	ISOLATED	33.60210860670	-114.76944525800	Cinnabar Wash-Palo Verde Valley	3.00
R16	R6	RIVERINE	0.0730946	796	ISOLATED	33.60188340790	-114.76885547500	Cinnabar Wash-Palo Verde Valley	4.00
R17	R6	RIVERINE	0.0179522	391	ISOLATED	33.60115960870	-114.76730833100	Cinnabar Wash-Palo Verde Valley	2.00
R18	R6	RIVERINE	0.0314509	685	ISOLATED	33.60061340790	-114.76687919200	Cinnabar Wash-Palo Verde Valley	2.00
R19	R6	RIVERINE	0.0130395	284	ISOLATED	33.60120368310	-114.76786859000	Cinnabar Wash-Palo Verde Valley	2.00
R20	R6	RIVERINE	0.0190083	414	ISOLATED	33.60084394560	-114.76735337900	Cinnabar Wash-Palo Verde Valley	2.00
R21	R6	RIVERINE	0.0103306	225	ISOLATED	33.60019093760	-114.76663556100	Cinnabar Wash-Palo Verde Valley	2.00
R22	R6	RIVERINE	0.0323691	705	ISOLATED	33.60218804170	-114.77309309200	Cinnabar Wash-Palo Verde Valley	2.00
R23	R6	RIVERINE	0.035101	1529	ISOLATED	33.60179190710	-114.77348249100	Cinnabar Wash-Palo Verde Valley	1.00
R24	R6	RIVERINE	0.0315886	688	ISOLATED	33.60040069980	-114.77105928800	Cinnabar Wash-Palo Verde Valley	2.00
R25	R6	RIVERINE	0.0466942	1017	ISOLATED	33.59951212120	-114.76952425600	Cinnabar Wash-Palo Verde Valley	2.00
R26	R6	RIVERINE	0.0162534	354	ISOLATED	33.59986259900	-114.76998750900	Cinnabar Wash-Palo Verde Valley	2.00
R27	R6	RIVERINE	0.0306703	668	ISOLATED	33.60030112250	-114.77015089700	Cinnabar Wash-Palo Verde Valley	2.00
R28	R6	RIVERINE	0.0456382	994	ISOLATED	33.59888076760	-114.76818959500	Cinnabar Wash-Palo Verde Valley	2.00
R29	R6	RIVERINE	0.3070248	4458	ISOLATED	33.60053472420	-114.77192446900	Cinnabar Wash-Palo Verde Valley	3.00
R30	R6	RIVERINE	0.0173554	378	ISOLATED	33.59927570560	-114.76939551100	Cinnabar Wash-Palo Verde Valley	2.00
R31	R6	RIVERINE	0.0041667	121	ISOLATED	33.60073971570	-114.77234950000	Cinnabar Wash-Palo Verde Valley	1.50
R32	R6	RIVERINE	0.0067493	196	ISOLATED	33.60063557540	-114.77227224800	Cinnabar Wash-Palo Verde Valley	1.50
R33	R6	RIVERINE	0.0225551	655	ISOLATED	33.60021076700	-114.77174218700	Cinnabar Wash-Palo Verde Valley	1.50
R34	R6	RIVERINE	0.1563361	1362	ISOLATED	33.59888308490	-114.76970072100	Cinnabar Wash-Palo Verde Valley	5.00
R35	R6	RIVERINE	0.055831	1216	ISOLATED	33.59798006460	-114.76787168300	Cinnabar Wash-Palo Verde Valley	2.00
R36	R6	RIVERINE	0.0326446	948	ISOLATED	33.59725254070	-114.76748268000	Cinnabar Wash-Palo Verde Valley	1.50
R37	R6	RIVERINE	0.0316804	276	ISOLATED	33.59720832730	-114.76783129200	Cinnabar Wash-Palo Verde Valley	5.00
R38	R6	RIVERINE	0.0427456	931	ISOLATED	33.59656116270	-114.76741391300	Cinnabar Wash-Palo Verde Valley	2.00
R39	R6	RIVERINE	0.0150138	436	ISOLATED	33.59702852040	-114.76815917000	Cinnabar Wash-Palo Verde Valley	1.50
R40	R6	RIVERINE	0.0337695	1471	ISOLATED	33.60146160230	-114.77365272100	Cinnabar Wash-Palo Verde Valley	1.00

R41	R6	RIVERINE	0.0782369	1136	ISOLATED	33.60178338500	-114.77469199500	Cinnabar Wash-Palo Verde Valley	3.00
R42	R6	RIVERINE	0.0453857	659	ISOLATED	33.60127786040	-114.77438465900	Cinnabar Wash-Palo Verde Valley	3.00
R43	R6	RIVERINE	0.0039256	114	ISOLATED	33.60279910310	-114.77700216900	Cinnabar Wash-Palo Verde Valley	1.50
R44	R6	RIVERINE	0.0044421	129	ISOLATED	33.60235958590	-114.77651288200	Cinnabar Wash-Palo Verde Valley	1.50
R45	R6	RIVERINE	0.0043388	126	ISOLATED	33.60238874570	-114.77658443500	Cinnabar Wash-Palo Verde Valley	1.50
R46	R6	RIVERINE	0.0652204	947	ISOLATED	33.60123497790	-114.77807526600	Cinnabar Wash-Palo Verde Valley	3.00
R47	R6	RIVERINE	0.0003214	7	ISOLATED	33.60186900000	-114.77909900000	Cinnabar Wash-Palo Verde Valley	2.00
R48	R6	RIVERINE	0.0061983	270	ISOLATED	33.60114789690	-114.77763369400	Cinnabar Wash-Palo Verde Valley	1.00
R49	R6	RIVERINE	0.0060836	265	ISOLATED	33.60109107210	-114.77731624800	Cinnabar Wash-Palo Verde Valley	1.00
R50	R6	RIVERINE	0.001056	23	ISOLATED	33.60167779300	-114.77912025300	Cinnabar Wash-Palo Verde Valley	2.00
R51a	R6	RIVERINE	0.0079201	69	ISOLATED	33.59679392450	-114.77299939600	Cinnabar Wash-Palo Verde Valley	5.00
R51b	R6	RIVERINE	0.1355372	2952	ISOLATED	33.59928377080	-114.77609871100	Cinnabar Wash-Palo Verde Valley	2.00
R51c	R6	RIVERINE	0.0467172	407	ISOLATED	33.59636714270	-114.77259344700	Cinnabar Wash-Palo Verde Valley	5.00
R52a	R6	RIVERINE	0.1020661	2223	ISOLATED	33.59459210680	-114.76969840400	Cinnabar Wash-Palo Verde Valley	2.00
R52b	R6	RIVERINE	0.0567952	1237	ISOLATED	33.59958275190	-114.77527072200	Cinnabar Wash-Palo Verde Valley	2.00
R52c	R6	RIVERINE	0.0780533	680	ISOLATED	33.59756075620	-114.77368120900	Cinnabar Wash-Palo Verde Valley	5.00
R52d	R6	RIVERINE	0.0643939	935	ISOLATED	33.59615214640	-114.77198198900	Cinnabar Wash-Palo Verde Valley	3.00
R53	R6	RIVERINE	0.1474747	1606	ISOLATED	33.59547817540	-114.76851253500	Cinnabar Wash-Palo Verde Valley	4.00
R54a	R6	RIVERINE	0.0024334	53	ISOLATED	33.58844300000	-114.75322000000	Cinnabar Wash-Palo Verde Valley	2.00
R54b	R6	RIVERINE	0.0523875	1141	ISOLATED	33.58838100000	-114.75132000000	Cinnabar Wash-Palo Verde Valley	2.00
R54c	R6	RIVERINE	0.0202938	442	ISOLATED	33.58838791650	-114.74884243500	Cinnabar Wash-Palo Verde Valley	2.00
			2.2421258	**41932**					

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1451 RESEARCH PARK DRIVE, SUITE 100
RIVERSIDE, CALIFORNIA 92507-2154

February 18, 2016

Terry Huffman, PhD
Huffman-Broadway Group, Inc.
828 Mission Avenue
San Rafael, California 94901

SUBJECT: Approved Jurisdictional Determination regarding geographic jurisdiction for the Desert Quartzite Project (SPL-2014-00535-JEM)

Dear Dr. Huffman:

I am responding to your request (File No. SPL-2014-00535-JEM) dated May 8, 2015, on behalf of First Solar Development, LLC, for an approved Department of the Army jurisdictional determination (JD) for the Desert Quartzite Solar Project site, located near the city of Blythe, Riverside County, California. The approximately 3,900 acre site is situated south of Interstate 10, approximately 8 miles southwest of Blythe, with centered coordinates of approximately 33.579 N, -114.756 W.

Based on your submitted materials, additional field data (October, 2015), and other jurisdictional determinations and available information, I have determined waters of the United States do not occur on the project site.

The aquatic resources identified as ephemeral streambeds and excavated ephemeral streambeds (both riverine) in project documentation you provided are intrastate isolated waters with no apparent interstate or foreign commerce connection. As such, these aquatic resources are not currently regulated by the Corps of Engineers. This disclaimer of jurisdiction is only for Section 404 of the Clean Water Act. Other federal, state, and local laws may apply to activities at the referenced project site. In particular, you may need authorization from the California State Water Resources Control Board, the California Department of Fish and Wildlife, and/or the U.S. Fish and Wildlife Service.

This determination has been conducted to identify the extent of the Corps' Clean Water Act jurisdiction on the particular project site identified in your request, and is valid for five years from the date of this letter, unless new information warrants revision of the determination before the expiration date. This determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

Thank you for participating in the regulatory program. If you have any questions, please contact me at 951-276-6624 x263 or via e-mail at James.E.Mace@usace.army.mil. Please help me to evaluate and improve the regulatory experience for others by completing the customer survey form at http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey.

Sincerely,

James E. Mace
Senior Project Manager
South Coast Branch
Regulatory Division

APPENDIX J

DRAFT INTEGRATED WEED MANAGEMENT PLAN

DRAFT
INTEGRATED WEED MANAGEMENT PLAN

DESERT QUARTZITE SOLAR PROJECT
RIVERSIDE COUNTY, CALIFORNIA

BLM Project Number: CACA # 049397

Riverside County CUP Number 3721

May 2016

Table of Contents

1 Introduction 1

2 Roles and Responsibilities 2

3 Project Summary 3

  3.1 Project Location 3

  3.2 Project Description 3

4 Weed Management Objectives 4

5 Weed Risk Assessment 4

  5.1 Invasive/Noxious Weed Definitions and Rankings 4

  5.2 Identification of Target Weed Species in the Project Site 5

  5.3 Non-Target Weed Species Present in the Project Site 8

  5.4 BLM Weed Risk Assessment 9

6 Weed Management 14

  6.1 Weed Management Areas 14

  6.2 Recommended Actions 14

  6.3 Preventative Measures 15

  6.4 Treatment Methods 18

  6.5 Recommended Treatments 21

7 Weed Monitoring 24

  7.1 Success Criteria 24

  7.2 Monitoring Schedule 24

  7.3 Adaptive Management and Reporting 25

8 Safety Considerations for Herbicide Application, Handling, Spills and Cleanup 26

  8.1 Herbicide Application 26

8.2 Herbicide Spills and Cleanup 27
8.3 Worker Safety and Spill Reporting 27
9 References 28

FIGURES

Figure 1: Regional Vicinity Map
Figure 2: Preliminary Site Plan

TABLES

TABLE 1. TARGET, NONNATIVE WEED SPECIES PRESENT ON THE PROJECT SITE THAT ARE CONSIDERED INVASIVE BY CAL-IPC. 6
TABLE 2. PROCEDURE FOR BLM WEED RISK ASSESSMENT. 9
TABLE 3: RISK ASSESSMENT OF TARGET WEED SPECIES ON THE PROJECT SITE. 12
TABLE 4. RECOMMENDED ACTIONS FOR TARGET WEED SPECIES ON THE PROJECT SITE. 14
TABLE 5. RECOMMENDED TREATMENT METHODS FOR THE REMOVAL AND CONTROL OF TARGET WEED SPECIES. 21

APPENDICES

Appendix A BLM Herbicide Treatment Standard Operating Procedures
Appendix B Adjuvant and Herbicide Formulas Approved by the BLM
Appendix C Example of BLM Pesticide Use Proposal Submittal Form
Appendix D Example of a BLM Pesticide Application Record Form

Acronyms and Abbreviations

AC	alternating-current
BLM	Bureau of Land Management
CAISO	California Independent System Operator
CAL-IPC	California Invasive Plant Council
CDFA	California Department of Food and Agriculture
CRSS	Colorado River Substation
EPA	U.S. Environmental Protection Agency
Gen-Tie Line	generation interconnection transmission line
GIS	geographic information system
GPS	global positioning system
IWMP	Integrated Weed Management Plan
MM	Mitigation Measure
mph	miles per hour
MW	megawatt
NECO Plan	Northern and Eastern Colorado Desert Coordinated Management Plan
NEPA	National Environmental Policy Act
NISC	National Invasive Species Management Plan
O&M	Operations and Maintenance
OHV	Off-highway vehicle
PAR	Pesticide Application Records
PPE	Personal Protective Equipment
Project	Desert Quartzite Solar Project
PV	Photovoltaic
PPA	Power Purchase Agreement
PUP	Pesticide Use Proposal
ROW	right-of-way
SCE	Southern California Edison
SDS	Safety Data Sheets

SPGF	solar power generation facility
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WEAP	Worker Environmental Awareness Procedure

1 Introduction

The purpose of this Integrated Weed Management Plan (IWMP) is to describe methods to prevent, mitigate, and control the establishment and spread of weeds during implementation of the Desert Quartzite Solar Project (Project). The objective of the IWMP is to describe the types and distribution of weeds in the Project area, assess risk of weed establishment and spread based on species occurrences and Project activities, and to outline effective control measures and monitoring efforts that would reduce their establishment and spread. This IWMP is applicable to the construction, operation and, decommissioning of the proposed Project, and the Project proponent and its approved contractors are responsible for its implementation. This IWMP is prepared in accordance with regulatory guidance from several agency sources, including the BLM Vegetation Treatments Using Herbicides in BLM Lands in 17 Western States (BLM 2007) and the National Invasive Species Council (NISC) National Invasive Species Management Plan (NISC 2008) and BLM Integrated Weed Management Manual (BLM 1992). The IWMP is prepared to be consistent for requirements in local BLM management plans, including the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO Plan; BLM 2002). Additionally, the IWMP is consistent with applicable Federal and State laws, regulations and weed management guidelines established by the BLM and other regulatory agencies. These include the Federal Noxious Weed Act of 1974 including the 1994 amendment, the federal Plant Protection Act of 2000, and Section 403 of the California Food and Agriculture Code, among others.

For the purpose of this IWMP, invasive weeds are defined as species of nonnative plants that are included on the California Invasive Plant Council's (CAL-IPC) list of invasive species for the Mojave Desert, have a rating of High or Moderate (CAL-IPC 2015) and are included on the United States Department of Agriculture (USDA) database of Federal Noxious Weeds (USDA 2015a), the USDA California State-listed Noxious Weeds (USDA 2015b), California Department of Food and Agriculture's (CDFA) Noxious Weed List (CDFA 2015), and the BLM National List of Invasive Weed Species of Concern (BLM 2008). Weeds are commonly categorized as either noxious, invasive, or both. The differences in definition lie in both legislative- and action-oriented considerations.

2 Roles and Responsibilities

All site Project proponent employees, contractors, and sub-contractors will be familiar with the IWMP, and will be responsible for implementing aspects of this IWMP.

All Workers, Contractors, and Contractor Staff will:

- Complete all required Worker Environmental Awareness Procedure (WEAP) training before starting work. WEAP training will include a section pertaining to weed establishment and spread.
- Ensure that any vehicles and equipment used on the Project site are inspected for excess soil or signs of noxious weeds prior to gaining entry to the site. If inspections indicate that a vehicle requires washing, this activity will occur off-site at existing car washes with appropriate containment facilities.
- Ensure that vehicle cabs are inspected for refuse, soil, or other materials susceptible to transporting weed seeds or other plant structures. If deemed necessary, the interiors of vehicles should be cleaned using compressed air before entry and immediately prior to departing the Project site.
- Ensure that all imported or procured materials used for site reclamation, revegetation, and installation of stormwater/erosion control measures are certified as weed-free by the vendor.
- Limit vehicle travel within the Project site to designated roads and established overland travel routes only, with no off-road travel.
- Limit disturbance areas to the smallest area needed for activity.

3 Project Summary

3.1 Project Location

The Project site is located in rural eastern Riverside County near the City of Blythe, California, and situated on the Blythe United States Geological Survey (USGS) 7.5-minute Topographic Quadrangle (Figure 1, Regional Vicinity Map). The site is situated just south of Interstate Highway 10 (I-10) and approximately 2.5 miles to the southwest of the Blythe Airport. The majority of the Project site is located on land administered by the BLM. A 160-acre private parcel land inholding is also included in the Project's Preliminary Site Plan (Figure 2).

The primary access to the Project site will be via I-10 to State Route 78 (SR 78)/S. Neighbours Boulevard to 16th Avenue/Seeley Boulevard. Emergency access from the west of the overall Project Site will be provided by I-10 to Wiley's Well Road to Power Line Road (both Wiley's Well Road and Power Line Road are paved) and then from the north of the existing Colorado River Substation (CRSS) via a maintenance road along the proposed gen-tie route. Land uses in the Project vicinity include agricultural uses, off-highway vehicle (OHV) recreation, roads, pipelines, and transmission line rights-of-way.

3.2 Project Description

The Project will consist of the construction, operation, and maintenance of an approximately 300-megawatt (MW) alternating-current (AC) photovoltaic (PV) solar power generation facility (SPGF). Project components include on-site facilities, offsite facilities, and temporary facilities needed to construct the Project. Major on-site facilities are the solar field (comprised of multiple blocks of solar PV panels mounted on fixed tilt or tracking systems and associated equipment), a project substation, and operations and maintenance (O&M) facilities. The perimeter of the occupied portions of the Solar Facility will be fenced to limit public access. The entrance to the completed Project will be gated and restricted to unauthorized entry, and the Project will be surrounded by a permanent, six-foot tall, chain-link security fence with barbed wire. The offsite facilities include an approximately 3-mile 230 kV gen-tie located on BLM-administered lands within a 160-foot wide operational right-of-way (ROW). Interconnection to the California Independent System Operator (CAISO) Grid will be via the Southern California Edison (SCE)-operated transmission system at the CRSS. Temporary facilities, which will be removed at the end of the construction period, include the on-site mobilization, laydown, and construction areas and, if needed, any water storage tanks utilized for dust suppression. The total Project area under application for BLM and County of Riverside approval is approximately 5,275 acres (approximately 5,115 acres of BLM administered lands and 160 acres of private lands). The Project would occupy approximately 3,772 acres when completed, including 3,714 acres for the solar facility site and 58 acres for the proposed 160-foot wide generation interconnection transmission line (Gen-Tie Line) ROW. The Project's Preliminary Site Plan is presented in Figure 2.

4 Weed Management Objectives

The Project's weed management objectives include:

Identification and Risk Assessment: Identify the presence, location, and abundance of weed species on the Project site, both existing conditions and conditions over time.

Suppression: Strive to ensure that populations of existing weed species do not increase due to implementation of the Project.

Containment: Strive to prevent the spread of existing weeds to new areas and prevent the introduction of new weed species into the Project Site.

The following sections detail the identification of weeds on the Project site, an assessment of their risk, and methods for suppression and containment.

5 Weed Risk Assessment

5.1 Invasive/Noxious Weed Definitions and Rankings

Weeds are typically defined as nonnative plant species that may be invasive or non-invasive and noxious or not noxious. ***Invasive weeds*** are nonnative plant species that are injurious to the public health, agriculture, recreation, wildlife habitat, or the biodiversity of native habitats. Many invasive plant species thrive in disturbed areas, and may out-compete native species in early successional environments. ***Noxious weeds*** are "competitive, persistent, and pernicious" plant species designated by federal, state, or county agencies as injurious to public health, agriculture, recreation, wildlife, or property (James et al. 1991; Sheley et al. 1999).

The California Invasive Plant Council (Cal-IPC) categorizes invasive plants as high, moderate, or limited according to the severity of their ecological impact (Cal-IPC 2015):

High – Invasive plants classified as high consist of species that have severe ecological impacts on physical processes, plant and animal communities and vegetation structure, and have a moderate to high rate of dispersal and establishment.

Moderate – These species consist of species that have substantial and apparent (but not severe) ecological impacts and have a moderate to high rate of dispersal and establishment, although establishment is generally dependent upon a disturbance regime such as soil disruption or fire.

Limited – These consist of species that are invasive, but their ecological impacts are minor on a state-wide level. Dispersal and establishment of species classified as limited are generally low to moderate.

These classifications are based on cumulative state-wide trends and can vary at local scales. As a result, a species classified as limited may be more invasive on a local scale than a species classified as high, depending on local conditions (Cal-IPC 2015). For this reason, all plants classified as invasive Cal-IPC, even those classified as limited, can potentially impact a local ecosystem. Not all nonnative plants that occur in California are listed in the Cal-IPC Invasive Plant Inventory. Most of these non-listed weeds have little invasive potential and are generally not considered harmful.

5.2 Identification of Target Weed Species in the Project Site

Weed surveys were conducted in the Project site in 2012 and 2013. These surveys, which included identifying and mapping the weed occurrences, determined that ten nonnative plant species occur on the Project site (Ironwood 2015), of which six are considered invasive by Cal-IPC. These six species, listed in Table 1, are considered the target weed species specifically addressed by this IWMP. Descriptions of the other nonnative, non-target weeds present on the Project site, including lamb’s quarters (*Chenopodium album*), nettlefleaf goosefoot (*Chenopodium murale*), prostrate knotweed (*Polygonum aviculare* ssp. *depressum*), and puncture vine (*Tribulus terrestris*) are provided; however, this IWMP does not contain specific measures for these species.

5.2.1 Sahara Mustard

Sahara mustard (*Brassica tournefortii*) is a winter annual in the family Brassicaceae that occurs in desert scrub communities and desert dunes in the Sonoran and Mojave Deserts. Sahara mustard germinates with the first substantial winter rain, and may be the most rapidly developing annual where it occurs. The plants mature quickly, typically producing flowers and fruits between December and February and seeds between February and May, depending on the onset of winter rains. Seed longevity in soils may be several years. Sahara mustard readily invades newly burned areas, and is known to increase fire frequency and fuel load. Increased fire frequency can cause scrub habitats to convert to grasslands because the native shrubs are not adapted to recurrent fires. The high biomass of Saharan mustard, along with frequent fires, may deplete soils of important nutrients, making native habitat recovery more difficult. This species spreads easily, and its degree of invasiveness has been listed as ‘high’ by Cal-IPC (Table 1). This species is widespread and diffusely distributed throughout most of the Project site, with areas of high abundance in areas of sandy soil. Millions of individuals were observed flowering and fruiting during the spring 2013 survey.

TABLE 1. TARGET, NONNATIVE WEED SPECIES PRESENT ON THE PROJECT SITE THAT ARE CONSIDERED INVASIVE BY CAL-IPC.

Species	Cal-IPC Degree of Invasiveness
Sahara mustard (*Brassica tournefortii*)	High
Bermuda grass (*Cynodon dactylon*)	Moderate
Eucalyptus tree (*Eucalyptus* sp.)	Limited
Russian thistle (*Salsola tragus*)	Limited
Mediterranean grass (*Schismus barbatus*)	Limited
Tamarisk (*Tamarix ramosissima*)	High

5.2.2 Bermuda Grass

Bermuda grass (*Cynodon dactylon*) is a low-growing, wiry, perennial grass from Africa. This species is used as a turf grass because it that spreads through both aboveground stolons and belowground rhizomes, but has become widespread as a weed throughout the Southwest and Southeast. It occurs as a weed in disturbed areas throughout California at elevations below 3,000 feet, and is considered moderately invasive by Cal-IPC (Table 1). This species was detected in Desert Woodland Wash habitat during the botanical inventory in an area north of the Project site in a location that provided limited microhabitat requirements (shade, mesic conditions) for this species to establish.

5.2.3 Eucalyptus Trees

Two eucalyptus trees, likely remnants of a planted windbreak, were observed north of the Project site in an off-site location during botanical inventories. Though these trees were not identified to species, there are two *Eucalyptus* species considered limited in their degree of invasiveness by Cal-IPC, including red gum (*Eucalyptus camaldulensis*) and Tasmanian blue gum (*Eucalyptus globulus*).

5.2.4 Russian Thistle

Russian thistle (*Salsola tragus*) is a large, bushy, annual plant native to Eurasia. The seeds of this cool-season species germinate with the first winter rains in December through February. The mature plants produce seed in July through October. A large Russian thistle plant may produce more than 200,000 seeds, which are dispersed as the main stem of the plant breaks and the weed skeleton “tumbles” across the landscape during windy conditions (hence the common name tumbleweed). This species grows in areas of loose, sandy soils, but also disturbed sites, waste places, roadsides, fields, cultivated fields, and disturbed natural and semi-natural plant communities. This species was locally abundant in portions of the Project site, primarily on sand dunes along the gen-tie line, but also in small occurrences across disturbed portions of the site. This plant represents the second most common weed onsite after Sahara mustard. This species is considered limited in its degree of invasiveness by Cal-IPC, and it is considered a noxious weed by the California Department of Food and Agriculture (CDFA 2011).

5.2.5 Mediterranean Grass

Mediterranean grass (*Schismus barbatus*) is a small, tufted annual grass that is native to the Mediterranean region. Seeds of this species germinate with the first winter rains between December and February. Plants mature in March and April and drop seeds beginning in May. Seeds disperse by sheet flooding and by wind and often persist within the inflorescence, detaching after it is blown across the ground for a short distance from the parent plant. This species has become widespread in the Mojave and Sonoran Deserts, and is particularly abundant where grazing, off-road-vehicle use, or construction of linear corridors have reduced shrub cover and disturbed the soil. Mediterranean grass competes for limiting nutrients with native annual plants in spaces between shrubs (Brooks 1998), and may contribute to increased frequencies and extents of fires in recent decades in California deserts (Brooks 1998). Mediterranean grass was recorded as widespread, but not abundant, at the Project site during the botanical inventories. This species is considered limited in its degree of invasiveness by Cal-IPC.

5.2.6 Tamarisk

Two tamarisk trees (*Tamarix ramosissima*), likely remnants of a planted windbreak, were observed north of the Project site in an off-site location during botanical inventories. This species is a semi-deciduous, loosely branched shrub or small to medium-sized tree that is native to Eurasia. In California it was used in windbreaks, but has become invasive in riparian areas, particularly within the Colorado River Basin. In invasive situations, this species displaces native plants, drastically alters habitat and food webs for animals, depletes water sources, and increases erosion, flood damage, soil salinity, and fire potential. This species spreads easily in riparian areas and lake margins with perennial water supply, and its degree of invasiveness has been listed as ‘high’ by Cal-IPC. Furthermore, it is considered a noxious weed by the California Department of Food and Agriculture (CDFA 2011).

5.3 Non-Target Weed Species Present in the Project Site

Four other nonnative weed species were observed within the Project site during surveys; however, they are not identified by Cal-IPC as being invasive. This may indicate that these species require more information in order to assess their invasiveness, or that they are not currently viewed as a significant threat to the ecosystem.

5.3.1 Lamb's Quarters

Lamb's quarters (*Chenopodium album*) is a broadleaf annual plant native to Europe. It inhabits agricultural lands and other disturbed areas throughout California at elevations up to 5900 feet (1800 m). Though this species is generally considered edible, it may be toxic to livestock when large amounts are consumed in a short period. Though not native to California, this species is not considered invasive by Cal-IPC. Only a few individuals were observed during the botanical inventories.

5.3.2 Nettleleaf Goosefoot

Nettleleaf goosefoot (*Chenopodiastrum murale*) is a broadleaf annual plant native to the Mediterranean region. It inhabits agricultural lands and other disturbed areas throughout California at elevations up to 5900 feet (1800 m). Like lamb's quarters, nettleleaf goosefoot may contain toxic amounts of oxalate or nitrate compounds that affect sheep and other grazing animals in high doses. Though not native to California, this species is not considered invasive by Cal-IPC. Only a few individuals were observed during the botanical inventories.

5.3.3 Prostrate Knotweed

Prostrate knotweed (*Polygonum aviculare* ssp. *depressum*) is an annual or short-lived perennial herb native to Eurasia. In California it has naturalized in areas supporting riparian habitat, and it is a common weed in urban situations and disturbed areas. It is not considered invasive by Cal-IPC. Only once instance of this plant was detected during the botanical inventories of the Project site.

5.3.4 Puncture Vine

Puncture vine (*Tribulus terrestris*) is an annual, prostrate plant that is native to the Mediterranean. This species is widespread in California, inhabiting agricultural lands, roadsides, and other disturbed locations, often in areas with high soil compaction. The seeds of puncture vine are enclosed in a hard caltrop-like case that can injure livestock, people, and pets when stepped on and can even puncture bicycle tires. Though not native to California, this species is not considered invasive by Cal-IPC. Only a few individuals were observed during the botanical inventories; these were limited to the boundary around the private 160-acre parcel inholding.

5.4 BLM Weed Risk Assessment

5.4.1 Risk Assessment Procedure

The risk for establishment and spread of target weed species within the Project site was assessed using guidance contained in the BLM Integrated Weed Management Manual 9015 and BLM Herbicide Treatment Standard Operating Procedures (Table 2; Appendix A).

TABLE 2. PROCEDURE FOR BLM WEED RISK ASSESSMENT.

Factor 1: Likelihood of Noxious Weed Species Spreading to Project Area	
None	Noxious/invasive weed species not located within or adjacent to the Project site. Project activity is not likely to result in the establishment of noxious/invasive weed species in the Project site.
Low (1)	Noxious/invasive weed species present in areas adjacent to but not within the Project site. Project activities can be implemented and prevent the spread of noxious/invasive weeds into the Project site.
Moderate (5)	Noxious/invasive weed species located immediately adjacent to or within the Project site. Project activities are likely to result in some areas becoming infested with noxious/invasive weed species even when preventative management actions are followed. Control measures are essential to prevent the spread of noxious/invasive weeds within the Project site.
High (10)	Heavy infestations of noxious/invasive weeds are located within or immediately adjacent to the Project site. Project activities, even with preventative management actions, are likely to result in the establishment and spread of noxious/invasive weeds on disturbed areas throughout much of the Project site.
Factor 2: Consequence of Noxious Weed Establishment in Project Area (consistent with Cal-IPC rating unless not rated)	
Low to Nonexistent (1)	None. No cumulative effects expected.
Moderate (5)	Possible adverse effects on site and possible expansion of infestation within Project site. Cumulative effects on native plant communities are likely but limited.
High (10)	Obvious adverse effects within the Project site and probable expansion of noxious/invasive weed infestations to areas outside the Project site. Adverse cumulative effects on native plant communities are probable.

TABLE 2. PROCEDURE FOR BLM WEED RISK ASSESSMENT.

<table>
<tr><th colspan="3">Risk Rating</th></tr>
<tr><td colspan="3">Step 1: Identify level of likelihood and consequence of adverse effects and assign values according to the following: None—0, Low—1, Moderate—5, High—10.</td></tr>
<tr><td colspan="3">Step 2: Multiply level of likelihood by consequence.</td></tr>
<tr><td colspan="3">Step 3: Use the value resulting in Step 2 to determine Risk Rating and Action as follows:</td></tr>
<tr><th>Value</th><th>Risk Rating</th><th>Action</th></tr>
<tr><td>0</td><td>None</td><td>Proceed as planned.</td></tr>
<tr><td>1-10</td><td>Low</td><td>Proceed as planned. Initiate control treatment on noxious/invasive weed populations that become established in the Project site.</td></tr>
<tr><td>25</td><td>Moderate</td><td>Develop preventative management measures for the proposed Project to reduce the risk of introduction or spread of noxious/invasive weeds into the Project site. Preventative management measures should include modifying the Project site to include seeding the area to occupy disturbed sites with desirable native species. Monitor area for at least 3 consecutive years and provide for control of newly established populations of noxious/invasive weeds and follow-up treatment for previously treated infestations.</td></tr>
<tr><td>50-100</td><td>High</td><td>Project must be modified to reduce risk level through preventative management measures including seeding with desirable native species to occupy disturbed sites and controlling existing infestations of noxious/invasive weeds prior to Project activity. Project must provide at least 5 consecutive years of monitoring. Project must also provide for control of newly established populations of noxious/invasive weeds and follow-up treatment for previously treated infestations.</td></tr>
</table>

In evaluating the risk of invasiveness in the Project site (Factor 1), the Cal-IPC's ratings of the degree of plant invasiveness for each species were reviewed. The 2015 Cal-IPC Invasive Plant Inventory rates non-native species according to degree of invasiveness using 13 different criteria and scoring them according to: (1) ecological impact, (2) invasive potential, and (3) distribution. Each of the three categories are interpreted as A=high, B=moderate, C=limited, D=none, and U=unknown. The documentation level for each species is based on the average level of references used to evaluate a particular species from 0 (no information) to 4 (all information). These three categories reflect the level of each species' negative ecological impact on California wildlands and are generally accepted in California as a reliable measure of a plant species' potential harmfulness:

- High – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically (Cal-IPC 2015). Project must be modified to reduce risk level through preventative management measures including seeding with desirable species to occupy disturbed sites and controlling existing infestations of invasive weeds prior to project activity. Project must provide at least 5 consecutive years of monitoring. Projects must also provide for control of newly established populations of invasive weeds and follow-up treatment for previously treated infestations.
- Moderate – These species have substantial and apparent (but generally not severe) ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread (Cal-IPC 2015). Develop preventative management measures for the proposed project to reduce the risk of introduction or spread of invasive weeds into the area. Preventative management measures should include modifying the project to include seeding the area to occupy disturbed sites with desirable species. Monitor area for at least 3 consecutive years and provide for control of newly established populations of invasive weeds and follow-up treatment for previously treated infestations.
- Limited – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic (Cal-IPC 2015). Proceed as planned. Initiate control treatment on invasive weed populations that get established in the area.

In evaluating the risk of consequences of spread of the weeds into the Project site (Factor 2), the USDA Federal Noxious Weeds list (USDA 2015a), the USDA California State-listed Noxious Weeds (USDA 2015b), the CDFA Noxious Weed List (CDFA 2015), and the BLM National List of Invasive Weed Species of Concern (BLM 2008) were reviewed to determine status for each species.

5.4.2 Risk of Target Weed Species

Following consideration of Factors 1 and 2, the risk ratings for target weed species on the Project site ranged from high to low (Table 3). The risk of these target species on the Project site is described further in detail below.

TABLE 3: RISK ASSESSMENT OF TARGET WEED SPECIES ON THE PROJECT SITE.

Species	**Occurrence in Project Site**	**Cal-IPC Degree of Invasiveness**	**BLM Factor 1 Score (Likeliness)**	**BLM Factor 2 (Consequences)**	**BLM Risk Rating**
Sahara mustard (*Brassica tournefortii*)	Widespread and locally abundant on sandy soils	High	10 (High)	10 (High)	100 (High)
Bermuda grass (*Cynodon dactylon*)	Scarce	Moderate	5 (Moderate)	1 (Low)	5 (Low)
Eucalyptus tree (*Eucalyptus* sp.)	Scarce	Limited	1 (Low)	1 (Low)	1 (Low)
Russian thistle (*Salsola tragus*)	Abundant on sandy soils in disturbed areas	Limited	5 (Moderate)	5 (Moderate)	25 (Moderate)
Mediterranean grass (*Schismus barbatus*)	Widespread	Limited	5 (Moderate)	5 (Moderate)	25 (Moderate)
Tamarisk (*Tamarix ramosissima*)	Scarce	High	1 (Low)	5 (Moderate)	5 (Low)

High Risk Weed Species

Sahara mustard was assessed a High risk rating (Table 3). This species is widespread throughout the Project site and abundant in areas of sandy soil. Sahara mustard is most common in wind-blown sand deposits and is particularly abundant in disturbed areas such as roadsides and graded areas. Thus, Project activities that contribute to ground disturbance are likely to cause the establishment and spread of this species.

Moderate Risk Weed Species

Russian thistle was assessed a Moderate risk rating (Table 3). This species is common in disturbed sites, particularly on sandy soils. Russian thistle is patchily distributed over portions of the Project site, being locally abundant in areas supporting sand dunes, along the Gen-Tie Line, and in other disturbed areas.

Project activities that contribute to ground disturbance are likely to cause the establishment and spread of this species, particularly in areas containing sandy soils.

Mediterranean grass was assessed a Moderate risk rating (Table 3). This species is common throughout desert areas in southern California, particularly in areas that have been grazed or disturbed. Mediterranean grass is widespread in the Project site, though not particularly abundant. Project activities that contribute to ground disturbance are likely to cause the establishment and spread of this species.

Low Risk Weed Species

Bermuda grass was assessed a Low risk rating (Table 3). This species was found to occur in a limited area of the Project site, within the Dry Desert Wash community in the northwestern portion of the Project site. This species is known to spread in mesic, riparian habitats, particularly near urbanized areas. Activities at the Project site are not likely to cause this species to spread or become established.

Eucalyptus tree was assessed a Low risk rating (Table 3). Just two eucalyptus trees were encountered just outside of the Project site. They are considered invasive in coastal areas of California, and the risk of spread in the Project vicinity is low due to climatic conditions in the region. Project activities are unlikely to cause the spread or establishment of eucalyptus tree species.

Tamarisk was assessed a Low risk rating (Table 3). Just two eucalyptus trees were encountered just outside of the Project site. They are considered highly invasive in riparian areas in southern California deserts, and are particularly problematic along the Colorado River. Conditions in the Project site are not particularly conducive for this species, and Project activities are not likely to cause its spread or establishment.

6 Weed Management

Effective weed management will be accomplished at the proposed Project through the identification of problem species and areas, and implementation of BLM-approved measures intended to prevent the spread and establishment of new weed occurrences and treat known occurrences of weeds.

6.1 Weed Management Areas

Soil disturbed during construction will create habitat well-suited to disturbance-adapted invasive species; thus weed management will focus on areas of temporary surface disturbance, including the solar facility and Gen-Tie Line. Restored areas may also be prone to weed invasion and establishment. Areas that will be paved, graveled and compacted, or otherwise covered with a non-growing surface are excluded from weed management.

6.2 Recommended Actions

Based upon the likelihood and consequences of the occurrence of high, moderate, and low risk target weeds on the Project site, recommended actions are based upon the BLM Integrated Weed Management Manual 9015 and BLM Herbicide Treatment Standard Operating Procedures (Appendix A), and include control, prevention, and monitoring (Table 4). Specific treatment methods and preventative measures are described below; specific monitoring techniques are described in the next section.

TABLE 4. RECOMMENDED ACTIONS FOR TARGET WEED SPECIES ON THE PROJECT SITE.

Risk Rating		
High	Sahara mustard	Conduct pre-construction weed survey to document the locations and densities of Sahara mustard populations during the winter prior to the initiation of construction. Using approved treatment methods, control existing populations identified during pre-construction surveys. Develop and

TABLE 4. RECOMMENDED ACTIONS FOR TARGET WEED SPECIES ON THE PROJECT SITE.

Risk Rating	Species	Recommended Action*
		implement preventative management measures to reduce the risk of establishment and spread of high priority weeds into the Project site during construction, O&M, and decommissioning phases. Provide 5 consecutive years of post-construction monitoring.
Moderate	Russian thistle Mediterranean grass	Develop and implement preventative management measures to reduce the risk of the establishment and spread of moderate priority weeds into the Project site during construction, O&M, and decommissioning phases. Provide 3 consecutive years of post-construction monitoring.
Low	Bermuda grass Eucalyptus tree Tamarisk	Implement preventative management measures to prevent the establishment of populations of low priority weed species into the Project site during construction, O&M, and decommissioning phases.

*based on BLM Integrated Weed Management Manual 9051 guidance

6.3 Preventative Measures

The prevention of weed establishment is the most effective weed management practice. Preventing or reducing the potential for weed establishment reduces additional efforts, costs, and time invested in subsequent weed control or eradication measures. Several measures have proven to be effective toward preventing the spread and establishment of weeds on projects where surface disturbing activities are proposed. The following preventative measures will be implemented during the construction, operation, and maintenance phases of the Project.

6.3.1 Construction Phase

The following preventative measures will be implemented on the Project site during its construction phase:

- Weeds spread when their seeds are contained in soil or other materials that travel in or on dirty vehicles and equipment. To prevent the spread of weeds in this manner, the bodies and cabs of all vehicles and equipment entering the Project site will be inspected to ensure their cleanliness.
- If vehicles/equipment are observed with excess soil or any plant material, they will not be allowed entry to the Project site unless they are cleaned/washed. Washing will occur off site at existing car washes with appropriate containment facilities. Upon initial entry to the Project site, the vehicles and equipment will be inspected to ensure they have been washed.
- Vehicles and equipment returning to the Project site following their initial visit will be subject to inspection upon re-entry. If soil or other materials are found on the body of the vehicle or equipment, it will be directed to an off-site car wash with appropriate containment facilities.
- Vehicle cabs may be subject to inspection and cleaning in an effort to remove refuse, soil, or other materials susceptible to transporting weed seeds or other plant structures. Vehicle cabs that do not pass inspection will be cleaned using compressed air at an off-site car wash with appropriate containment facilities prior to their entry to the Project site.
- All imported or procured materials used during site reclamation, revegetation, and installation of stormwater/erosion control measures will be certified as weed free by the vendor.
- Vehicle travel in the Project site will be restricted to designated roads and established overland travel routes.
- Disturbance areas will be limited to the smallest area needed for construction.
- The Project’s WEAP training will include a section on weed spread and colonization.
- On BLM lands, standardized operating procedures will be implemented (Appendix A), including the use of BLM-approved herbicides (Appendix B), submitting BLM Pesticide Use Proposal (PUP) Submittal Forms (Appendix C), and filing BLM Pesticide Application Record Forms (Appendix D).

6.3.2 Operation and Maintenance Phase

The following preventative measures will be implemented on the Project site during its O&M phase:

- Operation and maintenance vehicle bodies and their cabs will be inspected monthly to ensure cleanliness. If vehicles or equipment or their cabs are deemed to be at risk of carrying weed seeds or other plant structures, they will be subject to cleaning to remove refuse, soil, or other susceptible seed-carrying materials.

- Washing will occur off site at existing car washes with appropriate containment facilities. Vehicle cabs that do not pass inspection will be cleaned using compressed air at an offsite car wash with appropriate containment facilities.
- All imported or procured materials used during site reclamation, revegetation, and installation of stormwater/erosion control measures will be certified as weed free by the vendor.
- Vehicle travel in the Project site will be restricted to designated roads and established overland travel routes.
- The Project's WEAP training will include a section on weed spread and colonization.
- On BLM lands, standardized operating procedures will be implemented (Appendix A), including the use of BLM-approved herbicides (Appendix B), submitting BLM PUP Submittal Forms (Appendix C), and filling BLM Pesticide Application Record Forms (Appendix D).

6.3.3 Decommissioning Phase

The following preventative measures will be implemented on the Project site during its decommissioning phase:

- The bodies and cabs of all vehicles and equipment entering the Project site will be inspected to ensure their cleanliness. If vehicles/equipment are observed with excess soil or any plant material, they will not be allowed entry to the Project site unless they are cleaned/washed
- Washing will occur off site at existing car washes with appropriate containment facilities. Upon initial entry to the Project site, the vehicles and equipment will be inspected to ensure they have been washed.
- Vehicles and equipment returning to the Project site following their initial visit will be subject to inspection upon re-entry. If soil or other materials are found on the body of the vehicle or equipment, it will be directed to an off-site car wash with appropriate containment facilities.
- Vehicle cabs may be subject to inspection and cleaning in an effort to remove refuse, soil, or other materials susceptible to transporting weed seeds or other plant structures. Vehicle cabs that do not pass inspection will be cleaned using compressed air at an off-site car wash with appropriate containment facilities prior to their entry to the Project site.
- Vehicle travel in the Project site will be restricted to designated roads and established overland travel routes.
- Disturbance areas will be limited to the smallest area needed for decommissioning.
- The Project's WEAP training will include a section on weed spread and colonization.

- On BLM lands, standardized operating procedures will be implemented (Appendix A), including the use of BLM-approved herbicides (Appendix B), submitting BLM Pesticide Use Proposal (PUP) Submittal Forms (Appendix C), and filling BLM Pesticide Application Record Forms (Appendix D).

Note: *As this plan is in early draft form, it may be revised to modify or exclude measures listed, or include additional measures as appropriate before the final version is issued for approval*.

6.4 Treatment Methods

Treatment methods are necessary to control and eradicate known invasive and noxious weed occurrences or populations. Treatment methods include a variety of approaches such as mechanical, chemical, and biological controls. The weed treatment measures described here are considered the most appropriate and effective in controlling the range of high, medium, and low priority weeds identified on the Project site. Because the Project site is located in the historic range of the desert tortoise and sign of the species was detected prior to construction of the Project, the application of herbicides may only be permitted on BLM lands through submission and approval of a PUP (Appendix C).

6.4.1 Manual/Mechanical Treatments

Manual and mechanical treatments include the use of physical means to remove plants, reproductive parts, or propagules. These treatments include manual methods (pulling weed plants from the soil), use of hand tools and hand-held power tools, mowing, and more aggressive efforts that involve removing above and below ground plant structures. Manual and mechanical treatments are effective for controlling most of the weeds known to occur in the Project vicinity. An exception is Mediterranean grass, which is generally too numerous and widespread for effective control. The designation of the appropriate mechanical treatment will depend on variables including season, plant life stage, weed species, size and population of each occurrence, and more. The weed management contractor will coordinate with the appropriate agencies before implementing any weed treatment methods.

Manual Removal

Manual removal techniques are recommended to control Sahara mustard and Russian thistle; if manual removal techniques prove to be impractical; other methods such as the use of approved chemical methods (per Section 6.4.3 below) or mechanical means (see below) may be used. Manual removal methods will focus on removing plants or fruits with hand tools. This removal technique is viewed as ideal, as it has the least potential for unwanted impacts on the natural environment. Special care will be taken to use tools that will remove weeds effectively, while not disturbing native vegetation. When implementing manual removal of Sahara mustard and Russian thistle, both the above-ground vegetative portion of the plant and the root systems will be removed, as these species are capable of re-sprouting if the roots are left intact. Removal efforts will be timed appropriately for each species, before seeds set. Timing will also be flexible to reflect rainfall events and other factors that may speed up or delay weed growth and seed development. Multiple removals may be necessary to ensure that late-germinating plants are also removed (Trader et al. 2006).

Plants will be disposed of by bagging invasive plants, hauling them off site, and either incinerating them (if permitted by air quality standards) or transporting them to a permitted waste facility.

Mechanical Removal

Although mechanical removal techniques are unlikely to be implemented due to the nature of the target weed species present at the Project, Desert Quartzite may implement mechanical techniques, such as hand weed trimmers, mowers, and chainsaws, in limited applications to control weed populations in situations where manual removal techniques are ineffective and mechanical techniques would not result in plant proliferation. Mechanical trimmers will not be used during periods of high fire risk and will only be used with implementation of fire prevention measures. Timing of efforts will ideally coincide with manual removal, and, when possible, areas where weeds have been removed will be revegetated to hinder a future reemergence of weeds in the same location.

6.4.2 Biological Control

Biological treatments include the use of plants and animals (particularly sheep) that parasitize, ingest, or out-compete weed species. Based on the target weed species expected to occur on the Project and other factors, biological controls are not expected to be a viable or appropriate alternative for treating weed occurrences at the Project site.

6.4.3 Chemical Control

Regulations

Chemical treatments involve the use and application of herbicides. The use of herbicides is highly regulated and involves a variety of specific protocols, safety measures, and precautions for eliminating, reducing, and mitigating for uncontrolled releases. The BLM regulates the use and type of herbicides on all of its administered lands. Included in the BLM’s Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States (BLM 2007) is a list of the 14 active herbicidal ingredients approved for use on BLM lands. Appendix B includes the 2014 list of adjuvants, chemical additives intended to improve the efficacy of herbicides, approved for use on lands administered by the BLM. Guidelines for the use of chemical means to control vegetation on lands administered by the BLM are presented in the BLM Chemical Pest Control Manual (BLM n.d.). These guidelines require submittal of a PUP and pesticide application records (PAR) for use of herbicides on lands administered by the BLM. Appendix C includes a BLM PUP submittal form, and Appendix D includes an example of a BLM PAR form.

PUPs are to be submitted to BLM several weeks before herbicide application on lands administered by the BLM. The appropriate weed control procedures, including target species, timing of control, and method of control, will be determined through consultation with the Palm Springs Field Office weed specialist. All personnel associated with application of weed control measures will be appropriately trained and hold all of the required certifications. PARs are to be submitted no more than 24 hours after application of the herbicide.

These regulations and guidelines will be generally followed and implemented on all areas of proposed disturbance BLM controlled land and generally utilized as a guideline throughout the project site. Project personnel will implement safety measures when applying herbicides, as well as cleaning and reporting spills, as described in Section 7 of this report.

Pre- and Post-Emergent Herbicides

Pre-emergent herbicides (e.g., diuron) are applied to the soil before the weed seed germinates. Application may occur along segments of the fence line and the road shoulder where populations of weeds are either dense or have been enhanced by Project activities. Both pre- and post-emergent herbicides will be applied at the recommended rate of the manufacturer. Post-emergent herbicides (e.g., glyphosate or triclopyr) are applied directly to plants, in those areas where manual removal is impractical due to the abundance of weed plants and damage to native vegetation would be minimal. Where existing Sahara mustard populations are dense and likely to spread in response to construction, weed seeds may be allowed to germinate so that can then be eliminated prior to seed set if time permits. For instance, this could occur along the Gen-Tie Line or sections of silt fencing or tortoise fencing where sediments and weed seeds collect.

Timing is critical for both pre-emergent and post-emergent herbicide application. In the Project vicinity, pre-emergent herbicides would primarily be applied in early fall, prior to fall/early winter rains and weed germination. Post-emergent herbicides must be applied while the weed is actively growing, most effectively in the early seedling stage, but always prior to seed set. Therefore, all post-emergent treatments will occur between February and early April, depending on the target species. Species-specific herbicides are currently being investigated and will be used as appropriate and available, along with other mechanical and chemical means for post-emergent elimination. When possible, selective herbicides will be used to target specific weed species, rather than all plant growth.

Application of herbicide would be by approved operators using low-pressure sprayers at an application rate equal to, or less than, the manufacturer's recommendation; certified operators would be required for those herbicides that legally restrict application only to a licensed applicator. Standard procedures recommend using the lowest amount of herbicide to effectively treat the target species. In no instance would using the maximum rate of herbicide for direct use exceed the maximum allowable rate per acre. According to the BLM (2007), field studies suggest that appropriate herbicide use is not likely to have significant direct toxicological effects on wildlife. Based on the analysis in BLM (2007), risks to wildlife (terrestrial) from invasive plant treatments using herbicides proposed for potential use on-site would be as follows:

- Triclopyr – Low to moderate risk from direct spray for most wildlife. No to moderate risk from consumption of contaminated vegetation or prey.
- Glyphosate – No to moderate risk from direct spray; no to moderate risk from consumption of contaminated vegetation or prey.

Herbicides will only be applied using targeted methods (i.e., backpack sprayers or a spray rig with a hand held wand method); no broadcast treatment methods will be employed. This targeted application reduces potential impacts associated with application of herbicides to nontarget vegetation and wildlife. That stated, herbicide treatments are proposed for use in areas that have been disturbed by the Project, so there is a substantially reduced potential for direct adverse affects to native plants and wildlife. The most likely affect would be associated with the drift of herbicides into adjacent habitat. Drift can occur as vapor drift or particle drift. Vapor drift can be minimized by selecting product formulations resistant to vaporizing and applying herbicides at ideal temperature and humidity conditions. Generally, high temperatures and low relative humidity enhance vapor drift, and so any herbicide application should ideally occur in the early morning during most of the year at this site. Particle drift is a function of application method and equipment. Droplet size and pressure of the herbicide applicator will be controlled carefully to minimize particle drift. Herbicides will also to the extent practicable be applied on low wind days (<5 miles per hour). Drift control agents may also be used, if necessary (Jordan et al. 2009).

6.5 Recommended Treatments

Treatments recommended for target weed species range from none for low risk and moderate risk weeds to manual, mechanical, and chemical for high and moderate risk weed species (Table 5). Most treatments will be used to control two target weed species, including Sahara mustard and Russian thistle.

TABLE 5. RECOMMENDED TREATMENT METHODS FOR THE REMOVAL AND CONTROL OF TARGET WEED SPECIES.

Risk Rating	Species	Recommended Treatment Methods
High	Sahara mustard	Manual: Hand pulling might be effective in limited areas when seed pools have been suppressed. This technique must be used prior to seeding to be effective, and is most effective during the early flowering stage. Mechanical: Mowing this species may be problematic, in that root systems left intact may re-sprout. Chemical: The extremely early development of this species

TABLE 5. RECOMMENDED TREATMENT METHODS FOR THE REMOVAL AND CONTROL OF TARGET WEED SPECIES.

Risk Rating	Species	Recommended Treatment Methods
		might make early chemical control a possibility, especially when desirable native species have not yet begun to develop. Pre-emergent treatments that may be appropriate for control of this species include chlorsulfuron (Telar), metsulfuron (Escort), and hexazinone (Velpar). Post-emergent herbicides that may be effective include dicamba (2,4-D, Banvel, or Vanquish), triclopyr (Garlon 3A, Garlon 4 Ultra), and glycophosphate (Roundup, Accord XRT II).
Moderate	Russian thistle	Manual: Hand pulling may be effective in limited areas where seed pools have been suppressed. Mechanical: Mowing or weed-trimming young plants may be an effective control technique. Chemical: Pre-emergent herbicides are the most effective chemical control of this species. Chemicals that may be appropriate for control of this species include BLM-approved pre-emergent herbicides, including bromacil (Hyvar), hexazinone (Velpar), and imazapyr (Arsenal). Use of chlorsulfuron (Telar), and sulfometuron (Oust) should be avoided, as Russian thistle populations may evolve resistance to these treatments within two years. Post-emergent herbicides may be applied to plants, but timing is critical. For best results, these herbicides must be applied while the weed is in its early growth stages, preferably the early seedling stage, before it becomes hardened and starts producing its spiny branches. Post-emergent herbicides that are effective when properly applied include dicamba (2,4-D, Banvel, or Vanquish) and glyphosate (Roundup). Post-emergent herbicides are not effective after the plant has seeded, nor during the later spiny stage.
Moderate	Mediterranean grass	None; this species is not likely to be effectively controlled.
Low	Bermuda grass	None; this species is limited in its distribution and is not likely to spread or become established in the Project site.
Low	Eucalyptus tree	None; this species occurs outside of the Project boundaries and is not expected to spread or become established in the

TABLE 5. RECOMMENDED TREATMENT METHODS FOR THE REMOVAL AND CONTROL OF TARGET WEED SPECIES.

Risk Rating	Species	Recommended Treatment Methods
		Project site.
Low	Tamarisk	None; this species occurs outside of the Project boundaries and is not expected to spread or become established in the Project site.

7 Weed Monitoring

All areas of the Project site that experience surface disturbance due to Project activities will be monitored for weeds by qualified biologists and/or appropriately-trained personnel during the construction, O&M, and decommissioning phases of the Project.

7.1 Success Criteria

The weed monitoring will ensure that the IWMP weed management objectives (identification and risk assessment, suppression, and containment, Section 5.1) are being met. While eradication of weed species is not likely possible due to their current prevalence in the Project area and vicinity, their management will ensure that they do not spread as a result of implementation of the Project. Success criteria for meeting these objectives are defined as:

Construction Phase: No more than 10 percent increase in area of weed population extent and/or increase in density of existing weed populations. The baseline for weed occurrences will be determined by pre-construction surveys conducted in the winter preceding the initiation of construction activities.

Operations & Maintenance Phase: No increase (from baseline) in the area of weed population extent and/or increase in density of existing weed populations.

Decommissioning Phase: No increase (from baseline) in the area of weed population extent and/or increase in density of existing weed populations.

7.2 Monitoring Schedule

Monitoring efforts will be conducted at times when weed species are most likely to be detected and identified. For high and moderate risk species known to occur on the Project, detection of weeds would occur between December and May when they germinate, flower, fruit, and seed. Senesced individuals may be detected outside of this season. Control of the weeds may be accomplished as early two weeks following germination, and is best exercised before the plants produce seed. Thus, monitoring visits will be targeted to identify weeds during their early growing season on the following schedule:

Construction Phase: Weed monitoring visits will be performed monthly by a qualified biologist or appropriately-trained personnel throughout the duration of Project construction. Monitoring visits will determine the status of known weed occurrence areas and search for new opportunistic weed invasions, particularly in recently disturbed areas. A summary of the methods and results of these monitoring efforts will be provided to the BLM monthly.

Operations & Maintenance Phase: Weed monitoring visits will be performed monthly between December and February, followed by a visit in April (for a total of four visits), by a qualified biologist or appropriately-trained personnel for a period of 3 to 5 years following the end of construction. Sahara mustard monitoring efforts will be implemented over five years following construction; Russian thistle and Mediterranean grass will be monitored for three years post-construction.

Decommissioning Phase: For those areas subject to restoration after decommissioning, weed monitoring visits will be performed annually in February by a qualified biologist or appropriately-trained personnel for a period of 3 to 5 years following the end of Project decommissioning. Sahara mustard monitoring efforts will be implemented over five years following decommissioning; Russian thistle and Mediterranean grass will be monitored for three years post- decommissioning.

7.3 Adaptive Management and Reporting

Upon identification of a new invasion of weeds or substantial changes in the known weed occurrences, a qualified biologist or appropriately-trained staff will determine the necessary course of action and implement treatment measures, accordingly.

An annual monitoring report will be prepared and submitted to the BLM that provides an evaluation of the effectiveness of the weed management program, including weed infestation identification, weed monitoring, and weed control, an evaluation of whether success criteria are being met, and recommendations for adaptive management strategies, as necessary. Annual reports will be submitted to the BLM throughout the duration of the construction phase, for the first five years post-construction during the O&M phase, and for the first five years following Project decommissioning.

8 Safety Considerations for Herbicide Application, Handling, Spills and Cleanup

8.1 Herbicide Application

Weed management contractors/personnel that are responsible for applying herbicides will obtain all of the required Federal, State, or local agency permits and will hold all necessary certifications and have received all relevant training. Permits may include terms and conditions that are required but not directly addressed by this IWMP. A licensed contractor will apply herbicides in accordance with all applicable laws, regulations, and permit stipulation, including U.S. Environmental Protection Agency (EPA) label instructions. A PUP must be obtained from BLM prior to herbicide application. If faced with any of the following scenarios, herbicide application shall be suspended until such conditions no longer exist:

- Wind velocities in excess of 10 miles per hour (mph) during application of liquid herbicides and 15 mph during application of dry herbicides;
- Snow or ice present on weed foliage; or
- Precipitation is occurring or imminent.

For weed infestations readily accessible and passable by vehicle, and where vehicle operation is authorized, vehicle-mounted applicators will be used. Manual application methods will be used in weed occurrences that are relatively small, inaccessible by established road or ROW, or in rough, varied terrain. All herbicide applicators, spreaders and sprayers, will be calibrated before each use to ensure all applications rates and procedures are appropriately implemented.

Herbicide transport and handling will follow these methods:

- No herbicides will be stored on-site.
- Only the quantity of herbicide expected for each day's use will be transported.
- Herbicide concentrate will be transported in approved containers in a controlled manner so as to prevent spills. Concentrate will be positioned in delivery or work vehicles so as to be secured and separated from the driving compartment, food, clothing, and safety equipment.
- The mixing of herbicide materials will be conducted at an off-site location or within a controlled space in the O&M Area that is designated on-site. All mixing will take place over a drip/spill containment device and at a distance more than 200 feet from open or flowing water, wetlands, or other sensitive resources.

- Herbicides will not be applied to areas of open or flowing water, wetlands, or other sensitive resources unless authorized by the appropriate regulatory agency.
- All equipment and containers used for herbicide storage, application, and transport will be subject to quarterly inspection for leaks or damage.
- Emptied herbicide containers and/or unused herbicide will be disposed in accordance with instructions provided on the product label or as specified by the manufacturer, and in accordance with applicable laws and regulations.

8.2 Herbicide Spills and Cleanup

All spills and inadvertent releases of herbicides will be addressed immediately upon detection. Spill response kits will be readily available in herbicide contractor vehicles and in daily on-site herbicide storage areas.

Spill response will vary depending on a variety of conditions, including location, amount of spill, area impacted by spill, type of herbicide spilled, and more. For each spill the following procedures should be implemented:

- Disseminate the appropriate on-site and agency notifications of a spill.
- Secure the affected area barring pedestrian and vehicle traffic.
- All spill response personnel shall put on the appropriate Personal Protective Equipment (PPE) prior to entering the spill containment area.
- Personnel, while wearing the appropriate PPE and equipped with the necessary tools and equipment, shall stop the herbicide leak or release.
- All materials associated with spill response, including the released herbicide, affected soils and plants, absorptive material, clothing, and PPE shall be removed and containerized according to appropriate regulations and procedures.

All generated spill response containers shall be transported, following appropriate regulations, and disposed legally at an approved disposal facility.

8.3 Worker Safety and Spill Reporting

All contractors responsible for herbicide use, transport, application, and control at the site will hold the appropriate certifications. Such certifications shall be made available. Contractors transporting herbicides to the site shall also have legible Safety Data Sheets (SDS) and labels on-site. All herbicide spills and inadvertent releases shall be reported in accordance with all applicable laws and regulations.

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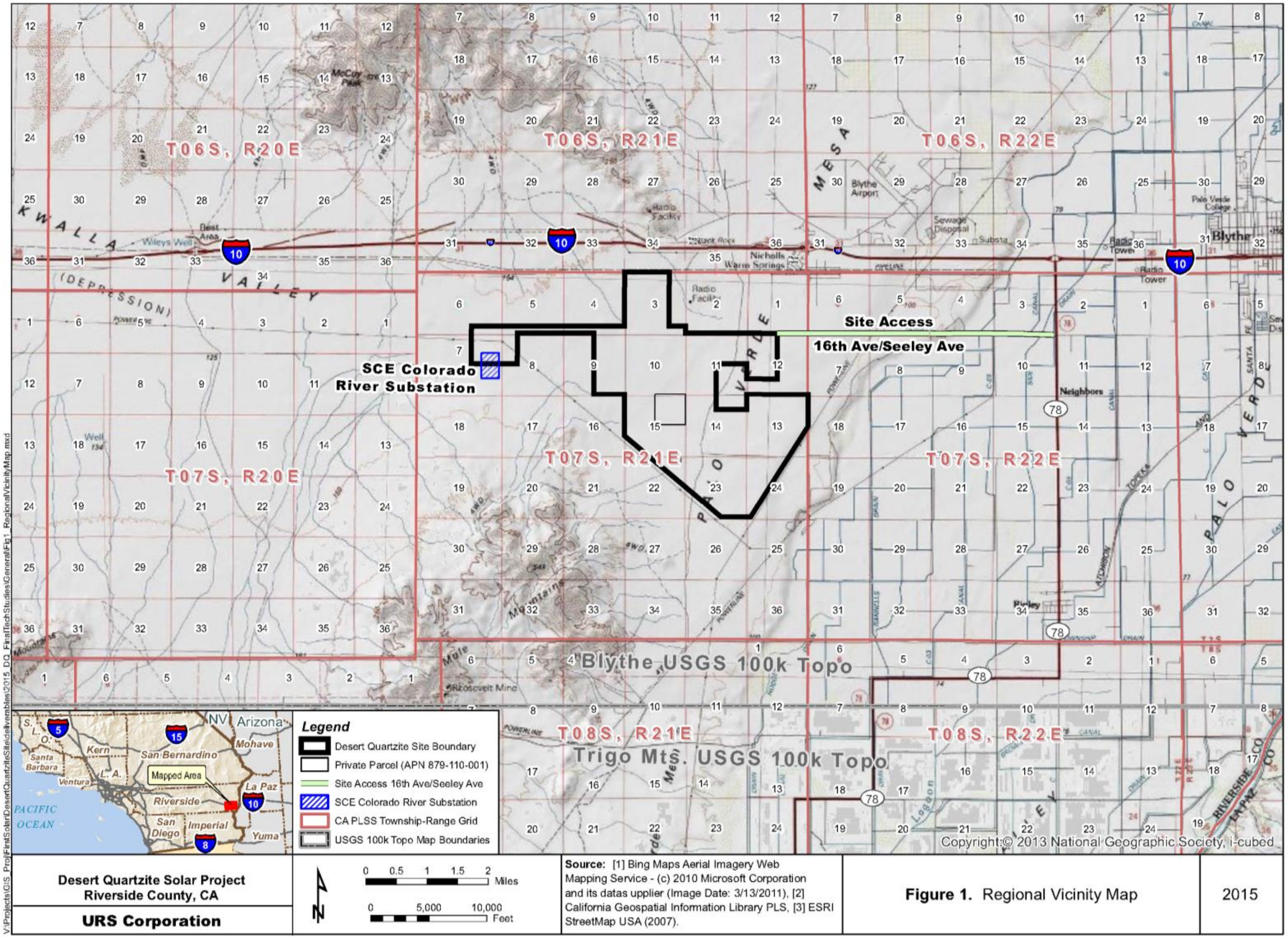
FIGURES

Figure 1: Regional Vicinity Map


Site Access
16th Ave/Seeley Ave
SCE Colorado River Substation
T06S, R20E
T06S, R21E
T06S, R22E
T07S, R20E
T07S, R21E
T07S, R22E
T08S, R21E
T08S, R22E
Blythe USGS 100k Topo
Trigo Mts. USGS 100k Topo
Palo Verde Mesa
Chuckwalla Valley (Depression)
Blythe
Blythe Airport
Nicholls Warm Springs
Neighbors
Ripley
McCoy Peak
Mule Mountains
Roosevelt Mine
Wileys Well
Rest Area
Radio Facility
Sewage Disposal
Palo Verde College
Radio Tower
10
78
Riverside Co
La Paz Co
Legend
Desert Quartzite Site Boundary
Private Parcel (APN 879-110-001)
Site Access 16th Ave/Seeley Ave
SCE Colorado River Substation
CA PLSS Township-Range Grid
USGS 100k Topo Map Boundaries
NV
Arizona
Mohave
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San Bernardino
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Desert Quartzite Solar Project
Riverside County, CA

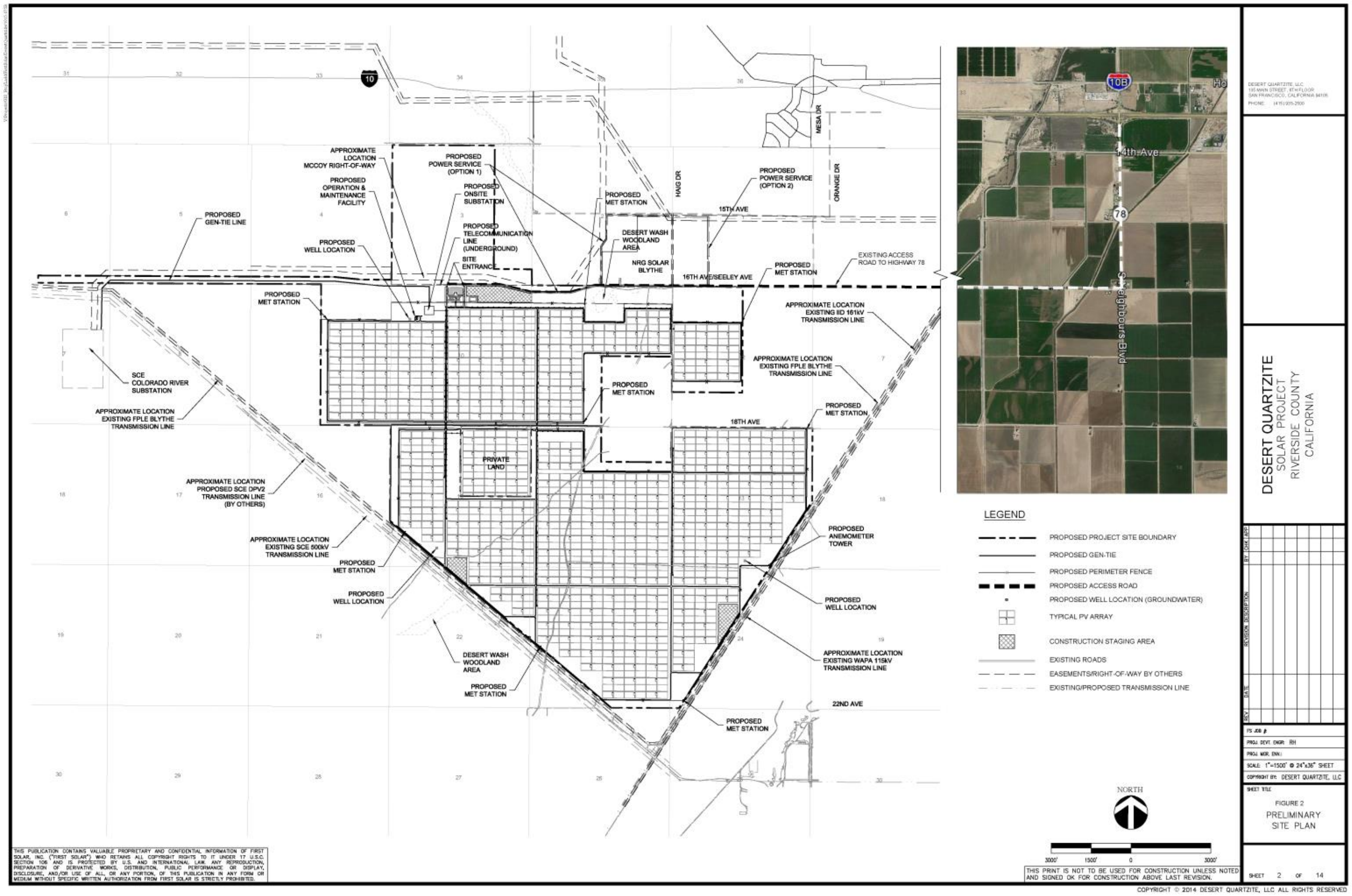
URS Corporation

Source: [1] Bing Maps Aerial Imagery Web Mapping Service - (c) 2010 Microsoft Corporation and its datas upplier (Image Date: 3/13/2011). [2] California Geospatial Information Library PLS, [3] ESRI StreetMap USA (2007).

Figure 1. Regional Vicinity Map

2015

Figure 2: Preliminary Site Plan


APPROXIMATE LOCATION MCCOY RIGHT-OF-WAY
PROPOSED OPERATION & MAINTENANCE FACILITY
PROPOSED POWER SERVICE (OPTION 1)
PROPOSED ONSITE SUBSTATION
PROPOSED TELECOMMUNICATION LINE (UNDERGROUND)
SITE ENTRANCE
PROPOSED WELL LOCATION
PROPOSED GEN-TIE LINE
PROPOSED MET STATION
DESERT WASH WOODLAND AREA
NRG SOLAR BLYTHE
16TH AVE/SEELEY AVE
15TH AVE
HAIG DR
MESA DR
ORANGE DR
PROPOSED POWER SERVICE (OPTION 2)
EXISTING ACCESS ROAD TO HIGHWAY 78
APPROXIMATE LOCATION EXISTING IID 161kV TRANSMISSION LINE
APPROXIMATE LOCATION EXISTING FPLE BLYTHE TRANSMISSION LINE
SCE COLORADO RIVER SUBSTATION
18TH AVE
PRIVATE LAND
APPROXIMATE LOCATION PROPOSED SCE DPV2 TRANSMISSION LINE (BY OTHERS)
APPROXIMATE LOCATION EXISTING SCE 500kV TRANSMISSION LINE
PROPOSED ANEMOMETER TOWER
APPROXIMATE LOCATION EXISTING WAPA 115kV TRANSMISSION LINE
22ND AVE
10
14th Ave
78
Neighbours Blvd
LEGEND
PROPOSED PROJECT SITE BOUNDARY
PROPOSED GEN-TIE
PROPOSED PERIMETER FENCE
PROPOSED ACCESS ROAD
PROPOSED WELL LOCATION (GROUNDWATER)
TYPICAL PV ARRAY
CONSTRUCTION STAGING AREA
EXISTING ROADS
EASEMENTS/RIGHT-OF-WAY BY OTHERS
EXISTING/PROPOSED TRANSMISSION LINE
NORTH
3000' 1500' 0 3000'
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DESERT QUARTZITE SOLAR PROJECT RIVERSIDE COUNTY CALIFORNIA
SCALE: 1"=1500' @ 24"x36" SHEET
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FIGURE 2 PRELIMINARY SITE PLAN
SHEET 2 OF 14
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Appendix A

BLM Herbicide Treatment Standard Operating Procedures

Vegetation Treatments Using Herbicides in BLM Lands in 17 Western States (Appendix B of the Record of Decision)

Appendix B

Adjuvant and Herbicide Formulas Approved by the BLM

Adjuvants Approved for Use on BLM Administered Lands

Update: July 21, 2014

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Surfactant	Non-ionic	Agrisolutions Preference	Agriliance, LLC.	WA Reg. No. 1381-50011
Surfactant	Non-ionic	A-90	Alligare, LLC	
Surfactant	Non-ionic	Alligare Surface	Alligare, LLC	
Surfactant	Non-ionic	Alligare Surface West	Alligare, LLC	
Surfactant	Non-ionic	Aqufact	Aqumix, Inc.	
Surfactant	Non-ionic	Brewer 90-10	Brewer International	
Surfactant	Non-ionic	No Foam A	Creative Marketing & Research, Inc.	CA Reg. No. 1050775-50015
Surfactant	Non-ionic	Aquafact	Crop Production Services	
Surfactant	Non-ionic	Baron	Crown (Estes Incorporated)	
Surfactant	Non-ionic	Audible 80	Exacto, Inc.	
Surfactant	Non-ionic	Audible 90	Exacto, Inc.	
Surfactant	Non-ionic	N.I.S. 80	Estes Incorporated	
Surfactant	Non-ionic	Ad Spray 90	Helena Chemical Company	WA Reg. No. 5905-70020
Surfactant	Non-ionic	Inlet	Helena Chemical Company	CA Reg. No. 5905-50099-AA
Surfactant	Non-ionic	Spec 90/10	Helena Chemical Company	
Surfactant	Non-ionic	Spret	Helena Chemical Company	CA Reg. No.
Surfactant	Non-ionic	Optima	Helena Chemical Company	CA Reg. No. 5905-50075-AA
Surfactant	Non-ionic	Induce	Setre (Helena)	CA Reg. No. 5905-50066-AA
Surfactant	Non-ionic		Helena Chemical Company	CA Reg. No. 5905-50091-AA
Surfactant	Non-ionic	Induce pH	Helena Chemical Company	
Surfactant	Non-ionic	Activator 90	Loveland Products Inc.	CA Reg. No. 34704-50034-AA
Surfactant	Non-ionic	LI-700	Loveland Products Inc.	CA Reg. No. 34704-50035 WA Reg. No. AW36208-70004
Surfactant	Non-ionic	Scanner	Loveland Products Inc.	CA Reg. No. 34704-50064 WA Reg. No. 34704-09003
Surfactant	Non-ionic	Spreader 90	Loveland Products Inc.	WA Reg. No. 34704-05002-AA
Surfactant	Non-ionic	UAP Surfactant 80/20	Loveland Products Inc.	
Surfactant	Non-ionic	X-77	Loveland Products Inc.	CA Reg. No. 34704-50044
Surfactant	Non-ionic	Magnify	Monterey AgResources	CA Reg. No. 17545-50018
Surfactant	Non-ionic	Range Master	ORO Agri Inc.	
Surfactant	Non-ionic	NIS 90:10	Precision Laboratories, LLC	CA Reg. No. 9349-50002-AA WA Reg. No. 9349-13001
Surfactant	Non-ionic	Elite Platinum	Red River Specialties, Inc.	
Surfactant	Non-ionic	Red River 90	Red River Specialties, Inc.	
Surfactant	Non-ionic	Red River NIS	Red River Specialties, Inc.	
Surfactant	Non-ionic	Cornbelt Premier 90	Van Diest Supply Co.	
Surfactant	Non-ionic	Cornbelt Trophy Gold	Van Diest Supply Co.	
Surfactant	Non-ionic	Spray Activator 85	Van Diest Supply Co.	
Surfactant	Non-ionic	NIS-EA	Wilbur-Ellis	
Surfactant	Non-ionic	R-900	Wilbur-Ellis	
Surfactant	Non-ionic	Super Spread 90	Wilbur-Ellis	WA Reg. No. AW-2935-70016
Surfactant	Non-ionic	Super Spread 7000	Wilbur-Ellis	CA Reg. No. 2935-50170 WA Reg. No. AW-2935-0002
Surfactant	Non-ionic	Agrisolutions Activate Plus	Winfield Solutions, LLC	CA Reg. No. 9779-50004-AA WA Reg. No. 1381-09001
Surfactant	Non-ionic	Agrisolutions Preference	Winfield Solutions, LLC	WA Reg. No. 1381-50011
Surfactant	Spreader/Sticker	Agri-Trend Spreader	Agri-Trend	
Surfactant	Spreader/Sticker	TopFilm	Biosorb, Inc.	
Surfactant	Spreader/Sticker	Onside Kick	Exacto, Inc.	
Surfactant	Spreader/Sticker	Bind-It	Estes Incorporated	
Surfactant	Spreader/Sticker	Surf-King PLUS	Crown (Estes Incorporated)	
Surfactant	Spreader/Sticker	CWC 90	CWC Chemical, Inc.	
Surfactant	Spreader/Sticker	Cohere	Helena Chemical Company	CA Reg. No. 5905-50083-A
Surfactant	Spreader/Sticker	Attach	Loveland Products Inc.	CA Reg. No. 34704-50026
Surfactant	Spreader/Sticker	Bond	Loveland Products Inc.	CA Reg. No. 36208-50005
Surfactant	Spreader/Sticker	Bond Max	Loveland Products Inc.	CA Reg. No. 34704-50060 WA Reg. No. 34704-08003
Surfactant	Spreader/Sticker	Tactic	Loveland Products Inc.	CA Reg. No. 34704-50041-AA
Surfactant	Spreader/Sticker	Widespread Max	Loveland Products Inc.	CA Reg. No. 34704-50061 WA Reg. No. 34704-09001
Surfactant	Spreader/Sticker	Rocket DL	Monterey AgResources	CA Reg. No. 17545-50019

Adjuvants Approved for Use on BLM Administered Lands

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Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Surfactant	Spreader/Sticker	Nu-Film-IR	Miller Chem. & Fert. Corp.	
Surfactant	Spreader/Sticker	Nu Film 17	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50021-AA
Surfactant	Spreader/Sticker	Nu Film P	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50022-AA
Surfactant	Spreader/Sticker	Protyx	Precision Laboratories, LLC	WA Reg. No. 9349-13002
Surfactant	Spreader/Sticker	Lastick	Setre (Helena)	
Surfactant	Spreader/Sticker	Insist 90	Wilbur-Ellis	
Surfactant	Spreader/Sticker	R-56	Wilbur-Ellis	CA Reg. No. 2935-50144
Surfactant	Spreader/Sticker	Aqua-King Plus	Winfield Solutions, LLC	
Surfactant	Spreader/Sticker	Surf-King Plus	Winfield Solutions, LLC	
Surfactant	Silicone- based	Alligare OSS/NIS	Alligare, LLC	
Surfactant	Silicone- based	SilEnergy	Brewer International	
Surfactant	Silicone- based	Silnet 200	Brewer International	
Surfactant	Silicone- based	Scrimmage	Exacto, Inc.	
Surfactant	Silicone- based	Bind-It MAX	Estes Incorporated	
Surfactant	Silicone- based	Thoroughbred	Estes Incorporated	
Surfactant	Silicone- based	Aero Dyne-Amic	Helena Chemical Company	CA Reg. No. 5905-50080-AA
Surfactant	Silicone- based	Dyne-Amic	Helena Chemical Company	CA Reg. No. 5095-50071-AA
Surfactant	Silicone- based	Kinetic	Setre (Helena)	CA Reg. No. 5905-50087-AA
Surfactant	Silicone- based	Freeway	Loveland Products Inc.	CA Reg. No. 34704-50031 WA Reg. No. 34704-04005
Surfactant	Silicone- based	Phase	Loveland Products Inc.	CA Reg. No. 34704-50037-AA
Surfactant	Silicone- based	Phase II	Loveland Products Inc.	
Surfactant	Silicone- based	Silwet L-77	Loveland Products Inc.	CA Reg. No. 34704-50043
Surfactant	Silicone- based	Speed	Precision Laboratories, LLC	
Surfactant	Silicone- based	Elite Marvel	Red River Specialties, Inc.	
Surfactant	Silicone- based	Sun Spreader	Red River Specialties, Inc.	
Surfactant	Silicone- based	Syl-coat	Wilbur-Ellis	CA Reg. No. 2935-50189 WA Reg. No. 2935-12002
Surfactant	Silicone- based	Sylgard 309	Wilbur-Ellis	CA Reg. No. 2935-50161
Surfactant	Silicone- based	Syl-Tac	Wilbur-Ellis	CA Reg. No. 2935-50167
Surfactant	Silicone- based	Thoroughbred	Winfield Solutions, LLC.	
Oil-based	Crop Oil Concentrate	Alligare Forestry Oil	Alligare, LLC	
Oil-based	Crop Oil Concentrate	Brewer 83-17	Brewer International	
Oil-based	Crop Oil Concentrate	CWR Herbicide Activator	Creative Marketing & Research, Inc.	CA Reg. No. 1050775-50020-AA
Oil-based	Crop Oil Concentrate	Majestic	Crown (Estes Incorporated)	
Oil-based	Crop Oil Concentrate	Agri-Dex	Helena Chemical Company	CA Reg. No. 5905-50094-AA
Oil-based	Crop Oil Concentrate	Crop Oil Concentrate	Helena Chemical Company	CA Reg. No. 5905-50085-AA
Oil-based	Crop Oil Concentrate	Power-Line Crop Oil	Land View Inc.	
Oil-based	Crop Oil Concentrate	Crop Oil Concentrate	Loveland Products Inc.	
Oil-based	Crop Oil Concentrate	Maximizer Crop Oil Conc.	Loveland Products Inc.	CA Reg. No. 34704-50059 WA Reg. No. 34704-08002
Oil-based	Crop Oil Concentrate	Herbimax	Loveland Products Inc.	CA Reg. No. 34704-50032-AA WA Reg. No. 34704-04006
Oil-based	Crop Oil Concentrate	Monterey M.S.O.	Monterey AgResources	CA Reg. No. 17545-50025
Oil-based	Crop Oil Concentrate	Exchange	Precision Laboratories, LLC	WA Reg. No. 9349-13008
Oil-based	Crop Oil Concentrate	Red River Forestry Oil	Red River Specialties, Inc.	
Oil-based	Crop Oil Concentrate	Red River Pacer Crop Oil	Red River Specialties, Inc.	
Oil-based	Crop Oil Concentrate	Cornbelt Crop Oil Concentrate	Van Diest Supply Co.	
Oil-based	Crop Oil Concentrate	Cornbelt Premium Crop Oil Concentrate	Van Diest Supply Co.	
Oil-based	Crop Oil Concentrate	R.O.C. Rigo Oil Conc.	Wilbur-Ellis	
Oil-based	Crop Oil Concentrate	Mor-Act	Wilbur-Ellis	CA Reg. No. 2935-50098
Oil-based	Crop Oil Concentrate	Agrisolutions Prime Oil	Winfield Solutions, LLC	CA Reg. No. 979-50002-AA
Oil-based	Crop Oil Concentrate	Agrisolutions Superb HC	Winfield Solutions, LLC	WA Reg. No. 1381-06003
Oil-based	Methylated Seed Oil	Alligare MSO	Alligare, LLC	
Oil-based	Methylated Seed Oil	Alligare MSO West	Alligare, LLC	
Oil-based	Methylated Seed Oil	MSO Concentrate	Alligare, LLC	
Oil-based	Methylated Seed Oil	SunEnergy	Brewer International	
Oil-based	Methylated Seed Oil	Sun Wet	Brewer International	

Adjuvants Approved for Use on BLM Administered Lands

Update: July 21, 2014

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Oil-based	Methylated Seed Oil	Premium MSO	Helena Chemical Company	
Oil-based	Methylated Seed Oil	Methylated Spray Oil Conc.	Helena Chemical Company	
Oil-based	Methylated Seed Oil	MSO Concentrate	Loveland Products Inc.	CA Reg. No. 34704-50029-AA
Oil-based	Methylated Seed Oil	Kixyt	Precision Laboratories, LLC.	WA Reg. No. 9349-12001
Oil-based	Methylated Seed Oil	Persist Ultra	Precision Laboratories, LLC.	CA Reg. No. 9349-50005 WA Reg. No. 9349-13003
Oil-based	Methylated Seed Oil	Elite Supreme	Red River Specialties, Inc.	
Oil-based	Methylated Seed Oil	Red River Supreme	Red River Specialties, Inc.	
Oil-based	Methylated Seed Oil	Sunburn	Red River Specialties, Inc.	
Oil-based	Methylated Seed Oil	Sunset	Red River Specialties, Inc.	
Oil-based	Methylated Seed Oil	Cornbelt Base	Van Diest Supply Co.	
Oil-based	Methylated Seed Oil	Cornbelt Methylates Soy-Stik	Van Diest Supply Co.	
Oil-based	Methylated Seed Oil	Hasten	Wilbur-Ellis	CA Reg. No. 2935-50160 WA Reg. No. 2935-02004
Oil-based	Methylated Seed Oil	Renegade 2.0	Wilbur-Ellis	CA. Reg. No. 2935-50194 WA Reg. No. 2935-13001
Oil-based	Methylated Seed Oil	Super Kix	Wilbur-Ellis	
Oil-based	Methylated Seed Oil	Super Spread MSO	Wilbur-Ellis	
Oil-based	Methylated Seed Oil	Agrisolutions Destiny HC	Winfield Solutions, LLC	WA Reg. No. 1381-09002
Oil-based	Methylated Seed Oil	Atmos	Winfield Solutions, LLC	
Oil-based	Methylated Seed Oil + Organosilicone	Alligare MVO Plus	Alligare, LLC	
Oil-based	ethylated Seed Oil + Organosilicone	Inergy	Crown (Estes Incorporated)	
Oil-based	ethylated Seed Oil + Organosilicone	Inergy	Winfield Solutions, LLC	
Oil-based	Vegetable Oil	Motion	Exacto, Inc.	
Oil-based	Vegetable Oil	Noble	Estes Incorporated	
Oil-based	Vegetable Oil	Amigo	Loveland Products Inc.	CA Reg. No. 34704-50028-AA WA Reg. No. 34704-04002
Oil-based	Vegetable Oil	Elite Natural	Red River Specialities	
Oil-based	Vegetable Oil	Competitor	Wilbur-Ellis	CA Reg. No. 2935-50173 WA Reg. No. AW-2935-04001
Fertilizer- based	Nitrogen- based	Quest	Setre (Helena)	CA Reg. No. 5905-50076-AA
Fertilizer- based	Nitrogen- based	Quest	Helena Chemical Company	CA Reg. No. 5905-50076-AA
Fertilizer- based	Nitrogen- based	TransActive HC	Helena Chemical Company	
Fertilizer- based	Nitrogen- based	Actamaster Spray Adjuvant	Loveland Products Inc.	WA Reg. No. 34704-50006
Fertilizer- based	Nitrogen- based	Actamaster Soluble Spray Adjuvant	Loveland Products Inc.	WA Reg. No. 34704-50001
Fertilizer- based	Nitrogen- based	Dispatch	Loveland Products Inc.	
Fertilizer- based	Nitrogen- based	Dispatch 111	Loveland Products Inc.	
Fertilizer- based	Nitrogen- based	Dispatch 2N	Loveland Products Inc.	
Fertilizer- based	Nitrogen- based	Dispatch AMS	Loveland Products Inc.	
Fertilizer- based	Nitrogen- based	Flame	Loveland Products Inc.	
Fertilizer- based	Nitrogen- based	Cornbelt Gardian	Van Diest Supply Co.	
Fertilizer- based	Nitrogen- based	Cornbelt Gardian Plus	Van Diest Supply Co.	
Fertilizer- based	Nitrogen- based	Bronc	Wilbur-Ellis	
Fertilizer- based	Nitrogen- based	Bronc Max	Wilbur-Ellis	
Fertilizer- based	Nitrogen- based	Bronc Max EDT	Wilbur-Ellis	
Fertilizer- based	Nitrogen- based	Bronc Plus Dry	Wilbur-Ellis	
Fertilizer- based	Nitrogen- based	Bronc Plus Dry EDT	Wilbur-Ellis	WA Reg. No.2935-03002
Fertilizer- based	Nitrogen- based	Bronc Total	Wilbur-Ellis	
Fertilizer- based	Nitrogen- based	Cayuse Plus	Wilbur-Ellis	CA Reg. No. 2935-50171
Fertilizer- based	Nitrogen- based	Agrisolutions Alliance	Winfield Solutions, LLC	CA Reg. No. 1381-50002-AA WA Reg. No.1381-05005
Fertilizer- based	Nitrogen- based	Agrisolutions Class Act NG	Winfield Solutions, LLC	WA Reg. No. 1381-01004
Fertilizer- based	Nitrogen- based	Agrisolutions Corral AMS Liquid	Winfield Solutions, LLC	WA Reg. No. 1381-01006
Special Purpose or Utility	Buffering Agent	Yardage	Exacto, Inc.	
Special Purpose or Utility	Buffering Agent	Buffers P.S.	Helena Chemical Company	CA Reg. No. 5905-50062-ZA
Special Purpose or Utility	Buffering Agent	Spray-Aide	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50006-AA
Special Purpose or Utility	Buffering Agent	Oblique	Red River Specialties, Inc.	
Special Purpose or Utility	Buffering Agent	Brimstone	Wilbur-Ellis	

Adjuvants Approved for Use on BLM Administered Lands

Update: July 21, 2014

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Special Purpose or Utility	Buffering Agent	Tri-Fol	Wilbur-Ellis	CA Reg. No. 2935-50152
Special Purpose or Utility	Colorants/Dyes	Hi-Light	Becker-Underwood	
Special Purpose or Utility	Colorants/Dyes	Hi-Light WSP	Becker-Underwood	
Special Purpose or Utility	Colorants/Dyes	Hash Mark Green Powder	Exacto, Inc.	
Special Purpose or Utility	Colorants/Dyes	Hash Mark Green Liquid	Exacto, Inc.	
Special Purpose or Utility	Colorants/Dyes	Hash Mark Blue Powder	Exacto, Inc.	
Special Purpose or Utility	Colorants/Dyes	Hash Mark Blue Liquid HC	Exacto, Inc.	
Special Purpose or Utility	Colorants/Dyes	Hash Mark Blue Liquid	Exacto, Inc.	
Special Purpose or Utility	Colorants/Dyes	Spray Indicator XL	Helena Chemical Company	
Special Purpose or Utility	Colorants/Dyes	Marker Dye	Loveland Products Inc.	
Special Purpose or Utility	Colorants/Dyes	TurfTrax	Loveland Products Inc.	
Special Purpose or Utility	Colorants/Dyes	TurfTrax Blue Spray Indicator	Loveland Products Inc.	
Special Purpose or Utility	Colorants/Dyes	BullsEye	Milliken Chemical	
Special Purpose or Utility	Colorants/Dyes	Mark-It Blue	Monterey AgResources	
Special Purpose or Utility	Colorants/Dyes	Mark-It Red	Monterey AgResources	
Special Purpose or Utility	Colorants/Dyes	Signal	Precision	
Special Purpose or Utility	Colorants/Dyes	SPI-Max Blue Spray Marker	PROKoZ	
Special Purpose or Utility	Colorants/Dyes	Elite Splendor	Red River Specialities, Inc.	
Special Purpose or Utility	Colorants/Dyes	Mystic HC	Winfield Solutions, LLC	
Special Purpose or Utility	Compatibility/ Suspension Agent	E Z MIX	Loveland Products Inc.	CA Reg. No. 36208-50006
Special Purpose or Utility	Compatibility/ Suspension Agent	Support	Loveland Products Inc.	WA Reg. No. 34704-04011
Special Purpose or Utility	Compatibility/ Suspension Agent	Convert	Precision Laboratories, LLC	WA Reg. No. 9349-13007
Special Purpose or Utility	Compatibility/ Suspension Agent	Blendex VHC	Setre (Helena)	
Special Purpose or Utility	Deposition Aid	Alligare Pattern	Alligare, LLC	
Special Purpose or Utility	Deposition Aid	Cygnet Plus	Brewer International	CA Reg. No. 1051114-50001
Special Purpose or Utility	Deposition Aid	Poly Control 2	Brewer International	
Special Purpose or Utility	Deposition Aid	CWC Sharpshooter	CWC Chemical, Inc.	
Special Purpose or Utility	Deposition Aid	Offside	Exacto, Inc.	
Special Purpose or Utility	Deposition Aid	Clasp	Helena Chemical Company	WA Reg. No. 5905-13002
Special Purpose or Utility	Deposition Aid	Grounded	Helena Chemical Company	
Special Purpose or Utility	Deposition Aid	Grounded - CA	Helena Chemical Company	CA Reg. No. 5905-50096-AA
Special Purpose or Utility	Deposition Aid	ProMate Impel	Helena Chemical Company	
Special Purpose or Utility	Deposition Aid	Pointblank	Helena Chemical Company	CA Reg. No. 52467-50008-AA-5905
Special Purpose or Utility	Deposition Aid	Strike Zone DF	Helena Chemical Company	CA Reg. No. 5905-50084-AA
Special Purpose or Utility	Deposition Aid	Compadre	Loveland Products Inc.	CA Reg. No. 34704-50050 WA Reg. No. 34704-06004
Special Purpose or Utility	Deposition Aid	Intac Plus	Loveland Products Inc.	
Special Purpose or Utility	Deposition Aid	Liberate	Loveland Products Inc.	CA Reg. No. 34704-50030-AA WA Reg. No. 34704-04008
Special Purpose or Utility	Deposition Aid	Reign	Loveland Products Inc.	CA Reg. No. 34704-50045 WA Reg. No. 34704-05010
Special Purpose or Utility	Deposition Aid	Reign LC	Loveland Products Inc.	CA Reg. No. 34704-50048
Special Purpose or Utility	Deposition Aid	Weather Gard	Loveland Products Inc.	CA Reg. No. 34704-50042-AA
Special Purpose or Utility	Deposition Aid	Mist-Control	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50011-AA
Special Purpose or Utility	Deposition Aid	Sustain	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50015-AA
Special Purpose or Utility	Deposition Aid	Exit	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50014-AA
Special Purpose or Utility	Deposition Aid	Border AQ	Precision Laboratories, LLC	WA Reg. No. 9349-13009
Special Purpose or Utility	Deposition Aid	Direct	Precision Laboratories, LLC	
Special Purpose or Utility	Deposition Aid	Volare DC	Precision Laboratories, LLC	CA Reg. No. 9349-50004-AA WA Reg. No. 9349-13006
Special Purpose or Utility	Deposition Aid	Elite Secure Ultra	Red River Specialties, Inc.	
Special Purpose or Utility	Deposition Aid	Secure Ultra	Red River Specialties, Inc.	
Special Purpose or Utility	Deposition Aid	Sta Put	Setre (Helena)	CA Reg. No. 5905-50068-AA
Special Purpose or Utility	Deposition Aid	Agripharm Drift Control	Walco International	
Special Purpose or Utility	Deposition Aid	Bivert	Wilbur-Ellis	CA Reg. No. 2935-50163
Special Purpose or Utility	Deposition Aid	Coverage G-20	Wilbur-Ellis	
Special Purpose or Utility	Deposition Aid	Crosshair	Wilbur-Ellis	
Special Purpose or Utility	Deposition Aid	EDT Concentrate	Wilbur-Ellis	

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Update: July 21, 2014

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Special Purpose or Utility	Deposition Aid	Droplex	Winfield Solution, LLC.	
Special Purpose or Utility	Deposition Aid	Agrisolutions Interlock	Winfield Solutions, LLC	
Special Purpose or Utility	Defoaming Agent	Fast Break	Agrisolutions	CA Reg. No. 1381-50006-AA WA Reg. No. 1381-50006
Special Purpose or Utility	Defoaming Agent	Alligare Anti-Foamer	Alligare, LLC	
Special Purpose or Utility	Defoaming Agent	Defoamer	Brewer International	
Special Purpose or Utility	Defoaming Agent	Tripleline	Creative Marketing & Research, Inc.	CA Reg. No. 1050775-50023-AA
Special Purpose or Utility	Defoaming Agent	Reverse	Exacto, Inc.	
Special Purpose or Utility	Defoaming Agent	Foambuster Max	Helena Chemical Company	
Special Purpose or Utility	Defoaming Agent	Fighter-F 10	Loveland Products Inc.	
Special Purpose or Utility	Defoaming Agent	Fighter-F Dry	Loveland Products Inc.	
Special Purpose or Utility	Defoaming Agent	Unfoamer	Loveland Products Inc.	CA Reg. No. 34704-50062 WA Reg. No. 34704-09002
Special Purpose or Utility	Defoaming Agent	Foam Fighter	Miller Chem. & Fert. Corp.	CA Reg. No. 72-50005-AA
Special Purpose or Utility	Defoaming Agent	Gundown Max	Precision Laboratories, LLC	WA Reg. No. 9349-13013
Special Purpose or Utility	Defoaming Agent	Red River Defoamer	Red River Specialities, Inc.	
Special Purpose or Utility	Defoaming Agent	Foam Buster	Setre (Helena)	CA Reg. No. 5905-50072-AA
Special Purpose or Utility	Defoaming Agent	Cornbelt Defoamer	Van Diest Supply Co	
Special Purpose or Utility	Defoaming Agent	FTF Defoamer	Wilbur-Ellis	WA Reg. No. 2935-13002
Special Purpose or Utility	Defoaming Agent	No Foam	Wilbur-Ellis	CA Reg. No. 2935-50136
Special Purpose or Utility	Diluent/Deposition Agent	Improved JLB Oil Plus	Brewer International	
Special Purpose or Utility	Diluent/Deposition Agent	JLB Oil Plus	Brewer International	
Special Purpose or Utility	Diluent/Deposition Agent	Bark Oil EC	Crop Production Services	
Special Purpose or Utility	Diluent/Deposition Agent	Bark Oil	Crop Production Services	
Special Purpose or Utility	Diluent/Deposition Agent	Hy-Grade I	CWC Chemical, Inc	
Special Purpose or Utility	Diluent/Deposition Agent	Hy-Grade EC	CWC Chemical, Inc	
Special Purpose or Utility	Diluent/Deposition Agent	Elite Premier	Red River Specialties, Inc.	
Special Purpose or Utility	Diluent/Deposition Agent	Elite Premier Blue	Red River Specialties, Inc.	
Special Purpose or Utility	Diluent/Deposition Agent	Red River Basal Oil	Red River Specialties, Inc.	
Special Purpose or Utility	Diluent/Deposition Agent	Thinvert TRU	Waldrum Specialities, Inc.	
Special Purpose or Utility	Diluent/Deposition Agent	Thinvert Concentrate	Waldrum Specialities, Inc.	
Special Purpose or Utility	Diluent/Deposition Agent	In-Place	Wilbur-Ellis	CA Reg. No. 2935-50169
Special Purpose or Utility	Diluent/Deposition Agent	W.E.B. Oil	Wilbur-Ellis	CA Reg. No. 2935-50166 WA Reg. No. AW 2935-70023
Special Purpose or Utility	Foam Marker	Align	Helena Chemical Company	
Special Purpose or Utility	Foam Marker	Tuff Trax Foam Concentrate	Loveland Products, Inc.	
Special Purpose or Utility	Foam Marker	Trekker Trax	Loveland Products, Inc.	
Special Purpose or Utility	Foam Marker	Red River Foam Marker	Red River Specialties, Inc.	
Special Purpose or Utility	Foam Marker	R-160	Wilbur-Ellis	
Special Purpose or Utility	Invert Emulsion Agent	Redi-vert II	Wilbur-Ellis	CA Reg. No. 2935-50168
Special Purpose or Utility	Tank Cleaner	Wipe Out	Helena Chemical Company	
Special Purpose or Utility	Tank Cleaner	All Clear	Loveland Products Inc.	
Special Purpose or Utility	Tank Cleaner	Back Field	Exacto, Inc.	
Special Purpose or Utility	Tank Cleaner	Tank and Equipment Cleaner	Loveland Products Inc.	
Special Purpose or Utility	Tank Cleaner	Red River Tank Cleaner	Red River Specialties, Inc.	
Special Purpose or Utility	Tank Cleaner	Elite Vigor	Red River Specialties, Inc.	
Special Purpose or Utility	Tank Cleaner	Kutter	Wilbur-Ellis	
Special Purpose or Utility	Tank Cleaner	Neutral-Clean	Wilbur-Ellis	
Special Purpose or Utility	Tank Cleaner	Cornbelt Tank-Aid	Van Diest Supply Co.	
Special Purpose or Utility	Water Conditioning	Alligare Water Conditioner	Alligare, LLC	
Special Purpose or Utility	Water Conditioning	Rush	Crown (Estes Incorporated)	
Special Purpose or Utility	Water Conditioning	Completion	Exacto, Inc.	
Special Purpose or Utility	Water Conditioning	AccuQuest WM	Helena Chemical Company	
Special Purpose or Utility	Water Conditioning	Hel-Fire	Helena Chemical Company	
Special Purpose or Utility	Water Conditioning	Smoke	Helena Chemical Company	CA Reg. No. 5905-50104-AA
Special Purpose or Utility	Water Conditioning	Blendmaster	Loveland Products Inc.	
Special Purpose or Utility	Water Conditioning	Choice	Loveland Products Inc.	CA Reg. No. 34704-50027-AA WA Reg. No. 34704-04004
Special Purpose or Utility	Water Conditioning	Choice Xtra	Loveland Products Inc.	

Adjuvants Approved for Use on BLM Administered Lands

Update: July 21, 2014

Adjuvant Class	Adjuvant Type	Trade Name	Manufacturer	Comments
Special Purpose or Utility	Water Conditioning	Choice Weather Master	Loveland Products Inc.	CA Reg. No. 34704-50038-AA WA Reg. No. 34704-05005
Special Purpose or Utility	Water Conditioning	Import	Precision Laboratories, LLC	WA Reg. No. 9349-14001
Special Purpose or Utility	Water Conditioning	Transport LpH	Precision Laboratories, LLC	
Special Purpose or Utility	Water Conditioning	Transport Plus	Precision Laboratories, LLC	WA Reg. No. 9349-13014
Special Purpose or Utility	Water Conditioning	Elite Imperial	Red River Specialities, Inc.	
Special Purpose or Utility	Water Conditioning	Cornbelt N-Tense	Van Diest Supply Co.	
Special Purpose or Utility	Water Conditioning	Climb	Wilbur-Ellis	CA Reg. No. 2935-50181 WA Reg. No. 2935-09001
Special Purpose or Utility	Water Conditioning	Cut-Rate	Wilbur-Ellis	

Appendix C

Example of BLM Pesticide Use Proposal Submittal Form

UNITED STATE DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

PESTICIDE USE PROPOSAL

STATE: ______________________________

COUNTY: ____________________________

DISTRICT: ____________________________

DURATION OF PROPOSAL: ______________
____

DATE: ________________________________

PROPOSAL NUMBER: __________________

EA REFERENCE NUMBER: ______________

DECISION RECORD (DR) NUMBER:

LOCATION: ____________________________
____

ORIGINATOR – NAME: ____

ORIGINATOR – COMPANY: ____

ORIGINATOR – CONTACT INFORMATION: ____

PROPOSAL PREPARER - NAME: ____

PROPOSAL PREPARER – COMPANY: ____

PROPOSAL PREPARER – CONTACT INFORMATION: ____

………………………………………………………………

I. APPLICATION INFORMATION – Including mixtures and adjuvants):

1. TRADE NAME(S): ____
2. COMMON NAME(S) ____
3. EPA REGISTRATION NUMBER(S): ____
4. MANUFACTURER(S): ____
5. METHOD OF APPLICATION: ____
6. MAXIMUM RATE OF APPLICATION – AS STATED IN THE EIS:
   a. Pounds Active Ingredient or Acid Equivalent: ______________________________
7. MAXIMUM RATE OF APPLICATION – AS STATED ON THE LABEL:
   a. Formulated Product: ____
   b. Pounds Active Ingredient or Acid Equivalent: ______________________________
8. INTENDED RATE OF APPLICATION:

a. Formulated Product: ____

b. Pounds Active Ingredient or Acid Equivalent: ____________________________

9. APPLICATION DATE(S): ____

10. NUMBER OF APPLICATIONS: ____________________

II. PEST [List specific pest(s) and reason(s) for the proposed application of the pesticide]:

____

____

____

III. DESIRED RESULTS OF THE APPLICATION – LINKED TO THE OBJECTIVES OF THE APPLICATION:

____

____

____

____

IV. APPLICATION SITE DESCRIPTION:

1. ESTIMATED NUMBER OF ACRES: _______________________

2. GENERAL DESCRIPTION (Describe land type or use, size, stage of growth of target species, soil characteristics, and any additional information that may be important in describing the area to be treated.)

____

____

____

____

____

V. SENSITIVE ASPECTS AND PRECAUTIONS (Describe sensitive areas – marsh, endangered, threatened, candidate, and sensitive species habitat – and distance to application site. List measures to be taken to avoid impact to these areas):

____

____

____

____

____

VI. NON-TARGET VEGETATION (Describe potential immediate and cumulative impacts to non-target pests in project area as a result of the pesticide application. Identify any planned mitigation measures that will be employed – BE GENERAL, SPECIFICS DISCUSSED IN THE EA):

____

____

____

____

____

VII. INTEGRATED PEST MANAGEMENT PRACTICES CONSIDERED IN THE OVERALL PROJECT:

____

____

____

■ ■

VIII. SIGNATURES:

1. Pesticide Use Proposal's Originator: __________________________________ Date: ______
   a. Company: ____
2. Certified Pesticide Applicator: ____ Date: _______
   a. License Number: _____________________________________
   b. Certifying Organization: ______________________________
3. Field Office Pesticide/Noxious Weed Coordinator: ____ Date: _______
4. Field Office Manager: ____ Date: _______
5. BLM State Pesticide Coordinator: ____ Date: _______
6. Deputy State Director: ____ Date: _______

○ Concur or Approved
○ Not Concur or Disapproved
○ Concur or Approved With Modifications
  - Any changes (modifications) to this proposal by the State Pesticide Coordinator will be listed in an attached memo to the manager requesting approval from the Deputy State Director.

Appendix D

Example of a BLM Pesticide Application Record Form

DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

PESTICIDE APPLICATION RECORD

STATE:
COUNTY:
FIELD OFFICE: Uncompahgre
LOCATION OF APPLICATION:
T. R. SECTION

DATE OF APPLICATION:
PROJECT NAME:
OPERATOR:
PESTICIDE USE PROPOSAL NUMBER:
NEPA REFERENCE NUMBER:

NAME OF APPLICATION OR EMPLOYEE(S) APPLYING THE PESTICIDE:

SIGNATURE OF APPLICATOR: ____________________________________
APPLICATOR LICENSE NUMBER:

I. APPLICATION INFORMATION:

1. EQUIPMENT USED:
2. PESTICIDE(S) APPLIED:
    a. MANUFACTURER'S COMMON NAME:
    b. TRADE NAME:
    c. TYPE OF FORMULATION(S): LIQUID: GRANULAR:
    d. TOTAL SPRAY SOLUTION AMOUNT:
3. RATE OF APPLICATION:
    a. ACTIVE INGREDIENT PER ACRE (lbs):
    b. VOLUME OF FORMULATION PER ACRE:
    c. VOLUME OF EQUIPMENT OUTPUT: GPA
4. TREATMENT AREA:
    a. ACTUAL ACRES TREATED: ACRES (rate X amount of mixture used)
    b. ACRES TREATED: ACRES (estimate or gps acres treated)
5. PESTS TARGETED:
6. STAGE OF PEST DEVELOPMENT:
7. SITE TYPE TREATED: NATIVE RANGE RECLAMATION
    RIGHT OF WAY OTHER

8. APPLICATION CONDITIONS:
    a. WIND VELOCITY:
    b. WIND DIRECTION:
    c. TEMPERATURE:
    d. SURFACE CONDITION: DRY
       MOIST
9. MONITORING RECORD (GENERAL DESCRIPTION OF APPLICATION):

APPENDIX K

TRAFFIC IMPACT ANALYSIS

TRAFFIC IMPACT ANALYSIS

FOR THE
DESERT QUARTZITE SOLAR PROJECT
RIVERSIDE COUNTY, CALIFORNIA

Prepared for:

Desert Quartzite, LLC
135 Main Street, 6th Floor
San Francisco, California 94105

Prepared by:

URS
999 Town and Country Road
Orange, California 92868
(714) 689-7247 ⬍ Fax: (714) 567-2441

URS Project Number 60419825.28907534.30002

January 2016

TABLE OF CONTENTS

Section **Page**

1.0 PROJECT OVERVIEW 1-1

1.1 INTRODUCTION 1-1
1.2 PROJECT BACKGROUND 1-3

2.0 EXISTING BASELINE CONDITIONS 2-1

2.1 EXISTING ROADWAY NETWORK 2-1

2.1.1 North-south Facilities 2-1
2.1.2 East-west Facilities 2-1

2.2 STUDY INTERSECTIONS AND ROADWAY SEGMENTS 2-2
2.3 EXISTING TRAFFIC VOLUME 2-2
2.4 EXISTING LEVEL OF SERVICE ANALYSIS 2-2

2.4.1 Intersection Analysis 2-3
2.4.2 Roadway Analysis 2-4

3.0 IMPACT ASSESSMENT 3-1

3.1 REGULATORY FRAMEWORK 3-1

3.1.1 Federal 3-1
3.1.2 State 3-1
3.1.3 Local 3-5

3.2 IMPACT THRESHOLDS 3-6

3.2.1 Level of Service Descriptions 3-6
3.2.2 Threshold of Significance 3-6

3.3 IMPACT ASSESSMENT AND FINDINGS 3-10

3.3.1 Year 2018 (Project Construction) Conditions 3-10
3.3.2 Year 2018 Base (No Project) Traffic Conditions 3-11
3.3.3 Year 2018 Project Construction Conditions 3-12

Section **Page**

3.3.4 Year 2019 Project Operations Conditions 3-14
3.3.5 Area Roadway Considerations……….. 3-15

4.0 APPLICANT RECOMMENDED MITIGATION MEASURES 4-1

4.1 MITIGATION MEASURES 4-1

4.1.1 TRA-1 Worker Vehicle Reduction (Project Construction – PM Peak Hour) 4-1
4.1.2 TRA-3 Traffic and Monitoring Control Plan... 4-2

5.0 REFERENCES... 5-1
6.0 LIST OF PREPARERS... 6-1

Tables

Table 2-1 Study Intersections... 2-2
Table 2-2 Study Roadway Segments... 2-2
Table 2-3 Peak Hour Intersection Level of Service Results Existing Conditions............. 2-3
Table 2-4 Roadway Segment Level of Service Results Existing Conditions 2-4
Table 3-1 Intersection Level of Service Descriptions 3-7
Table 3-2 Roadway Link/Volume Capacity Level of Service for Riverside County Roadways.. 3-8
Table 3-3 Peak Hour Intersection Level of Service Results Year 2018 Base Conditions.. 3-11
Table 3-4 Roadway Segment Level of Service Results Year 2018 Base Conditions..... 3-12
Table 3-5 Peak Month Project Construction Trip Generation 3-13
Table 3-6 Peak Hour Intersection Level of Service Results Year 2018 Project Construction Conditions 3-14
Table 3-7 Roadway Segment Level of Service Results Year 2018 Project Construction Conditions 3-14

Figures **Follows Page**

Figure 1-1 Regional Vicinity Map... 1-3
Figure 1-2 Preliminary Site Layout 1-3
Figure 2-1 Existing Intersection Geometrics.. 2-4
Figure 2-2 Existing AM/PM Peak Hour Traffic Volume.. 2-4
Figure 3-1 Year 2018 Base No Project Traffic Volume.. 3-16

Figures (Continued) **Follows Page**

Figure 3-2 Year 2018 Construction Added Traffic Volumes 3-16
Figure 3-3 Year 2018 Base with Project Construction Traffic Volumes 3-16

Appendices

Appendix A Traffic Counts
Appendix B Existing LOS Worksheets
Appendix C Year 2018 Base Level of Service Worksheets
Appendix D Year 2018 Project Construction Worksheets
Appendix E Off-site Construction Phase Trip Estimates
Appendix F Worker Trip Threshold LOS D Computation Worksheet

SECTION 1.0
PROJECT OVERVIEW

1.1 INTRODUCTION

Desert Quartzite, LLC (Applicant), proposes to develop and construct a 300-megawatt (MW) alternating current photovoltaic solar facility known as the Desert Quartzite Solar Project (Project). The overall Project includes the solar generation facility, an on-site substation, and a generation-tie (gen-tie) line. The proposed Project is located in eastern Riverside County near Blythe, California. The proposed solar facility and the approximately 3-mile-long, 230-kilovolt (kV) gen-tie line interconnection to the existing Southern California Edison (SCE) Colorado River Substation (CRSS) are located primarily on lands administered by the U.S. Department of the Interior, Bureau of Land Management (BLM) (BLM CACA# 04937; 5,115 acres). The Project site also includes 160 acres of private land (APN 879-110-001). The overall Project site encompasses approximately 5,275 acres. The proposed solar facility would be constructed within an approximately 3,714-acre fenced portion of the overall Project site. The gen-tie line study corridor encompasses approximately 445 acres of BLM lands within the overall Project site. A vicinity map of the proposed Project (i.e., including BLM and privately-owned lands) is presented on Figure 1-1 and the proposed preliminary site layout is presented on Figure 1-2. Figures 1-1 and 1-2 are presented at the end of Section 1.0.

Site access will be via Interstate 10 (I-10) at the State Route (SR)-78 to SR-78 (south)/Neighbours Boulevard to 16th Avenue/Seeley Avenue (west).Project construction is anticipated to require from approximately 25 to 48 months to complete, and is expected to start in late 2016. This analysis is based on an assumed approximately 25-month construction timeframe which is considered to be worst case for impact assessment purposes. The construction workforce is estimated to result in an average of 450 (round trip) vehicles per day (21 working days per month), with a maximum of 810 (round trip) vehicle trips per day during peak construction. The workforce is expected to commute to the site from within an average distance of 35 miles from the Project site and is expected to arrive at the Project site by 7 a.m. and to depart at 5 p.m. each day (i.e., avoid 7–9 AM peak traffic period but not the 4–6 PM peak period); it is common that a fairly large portion of the workforce voluntarily carpools regularly. In addition to commute trips by construction workers, approximately 14,400 truck deliveries (i.e., 14,400 round trips or 28,800 one way trips) of equipment, materials, and fuel for on-site construction equipment are estimated to be required over the course of the construction period. Construction of the proposed Project is expected to require a total of up to 10-15 oversize loads for transformers and motor graders. Equipment, material, and fuel deliveries are planned to occur during non-peak traffic hours. Construction phase-related truck deliveries are estimated to require one-way distances (within the boundaries of the Mojave Desert Air Quality Management District) as follows: equipment and material deliveries at 30.5 miles; aggregate and concrete at 13 miles; and fuel at 10 miles.

Construction activities will include site preparation and grading, solar array foundation installation (which may include post driving), equipment installation, on-site substation and operations and maintenance building construction, gen-tie poles and conductor installation along the gen-tie route, equipment testing, and site cleanup and restoration. Typical construction equipment considered in this analysis includes graders, scrapers, dozers, loaders, tractors, tractor discs, skid steers, roller/vibrator/padders, trenchers, post drivers, forklifts, pumps, generators, and trucks. The operational workforce is anticipated to be 5 employees.

It is currently estimated that the maximum water usage for an approximate 25-month construction timeframe is 1,400 acre feet (AF) or approximately 700 AF per year on average. During construction, water will be needed primarily for dust control and soil compaction, with small amounts used for sanitary and other purposes. During operations, the Project will use no water directly for electricity generation. The operational phase of the Project is expected to require up to 38 AF per year (AFY) of water. The Project plans to utilize groundwater from either existing local well(s) or via installation of on-site groundwater wells. The applicant is also considering trucking water to the Project Site for at least the initial months of construction if an on-site water supply well(s) is not yet installed and functional. It is possible that trucking water to the Project Site could be required for the entire length of construction which would potentially require up to approximately 57,000 water deliveries (assuming 8,000-gallon capacity water trucks). All water deliveries to the Project site would be required by the Applicant to occur during non-peak traffic hours. It is assumed that water deliveries would originate from a water supply source within 10 miles of the Project site.

The purpose of this study is to provide scientific and technical data regarding the existing Traffic and Transportation within the study area and the proposed Project's potential to change the area's Traffic and Transportation system. The Project information supporting this analysis is based primarily on the Applicant's revised Desert Quartzite Solar Project Plan of Development (POD) submitted to the BLM in May 2014, as amended. The POD will continue to be updated by the Applicant to provide current and accurate Project information. If warranted, Applicant measures are proposed or recommended in this study to address adverse changes to Traffic and Transportation system as a result of the Project. This study is submitted to the BLM and Riverside County to support their independent review and evaluation of the environmental impacts of the Project pursuant to applicable Federal, State, and local laws. The POD is part of the BLM Right-of-Way (ROW) grant application process which for this Project includes preparation of an Environmental Impact Statement in accordance with the National Environmental Policy Act (NEPA). The proposed Project is also expected to require a Conditional Use Permit (CUP) from Riverside County which would require compliance with the California Environmental Quality Act (CEQA) (e.g., Environmental Impact Report). Therefore, it is currently assumed that a joint EIS/EIR will be prepared by the BLM and Riverside County.

1.2 PROJECT BACKGROUND

The fundamental purpose of the Project is to construct, operate, and eventually decommission a clean, renewable source of solar electricity that helps meet California’s growing demand for power and helps fulfill national and State renewable energy and GHG goals. Solar energy provides a sustainable, renewable source of power that helps reduce fossil fuel dependence and GHG emissions. The proposed Project will help California meet its Renewable Portfolio Standard (RPS) goal, which is currently 50 percent of electrical power retail sales by 2030 under Senate Bill (SB) 350. The Project supports Secretary of the Interior Salazar’s Orders 3283 and 3285, which make developing renewable energy a top national priority. The Project will also help the State achieve the 2006 Global Warming Solutions Act (Assembly Bill [AB] 32) greenhouse gas (GHG) reduction targets, which require California’s GHG emissions to be reduced to 1990 levels by 2020.

When fully operational, the 300 MW Project will deliver over 1.5 billion kilowatt-hours of clean, renewable energy annually. This is equivalent to the amount of energy needed to serve over 90,000 California homes each year. When compared to the carbon dioxide (CO2) emissions that would be emitted if the same amount of electricity was generated from fossil fuels, implementing the Project will avoid emissions of over 165,000 metric tons of CO2 annually – the equivalent of taking almost 32,000 automobiles off the road. The electricity generated by the Project will be sold to one or more utilities or other retail customers.

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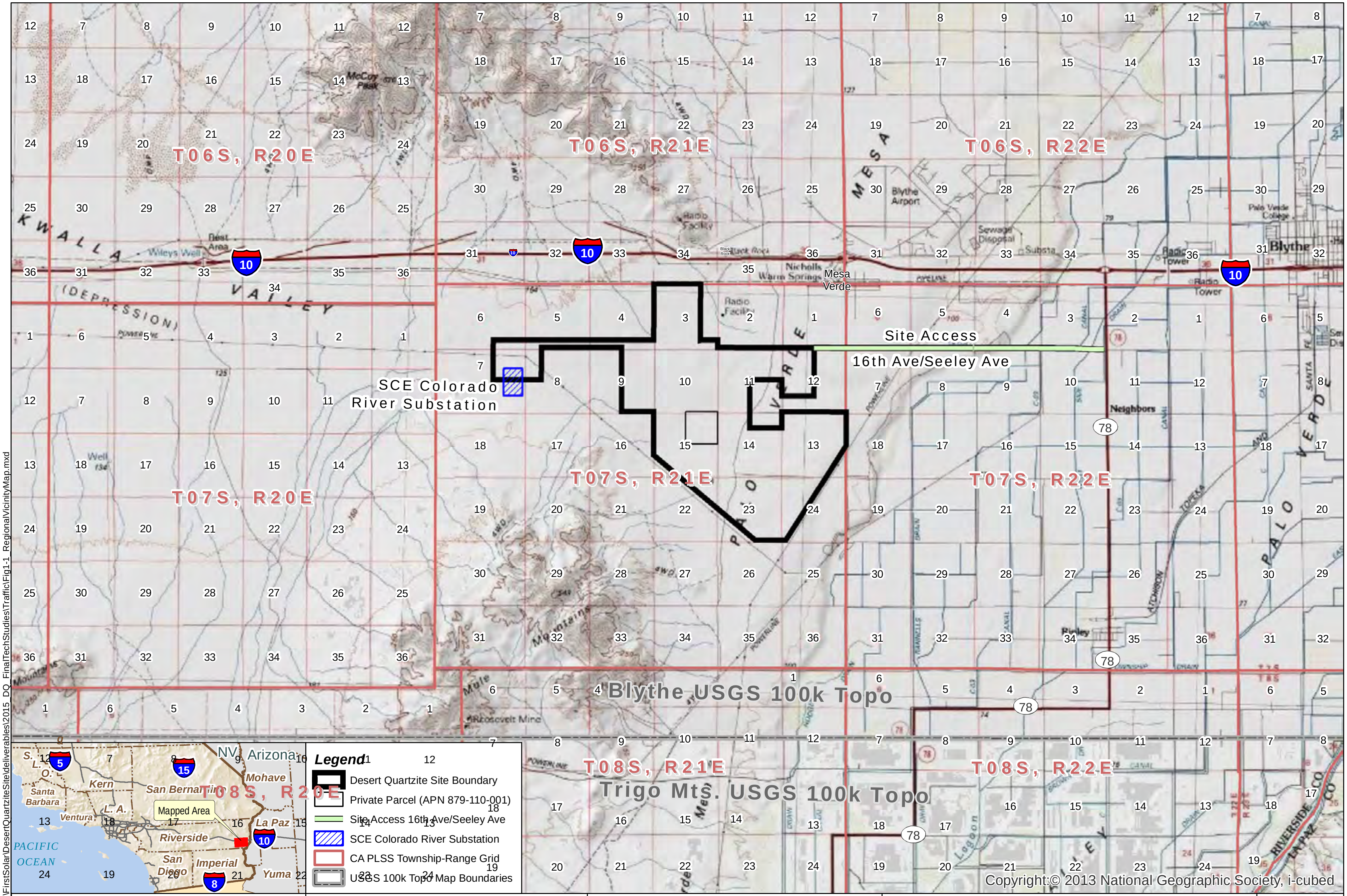
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T08S, R21E
T08S, R22E
Site Access
16th Ave/Seeley Ave
SCE Colorado River Substation
Blythe USGS 100k Topo
Trigo Mts. USGS 100k Topo
Blythe
Mesa Verde
Nicholls Warm Springs
Blythe Airport
Neighbors
Ripley
Palo Verde College
Wileys Well
Rest Area
McCoy Peak
Mule Mountains
Roosevelt Mine
Radio Facility
Radio Tower
Sewage Disposal
Palo Verde
Mesa
Chuckwalla Valley (Depression)
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Copyright:© 2013 National Geographic Society, i-cubed
Mapped Area
Arizona
NV
Kern
San Bernardino
Santa Barbara
Ventura
L.A.
Riverside
San Diego
Imperial
Mohave
La Paz
Yuma
PACIFIC OCEAN
5
15
8
Legend
Desert Quartzite Site Boundary
Private Parcel (APN 879-110-001)
Site Access 16th Ave/Seeley Ave
SCE Colorado River Substation
CA PLSS Township-Range Grid
USGS 100k Topo Map Boundaries
N
0 0.5 1 1.5 2 Miles
0 5,000 10,000 Feet

Desert Quartzite Solar Project
Riverside County, CA

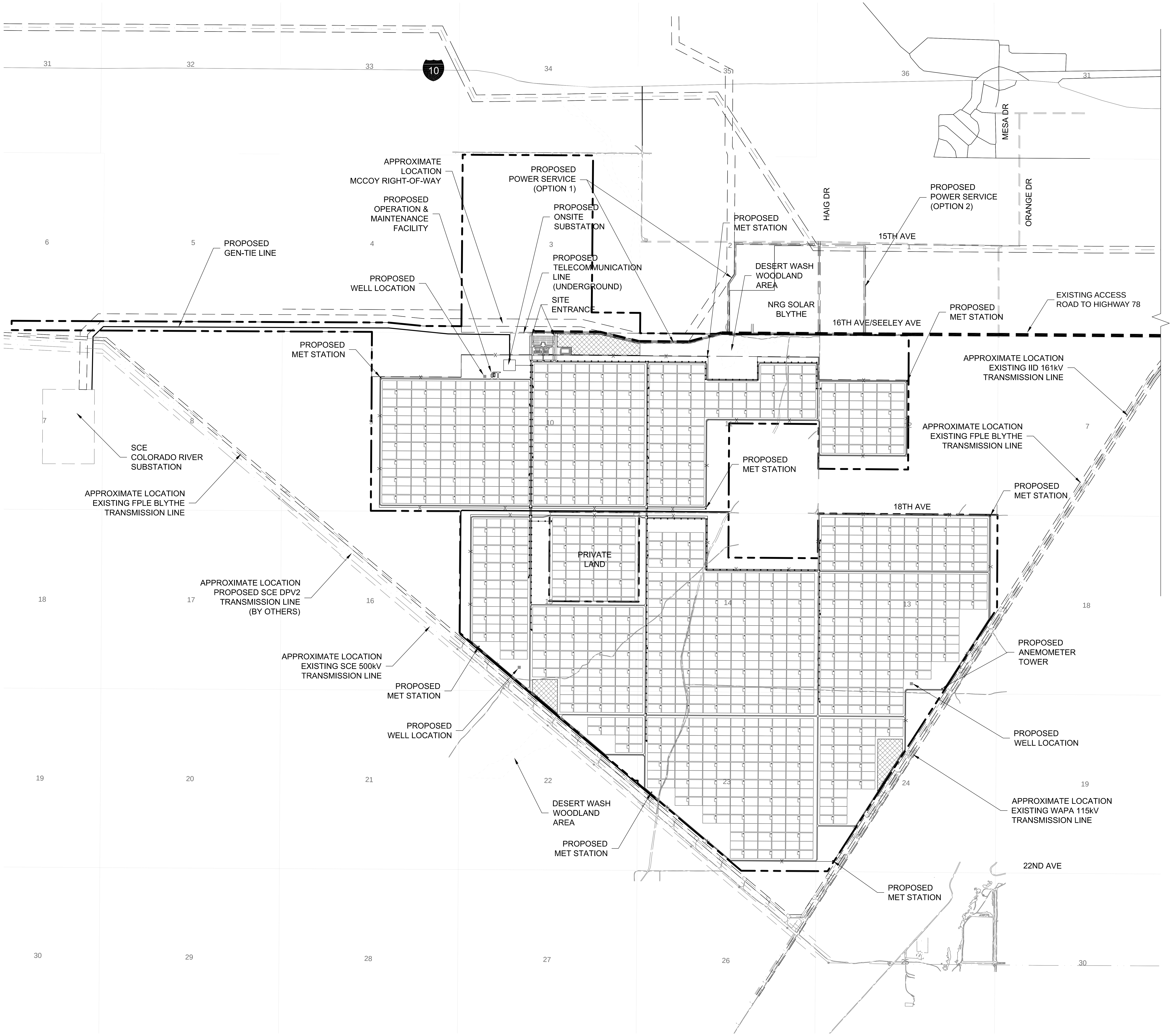
URS Corporation

Source: [1] Bing Maps Aerial Imagery Web Mapping Service - (c) 2010 Microsoft Corporation and its datas upplier (Image Date: 3/13/2011), [2] California Geospatial Information Library PLS, [3] ESRI StreetMap USA (2007).

Figure 1-1. Regional Vicinity Map

2015

V/Projects/GIS_Proj/Ladd/FirstSolar/DesertQuartrzite/1015-075A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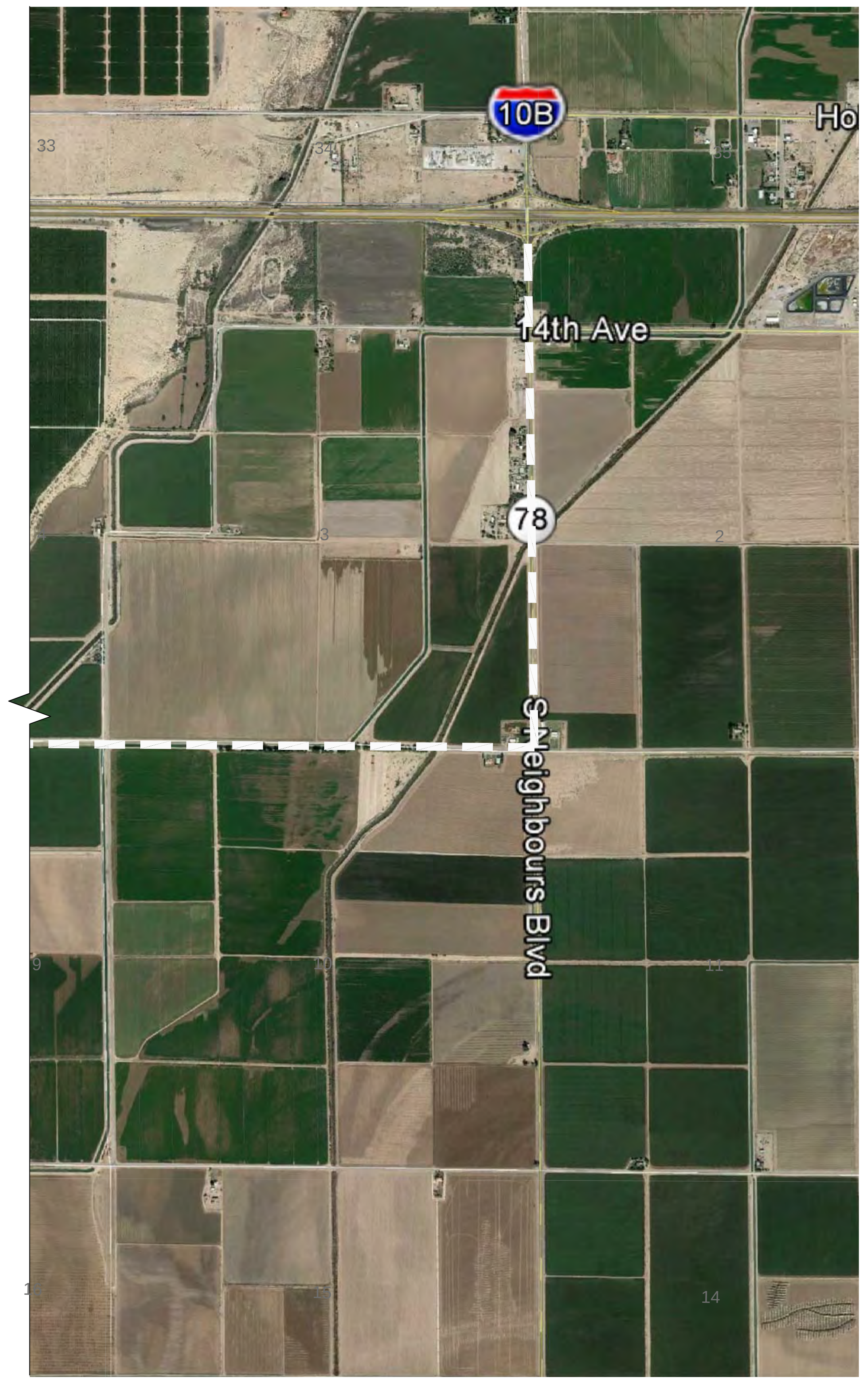
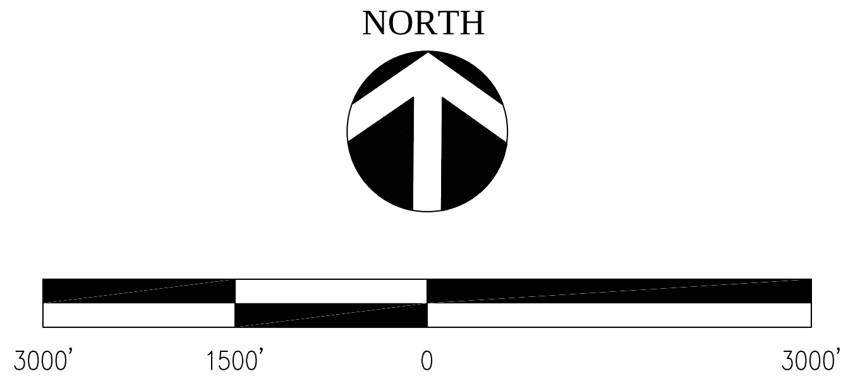
26
25
30
MESA DR
ORANGE DR
HAIG DR
15TH AVE
16TH AVE/SEELEY AVE
18TH AVE
22ND AVE
APPROXIMATE LOCATION MCCOY RIGHT-OF-WAY
PROPOSED POWER SERVICE (OPTION 1)
PROPOSED ONSITE SUBSTATION
PROPOSED OPERATION & MAINTENANCE FACILITY
PROPOSED TELECOMMUNICATION LINE (UNDERGROUND)
PROPOSED MET STATION
PROPOSED POWER SERVICE (OPTION 2)
PROPOSED GEN-TIE LINE
DESERT WASH WOODLAND AREA
PROPOSED WELL LOCATION
SITE ENTRANCE
NRG SOLAR BLYTHE
EXISTING ACCESS ROAD TO HIGHWAY 78
PROPOSED MET STATION
PROPOSED MET STATION
APPROXIMATE LOCATION EXISTING IID 161kV TRANSMISSION LINE
APPROXIMATE LOCATION EXISTING FPLE BLYTHE TRANSMISSION LINE
SCE COLORADO RIVER SUBSTATION
PROPOSED MET STATION
APPROXIMATE LOCATION EXISTING FPLE BLYTHE TRANSMISSION LINE
PROPOSED MET STATION
PRIVATE LAND
APPROXIMATE LOCATION PROPOSED SCE DPV2 TRANSMISSION LINE (BY OTHERS)
PROPOSED ANEMOMETER TOWER
APPROXIMATE LOCATION EXISTING SCE 500kV TRANSMISSION LINE
PROPOSED MET STATION
PROPOSED WELL LOCATION
PROPOSED WELL LOCATION
DESERT WASH WOODLAND AREA
APPROXIMATE LOCATION EXISTING WAPA 115kV TRANSMISSION LINE
PROPOSED MET STATION
PROPOSED MET STATION


10B
Ho
33
14th Ave
78
S Neighbours Blvd
14

LEGEND

━ ━	PROPOSED PROJECT SITE BOUNDARY
━━	PROPOSED GEN-TIE
—x—	PROPOSED PERIMETER FENCE
▬ ▬	PROPOSED ACCESS ROAD
▪	PROPOSED WELL LOCATION (GROUNDWATER)
⊞	TYPICAL PV ARRAY
▨	CONSTRUCTION STAGING AREA
═	EXISTING ROADS
— —	EASEMENTS/RIGHT-OF-WAY BY OTHERS
— - —	EXISTING/PROPOSED TRANSMISSION LINE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DESERT QUARTZITE, LLC
135 MAIN STREET, 6TH FLOOR
SAN FRANCISCO, CALIFORNIA 94105
PHONE: (415) 935-2500

DESERT QUARTZITE
SOLAR PROJECT
RIVERSIDE COUNTY
CALIFORNIA

REV	DATE	REVISION DESCRIPTION	BY	CHK	APP

FS JOB #:
PROJ. DEVT. ENGR: RH
PROJ. MGR. ENV.:
SCALE: 1"=1500' @ 24"x36" SHEET
COPYRIGHT BY: DESERT QUARTZITE, LLC

SHEET TITLE

FIGURE 1-2
PRELIMINARY
SITE PLAN

SHEET 2 OF 14

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SECTION 2.0
EXISTING BASELINE CONDITIONS

2.1 EXISTING ROADWAY NETWORK

This section describes key roadways segments and intersections, existing daily roadway and peak hour intersection traffic volume information, and LOS analysis results for existing conditions in the Project study area. Although closer to the Project site, the Mesa Drive interchange at I-10 is not considered for Project-related traffic to avoid the potential for traffic-related impacts to the community of Nicholls Warm Springs/Mesa Verde between the interchange and the Project site.

The description and characteristics of several regionally and locally significant roadways that traverse and serve the study area are discussed below.

2.1.1 North-south Facilities

2.1.1.1 State Route 78 (Neighbours Boulevard)

SR-78 is a north-south state highway that is located east of the Project site. SR-78 is a two-lane highway with a posted speed limit of 55 mph. except through Ripley, where the speed limit is 45 mph. SR-78 has two 12-foot-wide lanes and paved shoulders. The project site is accessed via Seeley Avenue which turns to 16th Avenue just west of SR-78. SR-78 is also referred to by local street names as Neighbours Boulevard, 28th Avenue and Rannells Boulevard. The east and west I-10 ramps at SR-78 are stop sign controlled. The land uses adjacent to SR-78 are predominantly agricultural fields with some residential and farm structures mostly on the west side between I-10 and 16th Avenue.

2.1.2 East-west Facilities

2.1.2.1 Interstate 10 (I-10 Freeway)

I-10 is a four-lane, east-west interstate freeway located to the north of the Project site and is under the operational jurisdiction of the California Department of Transportation (Caltrans). I-10 originates in Santa Monica and runs through Los Angeles, San Bernardino County, Riverside County, and beyond through the transcontinental U.S. to the east. In the vicinity of the Project, access to I-10 is provided via freeway ramp connections at South Neighbours Boulevard / SR-78 as well as Mesa Drive. The posted speed limit is 70 miles per hour (mph), and trucks comprise 37 to 38 percent of traffic on I-10.

2.1.2.2 16th Avenue/Seeley Avenue

The proposed access route to the Project site is via 16th Avenue, which is accessible from SR-78. Approximately 1.5 miles west of SR-78, 16th Avenue becomes Seeley Avenue, a generally unpaved dirt road providing access to local farms and the Project site.

2.2 STUDY INTERSECTIONS AND ROADWAY SEGMENTS

Based on the result of the traffic study field review, the following four key study area intersections were identified for analysis in the traffic study, as shown in Table 2-1. The existing intersection geometrics are shown on Figure 2-1.

TABLE 2-1
STUDY INTERSECTIONS

ID	Intersection	Jurisdiction
1	SR-78 (Neighbours Blvd)/I-10 WB Ramps	Caltrans
2	SR-78 (Neighbours Blvd)/I-10 EB Ramps	Caltrans
3	SR-78 (Neighbours Blvd)14th Avenue	Caltrans, Riverside County
4	SR-78 (Neighbours Blvd)16th Avenue	Caltrans, Riverside County

Note: All study intersections are currently unsignalized.

In addition to the study intersections described above, Table 2-2 lists the study roadway segments that serve and provide access to the Project site.

TABLE 2-2
STUDY ROADWAY SEGMENTS

ID	Roadway	Segment Location	Cross-section Classification	Jurisdiction
1	I-10	West of SR-78	4-Lane Freeway	Caltrans
2	I-10	East of SR-78	4-Lane Freeway	Caltrans
3	SR-78	South of I-10	2-Lane Undivided	Caltrans
4	16th Street	West of SR-78	2-Lane Collector	Riverside County

2.3 EXISTING TRAFFIC VOLUME

In order to support this analysis, traffic data were collected during typical weekdays in July 2011 (Wednesday, July 27, 2011) for the two SR-78 (Neighbours Blvd.) and I-10 ramp intersections, and September 2014 (Thursday, September 4, 2014) for the remainder of the study locations. Schools are closed from June 4 to August 18 per current calendar for both elementary and secondary schools. The traffic counts include 24-hour roadway segment counts and AM and PM peak hour study intersection counts which are used in this traffic impact analysis. The specific traffic count dates are included on the traffic count sheets provided in Appendix A – Traffic Counts. For analysis purposes, peak hour intersection data were collected during the 7 to 9 AM and 4 to 6 PM peak hours. These peak hours are the standard adjacent street traffic peak hours used in the ITE Trip Generation Manual and the majority of traffic analyses performed in Riverside County. Existing AM/PM traffic volumes for the four study intersections are presented on Figure 2-2. The traffic counts collected in 2011 for the two SR-78 (Neighbours Blvd.) and I-10 ramp intersections have been updated to 2015 conditions (based on 2 percent annual growth) as shown on Figure 2-2 and supported by the calculations in Appendix B (Existing LOS Worksheets).

2.4 EXISTING LEVEL OF SERVICE ANALYSIS

This section presents level of service (LOS) information for existing conditions at study area intersections and roadway segments. LOS descriptions are presented in Section 3.2 (Impact Thresholds).

2.4.1 Intersection Analysis

Table 2-3 displays intersection LOS and average delay results for the key study area intersections under Existing conditions. All intersections in the Project study area are currently unsignalized.

TABLE 2-3
PEAK HOUR INTERSECTION LEVEL OF SERVICE RESULTS
EXISTING CONDITIONS[1]

	AM Peak Hour		PM Peak Hour	
Intersection	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)
SR-78 (Neighbours Blvd)/I-10 WB Ramps	A	9.1	A	9.2
SR-78 (Neighbours Blvd)/I-10 EB Ramps	A	9.1	A	9.4
SR-78 (Neighbours Blvd)14th Avenue	A	9.4	A	9.7
SR-78 (Neighbours Blvd)16th Avenue	A	9.7	A	9.7

[1] Source: URS (August 2015).

Figure 2-2 shows existing AM/PM peak hour traffic volumes for the key study area intersections. The 24-hour traffic data and AM/PM peak hour intersection turning movement counts are provided in Appendix A.

The detailed LOS calculation worksheets for existing conditions are provided in Appendix B.

As shown in Table 2-3, all four study area intersections are currently operating at acceptable LOS A under existing conditions. These findings are consistent with the current low volume traffic at the study intersections

2.4.2 Roadway Analysis

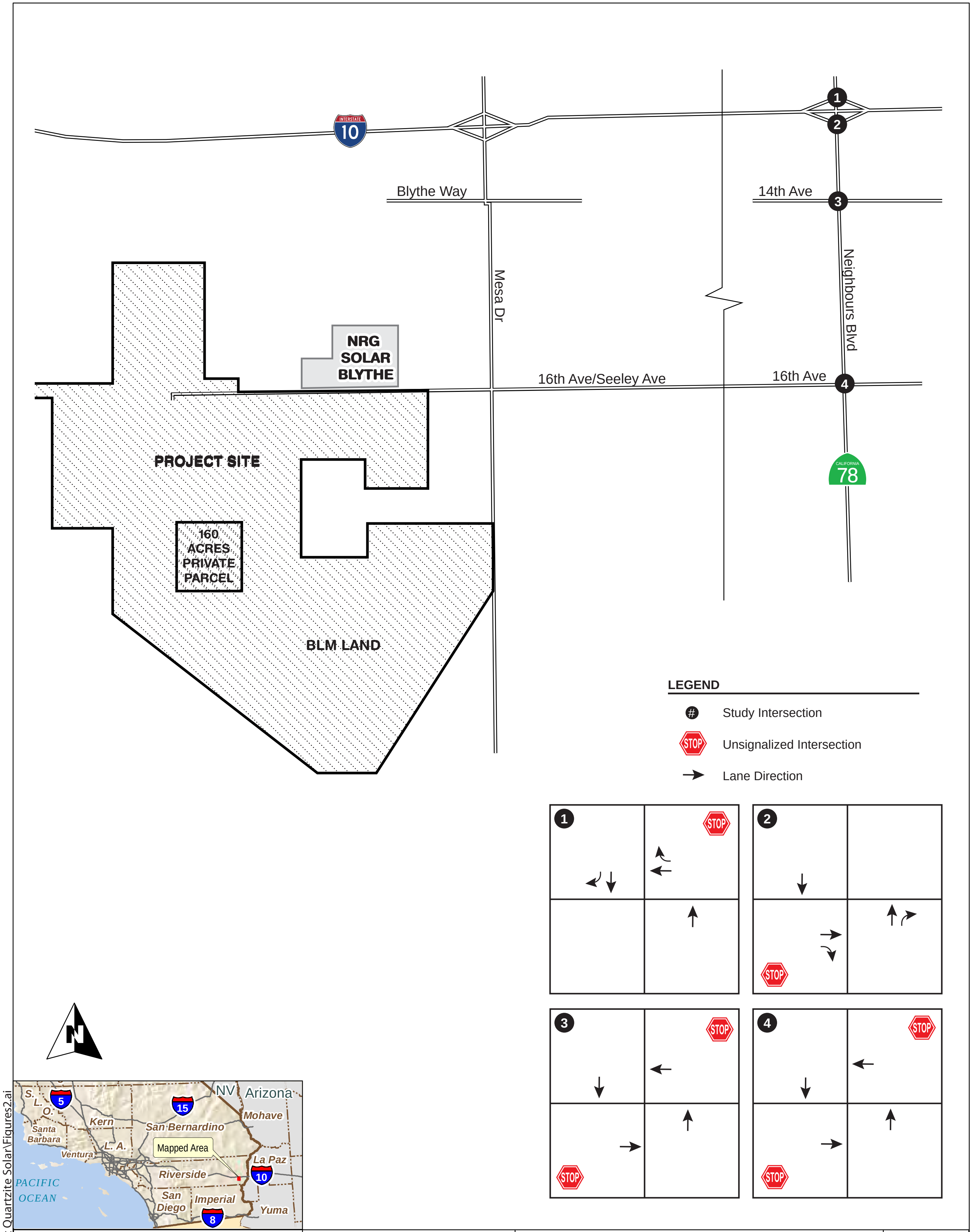
The analysis described below summarizes the result of the roadway segment LOS analysis conducted for existing conditions. Table 2-4 displays roadway segment volume and segment LOS under existing conditions.

TABLE 2-4
ROADWAY SEGMENT LEVEL OF SERVICE RESULTS
EXISTING CONDITIONS

Roadway	Segment	Cross-section Classification	Existing ADT[1]	Roadway Capacity	Truck Percent	LOS
I-10	West of SR-78	4-lane freeway	26,000	68,900	38%	C
I-10	East of SR-78	4-lane freeway	27,500	68,900	37%	C
SR-78	South of I-10	2-lane undivided	2,105	16,200	30%	C
16th Street	West of SR-78	2-lane collector	117	11,700	30%	C

[1] Average Daily Traffic (ADT).

As shown in Table 2-4, all study roadway segment are currently operating at acceptable LOS C under existing conditions.


INTERSTATE 10
Blythe Way
14th Ave
Mesa Dr
Neighbours Blvd
NRG SOLAR BLYTHE
16th Ave/Seeley Ave
16th Ave
CALIFORNIA 78
PROJECT SITE
160 ACRES PRIVATE PARCEL
BLM LAND
1
2
3
4
LEGEND
#
Study Intersection
STOP
Unsignalized Intersection
Lane Direction
STOP
N
S. L. O.
5
15
NV
Arizona
Santa Barbara
Kern
San Bernardino
Mohave
L. A.
Mapped Area
Ventura
La Paz
10
Riverside
PACIFIC OCEAN
San Diego
Imperial
8
Yuma

Traffic Impact Analysis
Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

Figure 2-1. Existing Intersection Geometrics

2015

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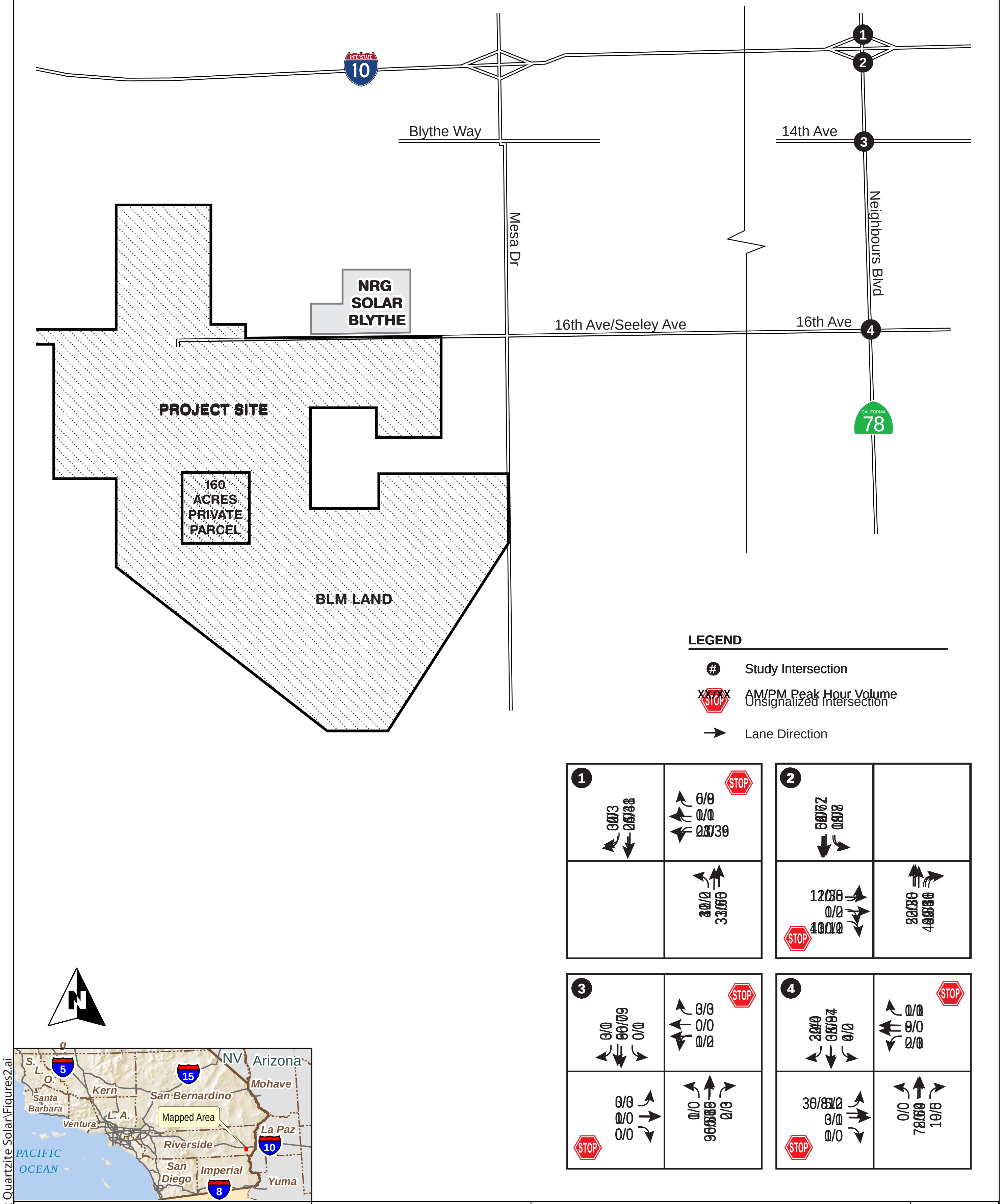

INTERSTATE 10
Blythe Way
14th Ave
Mesa Dr
Neighbours Blvd
NRG SOLAR BLYTHE
16th Ave/Seeley Ave
16th Ave
CALIFORNIA 78
PROJECT SITE
160 ACRES PRIVATE PARCEL
BLM LAND
1
2
3
4
LEGEND
Study Intersection
XX/XX AM/PM Peak Hour Volume
STOP Unsignalized Intersection
Lane Direction
N
S. L. O.
Kern
San Bernardino
Mohave
NV
Arizona
Santa Barbara
Ventura
L. A.
Mapped Area
Riverside
La Paz
PACIFIC OCEAN
San Diego
Imperial
Yuma
5
15
10
8

K:\2014\Desert Quartzite Solar\Figures2.ai

Traffic Impact Analysis
Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

Figure [illegible] [illegible] Project
[illegible] Traffic Volumes

2015

SECTION 3.0
IMPACT ASSESSMENT

3.1 REGULATORY FRAMEWORK

3.1.1 Federal

3.1.1.1 National Environmental Policy Act of 1969

NEPA establishes a public, interdisciplinary framework for Federal agencies reviewing projects under their jurisdiction to consider environmental impacts. NEPA's basic policy is to assure that all branches of government give proper consideration to the environment prior to undertaking any major federal action that significantly affects the environment.

The BLM, as lead Federal agency for the Project, is responsible for preparation of an Environmental Impact Statement (EIS) in compliance with NEPA to evaluate the environmental impacts of the Project.

3.1.1.2 Title 49, Code of Federal Regulations, §§ 171 177

Governs the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of the transportation vehicles. The administering agencies for this are the California Highway Patrol (CHP) and the DOT, Pipeline and Hazardous Materials Safety Administration. The Project will conform to this law by requiring that shippers of hazardous materials use the required markings on their transportation vehicles.

3.1.2 State

3.1.2.1 California Environmental Quality Act

The State CEQA Guidelines (California Code of Regulations, Title 14, Division 6, Chapter 3, Article 9, Contents of Environmental Impact Reports [Sections 15120-15132]) include the requirement that the environmental analysis for an EIR must evaluate impacts associated with the project and identify mitigation for any potentially significant impacts. All phases of a proposed project, including development and operation, are to be evaluated in the analysis.

Specific to traffic and transportation, Appendix G of the CEQA Guidelines, Environmental Checklist Form includes the following guidance:

XVI. TRANSPORTATION/TRAFFIC -- Would the project: a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?; b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?; c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?; d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?; e) Result in inadequate emergency access?; f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

As discussed previously, it is planned that CEQA compliance for the Project will be achieved through a combined NEPA/CEQA document, which will be prepared jointly by the BLM and Riverside County.

3.1.2.2 California Vehicle Code, § 353

Defines hazardous materials as any substance, material, or device posing an unreasonable risk to health, safety, or property during transportation, as defined by regulations adopted pursuant to § 2402.7. The administering agency for this statute is the California Highway Patrol (CHP). The Project will comply with these codes by continuing to classify all hazardous materials in accordance with their clarification.

3.1.2.3 California Vehicle Code, §§ 2500 2505

Authorizes the Commissioner of Highway Patrol to issue licenses for the transportation of hazardous materials including explosives. The administering agency for these statutes is the CHP. The Project will comply with these codes by requiring that contractors and employees be properly licensed and endorsed when operating vehicles used to transport hazardous materials.

3.1.2.4 California Vehicle Code, §§ 13369, 15275, 15278

Addresses the licensing of drivers and the classification of license required for the operation of particular types of vehicles. Requires a commercial driver's license to operate commercial vehicles. Requires an endorsement issued by the Department of Motor Vehicles (DMV) to drive any commercial vehicle identified in § 15278. The administering agency for these statutes is the DMV. The Project will comply with these codes by requiring that contractors and employees be properly licensed and endorsed when operating such vehicles.

3.1.2.5 California Vehicle Code, §§ 31303 31309

Requires that the transportation of hazardous materials be on the state or interstate highway that offers the shortest possible overall transit time. The administering agency for these statutes is the CHP. The Project will comply with this law by requiring that shippers of hazardous materials use the shortest route possible to and from the Project site.

3.1.2.6 California Vehicle Code, §§ 31600 31620

Regulates the transportation of explosive materials. The administering agency for the above statutes is the CHP. It must be noted that the Project does not propose to use explosive materials specifically defined in § 12000 of the Health and Safety Code. However, the Project will comply with this law by requiring that shippers of other potentially explosive materials have the required licenses from the CHP.

3.1.2.7 California Vehicle Code, §§ 32000 32053

Authorizes the CHP to inspect and license motor carriers transporting hazardous materials of the type requiring placards. The administering agency for this regulation is the CHP. The Project will comply with this law by requiring that motor carriers of hazardous materials be properly licensed by the CHP.

3.1.2.8 California Vehicle Code, §§ 32100 32109

Requires that shippers of inhalation hazards in bulk packaging comply with rigorous equipment standards, inspection requirements, and route restrictions. The administering agency for this regulation is the CHP. If applicable, the Project will comply with this law by requiring shippers of these types of material to comply with all route restrictions, equipment standards, and inspection requirements.

3.1.2.9 California Vehicle Code, §§ 34000 34100

Establishes special requirements for vehicles having a cargo tank and for hazardous waste transport vehicles and containers, as defined in § 25167.4 of the Health and Safety Code. The commissioner shall provide for the establishment, operation, and enforcement of random on- and off-highway inspections of cargo tanks and hazardous waste transport vehicles and containers and ensure that they are designed, constructed, and maintained in accordance with the regulations adopted by the commissioner pursuant to this code and Chapter 6.5 (commencing with § 25100) of Division 20 of the Health and Safety Code. The administering agency for this regulation is the CHP. The Project will comply with this law by requiring that shippers of hazardous materials maintain their hazardous material transport vehicles in a manner that ensures the vehicles will pass CHP inspections.

3.1.2.10 California Vehicle Code, §3500

Regulates the safe operation of vehicles, including those vehicles that are used for the transportation of hazardous materials. The administering agency for this regulation is the

CHP. The Project will comply with this law by requiring shippers of hazardous materials to have the necessary permits, inspections, and licenses issued by the CHP for the safe operation of the hazardous materials transport vehicles.

3.1.2.11 California Vehicle Code, § 35550

Imposes weight guidelines and restrictions on vehicles traveling on freeways and highways. The section holds that "a single axle load shall not exceed 20,000 pounds. The load on any one wheel or wheels supporting one end of an axle is limited to 10,500 pounds. The front steering axle load is limited to 12,500 pounds." Furthermore, California Vehicle Code § 35551 defines the maximum overall gross weight as 80,000 pounds and adds that "the gross weight of each set of tandem axles shall not exceed 34,000 pounds." The administering agency for this statute is Caltrans. The Project will comply with this code by requiring compliance with weight restrictions and by requiring heavy haulers to obtain permits, if required, prior to delivery of any heavy haul load.

3.1.2.12 California Vehicle Code, § 35780

Requires a Single-Trip Transportation Permit to transport oversized or excessive loads over state highways. The permit can be acquired through the Caltrans. The Project will comply with this code by requiring that heavy haulers obtain a Single-Trip Transportation Permit for oversized loads for each vehicle, prior to delivery of any oversized load.

3.1.2.13 California Streets and Highways Code, § 117

Unless otherwise specifically provided in the instrument conveying title, the acquisition by the department of any right-of-way over any real property for state highway purposes, includes the right of the department to issue, under Chapter 3 (commencing with § 660), permits for the location in the right-of-way of any structures or fixtures necessary to telegraph, telephone, or electric power lines or of any ditches, pipes, drains, sewers, or underground structures. The administering agency for this statute is Caltrans. If applicable, the Project will comply with this code by acquiring the necessary permits and approval from Caltrans with regard to use of public rights-of-way.

3.1.2.14 California Streets and Highways Code, §§ 660, 670, 672, 1450, 1460, 1470, 1480 et seq.

Defines highways and encroachment, requires encroachment permits for projects involving excavation in state highways and county/city streets. This law is generally enforced at the local level. The administering agencies for this regulation are Caltrans and County of Riverside Public Works Department. The Project will apply for encroachment permits for any excavation in state and county roadways prior to construction.

3.1.2.15 California Health and Safety Code, S§ 25160 et seq.

Addresses the safe transport of hazardous wastes, requires a manifest for hazardous waste shipments, require a person who transports hazardous waste in a vehicle to have a valid registration issued by the Department of Toxic Substances Control (DTSC) in his or her possession while transporting the hazardous waste. The administering agency for this regulation is the DTSC. The Project will comply with this law by requiring that shippers of hazardous wastes are properly licensed by the DTSC and hazardous waste transport vehicles are in compliance with DTSC requirements.

3.1.2.16 California Manual on Uniform Traffic Control Devices, Part 6

Requires a temporary traffic control plan be provided for “continuity of function (movement of traffic, pedestrians, bicyclists, transit operations), and access to property/utilities” during any time the normal function of a roadway is suspended. The administering agencies for this regulation are Caltrans and County of Riverside Public Works Department. If applicable, the Applicant will file a Traffic Control Plan prior to the start of construction.

3.1.3 Local

3.1.3.1 County of Riverside, General Plan, Circulation Element

Requires LOS C, D or E (depending on location) or better operating conditions for County intersections and roadways. The primary administering agency for this policy is the County of Riverside Transportation and Land Management Agency (TLMA) Public Works Department.

3.1.3.2 County of Riverside, Ordinance 500.1

An ordinance of the County of Riverside amending Ordinance No. 500, reducing the permissible weight of vehicles on unimproved County highways. The primary administering agency for this policy is the County of Riverside TLMA Public Works Department.

3.1.3.3 County of Riverside, Ordinance 524.1

An ordinance of the County of Riverside amending Ordinance No. 524, regulating oversize and overweight vehicles and loads. The primary administering agency for this policy is the County of Riverside TLMA Public Works Department.

3.1.3.4 County of Riverside, Ordinance 846

An ordinance of the County of Riverside reducing the permissible vehicle weight in the community of Mesa Verde/CSA 122. Pursuant to California Vehicle Code § 35712, any commercial vehicle exceeding a manufacturer’s gross vehicle weight rating of 14,000 pounds is prohibited from using the local streets within the community of Mesa Verde and County Service Area (CSA) 122 as identified in the restricted list. Certain exemptions apply to commercial vehicles owned by a public utility or a contractor while necessarily in use in the construction, installation, or repair of any public utility are exempt from the vehicle weight restriction. The primary administering agency for this policy is the County of Riverside TLMA Public Works Department. Project site access would be via SR-78 (south)/Neighbours Boulevard to 16th Avenue/Seeley Avenue (west).

3.2 IMPACT THRESHOLDS

The traffic analyses conducted for this study were performed in accordance with County of Riverside traffic impact analysis guidelines and the Riverside County Congestion Management Program (CMP) requirements. Detailed information on intersection analysis methodologies, standards, and thresholds are discussed in the following sections.

3.2.1 Level of Service Descriptions

LOS is an indicator of operating conditions on a roadway or at an intersection and is defined in categories ranging from A to F. These categories can be viewed much like school grades, with A representing the best traffic flow conditions and F representing poor conditions. LOS A indicates free-flowing traffic and LOS F indicates substantial congestion with stop-and-go traffic and long delays at intersections. Table 3-1 provides definitions of level of service for signalized and stop-controlled intersections.

Table 3-2 describes the Link/Volume capacity LOS for Riverside County roadways.

3.2.2 Threshold of Significance

Significance criteria were developed based on Appendix G of the CEQA Guidelines, which identifies potentially significant project impacts. A significant traffic-related project impact would occur if the project significantly changed the operating conditions on the surrounding roadway network. A freeway/roadway segment and intersection LOS analysis was conducted to assess operational performance of the traffic study area freeways/roadways and intersections during construction and operation of the Project. For LOS, the applicable significance threshold was based on the Riverside County Transportation Commission (RCTC) 2010 Congestion Management Program (CMP) and County of Riverside requirements.

3.2.2.1 State Highway Level of Service Standard

According to the Caltrans Guide for the Preparation of Traffic Impact Studies, “Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on State Highway Facilities; however, Caltrans acknowledges that this may not always be feasible

TABLE 3-1
INTERSECTION LEVEL OF SERVICE DESCRIPTIONS

LOS	Description of Operation	Signalized Intersection Delay (Seconds)	Stop-controlled Intersection Delay (Seconds)
LOS A	Describes operations with very low delay. This occurs when progression is extremely favorable, and most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.	<10.0	<10.0
LOS B	Describes operations with generally good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	10.1–20.0	10.1–15.0
LOS C	Describes operations with higher delays, which may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.	20.1–35.0	15.1–25.0
LOS D	Describes operations with high delay, resulting from some combination of unfavorable progression, long cycle lengths, or high volumes. The influence of congestion becomes more noticeable, and individual cycle failures are noticeable.	35.1–55.0	25.1–35.0
LOS E	Considered the limit of acceptable delay. Individual cycle failures are frequent occurrences.	55.1–80.0	35.1-50.0
LOS F	Describes a condition of excessively high delay, considered unacceptable to most drivers. This condition often occurs when arrival flow rates exceed the LOS D capacity of the intersection. Poor progression and long cycle lengths may also be major contributing causes to such delay.	>80.0	>50.0

and recommends that the lead agency consult with Caltrans to determine the target LOS. If an existing state highway facility is operating at less than the appropriate target LOS, the existing LOS should be maintained.

Based on the above requirements, the following conditions apply in the determination of significant State Highway impacts:

- Desired minimum LOS is LOS D
- When pre-project (Base) LOS A, B, C, and D becomes LOS E or F with project, the impact is considered significant
- When pre-project (Base) LOS E becomes LOS F with project, the impact is considered significant

TABLE 3-2
ROADWAY LINK/VOLUME CAPACITY LEVEL OF SERVICE FOR RIVERSIDE COUNTY ROADWAYS

Roadway Classification	Number of Lanes	LOS C	LOS D	LOS E
Collector	2	10,400	11,700	13,000
Secondary	4	20,700	23,300	25,900
Major	4	27,300	30,700	34,100
Mountain	2	12,900	14,500	16,100
Mountain	3	16,700	18,800	20,900
Mountain	4	29,800	33,500	37,200
Urban	4	28,700	32,300	35,900
Urban	6	43,100	48,500	53,900
Urban	8	57,400	64,600	71,800
Expressway	4	32,700	36,800	40,900
Expressway	6	49,000	55,200	61,300
Expressway	8	65,400	73,500	81,700
Freeway	4	61,200	68,900	76,500
Freeway	6	94,000	105,800	117,500
Freeway	8	128,400	144,500	160,500
Freeway	10	160,500	180,500	200,600
Ramp	1	16,000	18,000	20,000

Source: Riverside County, 2003. General Plan Circulation Element.
LOS = Level of service.

3.2.2.2 CMP Level of Service Standards

The following discussion of LOS standards was excerpted from RCTC 2010 CMP:

- CMP System of Streets and Highways
- Establishment of Minimum LOS

With the intent of the legislation in mind, the RCTC Technical Advisory Committee (TAC) CMP Subcommittee approved a “two-tiered” approach to establish the minimum LOS standard. Tier 1 involves the “locally established minimum traffic LOS – or – ceiling,” while Tier 2 involves the CMP minimum LOS standard – or – floor.”

Most local agencies in Riverside County and Caltrans have adopted LOS standards of C or D (representing the “ceiling” in Tier 2) for roadway segments in an effort to maintain a desired LOS for the local circulation system. To address the CMP legislative requirements and establish minimum LOS along the regional system of roadways and highways within the County (representing the “floor” in Tier 2), RCTC approved a minimum traffic LOS standard of E.

In accordance with CMP statutes, certain facilities (roadway segments and intersections) had been identified (see Table 4 1 and Exhibit 4 1 of the 2010 Riverside County CMP Document) to be exempt from CMP requirements as having been documented at LOS F since 1991. No study roadways and intersections fall under this exemption.

Within the traffic study area, both SR-78 and I-10 have been identified as key elements of the CMP system.

A CMP significant traffic impact occurs when:

- Pre-project (Base) LOS A, B, C, and D becomes LOS E or F with project
- Pre-project (Base) LOS E becomes LOS F with project

3.2.2.3 Local Level of Service Standards

According to the Riverside County General Plan Circulation Element, to achieve the true intent of community center design, LOS designations are typically lower (LOS E) to minimize the impacts of accommodating uncongested roadways and to maximize pedestrian use. Higher level of service designations (LOS A, B, C) require wider road widths, and as a result, would create circulation systems that are more accommodating to automobiles than pedestrians.

The County strives to maintain the following county-wide target LOS:

- LOS C along all County-maintained roads and conventional state highways. As an exception, LOS D may be allowed in Community Development areas, only at intersections of any combination of Secondary Highways, Major Highways, Expressways, conventional state highways, or freeway ramp intersections.
- LOS E may be allowed in designated community centers to the extent that it would support transit-oriented development and walkable communities.

The City of Blythe, strives to maintain LOS B (not applicable for the study locations) on residential streets and LOS C, D (depending on location) or better operating conditions for City intersections and roadways.

Based on the above requirements, the following conditions apply in the determination of significant local impacts:

- Desired LOS is LOS C, D, or E (with specific conditions)
- When pre-project (Base) LOS A, B, C, and D becomes LOS E or F with project, the impact is considered significant
- When pre-project (Base) LOS E becomes LOS F with project, the impact is considered significant

Significance issues for the other transportation elements include:

1. Additional Vehicular Traffic: Would the additional traffic generated by the project adversely affect operating conditions (i.e., LOS) on local and regional roadways?
2. Public Transit: Would the additional traffic generated by the project impede public transit operations in the vicinity of the project?
3. Bicycle and Pedestrian Circulation: Would the additional traffic generated by the project obstruct bicycle and pedestrian access to and from the project site or along adjacent bicycle and pedestrian routes?
4. Parking Facilities: Would the additional traffic generated by the project consume parking in proximity to the project site?
5. Goods Movement: Would the additional traffic generated by the project hinder goods movement along local and regional roadways?
6. Safety: Would the traffic generated by the project impose any safety concerns, such as a significant increase in crashes?
7. Air, Rail, and Waterborne Traffic: Would the traffic generated by the project interfere with air, rail, or waterborne traffic, or access to these transportation modes?

3.3 IMPACT ASSESSMENT AND FINDINGS

3.3.1 Year 2018 (Project Construction) Conditions

This section provides an analysis of Future Year 2018 traffic conditions both with and without the proposed Project construction traffic. The Future Year 2018 conditions were selected for analysis since they coincide with the peak construction traffic period for the assumed worst-case 25-month construction schedule. The traffic analysis conducted includes the following construction scenarios:

- Year 2018 Base Traffic Conditions (No Project)
- Year 2018 Base Traffic Conditions Plus Project Construction

The peak Project construction scenario considered the varying levels of Project construction activity and the associated amount of solar photovoltaic equipment installation per month and evaluated the worst case overlap of construction worker traffic and material and equipment deliveries.

3.3.2 Year 2018 Base (No Project) Traffic Conditions

For analysis purposes, and to establish Year 2018 baseline or no project conditions, it was conservatively assumed that to account for ambient traffic growth for yet to be developed cumulative development projects that could potentially occur within the Project study area, an annual traffic growth of two percent per year was used to develop Year 2018 baseline conditions from existing intersection traffic count data. Figure 3-1 shows the Year 2018 Base (No Project) Traffic Volume.

3.3.2.1 Intersection Analysis

Table 3-3 displays the results of intersection LOS and average delay analysis under Year 2018 Base conditions. The detailed LOS calculation worksheets for the Year 2018 Base conditions are provided in Appendix C.

TABLE 3-3
PEAK HOUR INTERSECTION LEVEL OF SERVICE RESULTS
YEAR 2018 BASE CONDITIONS[1]

	AM Peak Hour		PM Peak Hour	
Intersection	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)
SR-78 (Neighbours Blvd)/I-10 WB Ramps	A	9.2	A	9.2
SR-78 (Neighbours Blvd)/I-10 EB Ramps	A	9.1	A	9.4
SR-78 (Neighbours Blvd)14th Avenue	A	9.4	A	9.9
SR-78 (Neighbours Blvd)16th Avenue	A	9.7	A	9.8

[1] Source: URS (August 2015).

As shown in Table 3-3, all four study area intersections are forecast to operate at LOS A under Year 2018 Base conditions.

3.3.2.2 Roadway Analysis

The analysis described below summarizes the result of the roadway segment level of service analysis conducted for Year 2018 Base conditions. Table 3-4 displays roadway segment volume and segment LOS under Year 2018 Base conditions.

TABLE 3-4
ROADWAY SEGMENT LEVEL OF SERVICE RESULTS
YEAR 2018 BASE CONDITIONS

Roadway	Segment	Cross-section Classification	2018 No Project ADT[1]	Roadway Capacity	Truck Percent	LOS
I-10	West of Mesa Drive	4-Lane freeway	28,080	68,900	38%	C
I-10	East of SR-78	4-Lane freeway	29,700	68,900	37%	C
SR-78	South of I-10	2-Lane undivided	2,273	16,200	30%	C
16th Street	West of SR-78	2-Lane collector	126	11,700	30%	C

[1] Average Daily Traffic (ADT).

As shown in Table 3-4, all study roadway segment are forecast to operate at acceptable LOS C under Year 2018 Base conditions.

3.3.3 Year 2018 Project Construction Conditions

The traffic impact analysis is based on construction worker daily trip and construction-related truck delivery data provided by the Applicant (Desert Quartzite, LLC 2015). The traffic analysis is based on worst-case construction worker trips and truck delivery volumes which vary by construction activity and month for the assumed 25-month construction schedule. For reference, a detailed breakdown of the estimated construction worker trips and truck deliveries is presented by construction activity and month of construction in Appendix E (see Table 1, Off-site Construction Phase Trips).

During the construction phase of the proposed Project, the construction workforce is expected to peak at approximately 1,620 daily trips while the construction delivery traffic during construction is estimated to peak at 50 vehicles resulting in 300 daily trips (the trip generation assessment for the construction deliveries have been Passenger Car Equivalent adjusted for this analysis, 50 delivery vehicles multiplied 3 = 150 PCE or 300 daily trips). The Project plans to utilize groundwater from either existing local well(s) or via installation of on-site groundwater wells. The Applicant is also considering trucking water to the Project Site for at least the initial months of construction if an on-site water supply well(s) is not yet installed and functional. It is possible that trucking water to the Project Site could be required for the entire length of construction which would potentially require up to approximately 57,000 water deliveries (assuming the need for approximately 1,400 acre feet of water over the 25-month construction period and 8,000-gallon capacity water trucks). Off-site water delivery trucks, as applicable, are assumed to originate from within 10 miles of the Project site (refer to Table 1.2, Trip Distance, in Appendix E). All water deliveries to the Project site would be required by the Applicant to occur during non-peak traffic hours and, thus, would not contribute to traffic impacts on local roadways during the peak traffic periods of concern to this analysis.

Table 3-5 summarizes the peak Project construction trip generation used in the evaluation of Project construction impacts in this study. Figure 3-2 shows Year 2018 Construction Traffic Volumes and Figure 3-3 shows the Year 2018 Base with Project Construction Traffic Volumes.

TABLE 3-5
PEAK MONTH PROJECT CONSTRUCTION TRIP GENERATION

Category	Actual No. of Vehicles	Daily Trips (One-Way Trips)	AM Peak Hour Trips (7:00 – 9:00 AM)		PM Peak Hour Trips (4:00 – 6:00 PM)		Non-Peak Hour Trips	
			In	Out	In	Out	In	Out
Workers (staff and craft)[1]	810	1,620	0	0	0	810	810	0
Construction deliveries[2]	50	300[2]	30	30	0	0	120	120
Water truck deliveries[3]	109	654[3]	0	0	0	0	327	327
Total	969	2,574	30	30	0	810	1,257	447

[1] On-site Management Staff and Craft will use 810 (actual) worker vehicles resulting 1,620 daily (in/out) one-way trips during the Peak Project Construction Months in Year 2018. It is assumed that all the workers arrive at the Project site by 7:00 AM, thereby avoiding the 7:00–9:00 AM peak hour; 810 worker vehicles are assumed to depart the site at 5:00 PM during the 4:00–6:00 PM peak hour. The 810 worker vehicles estimate does not include consideration of carpooling.

[2] Construction deliveries were converted to Passenger Car Equivalent (PCE), assuming 1 Truck equals to 3 Passenger Cars. During the Peak Project Construction Month, there are 50 (actual) trucks delivering on-site each day converted to 150 PCE resulting in 300 daily (combined in/out) one-way trips. It was assumed that up to 20 percent of the deliveries (60 trips) occur during the AM peak hour and the remaining deliveries are expected to occur during non-peak traffic period (avoiding the 4:00–6:00 PM peak hour).

[3] Water truck deliveries were converted to Passenger Car Equivalent (PCE), assuming 1 Truck equals to 3 Passenger Cars. In the event that on-site groundwater is not available and trucking water to the Project site is necessary, there are an estimated 109 (actual) trucks delivering on-site each day converted to 327 PCE resulting in 654 daily (combined in/out) one-way trips. It was assumed that 100 percent of the water truck deliveries would occur during non-peak traffic periods (avoiding the 7:00–9:00 AM and 4:00–6:00 PM peak hour periods).

3.3.3.1 Intersection Analysis

Table 3-6 displays the results of intersection LOS and average delay analysis under Year 2018 Project Construction conditions. The detailed LOS calculation worksheets for the Year 2018 Project Construction conditions are provided in Appendix D.

As shown in Table 3-6, all four study area intersections are forecast to operate at LOS A during the AM peak hour under Year 2018 Project Construction conditions. During the PM peak all study intersections operate at LOS D or better with the exception of one LOS F location at SR-78 (Neighbours Boulevard) and 16th Avenue.

TABLE 3-6
PEAK HOUR INTERSECTION LEVEL OF SERVICE RESULTS YEAR 2018 PROJECT CONSTRUCTION CONDITIONS[1]

	AM Peak Hour		PM Peak Hour	
Intersection	LOS	Average Delay (sec/veh)	LOS	Average Delay (sec/veh)
SR-78 (Neighbours Blvd)/I-10 WB ramps	A	9.7	A	9.2
SR-78 (Neighbours Blvd)/I-10 EB ramps	A	9.0	B	12.8
SR-78 (Neighbours Blvd)/14th Avenue	A	9.9	D	31.9
SR-78 (Neighbours Blvd)/16th Avenue	A	9.9	F	78.2

[1] Source: URS (August 2015).

3.3.3.2 Roadway Analysis

The information presented below summarizes the result of the roadway segment level of service analysis conducted for Year 2018 Project Construction conditions. Table 3-6 displays the roadway segment volume and segment LOS under Year 2018 Project Construction conditions. As shown in Table 3-7, all study roadway segment are currently operating at acceptable LOS C under Year 2018 Base conditions.

TABLE 3-7
ROADWAY SEGMENT LEVEL OF SERVICE RESULTS YEAR 2018 PROJECT CONSTRUCTION CONDITIONS

Roadway	Segment	Cross-section Classification	2018 + Project Const. ADT[1]	Roadway Capacity	Truck Percent	LOS
I-10	West of Mesa Drive	4-Lane Freeway	28,380	68,900	38%	C
I-10	East of SR-78	4-Lane Freeway	31,164	68,900	37%	C
SR-78	South of I-10	2-Lane Undivided	4,847	16,200	30%	C
16th Street	West of SR-78	2-Lane Collector	2,700	11,700	30%	C

[1] Average Daily Traffic (ADT).

3.3.4 Year 2019 Project Operations Conditions

This section provides a discussion of Future Year 2019 traffic conditions both with and without the proposed Project operations traffic. After the construction period, the workforce for operations and maintenance (O&M) and security purposes is estimated to be 5 full time workers. During operations, potable water will be trucked into the site (one truck a week from Blythe) or on-site groundwater will be utilized, including treatment, as necessary. The O&M workforce will generate small amounts of sanitary wastewater that will be handled by an on-site septic system and leach field.

Only limited deliveries will be necessary for replacement photovoltaic modules and equipment during Project operation. When compared to construction activities, Project operations traffic will be miniscule (<2 percent of peak construction phase traffic) and would not create any significant delay or change in LOS from Year 2019 Base conditions. Based on the low anticipated employee trips (5 daily round trips) and deliveries (up to 10 daily round trips), no significant Project traffic impact is anticipated during Project operations.

3.3.5 Area Roadway Considerations

3.3.5.1 Truck Traffic Impacts to Roadway Surfaces

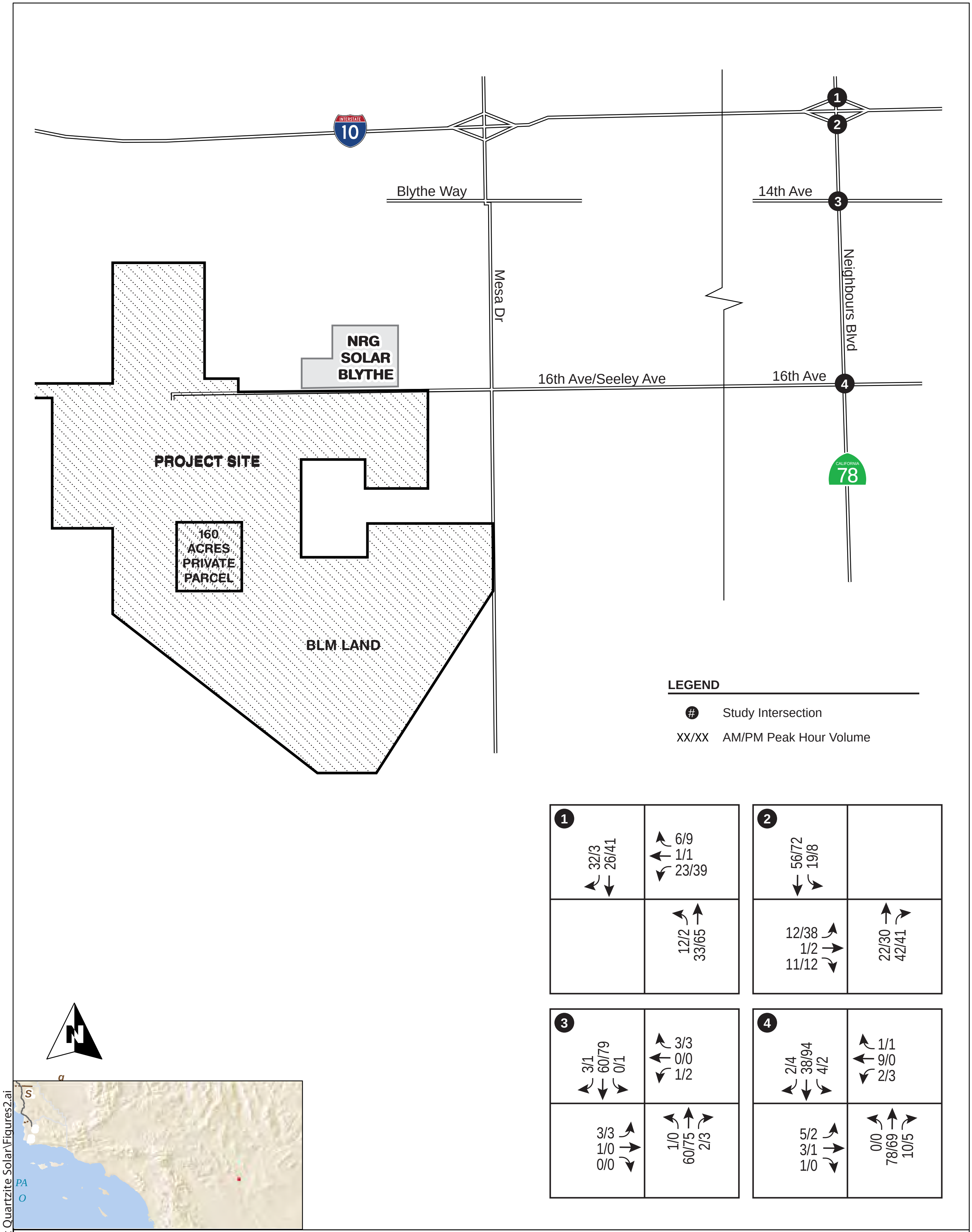
The proposed Project would involve considerable truck traffic for deliveries of materials and equipment, and water deliveries from an off-site source (if needed) over the assumed 25-month construction schedule (see Table 3-5). The proposed access route for workers and truck traffic to the Project site is primarily via I-10 to SR-78 to 16th Avenue/Seeley Avenue (see Figures 1-1 and 1-2).

As discussed in Section 2.1, I-10 is a four-lane east-west interstate highway under the jurisdiction of Caltrans. SR-78 is a two-lane State Highway. Both of these facilities were designed with the appropriate Traffic Indices (TI index) – a measure of truck loading effects over pavements, to carry interstate and interregional goods movement with substantial truck traffic and any short-term Project-related truck traffic on the applicable portions of these highways would not exceed their inherent design limits and would not be expected to result in degradation of the roadway surfaces.

The planned east-west access to the Project site from SR-78 is along 16th Avenue/Seeley Avenue which is paved along an approximate 1.5-mile section west of SR-78 and then is unpaved to the Project site. This generally 2-lane roadway west of SR-78 is under the jurisdiction of Riverside County until it reaches the eastern portion of the Project site. Prior to construction, the Applicant will coordinate with the Riverside County Transportation Department to discuss road maintenance requirements and plans to ensure that road conditions along 16th Avenue/Seeley Avenue are kept safe for Project-related traffic to traverse, including potential adverse roadway conditions following infrequent storm events in the area.

3.3.5.2 Gen-Tie Line Construction/Power Line Road

As discussed in Section 1.1, the proposed Project includes construction of an approximately 3-mile-long, 230 kilovolt gen-tie interconnection line to the SCE CRSS (refer to Figures 1-1 and 1-2). Construction of the gen-tie line will be coordinated with the BLM, SCE, and other transmission line projects in the area to ensure safe and efficient installation of the poles and conductors. The SCE CRSS is accessed by SCE from the west via Power Line Road which is paved and owned by SCE. The proposed gen-tie line will be constructed to the CRSS from the east within the gen-tie right-of-way on BLM land that is part of the proposed Project. Multiple transmission lines by others are either recently constructed, under construction, or planned within this corridor. The proposed Project does not propose to use Power Line Road for construction access. The tie-in to the CRSS will be coordinated with SCE to make sure SCE's CRSS operations are not impacted, including their use of the eastern end of Power Line Road for their access from the west. The proposed gen-tie line route and installation would not impact any public roadways to the east of the CRSS.


INTERSTATE
10
Blythe Way
14th Ave
Mesa Dr
Neighbours Blvd
NRG SOLAR BLYTHE
16th Ave/Seeley Ave
16th Ave
CALIFORNIA
78
PROJECT SITE
160 ACRES PRIVATE PARCEL
BLM LAND
1
2
3
4
LEGEND
# Study Intersection
XX/XX AM/PM Peak Hour Volume
1
32/3
26/41
6/9
1/1
23/39
12/2
33/65
2
56/72
19/8
12/38
1/2
11/12
22/30
42/41
3
3/1
60/79
0/1
3/3
0/0
1/2
3/3
1/0
0/0
1/0
60/75
2/3
4
2/4
38/94
4/2
1/1
9/0
2/3
5/2
3/1
1/0
0/0
78/69
10/5
N
S
PA
O

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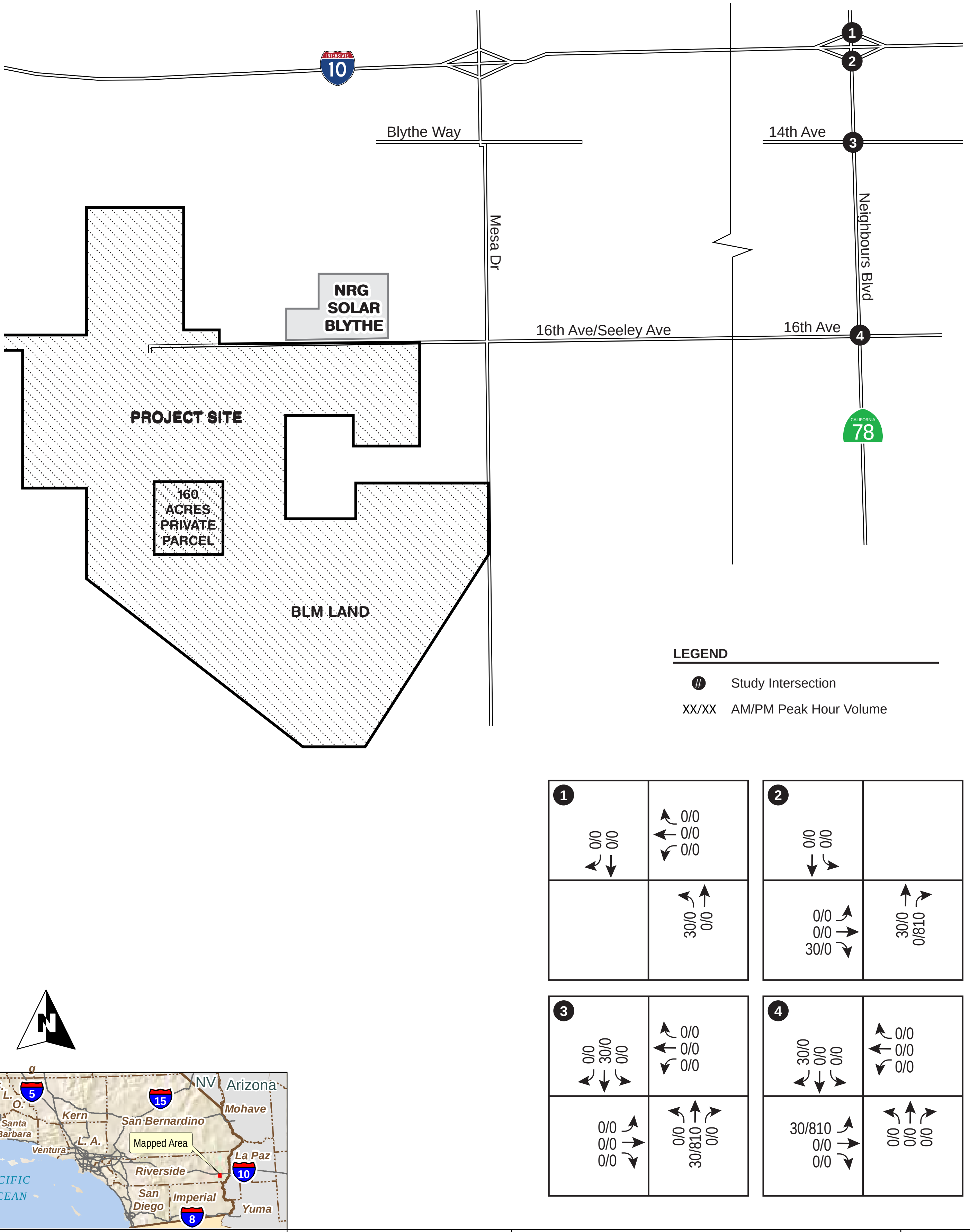
Blythe Way
14th Ave
Mesa Dr
Neighbours Blvd
16th Ave/Seeley Ave
16th Ave
INTERSTATE 10
CALIFORNIA 78
1
2
3
4
NRG SOLAR BLYTHE
PROJECT SITE
160 ACRES PRIVATE PARCEL
BLM LAND
LEGEND
# Study Intersection
XX/XX AM/PM Peak Hour Volume
1
0/0
0/0
0/0
0/0
0/0
30/0
0/0
2
0/0
0/0
0/0
0/0
30/0
30/0
0/810
3
0/0
30/0
0/0
0/0
0/0
0/0
0/0
0/0
0/0
0/0
30/810
0/0
4
30/0
0/0
0/0
0/0
0/0
0/0
30/810
0/0
0/0
0/0
0/0
0/0
N
S. L. O.
Santa Barbara
Kern
Ventura
L. A.
San Bernardino
Riverside
San Diego
Imperial
Mohave
La Paz
Yuma
NV
Arizona
PACIFIC OCEAN
Mapped Area
5
15
10
8

Traffic Impact Analysis
Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

Figure 3-2. Year 2018 Construction Added Traffic Volumes

2015

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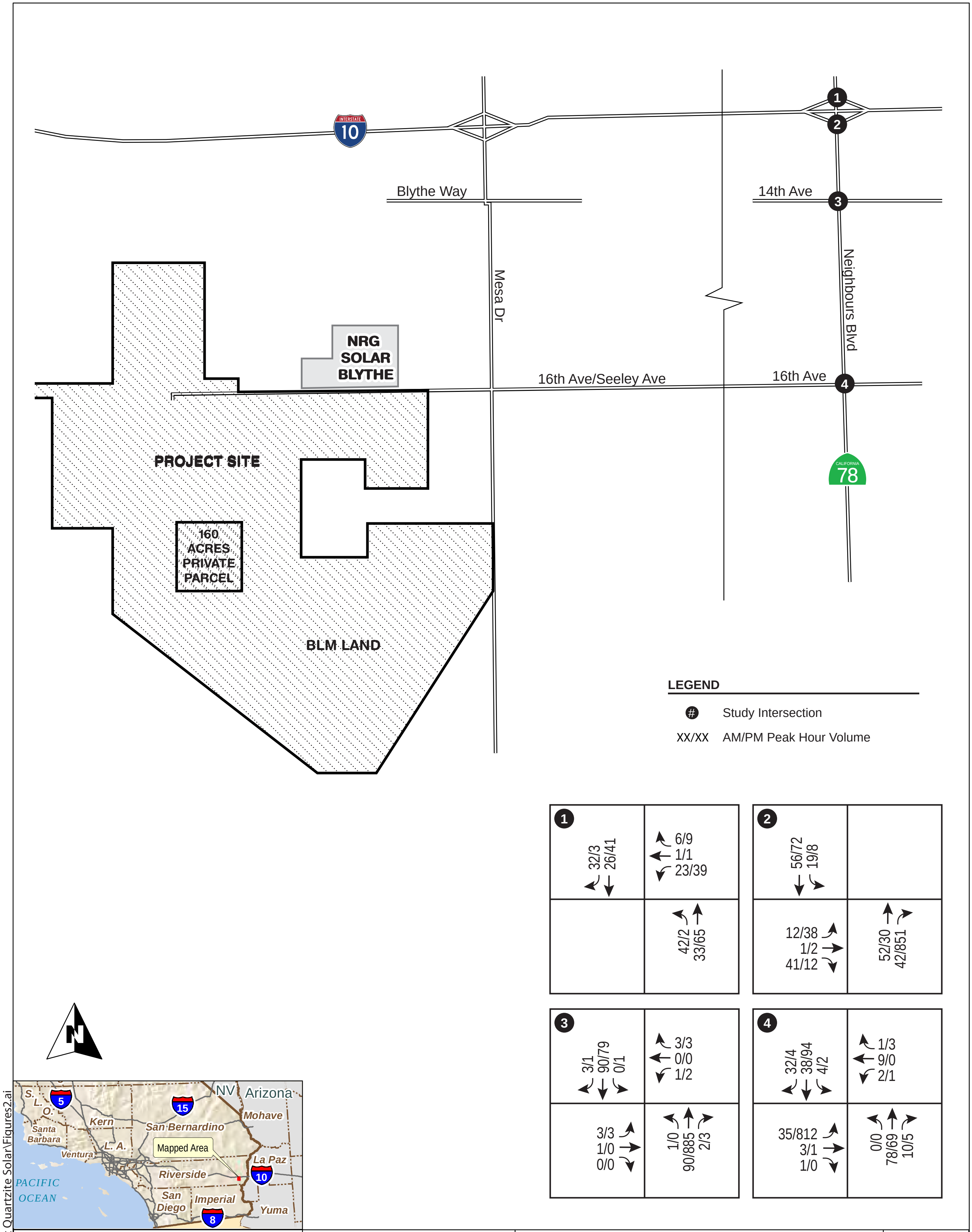
INTERSTATE 10
Blythe Way
14th Ave
1
2
3
Mesa Dr
Neighbours Blvd
NRG SOLAR BLYTHE
16th Ave/Seeley Ave
16th Ave
4
CALIFORNIA 78
PROJECT SITE
160 ACRES PRIVATE PARCEL
BLM LAND
LEGEND
# Study Intersection
XX/XX AM/PM Peak Hour Volume
1
32/3
26/41
6/9
1/1
23/39
42/2
33/65
2
56/72
19/8
12/38
1/2
41/12
52/30
42/851
3
3/1
90/79
0/1
3/3
0/0
1/2
3/3
1/0
0/0
1/0
90/885
2/3
4
32/4
38/94
4/2
1/3
9/0
2/1
35/812
3/1
1/0
0/0
78/69
10/5
N
S. L. O.
Santa Barbara
Kern
5
15
NV
Arizona
Mohave
San Bernardino
L. A.
Ventura
Mapped Area
La Paz
10
Riverside
PACIFIC OCEAN
San Diego
Imperial
8
Yuma

Traffic Impact Analysis
Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

Figure 3-3. Year 2018 Base with Project Construction Traffic Volumes

2015

SECTION 4.0
APPLICANT RECOMMENDED MITIGATION MEASURES

4.1 MITIGATION MEASURES

During Project construction, no study roadway segments will be significantly impacted by the Project. Some study intersections will experience short-term increases in traffic during the peak construction period and only one study intersection SR-78 (Neighbours Blvd.)/16th Avenue will be significantly impacted by the Project. The study roadways and intersections will return to pre-project operating conditions upon completion of Project construction.

During Project operations, no study roadway segments or intersections will be significantly impacted by the Project as discussed in Section 3.3.4. The following proposed mitigation measures are offered pro-actively to address Project-related traffic contribution to the roadway network during the construction phase.

4.1.1 TRA-1 Worker Vehicle Reduction (Project Construction – PM Peak Hour)

The Applicant will limit PM construction worker vehicles leaving the Project site between 4:00 PM to 6:00 PM to 650 vehicles resulting in LOS D, and thereby reducing the PM peak hour construction impact that would be caused by up to 810 construction worker vehicles leaving the Project site between 4 to 6 PM during the peak construction period to less than significant. The following measures will be implemented to limit the number of worker vehicles leaving the site during this timeframe to no more than 650. For reference, the maximum 650 construction worker vehicle threshold during the PM peak period for the intersection of SR-78/16th Avenue was derived through an iterative analysis (refer to Appendix F for LOS calculation worksheet).

The Applicant proposes to monitor and enforce construction traffic limits to avoid and minimize construction traffic impacts. In order to ensure that Project-related traffic levels do not exceed 650 passenger vehicles (or passenger car equivalent [PCE] considering one truck or bus is equivalent to 3 PCEs) departing the construction site during the PM peak traffic period of 4 to 6 PM, the Applicant will perform self-monitoring.

Available traffic count and monitoring technology will be used to ensure construction traffic limits are met and will be performed and logged using one or more of the following methods:

- Automatic Counts (Tube Counters, Radar Counters, Machine Vision)
- Video Recording with Manual Counting in the Office
- Manual Counts at the gate/entry point

The monitoring will be conducted during the peak construction months only when the traffic limits are needed. Assuming a 25-month construction period, the peak construction workforce months are currently anticipated to occur in the latter parts of the overall construction phase (e.g., Months 17-21) (refer to Appendix E for details). In the event that the 650 passenger vehicle limit is exceeded during the PM peak period of 4 to 6 PM, the Applicant will implement and document one or more of the following traffic reduction measures to reduce the PM peak traffic to at or below the 650 passenger vehicle equivalent limit:

- Enforce mandatory carpooling at the level needed to achieve the needed reduction in traffic
- Arrange for busing to and from the site for the needed number of employees to get below the 650 vehicle limit

Based on the Applicant’s experience on other similar projects, workers will voluntarily carpool and thereby help reduce the likelihood that the 650 vehicle limit would be exceeded during the peak construction period. In the event that the 650 vehicle limit is found to be exceeded, the Applicant will further evaluate carpool options and/or busing. Although not anticipated, if necessary, off-site busing locations will be identified at that time.

The traffic level monitoring will be logged on a daily basis during the applicable peak construction periods to document that the traffic level threshold of 650 passenger equivalent vehicles is not being exceeded. In the event that the threshold is exceeded, remedial traffic volume reduction measures will be implemented and documented. The Applicant will self-monitor, implement any remedial actions necessary, and report the results to the BLM and Riverside County, as appropriate.

4.1.2 TRA-3 Traffic and Monitoring Control Plan

The Applicant will develop and implement a standard traffic and monitoring control plan consistent with the size and scope of the project construction activity designed to minimize impact to traffic flow.

Proposed measures where applicable include, but are not limited to, the following:

1. Use proper signs and traffic control measures in accordance with Caltrans and Riverside County requirements. All traffic signs, equipment, and control measures shall conform to the provisions specified in the Caltrans Manual of Uniform Traffic Control Device. Specific jurisdictional requirements will be identified during the plan review and approval process.
2. Schedule traffic lane or road closures during off-peak hours whenever possible (e.g., during construction at road crossings, culverts or any Project activity that may encroach

in the traveled way). No traffic lane or off-site road closures are currently planned associated with the proposed Project.

3. Limit vehicular traffic to designated access roads, construction laydown and worker parking areas, and the Project construction site.
4. Provide orientation and briefing to employees and contractors on the desired construction route.
5. Encourage worker carpooling to minimize drive-alone worker trips.

Prior to construction, the Applicant will coordinate with the Riverside County Transportation Department to discuss road maintenance requirements and plans to ensure that road conditions along 16th Avenue/Seeley Avenue are kept safe for Project-related traffic to traverse, including potential adverse roadway conditions following infrequent storm events in the area.

SECTION 5.0
REFERENCES

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SECTION 6.0
LIST OF PREPARERS

The following staff assisted in the preparation of this document:

- Noel Casil, PE, TE, PTOE
- Sabrina Ventresca

APPENDIX A
TRAFFIC COUNTS

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

SR-78 (Neighbours Blvd) and I-10 WB Ramps , City of Blythe

Date: 7/27/2011

Day: Wednesday

Project #: CA11_6069_002

AM Peak Hour	715 AM
NOON Peak Hour	
PM Peak Hour	400 PM

SR-78 (Neighbours Blvd)

I-10 WB Ramps

Peak Hour Summary

Southbound Approach

Lanes	1	1	0		
	↲	↓	↳	⇧	
AM	28	23	0	35	AM
NOON	0	0	0	0	NOON
PM	3	36	0	65	PM

Eastbound Approach

	AM	NOON	PM
⇦	39	0	6

Lanes	AM	NOON	PM	
0	0	0	0	⤴
0	0	0	0	→
0	0	0	0	⤵

CONTROL

1-Way Stop (WB)

Westbound Approach

	AM	NOON	PM	Lanes
↰	6	0	8	1
←	1	0	1	1
↙	20	0	34	0

	AM	NOON	PM
⇨	0	0	0

Northbound Approach

	⇩	↰	↑	↱	
AM	43	10	29	0	AM
NOON	0	0	0	0	NOON
PM	70	2	57	0	PM
		0	1	0	Lanes

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

	⇩	⇧
AM	51	35
NOON	0	0
PM	39	65

West Leg

	AM	NOON	PM
⇦	39	0	6
⇨	0	0	0

East Leg

	AM	NOON	PM
⇦	27	0	43
⇨	0	0	0

South Leg

	⇩	⇧
AM	43	39
NOON	0	0
PM	70	59

Total Volume Per Leg

North Leg

AM	86
NOON	0
PM	104

West Leg

AM	NOON	PM
39	0	6

East Leg

AM	NOON	PM
27	0	43

South Leg

AM	82
NOON	0
PM	129

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

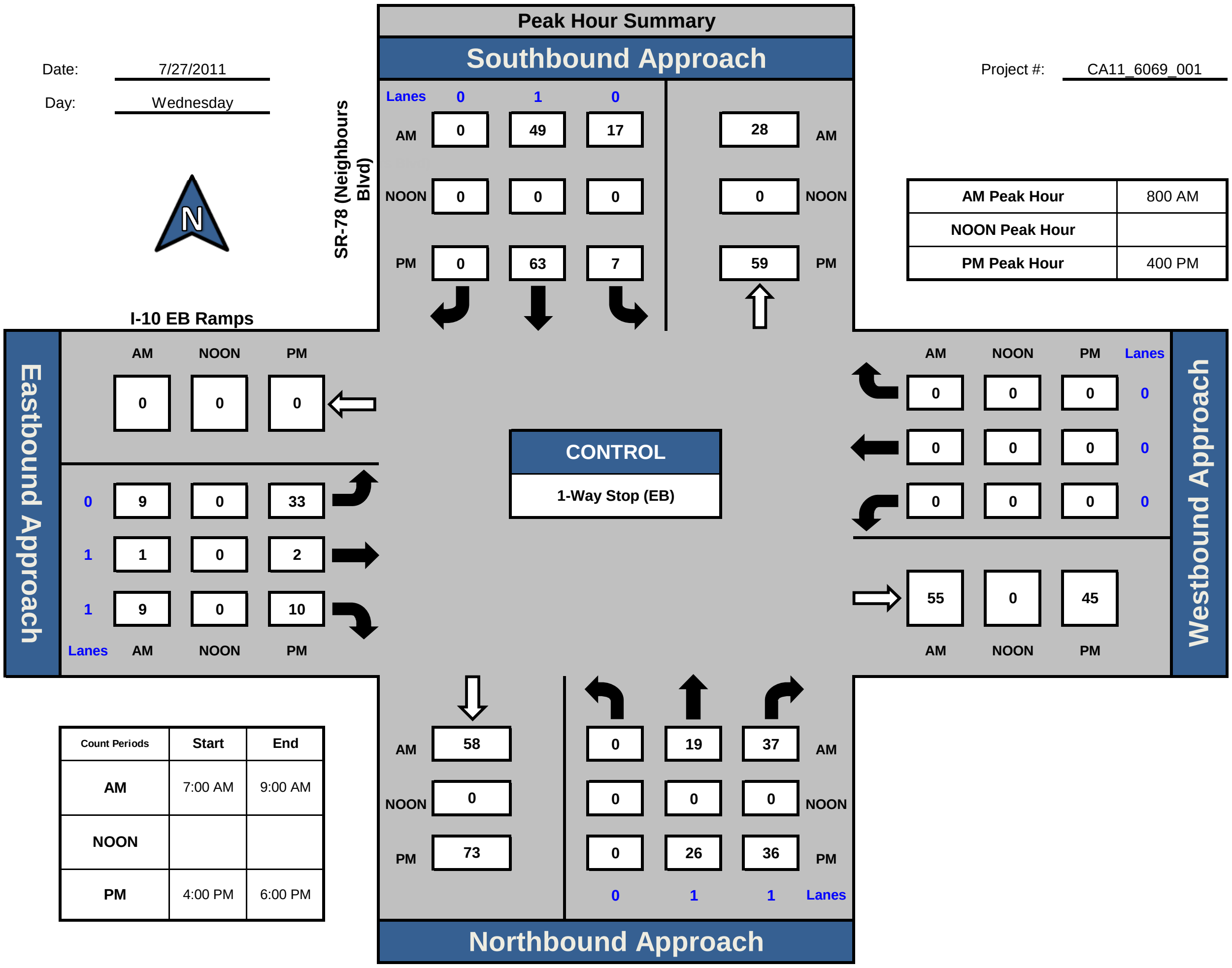
SR-78 (Neighbours Blvd) and I-10 EB Ramps , City of Blythe

Date: 7/27/2011

Day: Wednesday

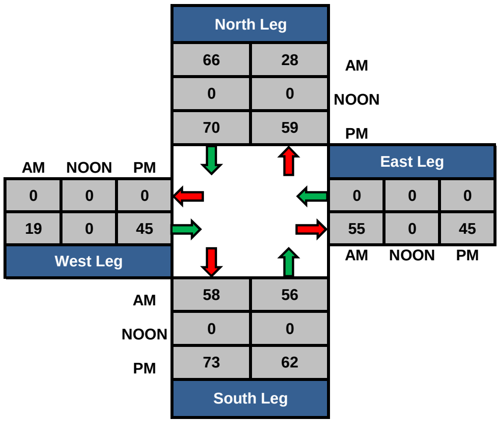
Project #: CA11_6069_001

AM Peak Hour	800 AM
NOON Peak Hour	
PM Peak Hour	400 PM

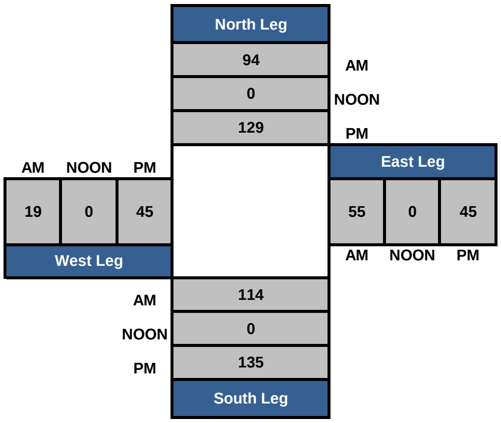

Peak Hour Summary
Southbound Approach
SR-78 (Neighbours Blvd)
N
Lanes 0 1 0
AM 0 49 17 28 AM
NOON 0 0 0 0 NOON
PM 0 63 7 59 PM
I-10 EB Ramps
Eastbound Approach
AM NOON PM
0 0 0
0 9 0 33
1 1 0 2
1 9 0 10
Lanes AM NOON PM
CONTROL
1-Way Stop (EB)
AM NOON PM Lanes
0 0 0 0
0 0 0 0
0 0 0 0
55 0 45
AM NOON PM
Westbound Approach
AM 58 0 19 37 AM
NOON 0 0 0 0 NOON
PM 73 0 26 36 PM
0 1 1 Lanes
Northbound Approach

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs


North Leg
66 28 AM
0 0 NOON
70 59 PM
AM NOON PM
0 0 0
19 0 45
West Leg
East Leg
0 0 0
55 0 45
AM NOON PM
AM 58 56
NOON 0 0
PM 73 62
South Leg

Total Volume Per Leg


North Leg
94 AM
0 NOON
129 PM
AM NOON PM
19 0 45
West Leg
East Leg
55 0 45
AM NOON PM
AM 114
NOON 0
PM 135
South Leg

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

SR-78 and 14th Ave , Blythe

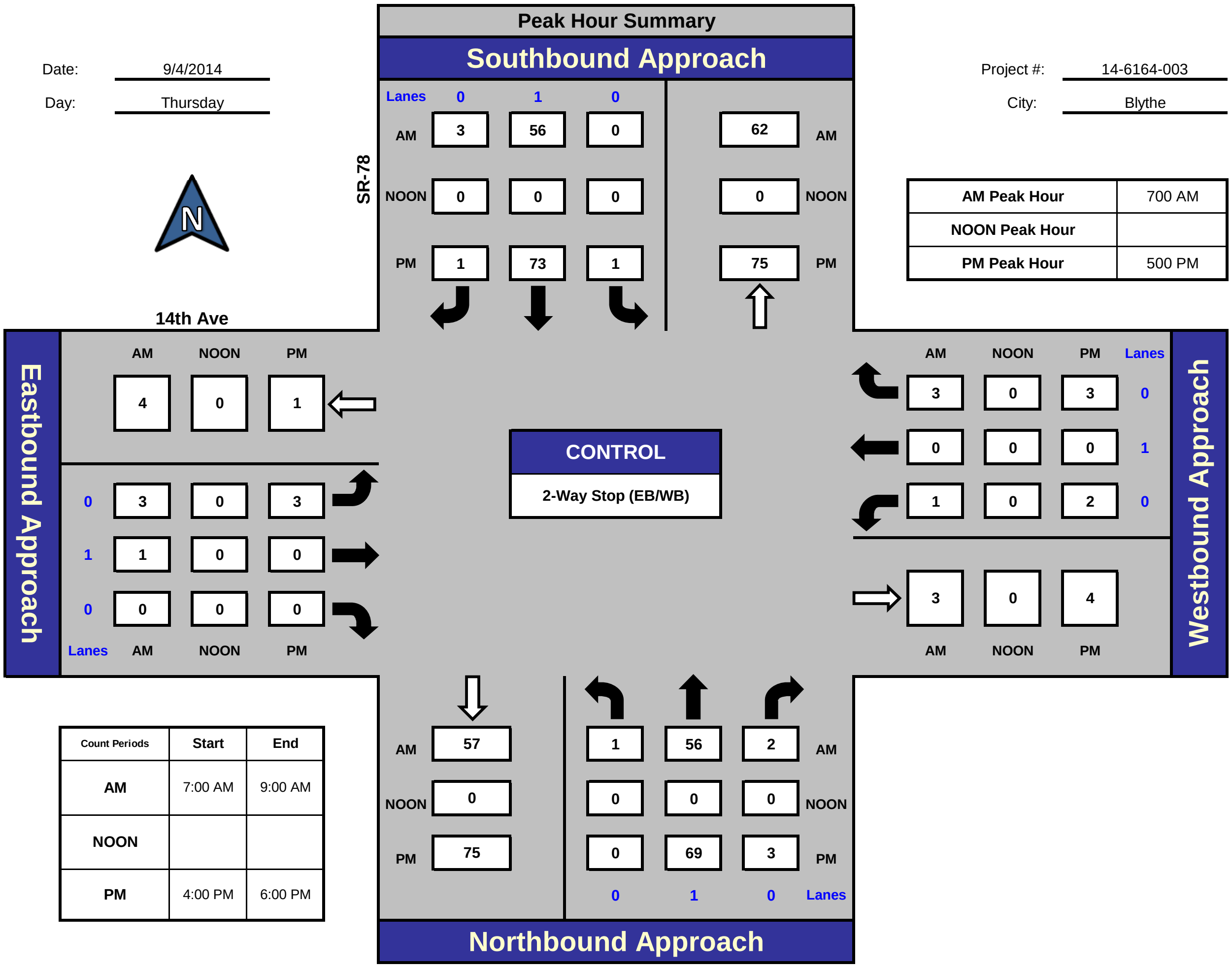
Date: 9/4/2014

Day: Thursday

Project #: 14-6164-003

City: Blythe

AM Peak Hour	700 AM
NOON Peak Hour	
PM Peak Hour	500 PM



Peak Hour Summary

Southbound Approach

	↲	↓	↳	⇧
Lanes	0	1	0	
AM	3	56	0	62
NOON	0	0	0	0
PM	1	73	1	75

Eastbound Approach

	Lanes	AM	NOON	PM
⇦		4	0	1
↱	0	3	0	3
→	1	1	0	0
↴	0	0	0	0

Westbound Approach

	AM	NOON	PM	Lanes
↰	3	0	3	0
←	0	0	0	1
↙	1	0	2	0
⇨	3	0	4	

CONTROL

2-Way Stop (EB/WB)

Northbound Approach

	⇩	↰	↑	↱
AM	57	1	56	2
NOON	0	0	0	0
PM	75	0	69	3
Lanes		0	1	0

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

	↓	↑
AM	59	62
NOON	0	0
PM	75	75

East Leg

	AM	NOON	PM
←	4	0	5
→	3	0	4

West Leg

	AM	NOON	PM
←	4	0	1
→	4	0	3

South Leg

	↓	↑
AM	57	59
NOON	0	0
PM	75	72

Total Volume Per Leg

North Leg

AM	121
NOON	0
PM	150

East Leg

AM	NOON	PM
7	0	9

West Leg

AM	NOON	PM
8	0	4

South Leg

AM	116
NOON	0
PM	147

ITM Peak Hour Summary

Prepared by:

NDS

National Data & Surveying Services

SR-78 and 16th Ave , Blythe

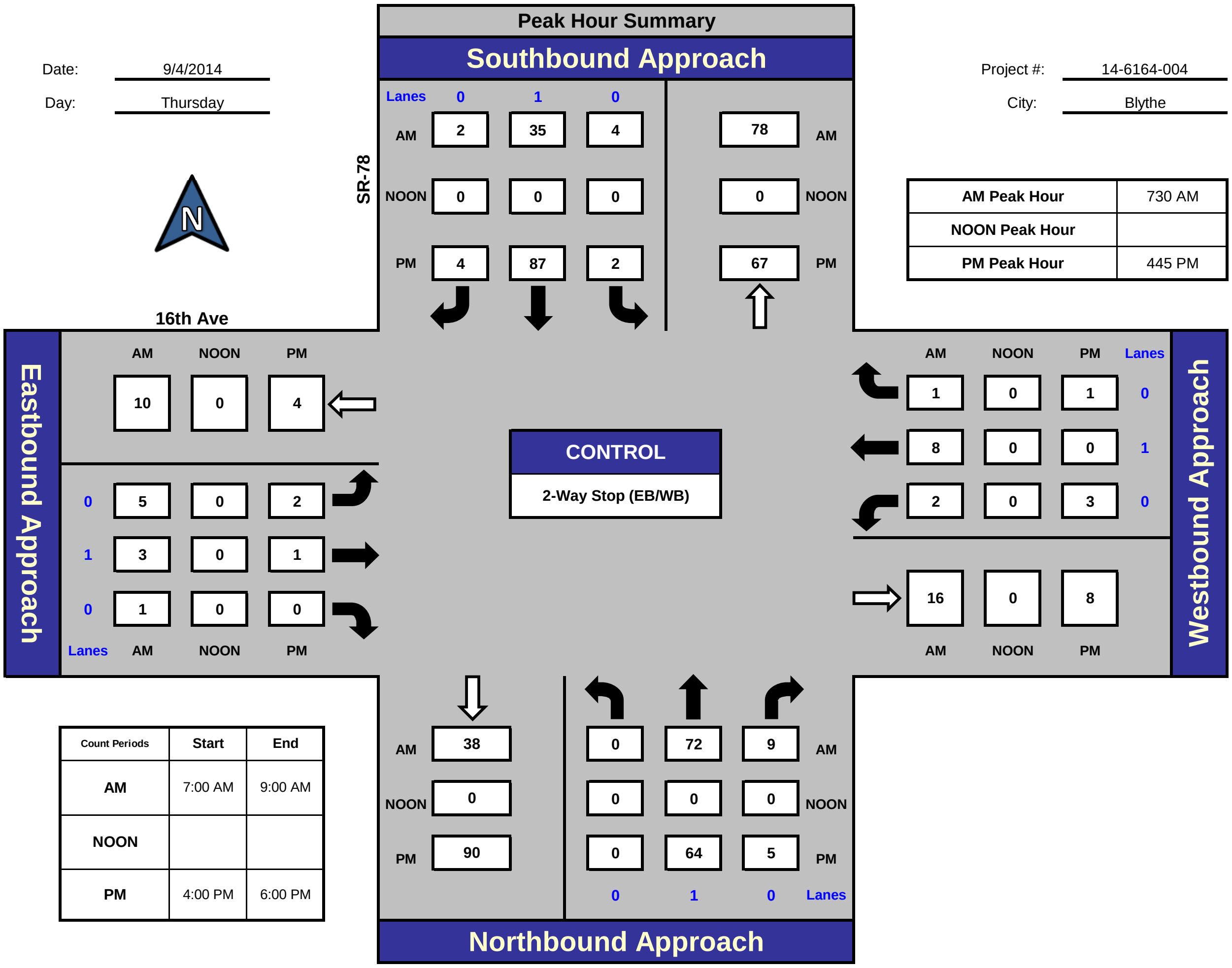
Date: 9/4/2014

Day: Thursday

Project #: 14-6164-004

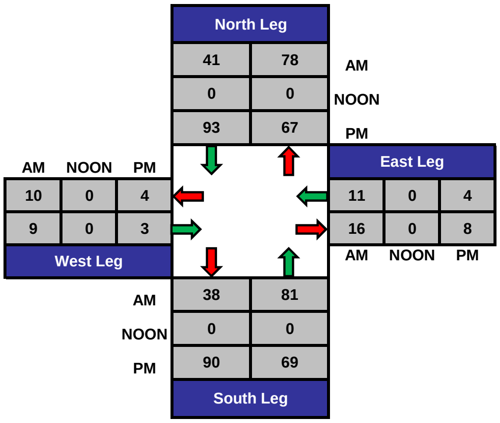
City: Blythe

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	445 PM

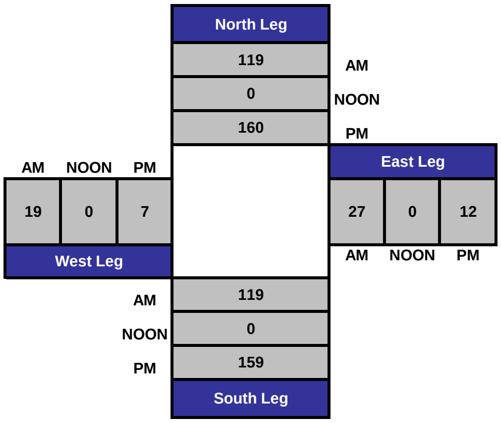

Peak Hour Summary
Southbound Approach
SR-78
Lanes 0 1 0
AM 2 35 4
NOON 0 0 0
PM 4 87 2
78 AM
0 NOON
67 PM
N
16th Ave
Eastbound Approach
AM NOON PM
10 0 4
0 5 0 2
1 3 0 1
0 1 0 0
Lanes AM NOON PM
CONTROL
2-Way Stop (EB/WB)
Westbound Approach
AM NOON PM Lanes
1 0 1 0
8 0 0 1
2 0 3 0
16 0 8
AM NOON PM
Northbound Approach
AM 38
NOON 0
PM 90
0 72 9 AM
0 0 0 NOON
0 64 5 PM
0 1 0 Lanes

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs


North Leg
41 78 AM
0 0 NOON
93 67 PM
East Leg
11 0 4
16 0 8
AM NOON PM
AM NOON PM
10 0 4
9 0 3
West Leg
AM 38 81
NOON 0 0
PM 90 69
South Leg

Total Volume Per Leg


North Leg
119 AM
0 NOON
160 PM
East Leg
27 0 12
AM NOON PM
AM NOON PM
19 0 7
West Leg
AM 119
NOON 0
PM 159
South Leg

Prepared by National Data & Surveying Services

CLASSIFICATION

SR-78 s/o I-10

Day: Thursday
Date: 9/4/2014

City: Blythe
Project #: CA14_6165_001n

North Bound

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
00:00 AM	1	2	3	0	1	0	0	0	0	0	1	0	0	**8**
01:00	0	1	0	0	1	0	0	0	1	0	1	0	0	**4**
02:00	0	2	2	0	0	0	0	0	1	0	0	0	0	**5**
03:00	0	5	0	0	0	0	0	0	1	0	3	0	0	**9**
04:00	0	7	2	0	2	0	0	0	0	0	0	0	0	**11**
05:00	1	26	9	1	3	0	0	2	0	0	0	0	0	**42**
06:00	0	21	9	0	9	0	0	0	5	0	2	0	0	**46**
07:00	1	32	12	4	10	2	0	2	3	0	0	0	0	**66**
08:00	0	32	11	0	6	0	0	3	3	0	0	0	0	**55**
09:00	0	34	14	0	8	1	0	1	7	0	0	0	0	**65**
10:00	0	38	8	0	10	0	0	1	8	0	0	0	0	**65**
11:00	0	46	14	4	10	1	0	1	2	0	2	0	0	**80**
12:00 PM	0	25	14	0	12	1	0	0	4	0	1	0	0	**57**
13:00	0	22	10	2	6	0	0	1	5	0	0	0	0	**46**
14:00	1	41	12	0	13	0	0	0	4	0	1	0	0	**72**
15:00	1	35	9	3	6	0	0	0	2	0	2	0	0	**58**
16:00	0	29	7	0	7	0	0	1	3	0	3	0	0	**50**
17:00	1	43	8	0	12	0	0	0	6	0	1	0	0	**71**
18:00	0	36	12	0	6	0	0	1	3	0	1	0	0	**59**
19:00	0	23	2	0	10	0	0	0	3	0	1	0	0	**39**
20:00	0	21	5	0	8	0	0	0	2	0	0	0	0	**36**
21:00	0	13	0	0	1	2	0	1	1	0	0	0	0	**18**
22:00	0	8	3	0	3	0	0	0	4	0	2	0	0	**20**
23:00	0	11	1	0	2	0	0	0	1	0	2	0	0	**17**
Totals	**6**	**553**	**167**	**14**	**146**	**7**		**14**	**69**		**23**			**999**
% of Totals	1%	55%	17%	1%	15%	1%		1%	7%		2%			100%

AM Volumes	3	246	84	9	60	4	0	10	31	0	9	0	0	456
% AM	0%	25%	8%	1%	6%	0%		1%	3%		1%			46%
AM Peak Hour		11:00	09:00	07:00	07:00	07:00		08:00	10:00		03:00			11:00
Volume	1	46	14	4	10	2		3	8		3			80
PM Volumes	3	307	83	5	86	3	0	4	38	0	14	0	0	543
% PM	0%	31%	8%	1%	9%	0%		0%	4%		1%			54%
PM Peak Hour	14:00	17:00	12:00	15:00	14:00	21:00		13:00	17:00		16:00			14:00
Volume	1	43	14	3	13	2		1	6		3			72

Directional Peak Periods	**AM 7-9**			**NOON 12-2**			**PM 4-6**			**Off Peak Volumes**		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	121	⟷	12%	103	⟷	10%	121	⟷	12%	654	⟷	65%

Classification Definitions

1 Motorcycles
2 Passenger Cars
3 2-Axle, 4-Tire Single Units
4 Buses
5 2-Axle, 6-Tire Single Units
6 3-Axle Single Units
7 > =4-Axle Single Units
8 <=4-Axle Single Trailers
9 5-Axle Single Trailers
10 >=6-Axle Single Trailers
11 <=5-Axle Multi-Trailers
12 6-Axle Multi-Trailers
13 >=7-Axle Multi-Trailers

Prepared by National Data & Surveying Services

CLASSIFICATION

SR-78 s/o I-10

Day: Thursday
Date: 9/4/2014

City: Blythe
Project #: CA14_6165_001s

South Bound

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
00:00 AM	0	3	1	1	1	0	0	0	5	0	1	0	0	**12**
01:00	0	3	1	0	1	0	0	0	0	0	2	0	0	**7**
02:00	0	1	1	0	0	0	0	0	3	0	1	0	0	**6**
03:00	0	0	0	0	2	0	0	0	1	0	1	0	0	**4**
04:00	0	3	2	0	0	0	0	0	6	0	1	0	0	**12**
05:00	0	22	4	1	6	0	0	0	2	0	3	0	0	**38**
06:00	0	21	7	1	9	0	0	2	6	0	1	0	0	**47**
07:00	0	19	10	2	12	1	0	0	7	0	1	0	0	**52**
08:00	1	18	11	0	11	0	0	4	9	0	0	0	0	**54**
09:00	0	26	7	0	4	0	0	1	8	0	2	0	0	**48**
10:00	0	29	13	1	10	1	0	0	9	0	4	0	0	**67**
11:00	0	20	14	3	11	0	0	0	14	0	2	0	0	**64**
12:00 PM	0	42	14	0	18	0	0	1	10	0	4	0	0	**89**
13:00	0	36	10	2	8	0	0	2	7	0	2	0	0	**67**
14:00	1	38	10	3	10	0	0	1	4	0	5	0	0	**72**
15:00	1	48	6	2	15	0	0	6	10	0	3	0	0	**91**
16:00	0	41	8	1	14	0	0	0	10	0	0	0	0	**74**
17:00	0	49	9	0	9	0	0	2	8	0	0	0	0	**77**
18:00	0	33	6	0	2	0	0	2	6	0	1	0	0	**50**
19:00	1	27	2	0	2	1	0	1	7	0	1	0	0	**42**
20:00	0	23	9	0	3	0	0	0	6	0	0	0	0	**41**
21:00	1	14	3	1	4	0	0	1	5	0	0	0	0	**29**
22:00	0	25	3	2	8	0	0	0	1	0	0	0	0	**39**
23:00	0	7	3	0	10	0	0	0	1	0	3	0	0	**24**
Totals	**5**	**548**	**154**	**20**	**170**	**3**		**23**	**145**		**38**			**1106**
% of Totals	0%	50%	14%	2%	15%	0%		2%	13%		3%			100%

	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
AM Volumes	1	165	71	9	67	2	0	7	70	0	19	0	0	411
% AM	0%	15%	6%	1%	6%	0%		1%	6%		2%			37%
AM Peak Hour	08:00	10:00	11:00	11:00	07:00	07:00		08:00	11:00		10:00			10:00
Volume	1	29	14	3	12	1		4	14		4			67
PM Volumes	4	383	83	11	103	1	0	16	75	0	19	0	0	695
% PM	0%	35%	8%	1%	9%	0%		1%	7%		2%			63%
PM Peak Hour	14:00	17:00	12:00	14:00	12:00	19:00		15:00	12:00		14:00			15:00
Volume	1	49	14	3	18	1		6	10		5			91

Directional Peak Periods	**AM 7-9**			**NOON 12-2**			**PM 4-6**			**Off Peak Volumes**		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	106	↔	10%	156	↔	14%	151	↔	14%	693	↔	63%

Classification Definitions

1 Motorcycles	**4** Buses	**7** > =4-Axle Single Units	**10** >=6-Axle Single Trailers	**13** >=7-Axle Multi-Trailers
2 Passenger Cars	**5** 2-Axle, 6-Tire Single Units	**8** <=4-Axle Single Trailers	**11** <=5-Axle Multi-Trailers	
3 2-Axle, 4-Tire Single Units	**6** 3-Axle Single Units	**9** 5-Axle Single Trailers	**12** 6-Axle Multi-Trailers	

Prepared by National Data & Surveying Services

CLASSIFICATION

SR-78 s/o I-10

Day: Thursday
Date: 9/4/2014

City: Blythe
Project #: CA14_6165_001

Summary

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
00:00 AM	1	5	4	1	2	0	0	0	5	0	2	0	0	**20**
01:00	0	4	1	0	2	0	0	0	1	0	3	0	0	**11**
02:00	0	3	3	0	0	0	0	0	4	0	1	0	0	**11**
03:00	0	5	0	0	2	0	0	0	2	0	4	0	0	**13**
04:00	0	10	4	0	2	0	0	0	6	0	1	0	0	**23**
05:00	1	48	13	2	9	0	0	2	2	0	3	0	0	**80**
06:00	0	42	16	1	18	0	0	2	11	0	3	0	0	**93**
07:00	1	51	22	6	22	3	0	2	10	0	1	0	0	**118**
08:00	1	50	22	0	17	0	0	7	12	0	0	0	0	**109**
09:00	0	60	21	0	12	1	0	2	15	0	2	0	0	**113**
10:00	0	67	21	1	20	1	0	1	17	0	4	0	0	**132**
11:00	0	66	28	7	21	1	0	1	16	0	4	0	0	**144**
12:00 PM	0	67	28	0	30	1	0	1	14	0	5	0	0	**146**
13:00	0	58	20	4	14	0	0	3	12	0	2	0	0	**113**
14:00	2	79	22	3	23	0	0	1	8	0	6	0	0	**144**
15:00	2	83	15	5	21	0	0	6	12	0	5	0	0	**149**
16:00	0	70	15	1	21	0	0	1	13	0	3	0	0	**124**
17:00	1	92	17	0	21	0	0	2	14	0	1	0	0	**148**
18:00	0	69	18	0	8	0	0	3	9	0	2	0	0	**109**
19:00	1	50	4	0	12	1	0	1	10	0	2	0	0	**81**
20:00	0	44	14	0	11	0	0	0	8	0	0	0	0	**77**
21:00	1	27	3	1	5	2	0	2	6	0	0	0	0	**47**
22:00	0	33	6	2	11	0	0	0	5	0	2	0	0	**59**
23:00	0	18	4	0	12	0	0	0	2	0	5	0	0	**41**
Totals	**11**	**1101**	**321**	**34**	**316**	**10**		**37**	**214**		**61**			**2105**
% of Totals	1%	52%	15%	2%	15%	0%		2%	10%		3%			100%

AM Volumes	4	411	155	18	127	6	0	17	101	0	28	0	0	867
% AM	0%	20%	7%	1%	6%	0%		1%	5%		1%			41%
AM Peak Hour		10:00	11:00	11:00	07:00	07:00		08:00	10:00		03:00			11:00
Volume	1	67	28	7	22	3		7	17		4			144
PM Volumes	7	690	166	16	189	4	0	20	113	0	33	0	0	1238
% PM	0%	33%	8%	1%	9%	0%		1%	5%		2%			59%
PM Peak Hour	14:00	17:00	12:00	15:00	12:00	21:00		15:00	12:00		14:00			15:00
Volume	2	92	28	5	30	2		6	14		6			149

Directional Peak Periods	**AM 7-9**			**NOON 12-2**			**PM 4-6**			**Off Peak Volumes**		
All Classes	Volume	⟷	%	Volume	⟷	%	Volume	⟷	%	Volume	⟷	%
	227		11%	259		12%	272		13%	1347		64%

Classification Definitions

1 Motorcycles	**4** Buses	**7** > =4-Axle Single Units	**10** >=6-Axle Single Trailers	**13** >=7-Axle Multi-Trailers
2 Passenger Cars	**5** 2-Axle, 6-Tire Single Units	**8** <=4-Axle Single Trailers	**11** <=5-Axle Multi-Trailers	
3 2-Axle, 4-Tire Single Units	**6** 3-Axle Single Units	**9** 5-Axle Single Trailers	**12** 6-Axle Multi-Trailers	

Prepared by National Data & Surveying Services

CLASSIFICATION

16th St w/o SR-78

Day: Thursday
Date: 9/4/2014

City: Blythe
Project #: CA14_6165_002e

East Bound

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
00:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
01:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
02:00	0	2	0	0	0	0	0	0	0	0	0	0	0	**2**
03:00	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
06:00	0	1	0	1	1	0	0	0	0	0	0	0	0	**3**
07:00	0	5	1	0	3	0	0	0	0	0	0	0	0	**9**
08:00	0	1	1	1	2	0	0	0	0	0	0	0	0	**5**
09:00	0	3	0	2	0	0	0	0	0	0	0	0	0	**5**
10:00	1	0	0	0	1	0	0	0	0	0	0	0	0	**2**
11:00	0	0	1	0	1	1	0	0	0	0	0	0	0	**3**
12:00 PM	1	1	1	0	1	0	0	0	0	0	0	0	0	**4**
13:00	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
14:00	0	1	1	0	1	0	0	0	0	0	0	0	0	**3**
15:00	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
16:00	0	2	0	0	1	0	0	0	0	0	0	0	0	**3**
17:00	0	3	0	0	1	0	0	0	0	0	0	0	0	**4**
18:00	0	1	1	1	0	0	0	0	0	0	0	0	0	**3**
19:00	0	2	0	0	1	0	0	0	0	0	0	0	0	**3**
20:00	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
21:00	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
22:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Totals	**2**	**25**	**7**	**5**	**14**	**1**								**54**
% of Totals	4%	46%	13%	9%	26%	2%								100%

AM Volumes	1	12	3	4	9	1	0	0	0	0	0	0	0	30
% AM	2%	22%	6%	7%	17%	2%								56%
AM Peak Hour	10:00	07:00	07:00	09:00	07:00	11:00								07:00
Volume	1	5	1	2	3	1								9
PM Volumes	1	13	4	1	5	0	0	0	0	0	0	0	0	24
% PM	2%	24%	7%	2%	9%									44%
PM Peak Hour	12:00	17:00	12:00	18:00	12:00									12:00
Volume	1	3	1	1	1									4

Directional Peak Periods	**AM 7-9**			**NOON 12-2**			**PM 4-6**			**Off Peak Volumes**		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	14	⟷	26%	5	⟷	9%	7	⟷	13%	28	⟷	52%

Classification Definitions

1	Motorcycles	**4**	Buses	**7**	> =4-Axle Single Units	**10**	>=6-Axle Single Trailers	**13**	>=7-Axle Multi-Trailers
2	Passenger Cars	**5**	2-Axle, 6-Tire Single Units	**8**	<=4-Axle Single Trailers	**11**	<=5-Axle Multi-Trailers		
3	2-Axle, 4-Tire Single Units	**6**	3-Axle Single Units	**9**	5-Axle Single Trailers	**12**	6-Axle Multi-Trailers		

Prepared by National Data & Surveying Services

CLASSIFICATION

16th St w/o SR-78

Day: Thursday
Date: 9/4/2014

City: Blythe
Project #: CA14_6165_002w

West Bound

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
00:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1
02:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	1	0	0	2	0	0	0	0	0	0	0	0	3
06:00	0	0	1	1	3	0	0	0	0	0	0	0	0	5
07:00	0	2	2	0	3	0	0	1	0	0	0	0	0	8
08:00	0	0	1	0	6	0	0	0	0	0	0	0	0	7
09:00	0	3	0	0	2	0	0	0	0	0	0	0	0	5
10:00	0	1	0	0	1	0	0	0	0	0	0	0	0	2
11:00	0	3	1	1	0	0	0	0	0	0	0	0	0	5
12:00 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	2
13:00	0	2	1	0	0	0	0	0	0	0	0	0	0	3
14:00	0	2	1	0	0	1	0	0	0	0	0	0	0	4
15:00	0	1	0	0	1	0	0	0	0	0	0	0	0	2
16:00	1	2	0	0	0	0	0	0	0	0	0	0	0	3
17:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
18:00	0	4	0	0	0	0	0	0	0	0	0	0	0	4
19:00	0	2	1	0	0	0	0	0	0	0	0	0	0	3
20:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
21:00	0	1	1	0	0	0	0	0	0	0	0	0	0	2
22:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	**1**	**30**	**10**	**2**	**18**	**1**		**1**						**63**
% of Totals	2%	48%	16%	3%	29%	2%		2%						100%

AM Volumes	0	11	6	2	17	0	0	1	0	0	0	0	0	37
% AM		17%	10%	3%	27%			2%						59%
AM Peak Hour		09:00	07:00	06:00	08:00			07:00						07:00
Volume		3	2	1	6			1						8
PM Volumes	1	19	4	0	1	1	0	0	0	0	0	0	0	26
% PM	2%	30%	6%		2%	2%								41%
PM Peak Hour	16:00	18:00	13:00		15:00	14:00								14:00
Volume	1	4	1		1	1								4

Directional Peak Periods	**AM 7-9**			**NOON 12-2**			**PM 4-6**			**Off Peak Volumes**		
All Classes	Volume	⟷	%	Volume	⟷	%	Volume	⟷	%	Volume	⟷	%
	15		24%	5		8%	4		6%	39		62%

Classification Definitions

1 Motorcycles
2 Passenger Cars
3 2-Axle, 4-Tire Single Units
4 Buses
5 2-Axle, 6-Tire Single Units
6 3-Axle Single Units
7 > =4-Axle Single Units
8 <=4-Axle Single Trailers
9 5-Axle Single Trailers
10 >=6-Axle Single Trailers
11 <=5-Axle Multi-Trailers
12 6-Axle Multi-Trailers
13 >=7-Axle Multi-Trailers

Prepared by National Data & Surveying Services

CLASSIFICATION

16th St w/o SR-78

Day: Thursday
Date: 9/4/2014

City: Blythe
Project #: CA14_6165_002

Summary

Time	# 1	# 2	# 3	# 4	# 5	# 6	# 7	# 8	# 9	# 10	# 11	# 12	# 13	Total
00:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0
01:00	0	0	1	0	0	0	0	0	0	0	0	0	0	1
02:00	0	3	0	0	0	0	0	0	0	0	0	0	0	3
03:00	0	0	0	0	1	0	0	0	0	0	0	0	0	1
04:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:00	0	1	0	0	2	0	0	0	0	0	0	0	0	3
06:00	0	1	1	2	4	0	0	0	0	0	0	0	0	8
07:00	0	7	3	0	6	0	0	1	0	0	0	0	0	17
08:00	0	1	2	1	8	0	0	0	0	0	0	0	0	12
09:00	0	6	0	2	2	0	0	0	0	0	0	0	0	10
10:00	1	1	0	0	2	0	0	0	0	0	0	0	0	4
11:00	0	3	2	1	1	1	0	0	0	0	0	0	0	8
12:00 PM	1	3	1	0	1	0	0	0	0	0	0	0	0	6
13:00	0	3	1	0	0	0	0	0	0	0	0	0	0	4
14:00	0	3	2	0	1	1	0	0	0	0	0	0	0	7
15:00	0	2	0	0	1	0	0	0	0	0	0	0	0	3
16:00	1	4	0	0	1	0	0	0	0	0	0	0	0	6
17:00	0	4	0	0	1	0	0	0	0	0	0	0	0	5
18:00	0	5	1	1	0	0	0	0	0	0	0	0	0	7
19:00	0	4	1	0	1	0	0	0	0	0	0	0	0	6
20:00	0	2	0	0	0	0	0	0	0	0	0	0	0	2
21:00	0	1	2	0	0	0	0	0	0	0	0	0	0	3
22:00	0	1	0	0	0	0	0	0	0	0	0	0	0	1
23:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	3	55	17	7	32	2		1						117
% of Totals	3%	47%	15%	6%	27%	2%		1%						100%

AM Volumes	1	23	9	6	26	1	0	1	0	0	0	0	0	67
% AM	1%	20%	8%	5%	22%	1%		1%						57%
AM Peak Hour	10:00	07:00	07:00	06:00	08:00	11:00		07:00						07:00
Volume	1	7	3	2	8	1		1						17
PM Volumes	2	32	8	1	6	1	0	0	0	0	0	0	0	50
% PM	2%	27%	7%	1%	5%	1%								43%
PM Peak Hour	12:00	18:00	14:00	18:00	12:00	14:00								14:00
Volume	1	5	2	1	1	1								7

Directional Peak Periods	**AM 7-9**			**NOON 12-2**			**PM 4-6**			**Off Peak Volumes**		
All Classes	Volume		%	Volume		%	Volume		%	Volume		%
	29	↔	25%	10	↔	9%	11	↔	9%	67	↔	57%

Classification Definitions

1	Motorcycles	**4**	Buses	**7**	> =4-Axle Single Units	**10**	>=6-Axle Single Trailers	**13**	>=7-Axle Multi-Trailers
2	Passenger Cars	**5**	2-Axle, 6-Tire Single Units	**8**	<=4-Axle Single Trailers	**11**	<=5-Axle Multi-Trailers		
3	2-Axle, 4-Tire Single Units	**6**	3-Axle Single Units	**9**	5-Axle Single Trailers	**12**	6-Axle Multi-Trailers		

APPENDIX B
EXISTING LOS WORKSHEETS

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
                       Existing AM Peak Hour  Conditions
--------------------------------------------------------------------------------
                            Impact Analysis Report
                               Level Of Service

Intersection                               Base           Future       Change
                                         Del/   V/      Del/   V/       in
                                     LOS Veh    C   LOS Veh    C
#  1 SR-78/I-10 WB Ramps             A   9.1 0.000   A   9.1 0.000  + 0.000 D/V

#  2 SR-78/I-10 EB Ramps             A   9.1 0.000   A   9.1 0.000  + 0.000 D/V

#  3 SR-78/14th Avenue               A   9.4 0.000   A   9.4 0.000  + 0.000 D/V

#  4 SR-78/16th Avenue               A   9.7 0.000   A   9.7 0.000  + 0.000 D/V
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
                       Existing AM Peak Hour  Conditions
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #1 SR-78/I-10 WB Ramps
********************************************************************************
Average Delay (sec/veh):      2.7   Worst Case Level Of Service:       A[  9.1]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Channel          Include          Channel
Lanes:        0  1  0  0  0    0  0  1  0  1    0  0  0  0  0    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 27 Jul 2011 << Adjusted to 2014
Base Vol:      11   31     0     0   24    30     0    0     0    21    1     6
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:   11   31     0     0   24    30     0    0     0    21    1     6
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.73 0.73  0.73  0.73 0.73  0.73  0.73 0.73  0.73  0.73 0.73  0.73
PHF Volume:    15   42     0     0   33    41     0    0     0    29    1     8
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:    15   42     0     0   33    41     0    0     0    29    1     8
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   33 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   126  105    42
Potent Cap.: 1592 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   874  788  1034
Move Cap.:   1592 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   867  781  1034
Volume/Cap:  0.01 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.03 0.00  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:        0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   0.0
Stopped Del:  7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   8.5
LOS by Move:   A    *     *     *    *     *     *    *     *     *    *     A
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   863 xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.1 xxxx xxxxx
Shrd StpDel:  7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   9.3 xxxx xxxxx
Shared LOS:    A    *     *     *    *     *     *    *     *     A    *     *
ApproachDel:    xxxxxx           xxxxxx           xxxxxx             9.1
ApproachLOS:        *                *                *                A
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
                       Existing AM Peak Hour  Conditions
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #2 SR-78/I-10 EB Ramps
********************************************************************************
Average Delay (sec/veh):      2.2   Worst Case Level Of Service:       A[  9.1]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Channel          Include          Channel          Include
Lanes:        0  0  1  0  1    0  1  0  0  0    0  1  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 27 Jul 2011 << Adjusted to 2014
Base Vol:       0   20    39    18   52     0    11    1    10     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0   20    39    18   52     0    11    1    10     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.84 0.84  0.84  0.84 0.84  0.84  0.84 0.84  0.84  0.84 0.84  0.84
PHF Volume:     0   24    46    21   62     0    13    1    12     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0   24    46    21   62     0    13    1    12     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    24 xxxx xxxxx   152  129    62  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  1604 xxxx xxxxx   845  766  1009  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  1604 xxxx xxxxx   836  755  1009  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.01 xxxx  xxxx  0.02 0.00  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx   0.0 xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx   8.6 xxxxx xxxx xxxxx
LOS by Move:   *    *     *     A    *     *     *    *     A     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx   829 xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx   7.3 xxxx xxxxx   9.4 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:    *    *     *     A    *     *     A    *     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx              9.1           xxxxxx
ApproachLOS:        *                *                A                *
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
                       Existing AM Peak Hour  Conditions
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #3 SR-78/14th Avenue
********************************************************************************
Average Delay (sec/veh):      0.6   Worst Case Level Of Service:       A[  9.4]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  0  1  0    0  1  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       1   56     2     0   56     3     3    1     0     1    0     3
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    1   56     2     0   56     3     3    1     0     1    0     3
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.93 0.93  0.93  0.93 0.93  0.93  0.93 0.93  0.93  0.93 0.93  0.93
PHF Volume:     1   60     2     0   60     3     3    1     0     1    0     3
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     1   60     2     0   60     3     3    1     0     1    0     3
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   7.1  6.5 xxxxx   7.1 xxxx   6.2
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0 xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   63 xxxx xxxxx  xxxx xxxx xxxxx   127  126 xxxxx   126 xxxx    61
Potent Cap.: 1552 xxxx xxxxx  xxxx xxxx xxxxx   851  768 xxxxx   853 xxxx  1009
Move Cap.:   1552 xxxx xxxxx  xxxx xxxx xxxxx   848  767 xxxxx   851 xxxx  1009
Volume/Cap:  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.00 0.00  xxxx  0.00 xxxx  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:        0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:  7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:   A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx   826 xxxx xxxxx  xxxx  965 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx  0.0 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   9.4 xxxx xxxxx xxxxx  8.7 xxxxx
Shared LOS:    *    *     *     *    *     *     A    *     *     *    A     *
ApproachDel:    xxxxxx           xxxxxx              9.4              8.7
ApproachLOS:        *                *                A                A
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
                       Existing AM Peak Hour  Conditions
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #4 SR-78/16th Avenue
********************************************************************************
Average Delay (sec/veh):      1.6   Worst Case Level Of Service:       A[  9.7]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  1  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   72     9     4   35     2     5    3     1     2    8     1
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0   72     9     4   35     2     5    3     1     2    8     1
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.89 0.89  0.89  0.89 0.89  0.89  0.89 0.89  0.89  0.89 0.89  0.89
PHF Volume:     0   81    10     4   39     2     6    3     1     2    9     1
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0   81    10     4   39     2     6    3     1     2    9     1
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    91 xxxx xxxxx   140  140    40   138  137    86
Potent Cap.: xxxx xxxx xxxxx  1517 xxxx xxxxx   834  754  1036   838  758   978
Move Cap.:   xxxx xxxx xxxxx  1517 xxxx xxxxx   824  752  1036   832  756   978
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  0.01 0.00  0.00  0.00 0.01  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  816 xxxxx  xxxx  785 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx xxxxx  0.0 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  9.5 xxxxx xxxxx  9.7 xxxxx
Shared LOS:     *    *     *     *    *     *     *    A     *     *    A     *
ApproachDel:    xxxxxx           xxxxxx              9.5              9.7
ApproachLOS:        *                *                A                A
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
                       Existing PM Peak Hour  Conditions
--------------------------------------------------------------------------------
                            Impact Analysis Report
                               Level Of Service

Intersection                               Base           Future        Change
                                         Del/   V/      Del/   V/         in
                                     LOS Veh    C   LOS Veh    C
#  1 SR-78/I-10 WB Ramps             A   9.2 0.000   A   9.2 0.000  + 0.000 D/V

#  2 SR-78/I-10 EB Ramps             A   9.4 0.000   A   9.4 0.000  + 0.000 D/V

#  3 SR-78/14th Avenue               A   9.7 0.000   A   9.7 0.000  + 0.000 D/V

#  4 SR-78/16th Avenue               A   9.7 0.000   A   9.7 0.000  + 0.000 D/V
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
                       Existing PM Peak Hour  Conditions
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #1 SR-78/I-10 WB Ramps
********************************************************************************
Average Delay (sec/veh):      2.9   Worst Case Level Of Service:       A[  9.2]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Channel          Include          Channel
Lanes:        0  1  0  0  0    0  0  1  0  1    0  0  0  0  0    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 27 Jul 2011 << Adjusted to 2014
Base Vol:       2   60     0     0   38     3     0    0     0    36    1     8
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    2   60     0     0   38     3     0    0     0    36    1     8
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.88 0.88  0.88  0.88 0.88  0.88  0.88 0.88  0.88  0.88 0.88  0.88
PHF Volume:     2   68     0     0   43     3     0    0     0    41    1     9
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     2   68     0     0   43     3     0    0     0    41    1     9
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   43 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   118  116    68
Potent Cap.: 1578 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   883  778  1001
Move Cap.:   1578 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   882  777  1001
Volume/Cap:  0.00 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.05 0.00  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:        0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   0.0
Stopped Del:  7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   8.6
LOS by Move:   A    *     *     *    *     *     *    *     *     *    *     A
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   879 xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.2 xxxx xxxxx
Shrd StpDel:  7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   9.3 xxxx xxxxx
Shared LOS:    A    *     *     *    *     *     *    *     *     A    *     *
ApproachDel:    xxxxxx           xxxxxx           xxxxxx              9.2
ApproachLOS:        *                *                *                A
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
                       Existing PM Peak Hour  Conditions
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #2 SR-78/I-10 EB Ramps
********************************************************************************
Average Delay (sec/veh):      2.7   Worst Case Level Of Service:       A[  9.4]
********************************************************************************
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign         Stop Sign
Rights:           Channel          Include          Channel          Include
Lanes:        0  0  1  0  1    0  1  0  0  0    0  1  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   28    38     7   67     0    35    2    11     0    0     0
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0   28    38     7   67     0    35    2    11     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.84 0.84  0.84  0.84 0.84  0.84  0.84 0.84  0.84  0.84 0.84  0.84
PHF Volume:     0   33    45     8   80     0    42    2    13     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0   33    45     8   80     0    42    2    13     0    0     0
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    33 xxxx xxxxx   152  130    80  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  1592 xxxx xxxxx   844  765   986  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  1592 xxxx xxxxx   841  761   986  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.01 xxxx  xxxx  0.05 0.00  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx   0.0 xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx   8.7 xxxxx xxxx xxxxx
LOS by Move:   *    *     *     A    *     *     *    *     A     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx   836 xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx   0.2 xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx   7.3 xxxx xxxxx   9.5 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:    *    *     *     A    *     *     A    *     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx              9.4           xxxxxx
ApproachLOS:        *                *                A                *
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
                       Existing PM Peak Hour  Conditions
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #3 SR-78/14th Avenue
********************************************************************************
Average Delay (sec/veh):      0.5   Worst Case Level Of Service:       A[  9.7]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  1  0    0  0  1! 0  0    1  0  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   69     3     1   73     1     3    0     0     2    0     3
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0   69     3     1   73     1     3    0     0     2    0     3
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.75 0.75  0.75  0.75 0.75  0.75  0.75 0.75  0.75  0.75 0.75  0.75
PHF Volume:     0   92     4     1   97     1     4    0     0     3    0     4
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0   92     4     1   97     1     4    0     0     3    0     4
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx   7.1 xxxx xxxxx   7.1 xxxx   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx   3.5 xxxx xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    96 xxxx xxxxx   197 xxxx xxxxx   195 xxxx    94
Potent Cap.: xxxx xxxx xxxxx  1510 xxxx xxxxx   767 xxxx xxxxx   769 xxxx   968
Move Cap.:   xxxx xxxx xxxxx  1510 xxxx xxxxx   763 xxxx xxxxx   769 xxxx   968
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  0.01 xxxx  xxxx  0.00 xxxx  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.0 xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.4 xxxx xxxxx   9.7 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:   *    *     *     A    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  877 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  9.1 xxxxx
Shared LOS:     *    *     *     *    *     *     *    *     *     *    A     *
ApproachDel:     xxxxxx           xxxxxx              9.7              9.1
ApproachLOS:        *                *                A                A
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
                       Existing PM Peak Hour  Conditions
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
            2000 HCM Unsignalized Method (Base Volume Alternative)
********************************************************************************
Intersection #4 SR-78/16th Avenue
********************************************************************************
Average Delay (sec/veh):      0.5   Worst Case Level Of Service:       A[  9.7]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  1  0    0  0  1! 0  0    0  1  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   64     5     2   87     4     2    1     0     3    0     1
Growth Adj:  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
Initial Bse:    0   64     5     2   87     4     2    1     0     3    0     1
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.96 0.96  0.96  0.96 0.96  0.96  0.96 0.96  0.96  0.96 0.96  0.96
PHF Volume:     0   67     5     2   91     4     2    1     0     3    0     1
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0   67     5     2   91     4     2    1     0     3    0     1
------------|---------------||---------------||---------------||---------------|
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5 xxxxx   7.1 xxxx   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0 xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    72 xxxx xxxxx   167  169 xxxxx   167 xxxx    69
Potent Cap.: xxxx xxxx xxxxx  1541 xxxx xxxxx   802  728 xxxxx   802 xxxx   999
Move Cap.:   xxxx xxxx xxxxx  1541 xxxx xxxxx   800  727 xxxxx   800 xxxx   999
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  0.00 0.00  xxxx  0.00 xxxx  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:    *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx   774 xxxx xxxxx  xxxx  842 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx  0.0 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   9.7 xxxx xxxxx xxxxx  9.3 xxxxx
Shared LOS:     *    *     *     *    *     *     A    *     *     *    A     *
ApproachDel:    xxxxxx           xxxxxx              9.7              9.3
ApproachLOS:         *                *                A                A
```

APPENDIX C

YEAR 2018 BASE LEVEL OF SERVICE WORKSHEETS

```
--------------------------------------------------------------------------------
                         Desert Quartzite Solar Project
                 Near Term AM Peak Hour Conditions - No Project
--------------------------------------------------------------------------------
                             Impact Analysis Report
                                Level Of Service

Intersection                                Base            Future        Change
                                          Del/   V/       Del/   V/         in
                                      LOS Veh    C    LOS Veh    C
#  1 SR-78/I-10 WB Ramps              A   9.2 0.000   A   9.2 0.000  + 0.000 D/V

#  2 SR-78/I-10 EB Ramps              A   9.1 0.000   A   9.1 0.000  + 0.000 D/V

#  3 SR-78/14th Avenue                A   9.4 0.000   A   9.4 0.000  + 0.000 D/V

#  4 SR-78/16th Avenue                A   9.7 0.000   A   9.7 0.000  + 0.000 D/V
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
                Near Term AM Peak Hour Conditions - No Project
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #1 SR-78/I-10 WB Ramps
********************************************************************************
Average Delay (sec/veh):      2.7   Worst Case Level Of Service:       A[  9.2]
********************************************************************************
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign         Stop Sign
Rights:           Include          Channel          Include          Channel
Lanes:        0  1  0  0  0    0  0  1  0  1    0  0  0  0  0    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 27 Jul 2011 << Adjusted to 2014
Base Vol:      11   31     0     0   24    30     0    0     0    21    1     6
Growth Adj:  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08
Initial Bse:   12   33     0     0   26    32     0    0     0    23    1     6
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   12   33     0     0   26    32     0    0     0    23    1     6
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.73 0.73  0.73  0.73 0.73  0.73  0.73 0.73  0.73  0.73 0.73  0.73
PHF Volume:    16   46     0     0   36    44     0    0     0    31    1     9
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:    16   46     0     0   36    44     0    0     0    31    1     9
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   36 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   136  114    46
Potent Cap.: 1589 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   862  780  1029
Move Cap.:   1589 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   855  772  1029
Volume/Cap:  0.01 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.04 0.00  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:        0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   0.0
Stopped Del:  7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   8.5
LOS by Move:   A    *     *     *    *     *     *    *     *     *    *     A
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   851 xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.1 xxxx xxxxx
Shrd StpDel:  7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   9.4 xxxx xxxxx
Shared LOS:    A    *     *     *    *     *     *    *     *     A    *     *
ApproachDel:    xxxxxx           xxxxxx           xxxxxx              9.2
ApproachLOS:        *                *                *                A
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
                Near Term AM Peak Hour Conditions - No Project
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #2 SR-78/I-10 EB Ramps
********************************************************************************
Average Delay (sec/veh):      2.2   Worst Case Level Of Service:       A[  9.1]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Channel          Include          Channel          Include
Lanes:        0  0  1  0  1    0  1  0  0  0    0  1  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 27 Jul 2011 << Adjusted to 2014
Base Vol:       0   20    39    18   52     0    11    1    10     0    0     0
Growth Adj:  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08
Initial Bse:    0   22    42    19   56     0    12    1    11     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0   22    42    19   56     0    12    1    11     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.84 0.84  0.84  0.84 0.84  0.84  0.84 0.84  0.84  0.84 0.84  0.84
PHF Volume:     0   26    50    23   67     0    14    1    13     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0   26    50    23   67     0    14    1    13     0    0     0
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    26 xxxx xxxxx   164  139    67  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  1602 xxxx xxxxx   831  756  1002  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  1602 xxxx xxxxx   822  745  1002  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.01 xxxx  xxxx  0.02 0.00  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx   0.0 xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx   8.6 xxxxx xxxx xxxxx
LOS by Move:   *    *     *     A    *     *     *    *     A     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx   815 xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx   7.3 xxxx xxxxx   9.5 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:    *    *     *     A    *     *     A    *     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx              9.1           xxxxxx
ApproachLOS:        *                *                A                *
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
                Near Term AM Peak Hour Conditions - No Project
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #3 SR-78/14th Avenue
********************************************************************************
Average Delay (sec/veh):      0.6   Worst Case Level Of Service:       A[  9.4]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  0  1  0    0  1  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       1   56     2     0   56     3     3    1     0     1    0     3
Growth Adj:  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08
Initial Bse:    1   60     2     0   60     3     3    1     0     1    0     3
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    1   60     2     0   60     3     3    1     0     1    0     3
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.93 0.93  0.93  0.93 0.93  0.93  0.93 0.93  0.93  0.93 0.93  0.93
PHF Volume:     1   65     2     0   65     3     3    1     0     1    0     3
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     1   65     2     0   65     3     3    1     0     1    0     3
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   7.1  6.5 xxxxx   7.1 xxxx   6.2
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0 xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   69 xxxx xxxxx  xxxx xxxx xxxxx   137  136 xxxxx   136 xxxx    66
Potent Cap.: 1545 xxxx xxxxx  xxxx xxxx xxxxx   838  758 xxxxx   840 xxxx  1003
Move Cap.:   1545 xxxx xxxxx  xxxx xxxx xxxxx   835  758 xxxxx   838 xxxx  1003
Volume/Cap:  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.00 0.00  xxxx  0.00 xxxx  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:        0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:  7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:   A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx   814 xxxx xxxxx  xxxx  956 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx  0.0 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   9.4 xxxx xxxxx xxxxx  8.8 xxxxx
Shared LOS:    *    *     *     *    *     *     A    *     *     *    A     *
ApproachDel:    xxxxxx           xxxxxx              9.4              8.8
ApproachLOS:        *                *                A                A
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
                Near Term AM Peak Hour Conditions - No Project
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #4 SR-78/16th Avenue
********************************************************************************
Average Delay (sec/veh):      1.6   Worst Case Level Of Service:       A[  9.7]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  1  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   72     9     4   35     2     5    3     1     2    8     1
Growth Adj:  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08
Initial Bse:    0   78    10     4   38     2     5    3     1     2    9     1
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0   78    10     4   38     2     5    3     1     2    9     1
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.89 0.89  0.89  0.89 0.89  0.89  0.89 0.89  0.89  0.89 0.89  0.89
PHF Volume:     0   87    11     5   42     2     6    4     1     2   10     1
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0   87    11     5   42     2     6    4     1     2   10     1
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    98 xxxx xxxxx   152  152    44   149  147    93
Potent Cap.: xxxx xxxx xxxxx  1507 xxxx xxxxx   820  744  1032   824  748   970
Move Cap.:   xxxx xxxx xxxxx  1507 xxxx xxxxx   809  741  1032   818  745   970
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  0.01 0.00  0.00  0.00 0.01  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:   *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  804 xxxxx  xxxx  774 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx xxxxx  0.1 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  9.5 xxxxx xxxxx  9.7 xxxxx
Shared LOS:    *    *     *     *    *     *     *    A     *     *    A     *
ApproachDel:    xxxxxx           xxxxxx              9.5              9.7
ApproachLOS:        *                *                A                A
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
                Near Term PM Peak Hour Conditions - No Project
--------------------------------------------------------------------------------
                            Impact Analysis Report
                               Level Of Service

Intersection                               Base           Future       Change
                                         Del/   V/      Del/   V/       in
                                     LOS Veh    C   LOS Veh    C
#  1 SR-78/I-10 WB Ramps             A   9.2 0.000   A   9.2 0.000  + 0.000 D/V

#  2 SR-78/I-10 EB Ramps             A   9.4 0.000   A   9.4 0.000  + 0.000 D/V

#  3 SR-78/14th Avenue               A   9.9 0.000   A   9.9 0.000  + 0.000 D/V

#  4 SR-78/16th Avenue               A   9.8 0.000   A   9.8 0.000  + 0.000 D/V
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
                Near Term PM Peak Hour Conditions - No Project
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #1 SR-78/I-10 WB Ramps
********************************************************************************
Average Delay (sec/veh):      2.9   Worst Case Level Of Service:       A[  9.2]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Channel          Include          Channel
Lanes:        0  1  0  0  0    0  0  1  0  1    0  0  0  0  0    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 27 Jul 2011 << Adjusted to 2014
Base Vol:        2   60     0     0   38     3     0    0     0    36    1     8
Growth Adj:  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08
Initial Bse:     2   65     0     0   41     3     0    0     0    39    1     9
Added Vol:       0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:     0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:     2   65     0     0   41     3     0    0     0    39    1     9
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.88 0.88  0.88  0.88 0.88  0.88  0.88 0.88  0.88  0.88 0.88  0.88
PHF Volume:      2   74     0     0   47     4     0    0     0    44    1    10
Reduct Vol:      0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:      2   74     0     0   47     4     0    0     0    44    1    10
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   47 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   127  125    74
Potent Cap.: 1574 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   872  769   994
Move Cap.:   1574 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   871  768   994
Volume/Cap:  0.00 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.05 0.00  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:        0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   0.0
Stopped Del:  7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   8.7
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     A
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   868 xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.2 xxxx xxxxx
Shrd StpDel:  7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   9.4 xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    *     *     A    *     *
ApproachDel:      xxxxxx           xxxxxx           xxxxxx             9.2
ApproachLOS:         *                *                *                A
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
                Near Term PM Peak Hour Conditions - No Project
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #2 SR-78/I-10 EB Ramps
********************************************************************************
Average Delay (sec/veh):      2.7   Worst Case Level Of Service:       A[  9.4]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Channel          Include          Channel          Include
Lanes:        0  0  1  0  1    0  1  0  0  0    0  1  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   28    38     7   67     0    35    2    11     0    0     0
Growth Adj:  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08
Initial Bse:    0   30    41     8   72     0    38    2    12     0    0     0
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0   30    41     8   72     0    38    2    12     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.84 0.84  0.84  0.84 0.84  0.84  0.84 0.84  0.84  0.84 0.84  0.84
PHF Volume:     0   36    49     9   86     0    45    3    14     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0   36    49     9   86     0    45    3    14     0    0     0
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    36 xxxx xxxxx   165  140    86  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  1588 xxxx xxxxx   831  755   978  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  1588 xxxx xxxxx   827  750   978  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.01 xxxx  xxxx  0.05 0.00  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx   0.0 xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx   8.7 xxxxx xxxx xxxxx
LOS by Move:   *    *     *     A    *     *     *    *     A     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx   823 xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx   0.2 xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx   7.3 xxxx xxxxx   9.6 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:    *    *     *     A    *     *     A    *     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx              9.4            xxxxxx
ApproachLOS:       *                *                 A                *
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
                Near Term PM Peak Hour Conditions - No Project
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #3 SR-78/14th Avenue
********************************************************************************
Average Delay (sec/veh):      0.5   Worst Case Level Of Service:       A[  9.9]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  1  0    0  0  1! 0  0    1  0  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   69     3     1   73     1     3    0     0     2    0     3
Growth Adj:  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08
Initial Bse:    0   75     3     1   79     1     3    0     0     2    0     3
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0   75     3     1   79     1     3    0     0     2    0     3
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.75 0.75  0.75  0.75 0.75  0.75  0.75 0.75  0.75  0.75 0.75  0.75
PHF Volume:     0   99     4     1  105     1     4    0     0     3    0     4
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0   99     4     1  105     1     4    0     0     3    0     4
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx   7.1 xxxx xxxxx   7.1 xxxx   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx   3.5 xxxx xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx   104 xxxx xxxxx   212 xxxx xxxxx   210 xxxx   102
Potent Cap.: xxxx xxxx xxxxx  1501 xxxx xxxxx   749 xxxx xxxxx   751 xxxx   959
Move Cap.:   xxxx xxxx xxxxx  1501 xxxx xxxxx   745 xxxx xxxxx   751 xxxx   959
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  0.01 xxxx  xxxx  0.00 xxxx  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.0 xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.4 xxxx xxxxx   9.9 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:   *    *     *     A    *     *     A    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  863 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.0 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  9.2 xxxxx
Shared LOS:    *    *     *     *    *     *     *    *     *     *    A     *
ApproachDel:    xxxxxx           xxxxxx              9.9              9.2
ApproachLOS:        *                *                A                A
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
                Near Term PM Peak Hour Conditions - No Project
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #4 SR-78/16th Avenue
********************************************************************************
Average Delay (sec/veh):      0.5   Worst Case Level Of Service:       A[  9.8]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:         0  0  0  1  0    0  0  1! 0  0    0  1  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   64     5     2   87     4     2    1     0     3    0     1
Growth Adj:  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08
Initial Bse:    0   69     5     2   94     4     2    1     0     3    0     1
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0   69     5     2   94     4     2    1     0     3    0     1
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.96 0.96  0.96  0.96 0.96  0.96  0.96 0.96  0.96  0.96 0.96  0.96
PHF Volume:     0   72     6     2   98     5     2    1     0     3    0     1
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0   72     6     2   98     5     2    1     0     3    0     1
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5 xxxxx   7.1 xxxx   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0 xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    78 xxxx xxxxx   180  182 xxxxx   180 xxxx    75
Potent Cap.: xxxx xxxx xxxxx  1534 xxxx xxxxx   786  715 xxxxx   786 xxxx   992
Move Cap.:   xxxx xxxx xxxxx  1534 xxxx xxxxx   784  714 xxxxx   784 xxxx   992
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  0.00 0.00  xxxx  0.00 xxxx  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:   *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx   760 xxxx xxxxx  xxxx  828 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx  0.0 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   9.8 xxxx xxxxx xxxxx  9.4 xxxxx
Shared LOS:    *    *     *     *    *     *     A    *     *     *    A     *
ApproachDel:    xxxxxx           xxxxxx                9.8              9.4
ApproachLOS:        *                *                A                A
```

APPENDIX D
YEAR 2018 PROJECT CONSTRUCTION WORKSHEETS

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
      Near Term AM Peak Hour Conditions - with Peak Project Construction
--------------------------------------------------------------------------------
                            Impact Analysis Report
                               Level Of Service

Intersection                               Base           Future       Change
                                         Del/   V/       Del/   V/       in
                                     LOS Veh    C    LOS Veh    C
#  1 SR-78/I-10 WB Ramps             A   9.2 0.000   A   9.7 0.000  + 0.495 D/V

#  2 SR-78/I-10 EB Ramps             A   9.1 0.000   A   9.0 0.000   -0.106 D/V

#  3 SR-78/14th Avenue               A   9.4 0.000   A   9.9 0.000  + 0.435 D/V

#  4 SR-78/16th Avenue               A   9.7 0.000   A   9.9 0.000  + 0.180 D/V
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
      Near Term AM Peak Hour Conditions - with Peak Project Construction
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #1 SR-78/I-10 WB Ramps
********************************************************************************
Average Delay (sec/veh):      3.7   Worst Case Level Of Service:       A[  9.7]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Channel          Include          Channel
Lanes:        0  1  0  0  0    0  0  1  0  1    0  0  0  0  0    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 27 Jul 2011 << Adjusted to 2014
Base Vol:      11   31     0     0   24    30     0    0     0    21    1     6
Growth Adj:  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08
Initial Bse:   12   33     0     0   26    32     0    0     0    23    1     6
Added Vol:     30    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:   42   33     0     0   26    32     0    0     0    23    1     6
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.73 0.73  0.73  0.73 0.73  0.73  0.73 0.73  0.73  0.73 0.73  0.73
PHF Volume:    57   46     0     0   36    44     0    0     0    31    1     9
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:    57   46     0     0   36    44     0    0     0    31    1     9
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   36 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   218  196    46
Potent Cap.: 1589 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   774  703  1029
Move Cap.:   1589 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   752  677  1029
Volume/Cap:  0.04 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.04 0.00  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:        0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   0.0
Stopped Del:  7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   8.5
LOS by Move:    A    *     *     *    *     *     *    *     *     *    *     A
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   749 xxxx xxxxx
SharedQueue:  0.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.1 xxxx xxxxx
Shrd StpDel:  7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx  10.0 xxxx xxxxx
Shared LOS:     A    *     *     *    *     *     *    *     *     B    *     *
ApproachDel:     xxxxxx           xxxxxx           xxxxxx             9.7
ApproachLOS:        *                *                *                A
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
      Near Term AM Peak Hour Conditions - with Peak Project Construction
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #2 SR-78/I-10 EB Ramps
********************************************************************************
Average Delay (sec/veh):      2.8   Worst Case Level Of Service:       A[  9.0]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Channel          Include          Channel          Include
Lanes:        0  0  1  0  1    0  1  0  0  0    0  1  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 27 Jul 2011 << Adjusted to 2014
Base Vol:       0   20    39    18   52     0    11    1    10     0    0     0
Growth Adj:  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08
Initial Bse:    0   22    42    19   56     0    12    1    11     0    0     0
Added Vol:      0   30     0     0    0     0     0    0    30     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0   52    42    19   56     0    12    1    41     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.84 0.84  0.84  0.84 0.84  0.84  0.84 0.84  0.84  0.84 0.84  0.84
PHF Volume:     0   61    50    23   67     0    14    1    49     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0   61    50    23   67     0    14    1    49     0    0     0
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    61 xxxx xxxxx   200  175    67  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  1555 xxxx xxxxx   794  722  1002  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  1555 xxxx xxxxx   784  712  1002  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.01 xxxx  xxxx  0.02 0.00  0.05  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx   0.2 xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx   8.8 xxxxx xxxx xxxxx
LOS by Move:   *    *     *     A    *     *     *    *     A     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx   778 xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx   7.4 xxxx xxxxx   9.7 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:    *    *     *     A    *     *     A    *     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx              9.0           xxxxxx
ApproachLOS:        *                *                A                *
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
      Near Term AM Peak Hour Conditions - with Peak Project Construction
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #3 SR-78/14th Avenue
********************************************************************************
Average Delay (sec/veh):      0.5   Worst Case Level Of Service:       A[  9.9]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  1! 0  0    0  0  0  1  0    0  1  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       1   56     2     0   56     3     3    1     0     1    0     3
Growth Adj:  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08
Initial Bse:    1   60     2     0   60     3     3    1     0     1    0     3
Added Vol:      0   30     0     0   30     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    1   90     2     0   90     3     3    1     0     1    0     3
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.93 0.93  0.93  0.93 0.93  0.93  0.93 0.93  0.93  0.93 0.93  0.93
PHF Volume:     1   97     2     0   97     3     3    1     0     1    0     3
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     1   97     2     0   97     3     3    1     0     1    0     3
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx   7.1  6.5 xxxxx   7.1 xxxx   6.2
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0 xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:  101 xxxx xxxxx  xxxx xxxx xxxxx   202  201 xxxxx   200 xxxx    98
Potent Cap.: 1504 xxxx xxxxx  xxxx xxxx xxxxx   761  699 xxxxx   762 xxxx   963
Move Cap.:   1504 xxxx xxxxx  xxxx xxxx xxxxx   758  698 xxxxx   761 xxxx   963
Volume/Cap:  0.00 xxxx  xxxx  xxxx xxxx  xxxx  0.00 0.00  xxxx  0.00 xxxx  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:        0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:  7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:   A    *     *     *    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx   742 xxxx xxxxx  xxxx  903 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx  0.0 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx   9.9 xxxx xxxxx xxxxx  9.0 xxxxx
Shared LOS:    *    *     *     *    *     *     A    *     *     *    A     *
ApproachDel:    xxxxxx           xxxxxx             9.9              9.0
ApproachLOS:        *                *                A                A
```

```
-------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
      Near Term AM Peak Hour Conditions - with Peak Project Construction
-------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #4 SR-78/16th Avenue
********************************************************************************
Average Delay (sec/veh):      2.5   Worst Case Level Of Service:       A[  9.9]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  1  0    0  0  1! 0  0    0  0  1! 0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:        0   72    9     4   35    2     5    3    1     2    8    1
Growth Adj:  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08
Initial Bse:     0   78   10     4   38    2     5    3    1     2    9    1
Added Vol:       0    0    0     0    0   30    30    0    0     0    0    0
PasserByVol:     0    0    0     0    0    0     0    0    0     0    0    0
Initial Fut:     0   78   10     4   38   32    35    3    1     2    9    1
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.89 0.89  0.89  0.89 0.89  0.89  0.89 0.89  0.89  0.89 0.89  0.89
PHF Volume:      0   87   11     5   42   36    40    4    1     2   10    1
Reduct Vol:      0    0    0     0    0    0     0    0    0     0    0    0
Final Vol.:      0   87   11     5   42   36    40    4    1     2   10    1
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5   6.2   7.1  6.5   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    98 xxxx xxxxx   169  169    61   166  181    93
Potent Cap.: xxxx xxxx xxxxx  1507 xxxx xxxxx   800  728  1010   803  716   970
Move Cap.:   xxxx xxxx xxxxx  1507 xxxx xxxxx   789  726  1010   797  714   970
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  0.05 0.01  0.00  0.00 0.01  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:   *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  788 xxxxx  xxxx  746 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.2 xxxxx xxxxx  0.1 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  9.8 xxxxx xxxxx  9.9 xxxxx
Shared LOS:    *    *     *     *    *     *     *    A     *     *    A     *
ApproachDel:    xxxxxx           xxxxxx              9.8              9.9
ApproachLOS:       *                *                 A                A
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
      Near Term PM Peak Hour Conditions - with Peak Project Construction
--------------------------------------------------------------------------------
                            Impact Analysis Report
                               Level Of Service

Intersection                               Base           Future       Change
                                         Del/   V/      Del/   V/        in
                                     LOS Veh    C   LOS Veh    C
#  1 SR-78/I-10 WB Ramps             A   9.2 0.000   A   9.2 0.000  + 0.000 D/V

#  2 SR-78/I-10 EB Ramps             A   9.4 0.000   B  12.8 0.000  + 3.364 D/V

#  3 SR-78/14th Avenue               A   9.9 0.000   D  31.9 0.000  +21.996 D/V

#  4 SR-78/16th Avenue               A   9.8 0.000   F  78.2 0.000  +68.418 D/V
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
      Near Term PM Peak Hour Conditions - with Peak Project Construction
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #1 SR-78/I-10 WB Ramps
********************************************************************************
Average Delay (sec/veh):      2.9   Worst Case Level Of Service:       A[  9.2]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Channel          Include          Channel
Lanes:        0  1  0  0  0    0  0  1  0  1    0  0  0  0  0    0  1  0  0  1
------------|---------------||---------------||---------------||---------------|
Volume Module: >> Count Date: 27 Jul 2011 << Adjusted to 2014
Base Vol:       2   60     0     0   38     3     0    0     0    36    1     8
Growth Adj:  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08
Initial Bse:    2   65     0     0   41     3     0    0     0    39    1     9
Added Vol:      0    0     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    2   65     0     0   41     3     0    0     0    39    1     9
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.88 0.88  0.88  0.88 0.88  0.88  0.88 0.88  0.88  0.88 0.88  0.88
PHF Volume:     2   74     0     0   47     4     0    0     0    44    1    10
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     2   74     0     0   47     4     0    0     0    44    1    10
Critical Gap Module:
Critical Gp:  4.1 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   6.4  6.5   6.2
FollowUpTim:  2.2 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   3.5  4.0   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol:   47 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   127  125    74
Potent Cap.: 1574 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   872  769   994
Move Cap.:   1574 xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   871  768   994
Volume/Cap:  0.00 xxxx  xxxx  xxxx xxxx  xxxx  xxxx xxxx  xxxx  0.05 0.00  0.01
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:        0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   0.0
Stopped Del:  7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx   8.7
LOS by Move:   A    *     *     *    *     *     *    *     *     *    *     A
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx   868 xxxx xxxxx
SharedQueue:  0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   0.2 xxxx xxxxx
Shrd StpDel:  7.3 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx   9.4 xxxx xxxxx
Shared LOS:    A    *     *     *    *     *     *    *     *     A    *     *
ApproachDel:    xxxxxx           xxxxxx           xxxxxx              9.2
ApproachLOS:        *                *                *                A
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
      Near Term PM Peak Hour Conditions - with Peak Project Construction
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #2 SR-78/I-10 EB Ramps
********************************************************************************
Average Delay (sec/veh):      0.7   Worst Case Level Of Service:       B[ 12.8]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Channel          Include          Channel          Include
Lanes:        0  0  1  0  1    0  1  0  0  0    0  1  0  0  1    0  0  0  0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   28    38     7   67     0    35    2    11     0    0     0
Growth Adj:  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08
Initial Bse:    0   30    41     8   72     0    38    2    12     0    0     0
Added Vol:      0    0   810     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0   30   851     8   72     0    38    2    12     0    0     0
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.84 0.84  0.84  0.84 0.84  0.84  0.84 0.84  0.84  0.84 0.84  0.84
PHF Volume:     0   36  1013     9   86     0    45    3    14     0    0     0
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0   36  1013     9   86     0    45    3    14     0    0     0
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx   6.4  6.5   6.2 xxxxx xxxx xxxxx
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0   3.3 xxxxx xxxx xxxxx
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    36 xxxx xxxxx   647  140    86  xxxx xxxx xxxxx
Potent Cap.: xxxx xxxx xxxxx  1588 xxxx xxxxx   439  755   978  xxxx xxxx xxxxx
Move Cap.:   xxxx xxxx xxxxx  1588 xxxx xxxxx   437  750   978  xxxx xxxx xxxxx
Volume/Cap:  xxxx xxxx  xxxx  0.01 xxxx  xxxx  0.10 0.00  0.01  xxxx xxxx  xxxx
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx   0.0 xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.3 xxxx xxxxx xxxxx xxxx   8.7 xxxxx xxxx xxxxx
LOS by Move:   *    *     *     A    *     *     *    *     A     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx   447 xxxx xxxxx  xxxx xxxx xxxxx
SharedQueue:xxxxx xxxx xxxxx   0.0 xxxx xxxxx   0.4 xxxx xxxxx xxxxx xxxx xxxxx
Shrd StpDel:xxxxx xxxx xxxxx   7.3 xxxx xxxxx  14.0 xxxx xxxxx xxxxx xxxx xxxxx
Shared LOS:    *    *     *     A    *     *     B    *     *     *    *     *
ApproachDel:    xxxxxx           xxxxxx             12.8           xxxxxx
ApproachLOS:        *                *                B                *
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
      Near Term PM Peak Hour Conditions - with Peak Project Construction
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #3 SR-78/14th Avenue
********************************************************************************
Average Delay (sec/veh):      0.3   Worst Case Level Of Service:       D[ 31.9]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  1  0    0  0  1! 0  0    1  0  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   69     3     1   73     1     3    0     0     2    0     3
Growth Adj:  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08
Initial Bse:    0   75     3     1   79     1     3    0     0     2    0     3
Added Vol:      0  810     0     0    0     0     0    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0  885     3     1   79     1     3    0     0     2    0     3
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.75 0.75  0.75  0.75 0.75  0.75  0.75 0.75  0.75  0.75 0.75  0.75
PHF Volume:     0 1179     4     1  105     1     4    0     0     3    0     4
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0 1179     4     1  105     1     4    0     0     3    0     4
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx   7.1 xxxx xxxxx   7.1 xxxx   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx   3.5 xxxx xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx  1184 xxxx xxxxx  1292 xxxx xxxxx  1290 xxxx  1182
Potent Cap.: xxxx xxxx xxxxx   597 xxxx xxxxx   141 xxxx xxxxx   142 xxxx   233
Move Cap.:   xxxx xxxx xxxxx   597 xxxx xxxxx   138 xxxx xxxxx   141 xxxx   233
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  0.03 xxxx  xxxx  0.02 xxxx  0.02
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.0 xxxx xxxxx   0.1 xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx  11.0 xxxx xxxxx  31.9 xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:   *    *     *     B    *     *     D    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx xxxx xxxxx  xxxx  185 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx  0.1 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx xxxxx 25.2 xxxxx
Shared LOS:    *    *     *     *    *     *     *    *     *     *    D     *
ApproachDel:    xxxxxx           xxxxxx             31.9             25.2
ApproachLOS:        *                *                D                D
```

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
      Near Term PM Peak Hour Conditions - with Peak Project Construction
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #4 SR-78/16th Avenue
********************************************************************************
Average Delay (sec/veh):     64.1   Worst Case Level Of Service:       F[ 78.2]
********************************************************************************
Approach:      North Bound      South Bound       East Bound       West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  1  0    0  0  1! 0  0    0  1  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   64     5     2   87     4     2    1     0     3    0     1
Growth Adj:  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08
Initial Bse:    0   69     5     2   94     4     2    1     0     3    0     1
Added Vol:      0    0     0     0    0     0   810    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0   69     5     2   94     4   812    1     0     3    0     1
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.96 0.96  0.96  0.96 0.96  0.96  0.96 0.96  0.96  0.96 0.96  0.96
PHF Volume:     0   72     6     2   98     5   846    1     0     3    0     1
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0   72     6     2   98     5   846    1     0     3    0     1
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5 xxxxx   7.1 xxxx   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0 xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    78 xxxx xxxxx   180  182 xxxxx   180 xxxx    75
Potent Cap.: xxxx xxxx xxxxx  1534 xxxx xxxxx   786  715 xxxxx   786 xxxx   992
Move Cap.:   xxxx xxxx xxxxx  1534 xxxx xxxxx   784  714 xxxxx   784 xxxx   992
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  1.08 0.00  xxxx  0.00 xxxx  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:   *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx   784 xxxx xxxxx  xxxx  828 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx  22.2 xxxx xxxxx xxxxx  0.0 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx  78.2 xxxx xxxxx xxxxx  9.4 xxxxx
Shared LOS:    *    *     *     *    *     *     F    *     *     *    A     *
ApproachDel:    xxxxxx           xxxxxx              78.2              9.4
ApproachLOS:        *                *                 F                A
```

APPENDIX E
OFF-SITE CONSTRUCTION PHASE TRIP ESTIMATES

Desert Quartzite Solar Project

Construction Emission Estimations

TABLE 1 OFF-SITE CONSTRUCTION PHASE TRIPS

TABLE 1 OFF-SITE CONSTRUCTION PHASE TRIPS - ESTIMATED CONSTRUCTION PHASE ONE-WAY TRIPS[1] By MONTH

CONSTRUCTION PHASE TRIPS	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sept 2017	Oct 2017	Nov 2017	Dec 2017	Jan 2018	Feb 2018	Mar 2018	Apr 2018	May 2018	Jun 2018	Jul 2018	Aug 2018	Sept 2018	Oct 2018	Nov 2018	Dec 2018	**Total Trips (One-Way)**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	
Activity 1: Move-On (Laydown, Construction Trailers, and Parking Area) (109 acres)																										
Worker Trips (Workers = 60)	2,520	2,520																					-			5,040
Material Delivery Trucks	920	920																								1,840
Aggregate Base	200	200																								400
Off-site Water Haul Trucks	560	560																								1,120
Sub-totals	4,200	4,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,400
Activity 2, Site Grading (Site Preparations/Clearing/Grading) (3,756 Acres)																										
Worker Trips (Workers = 80)		3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360				-			60,480
Material Delivery Trucks		20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20							360
Off-site Water Haul Trucks		2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600							46,800
Sub-totals	-	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980				-	-	-	107,640
Activity 3, Construction - Solar Array Structural Components																										
Worker Trips (Workers = 160)				6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720		-			120,960
Material Delivery Trucks				20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20					360
Off-site Water Haul Trucks				960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960					17,280
Sub-totals	-	-	-	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	-	-		-	138,600
Activity 4, Trenching - PCS Excavation, PCS Placement, UG Cabling Trenching (Underground Work) (200 acres disturbed)																										
Worker Trips (Workers = 80)					3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	-			60,480
Material Delivery Trucks					200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200				3,600
Off-site Water Haul Trucks					960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960				17,280
Sub-totals	-	-	-	-	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	-		-	81,360
Activity 5, Construction - Solar Module Installation																										
Worker Trips (Workers = 310)						13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020			234,360
Material Delivery Trucks (Trackers)						800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800			14,400
Off-site Water Haul Trucks						960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960			17,280
Sub-totals	-	-	-	-	-	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	-	-	266,040
Activity 6, Construction - Substation (7 acres)																										
Worker Trips (Workers = 60)																	2,520	2,520	2,520	2,520	2,520	2,520	-			15,120
Material Delivery Trucks																	480	480	480	480	480	480				2,880
Aggregate Base																	66	67	67	67	67	66				400
Concrete Delivery Trucks																	44	44	44	44	44	44				264
Off-site Water Haul Trucks																	960	960	960	960	960	960				5,760
Sub-totals	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,070	4,071	4,071	4,071	4,071	4,070	-	-	-	24,424
Activity 7, Construction - Gen-Tie (10 acres)																										
Worker Trips (Workers = 60)																	2,520	2,520	2,520	2,520	2,520	2,520	-			15,120
Material Delivery Trucks																	100	100	100	100	100	100				600
Concrete Delivery Trucks																	200	200	200	200	200	200				1,200
Off-site Water Haul Trucks																	960	960	960	960	960	960				5,760
Sub-totals	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,780	3,780	3,780	3,780	3,780	3,780	-	-	-	22,680
Activity 8, Construction (O&M Building) (Added)																										
Worker Trips (Workers = 60)																	2,520	2,520	2,520	2,520	2,520	2,520	-			15,120
Material Delivery Trucks																	160	160	160	160	160	160				960
Concrete Delivery Trucks																	6	7	7	7	7	6				40
Off-site Water Haul Trucks																	-	-	-	-	-	-				-
Sub-totals	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,686	2,687	2,687	2,687	2,687	2,686	-	-	-	16,120
Activity 9, Construction (Testing/Cleanup/Restoration) (Added)																										
Worker Trips (Workers = 60)																				2,520	2,520	2,520	2,520	2,520	2,520	15,120
Material Delivery Trucks																				80	80	80	80	80	80	480
Off-site Water Haul Trucks																				420	420	420	420	420	420	2,520
Sub-totals	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		3,020	3,020	3,020	3,020	3,020	3,020	18,120
TOTALS	4,200	10,180	5,980	13,680	18,200	32,980	32,980	32,980	32,980	32,980	32,980	32,980	32,980	32,980	32,980	32,980	43,516	43,518	43,518	40,558	40,558	32,856	17,800	3,020	3,020	**683,384**

NOTES:

[1] Each trip to the Project site (i.e., worker or truck delivery) requires two, one-way trips (i.e., one round trip).
[2] All workers would arrive at the Project site by 7 am, thereby avoiding the AM peak traffic period; all workers are assumed to depart the site at 5 pm during the PM peak period.
[3] Material deliveries are expected to occur primarily during non-peak traffic periods (i.e., avoid 7-9 am and 4-6 pm periods).
[4] All water haul deliveries would occur during non-peak traffic periods.
[5] This table does not include fuel truck trips; see Table 1.1 below for fuel trucks per month.

TABLE 1.1 CONSTRUCTION ONE-WAY PHASE TRIPS TOTAL

	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sept 2017	Oct 2017	Nov 2017	Dec 2017	Jan 2018	Feb 2018	Mar 2018	Apr 2018	May 2018	Jun 2018	Jul 2018	Aug 2018	Sept 2018	Oct 2018	Nov 2018	Dec 2018	Totals
Aggregate Base Delivery Trucks	200	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	66	67	67	67	67	66	-	-	-	**800**
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	250	251	251	251	251	250	-	-	-	**1,504**
Material Delivery Trucks	920	940	20	40	240	240	240	240	240	240	240	240	240	240	240	240	980	980	980	1,040	1,040	1,020	80	80	80	**11,080**
Tracker Deliveries Trucks	-	-	-	-	-	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	-	-	**14,400**
Water Haul Trucks	560	3,160	2,600	3,560	4,520	5,480	5,480	5,480	5,480	5,480	5,480	5,480	5,480	5,480	5,480	5,480	7,400	7,400	7,400	5,220	5,220	4,260	1,380	420	420	**113,800**
Worker Vehicles	2,520	5,880	3,360	10,080	13,440	26,460	26,460	26,460	26,460	26,460	26,460	26,460	26,460	26,460	26,460	26,460	34,020	34,020	34,020	33,180	33,180	26,460	15,540	2,520	2,520	**541,800**
Fuel Trucks	10	20	10	26	34	48	48	48	48	48	48	48	48	48	48	48	54	54	54	48	48	32	18	6	6	**948**
Total vehicle trips (Incl Water and Fuel)	4,210	10,200	5,990	13,706	18,234	33,028	33,028	33,028	33,028	33,028	33,028	33,028	33,028	33,028	33,028	33,028	43,570	43,572	43,572	40,606	40,606	32,888	17,818	3,026	3,026	**684,332**
UPDATED Vehicle Trips (No Water or Fuel)	3,640	7,020	3,380	10,120	13,680	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	36,116	36,118	36,118	35,338	35,338	28,596	16,420	2,600	2,600	**569,584**

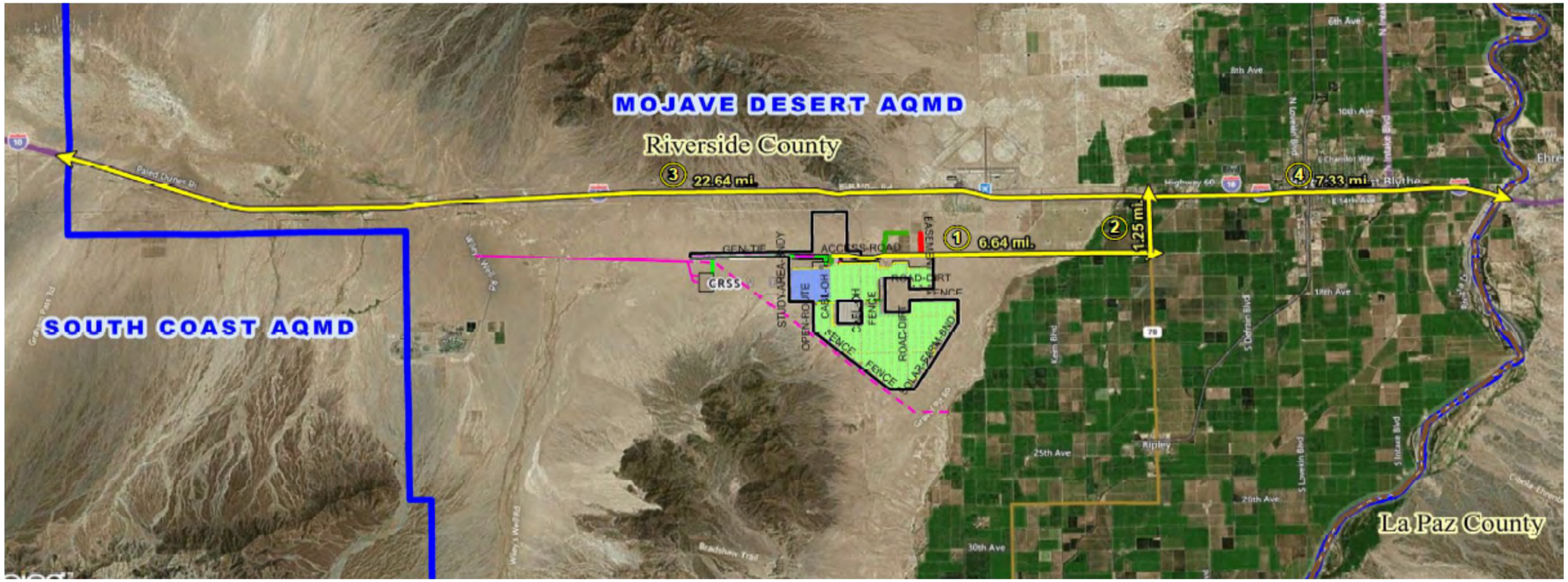
NOTES:

1. Assume the tank capacity for the fuel truck is 4000 gallon.
2. Number of fuel truck is calculated from total hours of construction equipment utilization, fuel tank truck capacity, and average fuel consumption.
3. Assume the average fuel consumption is 4 gallon per hour for each construction equipment.
4. Reference: http://www.epa.gov/cleandiesel/documents/420b10025.pdf

TABLE 1.2 TRIP DISTANCE (1 WAY; R/T = X2)

	Miles unpaved road, onsite laydown area to site entrance (assumption)	Miles unpaved road, site entrance to paved road (eastbound 16th at Stephenson)	Miles paved road in MDAQMD area	Total one way distance (all in MDAQMD area), miles
Aggregate Base Delivery Trucks	0.1	5.64	7.36	13
Concrete Delivery Trucks	0.1	5.64	7.36	13
Material Delivery Trucks	0.1	5.64	24.86	30.5
Tracker Deliveries Trucks	0.1	5.64	24.86	30.5
Water Haul Trucks	0.1	5.64	4.36	10
Worker Vehicles	0.1	5.64	29.36	35
Fuel Trucks	0.1	5.64	4.36	10

All miles in MDAQMD



APPENDIX F
WORKER TRIP THRESHOLD LOS D COMPUTATION WORKSHEET

```
--------------------------------------------------------------------------------
                        Desert Quartzite Solar Project
      Near Term PM Peak Hour Conditions - with Peak Project Construction
--------------------------------------------------------------------------------
                      Level Of Service Computation Report
           2000 HCM Unsignalized Method (Future Volume Alternative)
********************************************************************************
Intersection #4 SR-78/16th Avenue
********************************************************************************
Average Delay (sec/veh):     24.8   Worst Case Level Of Service:       D[ 31.6]
********************************************************************************
Approach:      North Bound      South Bound       East Bound        West Bound
Movement:     L  -  T  -  R    L  -  T  -  R    L  -  T  -  R    L  -  T  -  R
------------|---------------||---------------||---------------||---------------|
Control:       Uncontrolled     Uncontrolled      Stop Sign        Stop Sign
Rights:           Include          Include          Include          Include
Lanes:        0  0  0  1  0    0  0  1! 0  0    0  1  0  0  0    0  0  1! 0  0
------------|---------------||---------------||---------------||---------------|
Volume Module:
Base Vol:       0   64     5     2   87     4     2    1     0     3    0     1
Growth Adj:  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08  1.08 1.08  1.08
Initial Bse:    0   69     5     2   94     4     2    1     0     3    0     1
Added Vol:      0    0     0     0    0     0   650    0     0     0    0     0
PasserByVol:    0    0     0     0    0     0     0    0     0     0    0     0
Initial Fut:    0   69     5     2   94     4   652    1     0     3    0     1
User Adj:    1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00  1.00 1.00  1.00
PHF Adj:     0.96 0.96  0.96  0.96 0.96  0.96  0.96 0.96  0.96  0.96 0.96  0.96
PHF Volume:     0   72     6     2   98     5   679    1     0     3    0     1
Reduct Vol:     0    0     0     0    0     0     0    0     0     0    0     0
Final Vol.:     0   72     6     2   98     5   679    1     0     3    0     1
Critical Gap Module:
Critical Gp:xxxxx xxxx xxxxx   4.1 xxxx xxxxx   7.1  6.5 xxxxx   7.1 xxxx   6.2
FollowUpTim:xxxxx xxxx xxxxx   2.2 xxxx xxxxx   3.5  4.0 xxxxx   3.5 xxxx   3.3
------------|---------------||---------------||---------------||---------------|
Capacity Module:
Cnflict Vol: xxxx xxxx xxxxx    78 xxxx xxxxx   180  182 xxxxx   180 xxxx    75
Potent Cap.: xxxx xxxx xxxxx  1534 xxxx xxxxx   786  715 xxxxx   786 xxxx   992
Move Cap.:   xxxx xxxx xxxxx  1534 xxxx xxxxx   784  714 xxxxx   784 xxxx   992
Volume/Cap:  xxxx xxxx  xxxx  0.00 xxxx  xxxx  0.87 0.00  xxxx  0.00 xxxx  0.00
------------|---------------||---------------||---------------||---------------|
Level Of Service Module:
Queue:      xxxxx xxxx xxxxx   0.0 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
Stopped Del:xxxxx xxxx xxxxx   7.4 xxxx xxxxx xxxxx xxxx xxxxx xxxxx xxxx xxxxx
LOS by Move:   *    *     *     A    *     *     *    *     *     *    *     *
Movement:     LT - LTR - RT    LT - LTR - RT    LT - LTR - RT    LT - LTR - RT
Shared Cap.: xxxx xxxx xxxxx  xxxx xxxx xxxxx   784 xxxx xxxxx  xxxx  828 xxxxx
SharedQueue:xxxxx xxxx xxxxx xxxxx xxxx xxxxx  10.8 xxxx xxxxx xxxxx  0.0 xxxxx
Shrd StpDel:xxxxx xxxx xxxxx xxxxx xxxx xxxxx  31.6 xxxx xxxxx xxxxx  9.4 xxxxx
Shared LOS:    *    *     *     *    *     *     D    *     *     *    A     *
ApproachDel:    xxxxxx           xxxxxx             31.6              9.4
ApproachLOS:        *                *                D                A
```

APPENDIX L

ASSESSMENT OF NECO CMP DESIGNATED OPEN ROUTES (UNPAVED) WITHIN PROJECT BOUNDARY

URS
An AECOM Company.

October 30, 2015

Mr. Roy Skinner
First Solar, Inc.
135 Main Street, 6th Floor
San Francisco, California 94105

RE: DESERT QUARTZITE SOLAR PROJECT
ASSESSMENT OF NECO CMP DESIGNATED OPEN ROUTES (UNPAVED) WITHIN PROJECT BOUNDARY
URS PURCHASE ORDER NO. 4800019091

Dear Roy:

1.0 INTRODUCTION

The following assessment identifies the existing Bureau of Land Management (BLM)-designated Northern and Eastern Colorado Desert Coordinated Management Plan (NECO CMP Plan) routes located within the proposed Desert Quartzite Solar Project (Project) solar facility area that would require closure, as well as the original intended uses of the routes. The evaluation identifies the existing alternative Open Routes potentially serving similar uses as the routes proposed for closure. Closure of the Open Routes within the Project boundary is expected to be addressed as part of the overall Plan Amendment to the NECO CMP required for the Project, and would be analyzed in the in-progress Project Environmental Impact Statement/Environmental Impact Report (EIS/EIR).

2.0 NECO CMP DESIGNATED OPEN ROUTES (UNPAVED) WITHIN PROJECT BOUNDARY

The existing BLM-designated routes in the Project Area have been mapped on Figure 1, which shows that the Project solar facility site contains several NECO Plan designated Open Routes (unpaved). Based on the proposed Project site boundary, the BLM identification number for the routes requiring closure and respective locations of the routes are provided in Table 1, below. A detailed view of the NECO CMP route locations showing respective Township, Range, and Section designations is provided on Figure 2.

TABLE 1
NECO CMP DESIGNATED OPEN ROUTES (ALL UNPAVED) WITHIN DESERT QUARTZITE PROJECT BOUNDARY[1]

BLM Route Number	Location within Project Boundaries		Usage[2]
	Location Description	Township, Range, Section	
660862	Northeast project site area; north-south road (Haig Drive)	T07S, R21E, NE1/4 of Sec. 11	Access to 160-acre privately-owned parcel
660863	Northeast project site area; begins at Seeley Avenue and trends southwest	T07S, R21E, NE1/4 of Sec. 11, W1/2 of Sec. 14, W1/2 of Sec. 23	Access to Mule Mountains
661092	Traverses southern portion of site trending in southwesterly direction and bifurcates from Open Route 660863	T07S, R21E, W1/2 of Sec. 14, S1/2 of Sec. 15	Access to Mule Mountains
660866	Along 18th Avenue	T07S, R21E, S1/2 of Sec. 10, SW1/4 of Sec. 11	Access to 160-acre privately-owned parcel
661501	Perimeter of 160-acre private parcel (APN 879-110-001)	T07S, R21E, S1/2 of Sec. 10, N1/2 of Sec. 15	Access to 160-acre privately-owned parcel
661102	Southern portion of site; east-west road with terminus with Open Route 660863	T07S, R21E, S1/2 of Sec. 13, N1/2 of Sec. 15	Access to Mule Mountains

[1] Note that the westernmost extremity of the Project Boundary consists of the Project generation-tie line corridor, which would allow vehicle passage and would not require closure to NECO CMP designated Open Route 660703 (Figure 1).

[2] Usage is inferred based on geographic context, as shown on Figure 1.

3.0 BLM OPEN ROUTE BACKGROUND

3.1 Open Routes Description

According to the *California Desert Conservation Area Plan 1980, As Amended* (CDCA), an Open Route is described as where “access on route by motorized vehicles is allowed. Special uses with potential for resource damage or significant conflict with other use may require specific authorization.” (page 77)

3.2 Route Objectives

Based on the *NECO CMP/FEIS (July 2002)*, the objectives for motorized-vehicle access/routes of travel designations/recreation are to:

a) Designate routes of travel consistent with the criteria at 43 CFR 8342.1 (these address regulations governing use of open routes)

b) Provide for competitive off-highway vehicle events in a manner that protects desert resources

c) Establish stopping, parking, and vehicle camping limitations consistently

3.3 Route Designations and Review Process

According to the NECO CMP, decisions affecting vehicle access, such as area designations and specific route limitations, are intended to meet present access needs and protect sensitive resources. Future access needs or protection requirements may necessitate changes in these designations or limitations, or the construction of new routes. Access needs uses unrelated to mining operations, such as roads to private lands, grazing developments, or communication sites, would be reviewed on an individual basis under the authority outlined in Title V of Federal Land Policy and Management Act (FLPMA) and in accordance with appropriate regulations. Each proposal would be evaluated for environmental effects and subjected to public review and comment. As present access needs become obsolete or as considerable adverse impacts are identified through the monitoring program, area designations or route limitations may be revised. In all instances, new routes for permanent or temporary use would be selected to minimize resource damage and use conflicts consistent with the criteria at 43 CFR 8342.1.

3.4 Designation Changes (43 CFR Subpart 8342)

Under Subpart 8342, Designation of Areas and Trails, §8342.3 Designation Changes states, "The authorized officer shall monitor effects of the use of off-road vehicles. On the basis of information so obtained, and whenever the authorized officer deems it necessary to carry out the objectives of this part, designations may be amended, revised, revoked, or other actions taken pursuant to the regulations in this part."

4.0 ROUTE CLOSURE EVALUATION AND EXISTING ALTERNATIVE ROUTES

Development of the proposed Project would necessitate closure of open route segments within the Project development footprint. Open routes proposed for closure are shown in Figure 2, and are briefly discussed below.

4.1 Closure of Open Routes Providing Access to 160-acre Private Parcel

Open Routes 661501, 660866, and 660862 are presumed to provide access to the 160-acre privately-owned parcel (APN 879-110-001), as shown on Figure 1. Desert Quartzite, LLC has an option to purchase this property and has incorporated this parcel into the proposed Project design. Since this parcel would comprise part of the Project facility area, the Open Routes originally intended to provide access to this parcel would no longer be required.

Additionally, closure of the routes would not interfere with travel designations and recreation, and/or the route objectives identified in Section 3.2.

4.2 Existing Routes Providing Access to the Mule Mountains

Three (3) Open Routes (Open Routes 660863, 661092, and 661102) identified in Table 1 are presumed to provide access to the Mule Mountains, and as shown on Figure 1, are located within the proposed Project facility area. These Open Routes would require closure for Project development as shown on Figure 2. However, as shown on Figure 1 and Figure 2, the network of existing NECO CMP designated Open Routes could be used to provide access to the Mule Mountains. These existing alternative options include Open Routes 660868, 660703, 660620, and 660689, and the portion of 660863 outside of the Project boundary. Therefore, closure of the portions of Open Routes 660863, 661092, and 661102 within the Project boundaries would not preclude public use of other existing Open Routes providing access to the Mule Mountains.

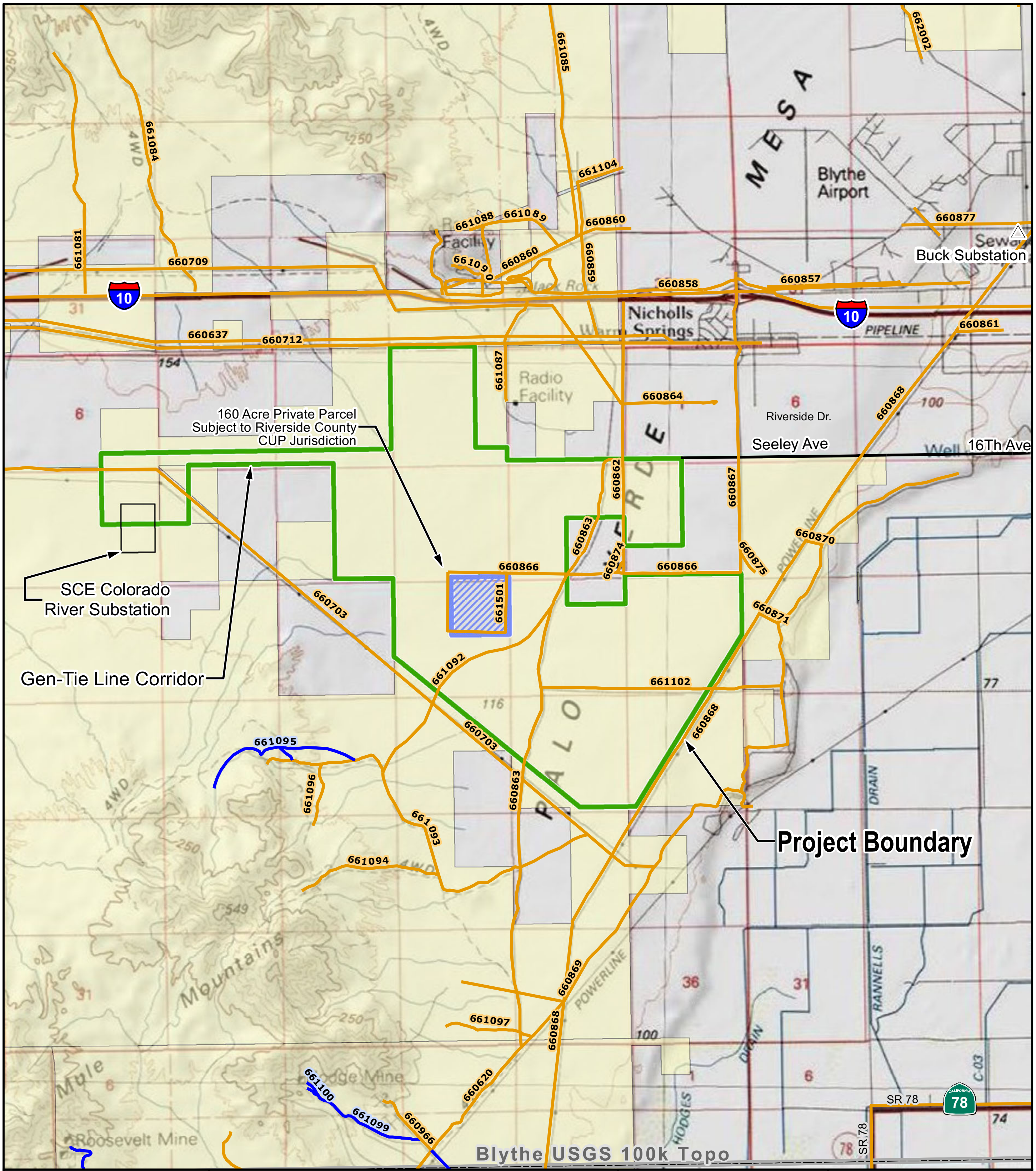
As mentioned previously, the closure process for the portion of the NECO CMP designated Open Routes within the Project boundary (listed in Table 1) would be incorporated as part of the Project proposal for Plan Amendment to the NECO CMP, and is anticipated to be addressed as part of the Project environmental review process (i.e., EIS/EIR).

Please let me know if you have any questions or need further assistance.

Sincerely,
URS Corporation

Jennifer Wu
Senior Environmental Scientist

Cc Dave Watkins
Robert Ray


4WD
661085
662002
661084
661081
250
661104
MESA
Blythe Airport
661088
661089
660860
660877
Facility
Sewa
Buck Substation
661090
660859
660709
10
31
660858
660857
Black Rock
Nicholls Springs
Warm Springs
10
PIPELINE
660861
660637
660712
154
661087
Radio Facility
6
6
Riverside Dr.
660868
100
660864
160 Acre Private Parcel Subject to Riverside County CUP Jurisdiction
Seeley Ave
16Th Ave
Well
VERDE
660862
660867
660863
660874
660875
660870
POWERLINE
660866
660866
SCE Colorado River Substation
660703
661501
660871
Gen-Tie Line Corridor
661092
661102
77
116
660868
660703
661095
661096
4WD
PALO
660863
661093
Project Boundary
DRAIN
250
661094
4WD
549
Mountains
660869
POWERLINE
36
31
31
661097
250
RANNELLS
660868
100
DRAIN
Mule
6
Hodge Mine
661100
660620
6
HODGES
C-03
SR 78
78
74
661099
660966
Roosevelt Mine
78
SR 78
Blythe USGS 100k Topo

Map Location
Tulare
Inyo
Las Vegas
NV
Kern
CALIFORNIA
San Bernardino
CA
AZ
Los Angeles
Los Angeles
Orange
Riverside
San Diego
San Diego
Imperial
Mexicali

Legend

🟩 Project Boundary

▨ 160 Acre Private Parcel (APN 879-110-001)

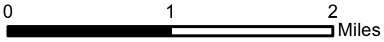
NECO Plan Route

Open Route

Closed Route

BLM Lands

1:75,000

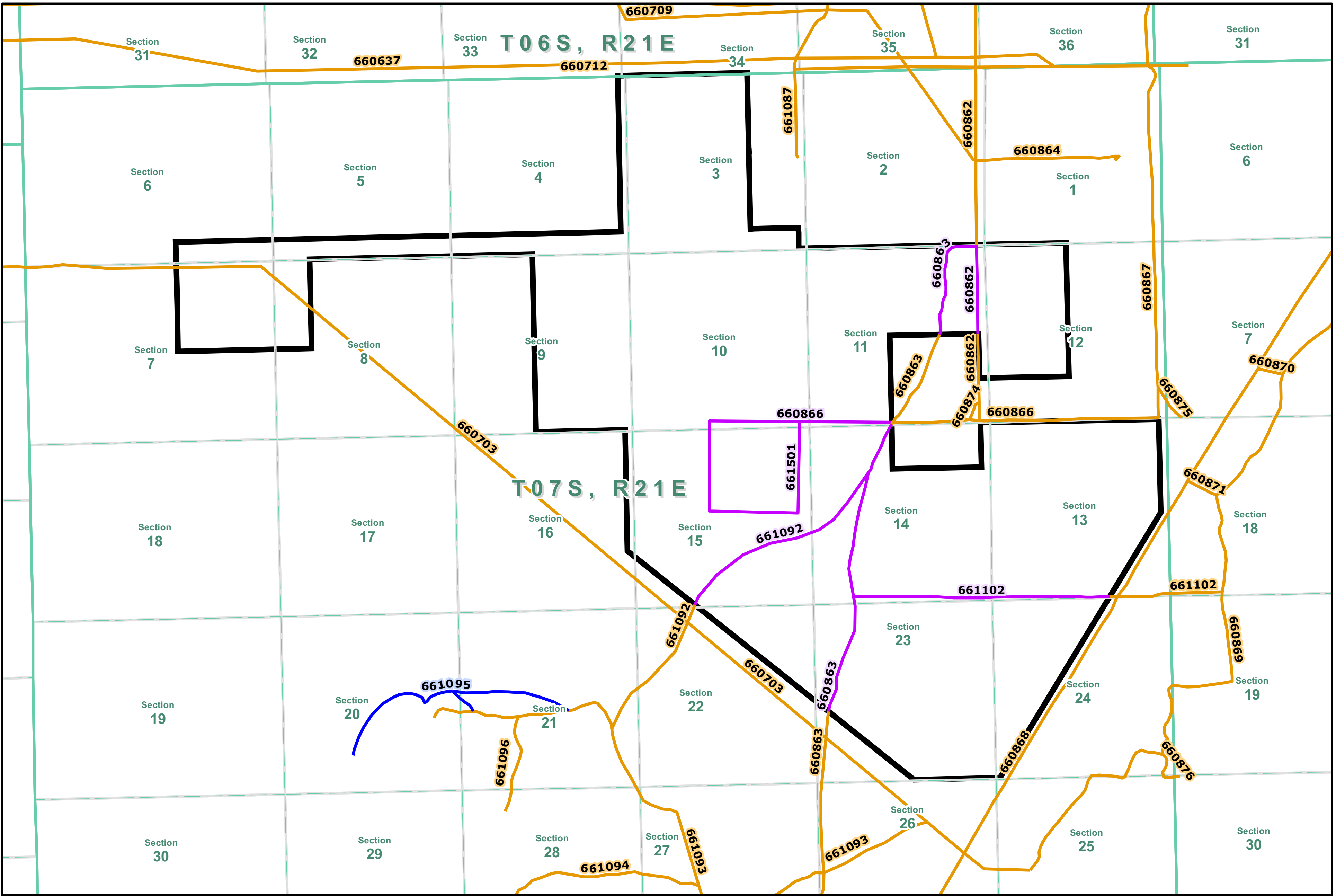


Desert Quartzite Solar Project

Figure 1
Project Area
NECO Plan Route Designations

Desert Quartzite, LLC

October 2015


T06S, R21E
T07S, R21E
Section 31
Section 32
Section 33
Section 34
Section 35
Section 36
Section 31
Section 6
Section 5
Section 4
Section 3
Section 2
Section 1
Section 6
Section 7
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660712
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660862
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660867
660863
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660874
660866
660866
660870
660875
661501
660871
661092
660703
661102
661102
660869
661092
660703
660863
661095
661096
660863
660868
660876
661094
661093
661093

Desert Quartzite, LLC
Desert Quartzite Solar Project

NECO Plan Route

▬ Open Route
▬ Open Route Subject to Closure (Due to Project)
▬ Closed Route

Figure 2
NECO Plan Routes within Project Boundary

October 2015

V:\Projects\GIS_Proj\FirstSolar\DesertQuartziteSite\incoming\fromBLM\Fig2_NECO_PlanRoutesWithinProjectBoundary.mxd

APPENDIX M

BIOLOGICAL RESOURCES TECHNICAL REPORT

BIOLOGICAL RESOURCES TECHNICAL REPORT
DESERT QUARTZITE SOLAR PROJECT
BLM CASE FILE NUMBER CACA-49397
RIVERSIDE COUNTY, CALIFORNIA

Prepared for
BUREAU OF LAND MANAGEMENT
Palm Springs South Coast Field Office
1201 Bird Center Drive
Palm Springs, CA 92262
&
DESERT QUARTZITE, LLC
135 Main Street, 6th floor
San Francisco, CA 94105

Prepared by:
IRONWOOD CONSULTING INC.
1030 Nevada Street, Suite 201
Redlands, CA 92374

January 2014

Updated August 2015

Updated January 2016

TABLE OF CONTENTS

LIST OF ACRONYMS V

SUMMARY 1

1.0 INTRODUCTION 3
  1.1 PURPOSE 3
  1.2 SITE LOCATION 3
  1.3 SITE CHARACTERISTICS 5
  1.4 STUDY AREA 7
  1.5 PROJECT SUMMARY 9

2.0 METHODS 10
  2.1 SPECIAL STATUS SPECIES DEFINITION 10
  2.2 PRELIMINARY MAPPING 10
  2.3 SOILS 10
  2.4 RAINFALL ANALYSIS 12
  2.5 STUDY AREA 12
  2.6 BASELINE SAMPLING 13
  2.7 BOTANICAL STUDIES 13
    2.7.1 Special Status Plant Species 13
    2.7.2 Cacti and Yucca 17
    2.7.3 Special Status Vegetation Communities 17
    2.7.4 Non-Native and Invasive Species 17
    2.7.5 Inholding (Historical Jojoba Farm) 18
  2.8 WILDLIFE SURVEYS 18
    2.8.1 Amphibians 18
    2.8.2 Reptiles 20
    2.8.3 Avian 22
    2.8.4 Mammals 46

3.0 RESULTS 51
  3.1 RAINFALL ANALYSIS 51
  3.2 BOTANICAL SURVEYS 52
    3.2.1 Special Status Plant Species 52
    3.2.2 Cacti and Yucca 70
    3.2.3 Special Status Vegetation Communities 70
    3.2.4 Non-Native and Invasive Species 74
    3.2.5 Inholding (Historical Jojoba Farm) 77
  3.3 WILDLIFE SURVEYS 78
    3.3.1 Amphibians 83
    3.3.2 Reptiles 84
    3.3.3 Avian 90
    3.3.4 Mammals 107
    3.3.5 Other Sensitive Species Noted During Surveys 113

4.0 RECOMMENDED PROTECTION MEASURES 115
  4.1 GENERAL MEASURES 115
  4.2 BOTANICAL RECOMMENDATIONS 117
    4.2.1 Special Status Plant Species 117
    4.2.2 Cactus and Yucca 117

4.2.3 Special Status Vegetation Communities 117
4.2.4 Non-Native and Invasive Species 117
4.3 WILDLIFE RECOMMENDATIONS 118
4.3.1 Amphibians 118
4.3.2 Reptiles 118
4.3.3 Avian 120
4.3.4 Mammals 122
4.4 COMPENSATORY MITIGATION 122
5.0 REFERENCES 124

LIST OF FIGURES

Figure 1 Regional Setting 4
Figure 2 Study Area 8
Figure 3 Soil Types 11
Figure 4 Baseline Points 15
Figure 5 Standing Water 19
Figure 6 Migratory Bird Survey Locations 24
Figure 7 Avian Line Transect Locations 39
Figure 8 2013-2015 Golden Eagle Observation Point Locations 44
Figure 9 Acoustic Bat Monitor Locations 48
Figure 10 Combined Plants Map 54
Figure 11 Harwood’s Milk Vetch (*Astragalus insularis* var. *harwoodii*) Distribution 58
Figure 12 Inholding 2015 Plant Survey 59
Figure 13 Abram’s Prostrate Spurge (*Euphorbia abramsiana*) and Utah Vine Milkweed (*Funastrum utahense*) Distribution 61
Figure 14 Ribbed Cryptantha (*Cryptantha costata*) Distribution 64
Figure 15 Harwood’s Eriastrum (*Eriastrum harwoodii*) Distribution 66
Figure 16 Desert Unicorn Plant (*Proboscidea althaeifolia*) Distribution 69
Figure 17 Vegetation Map 71
Figure 18 Sahara Mustard (*Brassica tournefortii*) Distribution 75
Figure 19 Desert Tortoise Sign 85
Figure 20 Mojave Fringe-Toed Lizard (*Uma scoparia*) Distribution 88
Figure 21 Average Numbers of Birds Recorded during Migration Surveys by Date 91
Figure 22 Burrowing Owl Class 1-3 Burrows 99
Figure 23 Raptor nests detected during golden eagle survey 102
Figure 24 Active Kit Fox Burrows/Camera Locations 109

LIST OF TABLES

Table 1 Adjacent Land Use 5
Table 2 Desert Tortoise Data Recorded 20
Table 3 Migration Point Locations 23
Table 4 Migration Point Visits -- Spring 2013-Fall 2014 25
Table 5 Line Transect Start and End Points 28
Table 6 Summary of Line Transect Surveys Conducted April 2013 through February 2015 29
Table 7 Golden Eagle Observation Points and Survey Dates 43
Table 8 Historical Winter Rainfall Data (inches)[1] 51
Table 9 Rainfall 2012 and 2013 (inches)[1] 51
Table 10 Blythe Rainfall: October 2014-March 2015 51
Table 11 Special Status Plants Found on Site 53
Table 12 Non-Native Plants Found on Project Site (Fall 2012 and Spring 2013 & 2015) 74
Table 13 Special Status Wildlife Species 79
Table 14 Lizards Found on Project Site 87
Table 15 Snakes Found on Project Site 87
Table 16 Total Numbers of Each Species Detected by Season and Year 92
Table 17 Earliest and latest dates for most commonly detected species 94
Table 18 Analysis of Avian Line Transect Results Spring 2013 – Winter 2014-15. 95
Table 19 Burrowing Owl Phase II Results from Fall 2012 and Spring 2013 and 2014 95
Table 20 Determination of Burrows Occupied by Burrowing Owls Prior to Breeding Season 100
Table 21 Burrows Occupied During Breeding Season 100
Table 22 Bird Nests (Including Raptor/Raven) Detected on the Project Site, Spring 2013 and 2014. 105
Table 23 Baseline Points: Small Mammals, April 2013 107
Table 24 Desert Kit Fox Presence, April 2013 108
Table 25 Bat Species Potentially Occurring within Study Area 112
Table 26 Minutes Per Night of Acoustic Activity by Site and Species or Acoustic Category 113

LIST OF PHOTOGRAPHS

Photograph 1 Inholding 6
Photograph 2 Detector 5, Microphyll Woodland 49
Photograph 3 Harwood’s Milkvetch (*Astragalus insularis* var. *harwoodii*) 57
Photograph 4 Abram’s Spurge (*Euphorbia abramisana*) (R), growing next to common *Euphorbia micromeria* (L) 57
Photograph 5 Ribbed Cryptantha (*Cryptantha costata*) (L) growing alongside the common *Cryptantha angustifolia* 63
Photograph 6 Harwood’s Eriastrum (*Eriastrum harwoodii*) 63
Photograph 7 Desert Unicorn Plant (*Proboscidea althaeifolia*) 68

Photograph 8 Desert Dry Wash Woodland 68
Photograph 9 Sonoran Desert Scrub 73
Photograph 10 Sand Dunes 73
Photograph 11 *Uma scoparia* Male, Captured for Identification to the Species Level 89
Photograph 12 Desert Kit Fox Family Captured on Camera on Project Site, April 29, 2013 110

LIST OF ACRONYMS

ACEC	Area of Critical Environmental Concern
amsl	above mean sea level
BBCS	Bird and Bat Conservation Strategy
BLM	U.S. Bureau of Land Management
BO	Biological Opinion
BRTR	Biological Resources Technical Report
BUOW	Burrowing Owl
CAA	California Airport Authority
CDFW	California Department of Fish and Wildlife
CDNPA	California Desert Native Plant Act
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CHU	Critical Habitat Unit
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CNPSEI	California Native Plant Society's Electronic Inventory
DDWW	Dry desert Wash Woodland
Dr	Doctor
DTCC	Desert Tortoise Conservation Center
DWMA	Desert Wildlife Management Area
EIS	Environmental Impact Statement
FEIS	Final Environmental Impact Statement
FESA	Federal Endangered Species Act
ft	Feet
GBBO	Great Basin Bird Observatory
GPS	Global Positioning System
HMA	Herd Management Area

HMANA	Hawk Migration Association of North America
HMP	Habitat Management Plan
I-10	Interstate 10
IWMP	Integrated Weed Management Plan
kHz	Kilohertz
kv	Kilovolt
m	Meter
MBTA	Migratory Bird Treaty Act
MCL	Mean carapace length
mm	Millimeters
MP	Migratory Point
mph	Miles per hour
NECO	Northern and Eastern Colorado Coordination Plan
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service
O&M	Operations and Maintenance
OHV	Off-Highway Vehicle
POD	Plan of Development
PST	Pacific Standard Time
PV	Photovoltaic
ROW	Right of Way
SCE	Southern California Edison
SSC	Species of Special Concern
URTD	Upper respiratory tract disease
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UTM	Universal Transverse Mercator
VRMP	Vegetation Resources Management Program
WEAP	Workers Environmental Awareness Program

SUMMARY

Desert Quartzite, LLC has requested a right-of-way grant from the Bureau of Land Management (BLM) to construct and operate a new solar photovoltaic energy generating facility, near the interstate boundary of California and Arizona, just east of Blythe in unincorporated Riverside County, California (Case File Number CACA-49397). The solar facility and associated generation interconnection line (gen-tie line) are collectively referred to in this report as the Desert Quartzite Solar Project (Project). The Project site is located outside the boundaries of any Area of Critical Environmental Concern, Desert Wildlife Management Area, BLM Wilderness Area, or designated Critical Habitat Unit.

This report provides a comprehensive description of methods and results of biological resource surveys and investigations conducted in the fall of 2012 to the spring of 2015 within the Study Area (See Section 1.4). The purpose of the surveys was to provide information supporting consultation between BLM, United States Fish and Wildlife Service (USFWS), and California Department of Fish and Wildlife (CDFW) with respect to the California and Federal Endangered Species Acts, National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). Survey standards and recommended protection measures described in this report are consistent with the Best Management Practices and Guidance Manual: Desert Renewable Energy Projects (Renewable Energy Action Team 2010).

Focused botanical surveys resulted in the documentation of six special status (California Native Plant Society list status) plant species within the Study Area including Harwood's milkvetch (*Astragulus insularis var. harwoodii*), Abram's spurge (*Chamaesyce abramsiana*), ribbed cryptantha (*Cryptantha costata*), Harwood's eriastrum (*Eriastrum harwoodii*), Utah vine milkweed (*Funastrum utahense*) and desert unicorn-plant (*Proboscidea althaeifolia*). More than 124 species of plants were identified during the surveys. Federal or state listed (endangered or threatened) plant species were not observed.

Full-coverage surveys for desert tortoise (*Gopherus agassizii*), the only animal species listed as federal and state endangered with potential to occur on site, were conducted in 2013. Tortoise sign observed during the survey consisted of six carcasses, all-greater than 4 years old and disarticulated, and one set of tortoise tracks. Live desert tortoises were not observed during surveys; however, a tortoise was observed incidentally within the buffer zone during avian surveys

Numerous Mojave fringed-toed lizards (*Una scoparis*), which is a species of concern, were found while performing surveys in the western portion of the Project where soils consist of much finer sand. Other special status wildlife species observed or likely to occur within the Project site included loggerhead shrike (*Lanius ludovicianus*), burrowing owl (*Athene cunicularia*), LeConte’s thrasher (*Toxostoma lecontei*), American badger (*Taxidea taxus*), desert kit fox (*Vulpes macrotis arsipus*), pallid bat (*Antrozous pallidus*), cave myotis (*Myotis velifer*), and western mastiff bat (*Eumopus perotis*).

1.0 INTRODUCTION

1.1 PURPOSE

This Biological Resources Technical Report (BRTR) provides a comprehensive description of methods and results of biological resource surveys and investigations conducted to date within the Study Area (See Section 1.4) for the Desert Quartzite Solar Project (Project) as proposed by Desert Quartzite, LLC. The purpose of the surveys is to support consultations between Bureau of Land Management (BLM) and United States Fish and Wildlife Services (USFWS) under Section 7 of the Federal Endangered Species Act (FESA), and any necessary incidental take authorization from the California Department of Fish and Wildlife (CDFW) with respect to the California Endangered Species Act (CESA). The data contained within this report also provides information to promote compliance with requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). Survey standards and recommended protection measures described in this report are consistent with the Best Management Practices and Guidance Manual: Desert Renewable Energy Projects (Renewable Energy Action Team 2010).

1.2 SITE LOCATION

The Project site is located in unincorporated Riverside County within California. It is situated south of Interstate 10 (I-10), approximately ten miles west of the City of Blythe, California (Figure 1). The Project site is located on the Ripley and Roosevelt Mine 7.5-Minute United States Geological Survey (USGS) topographic quadrangle. Elevation at the site ranges from approximately 320 to 475 feet above mean sea level (amsl). The Project is located on the Palo Verde Mesa within BLM land designated as Multiple-Use Class M (Moderate Use). The Project site is located outside the boundaries of any Area of Critical Environmental Concern (ACEC), Desert Wildlife Management Area (DWMA), BLM wilderness area, or USFWS designated critical habitat unit for desert tortoise. The Mule Mountains ACEC, which was established to manage prehistoric resources, is located less than one mile west of the Project site. The Chuckwalla DWMA for desert tortoise is located approximately twenty miles west and the current Herd Management Area (HMA) for burros is located approximately five miles south of the Project site. Please see Table 1 for additional adjacent land uses.

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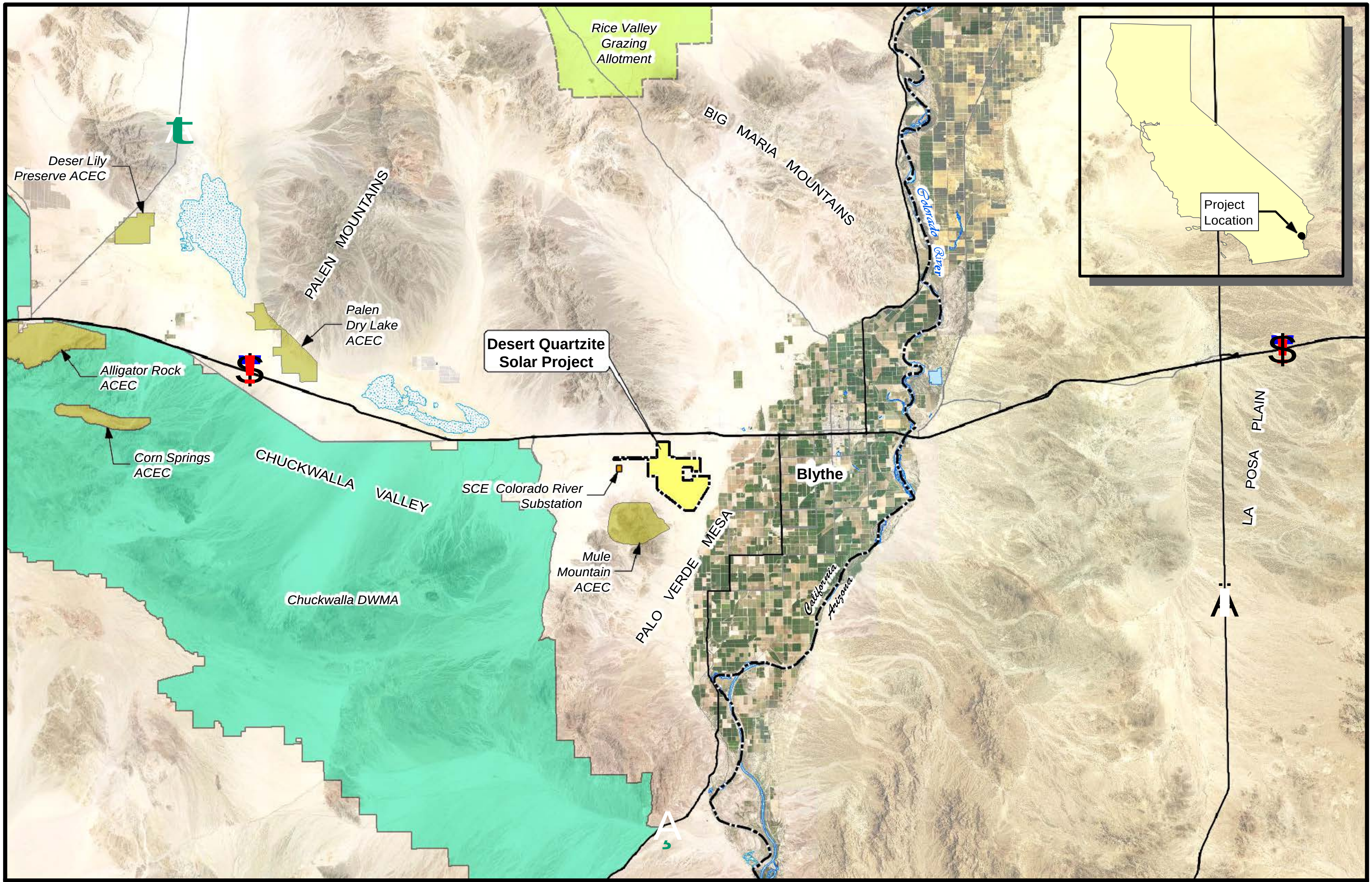

Rice Valley Grazing Allotment
BIG MARIA MOUNTAINS
Deser Lily Preserve ACEC
PALEN MOUNTAINS
Palen Dry Lake ACEC
Desert Quartzite Solar Project
Alligator Rock ACEC
Corn Springs ACEC
CHUCKWALLA VALLEY
SCE Colorado River Substation
Mule Mountain ACEC
PALO VERDE MESA
Chuckwalla DWMA
Blythe
Colorado River
California
Arizona
LA POSA PLAIN
Project Location

🟨 Desert Quartzite Site Boundary

-·- State Boundary

🟧 Proposed SCE Colorado River Substation

🟩 BLM Grazing Allotment

▨ Area of Critical Environmental Concern (ACEC)

🟩 Desert Wildlife Management Area (DWMA)

0 5 10
Miles

DESERT QUARTZITE SOLAR PROJECT
DESERT QUARTZITE, LLC

Figure 1

Regional Setting

Table 1 Adjacent Land Use

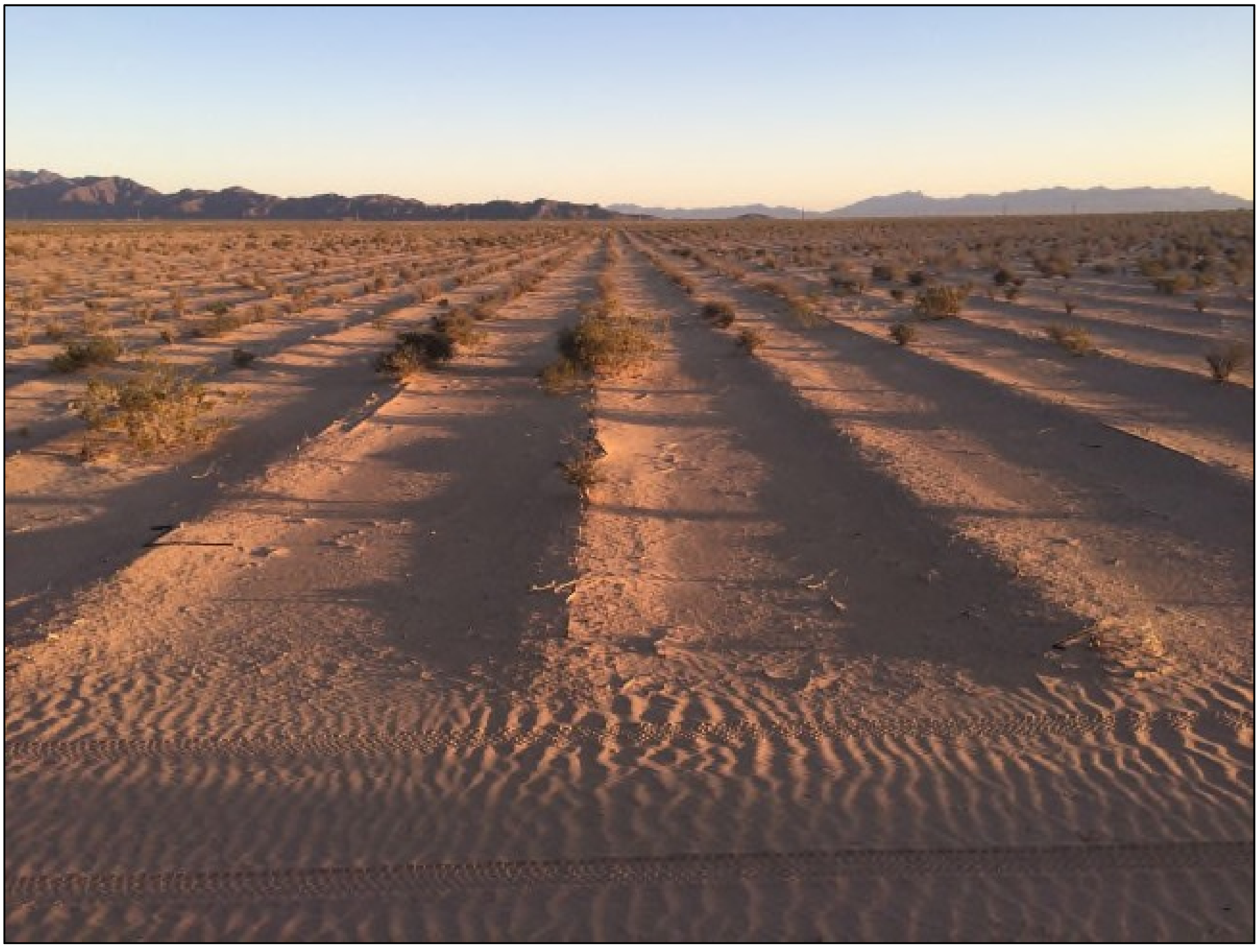
Direction	Land Uses
North	McCoy Mountains; McCoy Wash; BLM Limited MUC land with interspersed privately owned land and an existing solar facility, small single family home community of Mesa Verde, Interstate 10
East	Palo Verde Valley; privately owned agricultural land; some fallow land
South	Southern extent of Palo Verde Mesa; Mule Mountains; BLM Limited MUC land with interspersed privately owned land
West	Southern California Edison's Colorado River Substation; Mule Mountains; BLM Moderate and Limited MUC land with interspersed privately owned land

1.3 SITE CHARACTERISTICS

Based on visual observations of surface soils, soils within the Project site appear to be dominated by gravely sands and sandy loams, and ranged in texture from very fine sand to gravel. Formal site soil data from the Natural Resources Conservation Service (NRCS) is not available in the northwest portion of the Project site. Desert pavement is present in the extreme northwest and southwest limits of the Project site. Human disturbances within the Project site include off-highway vehicle (OHV) activity, existing utility corridors (i.e., overhead power transmission lines and underground petroleum pipeline), residential trash dumping and access roads for both utilities and fallow agriculture sites.

In 2014, a 160-acre inholding (privately owned land surrounded by public lands), which was originally excluded from the biological surveys that took place in 2008 and 2012 on the surrounding BLM lands, became part of the Project. The inholding is a historical jojoba farm that is a square 160-acre parcel situated within diffuse creosote bush scrub (Photograph 1). Presumably the farm was constructed in the late 1970s to early 1980s and abandoned within 10 years thereafter. The entire site was either chained or bulldozed and is surrounded by bulldozed berms about 4 to 5 ft. high. Soil is soft decomposed granitic sand with occasional patches of gravel and larger cobbles. There is a well-traveled access road around the inner perimeter of the berms on all four sides.

Photograph 1 Inholding

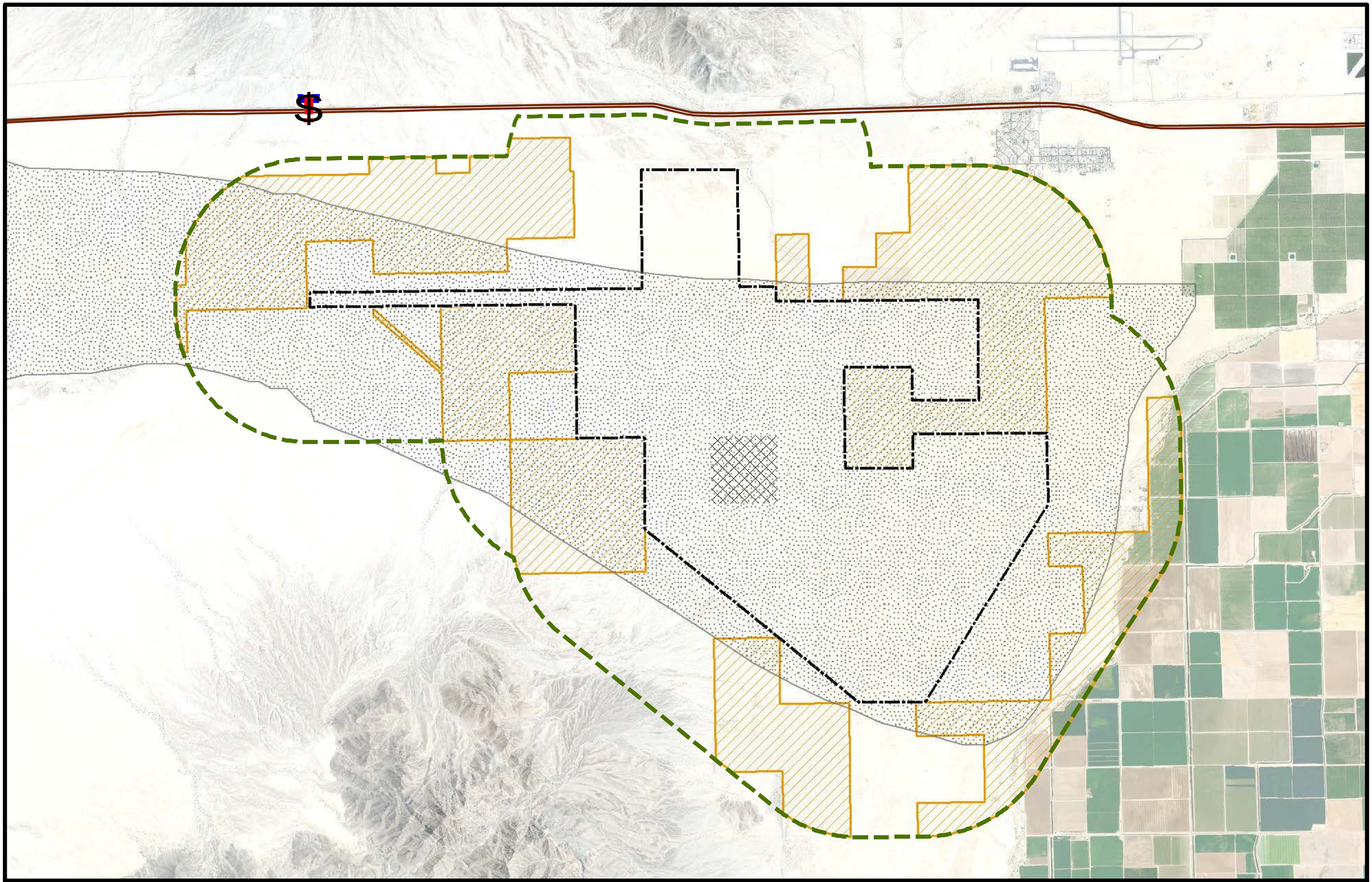


1.4 STUDY AREA

For the purposes of this report, the Project site is the area that was described in the updated Application for Transportation and Utility Systems and Facilities on Federal Lands (SF 299). This updated version decreased the size of the Project site from 7,272 acres to the current 4,885 acres. The Project site includes the electrical generation interconnection (gen-tie) transmission line to the existing Southern California Edison's (SCE) Colorado River Substation. Generally, the Study Area is the combination of the Project site and a one-mile buffer around the Project site (Figure 2). Specific species survey protocols may require a buffer larger or smaller than the one established for this project (e.g., golden eagles and bats). This buffer area will allow for adjustments to access roads and or other project related activities outside of the current proposed location. Since the gen-tie line is included as part of the Project site, the Study Area also included this area.

In 2014, a 160-acre inholding (privately owned land) situated within the Project site, which was originally excluded from the biological surveys that took place in 2008 and 2012 on the surrounding BLM lands, was added to the Project. This area has since been surveyed and has become part of the larger Project. With the inclusion of the inholding, the current acreage of the entire Project site is 5,045 acres.

It should be noted that although this inholding is privately owned land and not necessarily under BLM jurisdiction, all BLM protocols were followed ensuring that the surveys on this parcel are consistent throughout the Desert Quartzite Solar Project.



- 1-Mile Site Boundary Buffer
- ▩ Inholding
- ░ Sand Corridor
- ▭ Desert Quartzite Site Boundary
- ▨ Private Lands

DESERT QUARTZITE SOLAR PROJECT
DESERT QUARTZITE, LLC

Figure 2

Study Area

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1.5 PROJECT SUMMARY

The Project, as proposed, is described in general terms below. Specific details of the Project description are included in other related documents including the Plan of Development (POD). The Project would include the solar facility (where the electrical power will be generated) and a 230-kilovolt (kV) transmission line (gen-tie line). The solar facility would consist of several main components, all located within the Project security and permanent desert tortoise fencing:

- Main Generation Area – Photovoltaic (PV) arrays, combining switchgear, overhead lines, and access corridors;
- Operations and Maintenance (O&M) Facility;
- On-site substation; and
- Fencing and lighting.

The Project would interconnect with the regional transmission system via a 230-kV single-circuit gen-tie line that will be located on the western portion of the Project site and follow a 160-foot-wide transmission right of way (ROW) to the existing SCE's Colorado River Substation located approximately one mile west of the solar facility's western boundary. Construction of the Project would be completed in three basic phases: 1) pre-construction activities, 2) site preparation; and 3) construction and installation of the solar photovoltaic (PV) modules and electrical components, including the gen-tie line.

2.0 METHODS

2.1 SPECIAL STATUS SPECIES DEFINITION

For assessment purposes in this report, a special status species has been defined as a plant or wildlife species that meets one or more of the following criteria:

- Designated as either rare, threatened, or endangered by CDFW or the USFWS, and are protected under either CESA or FESA;
- Candidate species being considered or proposed for listing under these same Acts;
- Species of special consideration as referenced in the Northern and Eastern Colorado Coordinated Coordination Plan (NECO) and Final Environmental Impact Statement (FEIS) (Bureau of Land Management 2002) and Biological Opinion for the NECO Plan (United States Fish and Wildlife Service 2005);
- State Species of Special Concern as designated by CDFW;
- Considered endangered, threatened, or rare pursuant to CEQA Guidelines, Section 15380; or
- Considered listed under special status by California Native Plant Society (CNPS).

2.2 PRELIMINARY MAPPING

A large-scale aerial photograph of the Study Area was created and used to preliminarily map vegetation communities, soil substrates, and other areas of interest during the survey. Such areas included those that appeared to have unique plant assemblages or areas of interest under NECO including Desert Dry Wash Woodland habitat. The preliminary mapping effort allowed surveyors to focus on areas most likely to support special status species and habitats, while characterizing each type of vegetation community and soil substrate.

The 2008 mapping depicted a Project site of approximately 7,272 acres. The southern portion of the original site boundary has been removed. The current Project site on BLM lands is 4,885 acres. Although the inholding had always been on the maps, it was depicted as “Not A Part” of the Project. In 2014, all mapping started to show the inclusion of the inholding.

2.3 SOILS

Soils within the Project site are dominated by gravely sands and sandy loams, and ranged from very fine sand to gravel (Figure 3). The Natural Resources Conservation Service (NRCS) Web Survey contained data for the majority of the Project site. NCRS data is not available for the northwest portion of the Project site.

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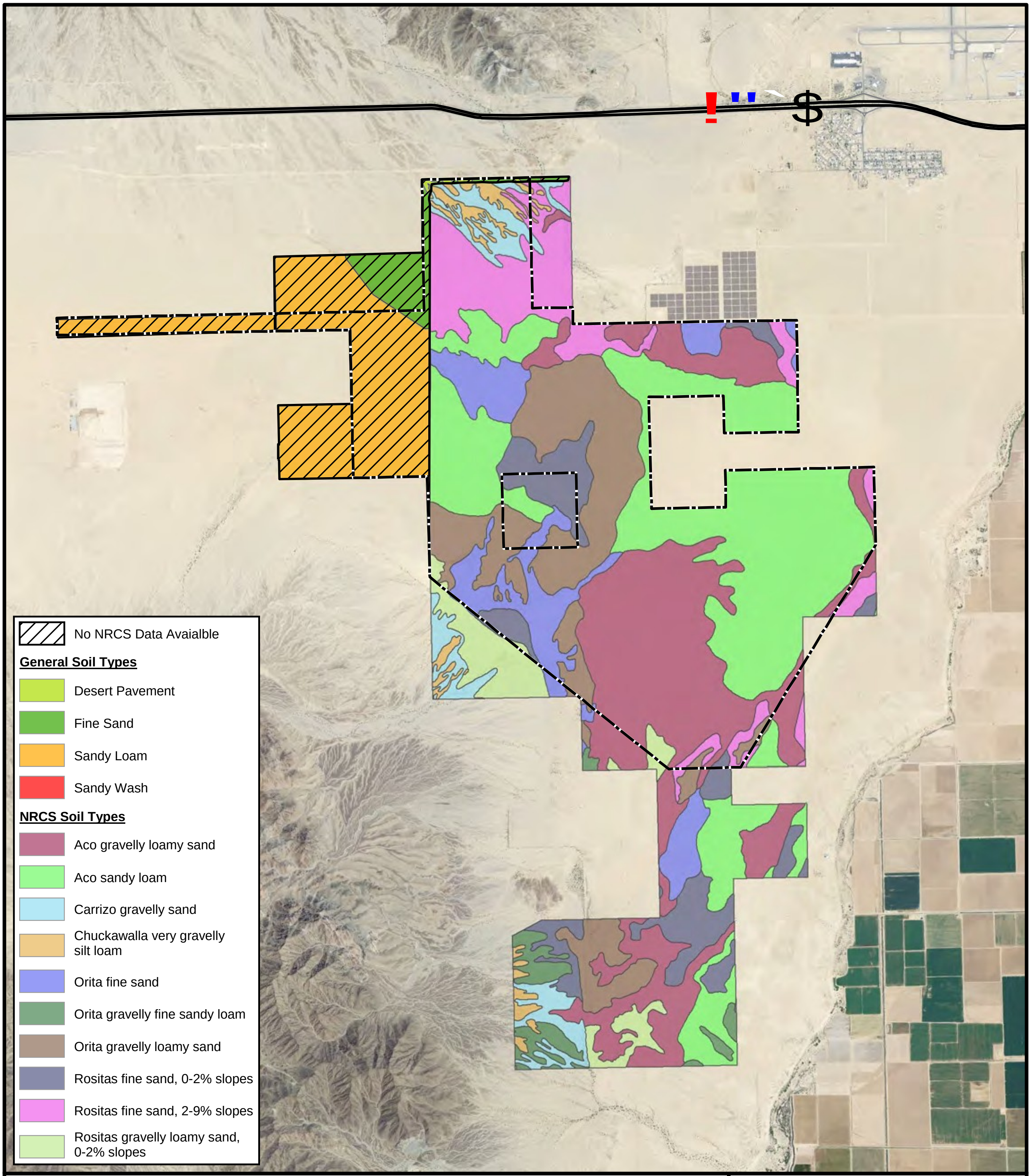

▨ No NRCS Data Avaialble
General Soil Types
Desert Pavement
Fine Sand
Sandy Loam
Sandy Wash
NRCS Soil Types
Aco gravelly loamy sand
Aco sandy loam
Carrizo gravelly sand
Chuckawalla very gravelly silt loam
Orita fine sand
Orita gravelly fine sandy loam
Orita gravelly loamy sand
Rositas fine sand, 0-2% slopes
Rositas fine sand, 2-9% slopes
Rositas gravelly loamy sand, 0-2% slopes
Proposed Desert Quartzite Site Boundary
0
1
Miles

DESERT QUARTZITE SOLAR PROJECT

DESERT QUARTZITE, LLC

Figure 3

Soil Types

2.4 RAINFALL ANALYSIS

Measurements of total and average precipitation during winter periods (October through March) are important in determining the efficacy of both desert tortoise and special status plant surveys. Per the USFWS desert tortoise protocol, data was obtained from the Western Regional Climate Center (2013). The Blythe CAA Airport, California weather station [elevation 390 feet (ft) above mean sea level (amsl)], approximately three miles north of the Project site and is the most proximate station. The rainfall data that was obtained and utilized for the surveys can be located in Appendix A.

Surveys performed during fall 2014 through spring 2015 were performed during extreme historical drought conditions; however, the actual rainfall on the Study Area was only slightly below average.

2.5 STUDY AREA

Several species of flora and fauna known to occur on or near the Project are accorded “special-status” by federal and state agencies because of their recognized rarity or potential vulnerability to extinction. These species typically have a limited geographic range and/or limited habitat and are collectively referred to as “special-status” species. Additional species protected by other regulations within the region were added to the overall species survey list and are referred to in this document as the target species. According to the NECO Plan (Bureau of Land Management and California Department of Fish and Game 2002) surveys must be completed where a project intersects the species’ ranges as represented and mapped within the plan. Since the Project site is within NECO, species covered in this document but not necessarily recognized as a “special status” species were added to the target species list. Managed big game species and burros (protected by the Wild Free-Roaming Horse and Burro Act) were also included as target species. Desert kit fox (*Vulpes macrotis*) being a protected furbearer, per California Department of Fish and Game Code (California Department of Fish and Wildlife 2013b), was also included as a target animal species.

Comprehensive biological resource surveys designed to meet all applicable USFWS, BLM, and CDFW requirements were performed in the fall of 2012 to the spring of 2015 depending on survey specifics. Surveys for biological resources were conducted within the Project site and up to a one-mile buffer around the proposed disturbance area. The entire 5,045 acre survey area with the buffer area will collectively be called the Study Area within this BRTR. (The Project Site Boundary and the Site Boundary Buffer depicted on Figure 2 make up the Study Area.) Any modifications to this Study Area due to specific protocol or guideline changes will be discussed for the species for which they occur.

During the fall of 2012 and spring of 2013, a full focused rare plant survey was performed on the Project site. In the spring of 2015, plant surveys were also completed for the inholding portion of the Project. In addition to the focused rare plant surveys, Project biologists completed the following surveys within the

Study Area: vegetation mapping, general wildlife surveys, protocol desert tortoise surveys, protocol western burrowing owl surveys and avian point count and migration surveys. Other studies performed on site were the spadefoot and elf owl habitat assessments and the protocol golden eagle surveys. The section below details the specific methodologies and protocols utilized for the Project's biological resources surveys within the Study Area.

"Established protocols," which in this case is a species listed as threatened or endangered by the federal or state government, are guidelines promulgated by USFWS or CDFW, respectively. In an effort to gain consensus regarding the survey methodologies to be employed, the Project team initiated discussions with USFWS, BLM, and CDFW (hereafter collectively referred to as "the agencies"). The protocols were submitted for review to the agencies and modified slightly based on input received from the agencies.

The non-avian wildlife species detected in the Study Area are listed in Appendix B, the bird species list is in Appendix D and the plant species list for the Study Area are provided in Appendix E and F.

2.6 BASELINE SAMPLING

Twelve primary sampling stations (vegetation, avian, reptile, and small mammal sampling), were established (Figure 4) to provide information of species composition and provide baseline quantitative data for future monitoring associated with the Project. Ten sampling stations were established within the Project site and two offsite as controls. Sampling stations were randomly generated to obtain a sufficient representation of the area. Each sampling location represented the center or corner point of larger linear transects or grids depending on the specific survey methodology as described in the following sections.

2.7 BOTANICAL STUDIES

Surveys were performed to determine the presence and distribution of special status plant species and estimates of succulent species (cacti and yucca) within the Study Area. Vegetation sampling was also performed under the baseline survey effort as described in this section.

2.7.1 Special Status Plant Species

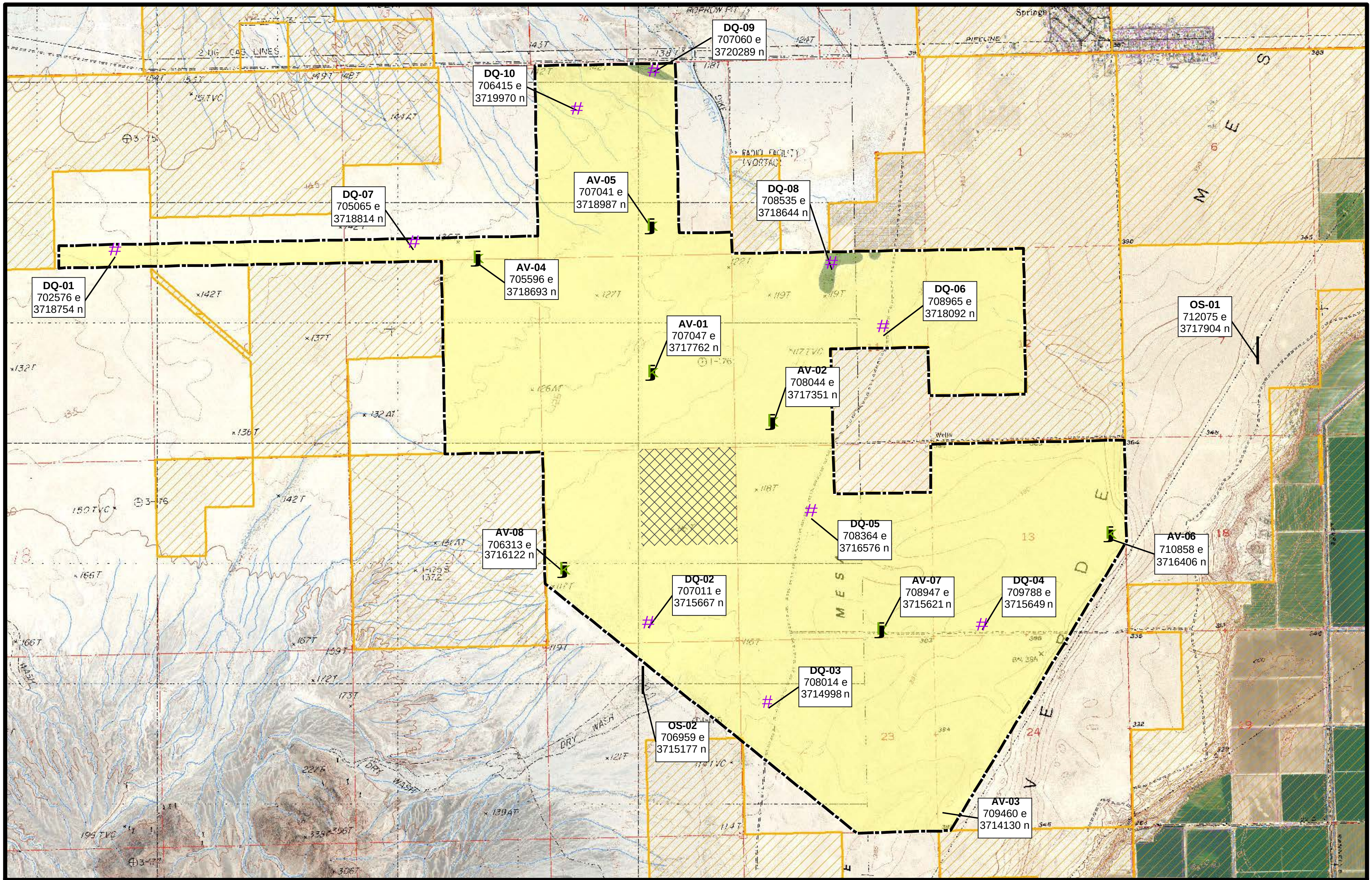
Special status plant species have been identified as potentially occurring in the vicinity of the Project site. The site specific special status target plant species list (Appendix C) was generated by searching multiple databases and reference sources for occurrence records, including:

- California Natural Diversity Database (California Department of Fish and Wildlife 2013a);
- Northern and Eastern Colorado Desert Coordinated Management Plan (Bureau of Land Management 2002);
- Consortium of California Herbaria, 10,000 meter search centered at Project site (Consortium of

California Herbaria 2012); and

- BLM Palm Springs South Coast Field Office Sensitive Plant List: Desert Species (Bureau of Land Management 2012).

In addition, records were reviewed from the greater southern California desert region.


DQ-09
707060 e
3720289 n
DQ-10
706415 e
3719970 n
AV-05
707041 e
3718987 n
DQ-08
708535 e
3718644 n
DQ-07
705065 e
3718814 n
AV-04
705596 e
3718693 n
DQ-01
702576 e
3718754 n
DQ-06
708965 e
3718092 n
OS-01
712075 e
3717904 n
AV-01
707047 e
3717762 n
AV-02
708044 e
3717351 n
DQ-05
708364 e
3716576 n
AV-08
706313 e
3716122 n
AV-06
710858 e
3716406 n
DQ-02
707011 e
3715667 n
AV-07
708947 e
3715621 n
DQ-04
709788 e
3715649 n
DQ-03
708014 e
3714998 n
OS-02
706959 e
3715177 n
AV-03
709460 e
3714130 n

Baseline Point Location

Avian

Avian

♦ Off Site

On Site

▭ Desert Quartzite Site Boundary

▨ Site Boundary

Private Land

▩ Inholding

🟩 Desert Wash Woodland (microphyll woodland)

🟨 (microphyll woodland)

Sonoran Creosote Bush Scrub

0 500 1,000

Meters

DESERT QUARTZITE SOLAR PROJECT
DESERT QUARTZITE, LLC

Figure 4

Baseline Points

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A list of special status target plants, as defined in Section 2.5, was assembled from a 12-quad CNDDB search centered on Ripley and Roosevelt Mine quads, as well as California Consortium of Herbaria records queried within a 10,000 meter (m) radius of the site (Appendix C). Additional information (especially on probability of occurrence and habitat) was gathered from several biologists with extensive experience in the surrounding areas. Rarity ranks conform to the CDFW CNDDB plant listing of April 2013 (California Department of Fish and Wildlife 2013a).

Surveys were developed and conducted to maximize the likelihood of locating special status plant species or special status natural communities within the Project site. The primary objective was to identify all plant species to the taxonomic level (i.e., species, subspecies, or variety) necessary to determine rarity status.

Rare Plant Surveys were designed and timed to conform to practices detailed in BLM and CDFW protocols; BLM: Survey Protocols Required for NEPA/ESA Compliance for BLM Special Status Plant Species (Bureau of Land Management 2009). For the CDFW, the following protocol is required: Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (California Department of Fish and Wildlife 2009). In summary, these protocols emphasize these major methods:

- Timing: Surveys should be conducted during the optimal season for positive identification of all target plant species, as well as justifiable on-site conditions for finding plants (adequate seasonal rainfall).
- Survey Intensity: Site coverage and surveyor spacing should be adequate for seeing and recording all potential rare plant species.
- Surveyor Qualifications: Surveyors should have experience identifying California desert rare plants, particularly Colorado Desert flora, be trained on the specific target plants through orientation meetings, specimen examples, and reference population checks prior to performing surveys on site.

Two formal Rare Plant Surveys were conducted across the BLM lands and one formal Rare Plant Survey was completed on the inholding. The details for each survey are as follows:

- Fall 2012 (September 11 - 19) surveys were conducted after significant summer monsoon rainfall germinated abundant annuals and timing was good to observe and identify all potentially occurring fall-blooming target plants. Full coverage at 10 m spacing occurred across approximately 50 percent of the site (on loose sandy-gravelly soil in creosote bush scrub), and 20 m spacing was done on the remaining dry sandy areas where there was not significant annual germination.

- Spring 2013 (March 18 - 30) surveys were also conducted. Localized winter rainfall was enough to germinate copious annual blooms, and the timing was excellent for observing and identifying all potentially occurring target plants. Full coverage transects were performed at 10 m spacing across the entire Study Area.
- Spring 2015 (March 10-12) surveys were conducted on the 160-acre inholding. The survey was performed when the soil was still quite moist at a depth of about 3 inches. This survey provided 100 percent coverage of the entire parcel, including the surrounding berms. Transects were walked slowly along existing jojoba rows in North-South and South-North directions, at a spacing of less than 10 m between surveyors.

All data was recorded in triplicate form: paper data sheets, Global Positioning System (GPS) waypoints, and Pendragon handheld data collection forms. A Quality Control review of the data was provided by Ironwood staff and periodically posted for review by the Ironwood Project Manager on Ironwood's Egnyte website.

In addition to Rare Plant Surveys, botanists also compiled and surveyed for a general Floristic Plant List (Appendix E) with many voucher specimens, mapped vegetation communities, tracked weed infestations, and counted cacti.

2.7.2 Cacti and Yucca

Systematic sampling of succulents (cacti and yucca) was conducted during the fall 2012 plant surveys by botanists experienced with Colorado Desert flora. The purpose of this sampling effort was to estimate the number of individual cacti and yucca present. All species of cactus were documented and cumulative counts of the number of individual cacti were recorded. Yuccas were not observed on site.

2.7.3 Special Status Vegetation Communities

The science of vegetation classification is undergoing continued revision, with new nomenclature for previously described "vegetation communities." For the purposes of this report NECO common names (Bureau of Land Management 2002), with the latest nomenclature from **A Manual of California Vegetation, Second Edition** (Sawyer et al, 2009), and corresponding "Holland types" nomenclature (Holland 1986) were used for each of these communities described in this report.

2.7.4 Non-Native and Invasive Species

Non-native and invasive species were documented during both the fall 2012 and spring 2013 plant survey season. During the fall season survey, the surveyors identified two invasive and two weedy non-native plants on the Project site. Due to the fact the species were found as dried up stems, the general location of these weeds were noted, but not located with a GPS or recorded. During the spring season, surveyors performed a detailed survey account of non-native and invasive plants on the Project site. The purpose of this sampling effort was to estimate the number of non-native and invasive species that were present on the site. All non-native and invasive species were documented and cumulative counts of the number of individual species were recorded.

2.7.5 Inholding (Historical Jojoba Farm)

A cursory site check was performed by Michael Honer on February 24, 2015. Many common annuals and one target plant were observed leafing-out at that time. It was decided that survey timing should be in mid-March to catch most of the target plants in optimal identifiable condition. During the survey of March 10-12, the soil was still quite moist at a depth of about 3 inches.

Reference population checks were performed for the three special status species with the highest probability of being encounter during the survey: *Astragalus insularis* var. *harwoodii*, *Cryptantha costata*, and *Eriastrum harwoodii*. All three of these plants were located off-site from populations found during the spring 2013 surveys, and observed in flowering and/or fruiting condition on March 10, 2015.

This survey provided 100 percent coverage of the entire jojoba farm site, including the surrounding berms. Transects were walked slowly along the jojoba rows in North-South and South-North directions, at a spacing of less than 10 m between surveyors. This was appropriate spacing for detecting any special status plants, no matter how small or cryptic.

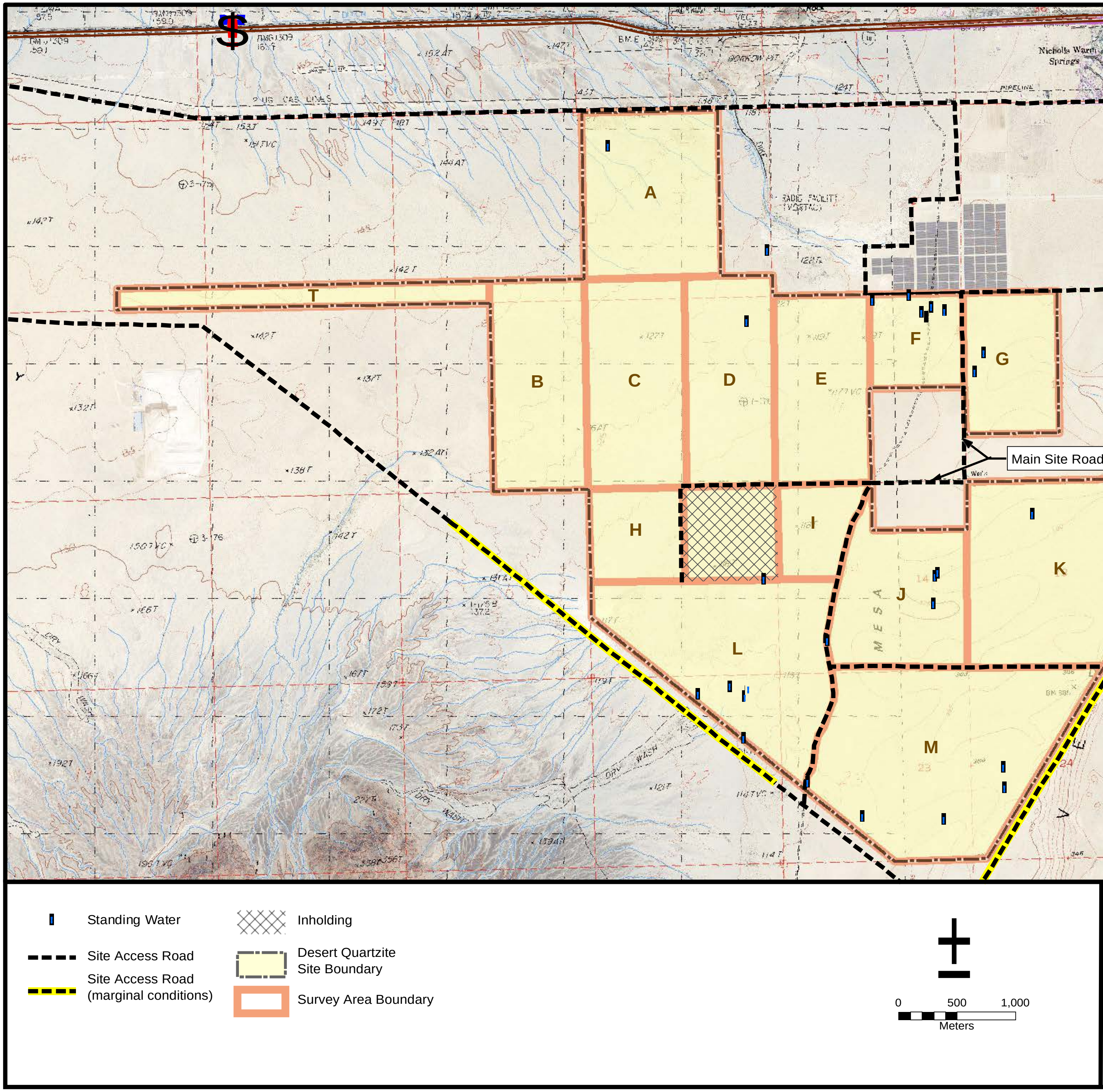
This survey was conducted during the optimal season for positive identification of all target plants, as well as justifiable on-site conditions for finding target plants.

2.8 WILDLIFE SURVEYS

2.8.1 Amphibians

2.8.1.1 Couch’s Spadefoot

There is one amphibian with the potential to be found on the Project site, Couch's spadefoot (*Scaphiopus couchii*). There were 27 different points in the Study Area identified as having standing water at some time from 2008 until 2012 (Figure 5). Two locations were identified as likely to support Couch’s spadefoot in the event of rains, due to the fact they were the most extant areas for having held water and exhibited a


Nicholls Warm Springs
Mesa Dr (Airport Exit)
Seeley Ave
A
T
B
C
D
E
F
G
Main Site Road
H
I
J
K
L
M
22nd Ave
Standing Water
Site Access Road
Site Access Road (marginal conditions)
Inholding
Desert Quartzite Site Boundary
Survey Area Boundary
0
500
1,000
Meters

DESERT QUARTZITE SOLAR PROJECT
DESERT QUARTZITE, LLC

Figure 5

Standing Water

#343 P:\GIS\Ironwood\Shared\Projects\Projects\Quartzite\ArcGIS project files\Water_Spots.mxd 8/26/2015 strong component of dry desert wash woodland plant species. One area was southeast of the existing solar facility and the second was south of the Project site in the Study Area buffer zone. Using this information, the surveyors monitored the areas during the monsoon season, summer of 2013, both to determine how long water was standing in these locations and to potentially identify if individuals were present.

2.8.2 Reptiles

2.8.2.1 Desert Tortoise Focused Surveys

Full-coverage protocol desert tortoise (*Gopherus agassizii*) surveys were conducted in the spring of 2013 (March 25 –April 15, 2013) according to the most current USFWS issued survey protocols (United States Fish and Wildlife Service 2010a). The protocols also provide methods to estimate the abundance of tortoises occurring within the Study Area. These desert tortoise surveys employed belt transects approximately 10 meters (33 feet) wide in order to provide 100 percent (full) coverage of the entire Study Area.

The survey crews consisted of highly experienced desert tortoise surveyors and field technicians of varying experience who attended field and training sessions prior to conducting surveys. The desert tortoise surveyors were divided into crews of approximately 3-4 people, with one or two highly experienced desert tortoise surveyors on each crew. Each of these crews typically surveyed approximately one square-mile section until the entire surveyed portion of the Study Area was covered.

All tortoise sign [e.g., live tortoises (all age classes), shell/bone/scutes, scats, burrows/pallets, tracks, egg shell fragments, and courtship rings] were recorded (Table 2). The location of tortoise sign was recorded on a Garmin GPS unit (GPS 72, 76, or 60CSx) using a unique identification code. In addition to recording sign with the GPS unit, standardized paper datasheets were completed. Data was entered from these datasheets into a Microsoft Access database, during post processing.

Table 2 Desert Tortoise Data Recorded

Type of Sign	Measurements	Estimates	Other
Live tortoise		Sex, age class	Location, activity
Cover site (burrow, pallet)	Width, height	Depth	Condition (active [excellent], inactive [good, fair, or poor]) and location. Each burrow was investigated by using a handheld mirror and/or flashlight to detect if a tortoise was present
Shell or bone (carcass or fragments)		Sex, age class, time since death	Location
Tracks		Age	Location

2.8.2.2 Mojave Fringe-Toed Lizard and Herpetofaunal Surveys

Three herpetofaunal surveys were completed on the Project site. Two preliminary baseline herpetofaunal investigations (October 22-23, 2012 and March 25-April 12, 2013) and one Visual Encounter Survey (April 10 -25, 2013) were completed. Twenty-one qualified and trained field wildlife biologists took part in the surveys.

Preliminary herpetofaunal baseline investigations had two objectives; 1) to census extant squamate populations and 2) identify and determine species of concern and/or their required habitat. Sampling took place in three distinct bouts; twice during 100 percent coverage surveys. The herp surveys consisted of walking belt transects approximately 10 m (33 ft) wide to provide 100 percent (full) coverage of the entire Project site.

The Visual Encounter Survey, which is a more intensive survey, was also conducted. This survey was employed to augment the incidental data collected during the 100 percent coverage wildlife surveys. Using the 12 baseline sampling points (Figure 4) employed by the avian, botanical, and small mammal teams, 12 transects were set up (ten on site and two in the buffer zone) and sampled using visual encounter surveys. Six different wildlife biologists carried out these surveys across five different times of day over two weeks. Transects were intensively searched and although localized effects had been exhibited by various sampling points, when viewed on the whole, the data bore out similar data collected by the wildlife biologist crews.

A habitat assessment of the 160-acre inholding parcel was conducted on March 22-23, 2015 by two qualified and trained field wildlife biologists. The surveyors walked 100 percent of the parcel.

2.8.3 Avian

Avian Surveys at Quartzite used various sampling methodologies to depict the occurrence and habitat (site) use by birds during all critical life stages. Sampling models and survey techniques were designed to maximize the detection of migratory birds and local residents; including all raptor, shorebird, waterfowl and passerine species. Each sampling methodology was selected to increase the potential for species detection respective to habitat type, and particular attention was focused on the detection of sensitive and/ or listed species.

2.8.3.1 Unlimited Distance Extended Observation Surveys

The purpose of the Migratory Bird Surveys was to record observed avian migration and use patterns at, and adjacent to, the Project site. Data on diurnal bird migration will provide information on:

- Seasonal and individual population pulses
- Range of daily behavior and movements
- Flight elevation through and near the Project
- Duration of visitation by migratory birds, including raptors

Survey results will be used in the development of an avian risk characterization (illustrating species use and occurrence within the proposed Project Site) as part of the Project's Bird and Bat Conservation Strategy (BBCS).

An avian biologist monitored migration trends following guidance provided by BLM, USFWS, and CDFW, and protocol based on Hawk Migration Association of North America (HMANA) standard field survey techniques. The HMANA protocol, modeled after Cape May Raptor observation methods, is now standard for hawk migration counts (Bird and Bildstein 2007, Bildstein et al. 2007). A survey-specific protocol (Appendix D) was developed based on the above referenced documents.

Two migration points (MP) bisect the proposed Project site footprint along the central east-west axis, and exhibit near 360 degree views of the distant horizon to maximize visual capture of migrating birds passing over the area (Table 3). After the fall 2013 season, avian biologists determined that, due to the pattern of migratory movement prevalent in the area, the survey points should be adjusted to maximize visibility of migrating birds to the observer. Beginning during the spring of 2014, MP01 and MP02 were replaced with MP03 and MP04 (Table 4; Figure 6). During peak migration periods in the spring and fall of 2013 and 2014 an avian biologist conducted a survey at each MP, once per week, using unlimited-distance bird migration survey methods.

Each migration point was visited 6 times between April 18, 2013 and May 18, 2013 and 11 times between September 2, 2013 and November 12, 2013. The number of visits was limited during the spring 2013 migration period by delays surrounding agency acceptance of the Project-specific Avian Work Plan (Table 4). During the spring and fall of 2014, the new MPs were each visited 11 times between March 3 and May 22 and between September 5 and November 15.

Table 3 Migration Point Locations

Survey Point	UTM (WGS 84)	
	Easting	Northing
MP01	706914	3717172
MP02	710176	3717195
MP03	712050	3717046
MP04	707330	3720406

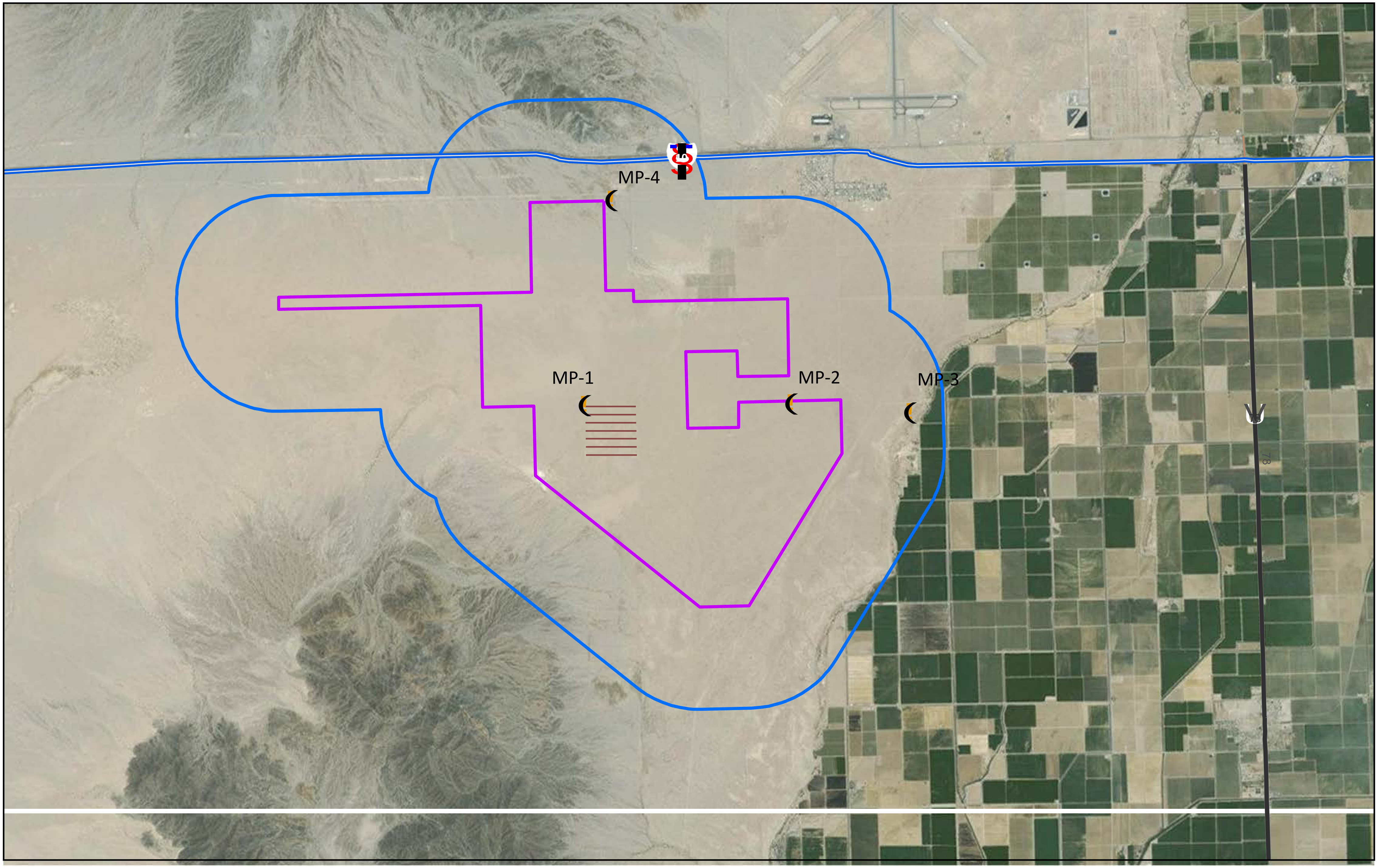

MP-4
MP-1
MP-2
MP-3
Migration Survey Locations
Project Footprint Plus Gentie
Project 1-mile Buffer
Interstate
Highway
Major Road
Land orginally not included in project but subsequently acquired
0
1
2
4
Miles

Figure 6

MIGRATORY BIRD SURVEY LOCATIONS

QUARTZITE SOLAR | RIVERSIDE COUNTY, CALIFORNIA

CORVUS
ECOLOGICAL CONSULTING

Table 4 Migration Point Visits -- Spring 2013-Fall 2014

2013			2014		
Point ID	**Visit Date**	**Observer**	**Point ID**	**Visit Date**	**Observer**
MP-1	4/18/2013	J. Yerger	MP-3	3/5/2014	Roger Radd
	4/25/2013	Roger Radd		3/10/2014	Roger Radd
	4/28/2013	Roger Radd		3/17/2014	Roger Radd
	5/3/2013	Roger Radd		3/24/2014	Roger Radd
	5/10/2013	Roger Radd		4/1/2014	Roger Radd
	5/13/2013	Roger Radd		4/1/2014	Roger Radd
	5/23/2013	Roger Radd		4/8/2014	Roger Radd
	5/30/2013	Roger Radd		4/21/2014	Roger Radd
	9/3/2013	Roger Radd		5/5/2014	Roger Radd
	9/11/2013	Roger Radd		5/15/2014	Roger Radd
	9/17/2013	Roger Radd		5/22/2014	Roger Radd
	9/23/2013	Roger Radd		9/5/2014	Erin Lockward
	10/2/2013	Roger Radd		9/11/2014	Erin Lockward
	10/7/2013	Roger Radd		9/21/2014	Erin Lockward
	10/15/2013	Roger Radd		9/27/2014	Erin Lockward
	10/21/2013	Roger Radd		10/2/2014	Erin Lockward
	10/29/2013	Roger Radd		10/9/2014	Erin Lockward
	11/4/2013	Roger Radd		10/13/2014	Brooks Hart
	11/11/2013	Roger Radd		10/23/2014	Erin Lockward
MP-2	4/18/2013	Roger Radd		10/27/2014	Erin Lockward
	4/26/2013	Roger Radd		11/6/2014	Erin Lockward
	5/2/2013	Roger Radd		11/10/2014	Erin Lockward
	5/6/2013	Roger Radd	MP-4	3/6/2014	Roger Radd
	5/11/2013	Roger Radd		3/11/2014	Roger Radd
	5/18/2013	Roger Radd		3/17/2014	Roger Radd
	5/22/2013	Roger Radd		3/25/2014	Roger Radd
	5/28/2013	Roger Radd		4/2/2014	Roger Radd
	9/2/2013	Roger Radd		4/9/2014	Roger Radd
	9/12/2013	Roger Radd		4/22/2014	Roger Radd
	9/18/2013	Roger Radd		5/7/2014	Roger Radd

2013			2014		
Point ID	Visit Date	Observer	Point ID	Visit Date	Observer
	9/24/2013	Roger Radd		5/14/2014	Roger Radd
	10/3/2013	Roger Radd		5/20/2014	Roger Radd
	10/8/2013	Roger Radd		9/6/2014	Erin Lockward
	10/17/2013	Roger Radd		9/14/2014	Erin Lockward
	10/23/2013	Roger Radd		9/18/2014	Erin Lockward
	10/30/2013	Roger Radd		9/28/2014	Erin Lockward
	11/5/2013	Roger Radd		10/6/2014	Erin Lockward
	11/12/2013	Roger Radd		10/12/2014	Erin Lockward
				10/15/2014	Brooks Hart
				10/25/2014	Erin Lockward
				10/29/2014	Brooks Hart
				11/8/2014	Erin Lockward
				11/15/2014	Erin Lockward

2.8.3.2 Line Transect Sampling

The purpose of these surveys is to depict avian use patterns at and adjacent to the Project site. Data will provide information on the following:

- Sedentary and migratory populations;
- Species richness (number of different species present);
- Species diversity (species richness combined with species evenness);
- Species use, behavior and movements; and
- Species distribution across the project.

Qualified biologists conducted surveys from the spring of 2013 to the winter of 2014-15, not including the summer months, recording all species observed and documenting their site use. Surveyors followed a sampling model that implemented a line-transect survey methodology.

Survey results will be used in the development of an avian risk characterization (illustrating species use and occurrence within the proposed Project site) as part of the Bird and Bat Conservation Strategy (BBCS).

Line-transect sampling was conducted by traveling a pre-determined route and recording all bird detections (visual or aural) on either side of the transect line. The distance a bird was detected from the transect line was estimated and recorded as an absolute measure. The observer scanned the sky as well as the surrounding habitat and recorded bird use and movement data under good weather conditions, good visibility, no sustained precipitation and average wind speeds less than 15 miles per hour (mph). Each line-transect was surveyed in an effort to capture species occurrences and temporal site use through the spring season. Surveys were timed to capture migrants, breeding birds and local residents.

Information recorded during the line-transect sampling included the following:

- Transect start time;
- Species identification;
- Number of birds seen;
- Flight height;
- Time of day;
- Horizontal distance (perpendicular) to the survey line;
- Behavior during observation; and
- Transect end time.

Project-specific survey protocol were developed to ensure consistent data collection (Appendix D).

A total of eight (8) 2000 meter long transects were established in spring 2013 and eight (8) more were added in fall of 2013 (Table 5). To facilitate robust data analysis, half (8) of the line-transects were situated within the Project site and half were located outside the Project site on public lands with similar habitat composition. One transect of each subset samples microphyll woodland. The control to sample ratio is therefore; 1:1. In October of 2014, we were notified to begin surveying the small 160-acre inholding that was previously excluded from surveys (shown in Figure 7). Two shorter (500 m) transects were added in this area for a total of 18 transects.

Transects within the Project site were aligned to promote continuity so that post-construction surveys could use the same transects and be unimpeded by installed solar panel arrays, if arrays are positioned where proposed (Figure 8).

To reduce temporal bias, transects randomized with respect to order performed and also at which end to start for each survey. At least three visits per transect per season were used in analysis (Table 6).

Table 5 Line Transect Start and End Points

Transect ID	Site Name	Start Point		End Point	
		Easting	Northing	Easting	Northing
T1	Project Footprint	707,056	3,718,437	709,056	3,718,464
T2	Project Footprint	706,625	3,718,060	706,666	3,716,060
T3	Project Footprint	708,120	3,717,427	708,120	3,715,427
T4	Project Footprint	709,439	3,716,511	709,494	3,714,512
T5	Project Control	711,338	3,718,342	711,378	3,716,343
T6	Project Control	711,213	3,715,380	709,722	3,714,047
T7	Project Control	709,278	3,713,697	709,344	3,711,698
T8	Project Control	705,184	3,715,178	706,759	3,713,945
T9	Project Footprint	707,892	3,718,197	709,892	3,718,200
T10	Project Footprint	708,539	3,716,485	708,539	3,714,490
T11	Project Footprint	708,886	3,716,512	708,886	3,714,510
T12	Project Footprint	709,888	3,716,943	709,888	3,714,940
T13	Project Control	708,156	3,720,221	710,062	3,719,778
T14	Project Control	702,774	3,720,043	704,686	3,719,486
T15	Project Control	703,314	3,718,563	704,016	3,716,690
T16	Project Control	706,845	3,713,635	708,829	3,713,748
T17	Project Footprint	707,245	3,717,067	707,245	3,716,617
T18	Project Footprint	707,645	3,716,876	707,645	3,716,426

Table 6 Summary of Line Transect Surveys Conducted April 2013 through February 2015

Transect ID	Start Point	Visit Date	Observer	Start Time	End Time	Start Point	Visit Date	Observer	Start Time	End Time
T1	B	4/18/2013	John Yerger	6:39 AM	7:43 AM	B	3/24/2014	Roger Radd	7:17 AM	8:46 AM
	A	4/28/2013	Roger Radd	6:45 AM	7:40 AM	A	4/21/2014	Roger Radd	7:07 AM	8:36 AM
	B	5/2/2013	Roger Radd	6:16 AM	7:09 AM	B	5/9/2014	Roger Radd	6:06 AM	7:37 AM
	B	9/2/2013	Roger Radd	6:29 AM	7:59 AM	A	9/11/2014	Erin Lockward	6:43 AM	7:07 AM
	A	10/4/2013	Roger Radd	7:12 AM	8:38 AM	B	10/2/2014	Erin Lockward	9:53 AM	10:15 AM
	A	11/7/2013	Roger Radd	6:55 AM	8:47 AM	A	11/6/2014	Erin Lockward	6:25 AM	6:51 AM
	A	12/2/2013	Roger Radd	7:09 AM	8:55 AM	B	12/11/2014	Erin Lockward	8:19 AM	8:56 AM
	B	1/6/2014	Roger Radd	7:07 AM	8:58 AM	A	1/27/2015	Erin Lockward	8:56 AM	9:41 AM
	B	2/3/2014	Roger Radd	7:11 AM	9:09 AM	B	2/5/2015	Erin Lockward	9:41 AM	10:20 AM
T2	A	4/19/2013	John Yerger	6:28 AM	7:32 AM	A	3/26/2014	Roger Radd	7:25 AM	8:43 AM
	A	5/2/2013	Roger Radd	7:25 AM	8:06 AM	B	4/28/2014	Roger Radd	12:13 PM	1:35 PM
	A	5/24/2013	Roger Radd	9:21 AM	10:37 AM	A	5/15/2014	Roger Radd	6:06 AM	7:29 AM
	A	10/2/2013	Roger Radd	7:04 AM	8:36 AM	A	9/12/2014	Erin Lockward	10:40 AM	10:59 AM
	B	10/16/2013	Roger Radd	2:52 PM	4:08 PM	B	10/3/2014	Erin Lockward	8:40 AM	8:58 AM
	A	11/11/2013	Roger Radd	7:22 AM	9:08 AM	A	11/7/2014	Erin Lockward	9:36 AM	10:02 AM

Transect ID	Start Point	Visit Date	Observer	Start Time	End Time	Start Point	Visit Date	Observer	Start Time	End Time
T3	B	12/3/2013	Roger Radd	10:10 AM	11:52 AM	A	12/6/2014	Erin Lockward	8:05 AM	8:46 AM
	A	1/8/2014	Roger Radd	10:39 AM	12:29 PM	B	1/28/2015	Erin Lockward	10:03 AM	10:47 AM
	A	2/7/2014	Roger Radd	2:06 PM	3:54 PM	A	2/12/2015	Erin Lockward	8:08 AM	8:43 AM
	B	4/19/2013	John Yerger	8:21 AM	9:20 AM	A	3/17/2014	Roger Radd	7:44 AM	9:17 AM
	A	4/28/2013	Roger Radd	8:32 AM	9:30 AM	B	5/2/2014	Roger Radd	10:45 AM	12:08 PM
	A	5/23/2013	Roger Radd	6:15 AM	7:22 AM	A	5/9/2014	Roger Radd	9:46 AM	10:52 AM
	A	9/3/2013	Roger Radd	6:23 AM	7:50 AM	A	9/12/2014	Erin Lockward	7:10 AM	7:40 AM
	B	10/10/2013	Roger Radd	1:11 PM	2:28 PM	B	10/3/2014	Erin Lockward	7:38 AM	8:12 AM
	A	11/12/2013	Roger Radd	7:03 AM	8:53 AM	A	11/7/2014	Erin Lockward	8:08 AM	8:32 AM
	B	12/6/2013	Roger Radd	10:43 AM	12:12 PM	A	12/5/2014	Erin Lockward	11:02 AM	11:50 AM
	A	1/7/2014	Roger Radd	7:18 AM	9:08 AM	A	1/20/2015	Erin Lockward	8:03 AM	9:37 AM
	B	2/3/2014	Roger Radd	1:42 PM	3:30 PM	B	2/6/2015	Erin Lockward	7:23 AM	8:07 AM
T4	B	4/22/2013	Roger Radd	9:45 AM	10:48 AM	A	3/25/2014	Roger Radd	7:20 AM	8:48 AM
	B	5/10/2013	Roger Radd	7:12 AM	8:13 AM	A	4/28/2014	Roger Radd	6:52 AM	8:18 AM
	A	5/23/2013	Roger Radd	8:33 AM	9:35 AM	B	5/22/2014	Roger Radd	6:55 AM	8:21 AM

Transect ID	Start Point	Visit Date	Observer	Start Time	End Time	Start Point	Visit Date	Observer	Start Time	End Time
	A	9/13/2013	Roger Radd	6:34 AM	8:24 AM	B	9/11/2014	Erin Lockward	7:38 AM	8:01 AM
	B	10/3/2013	Roger Radd	7:19 AM	9:22 AM	A	10/2/2014	Erin Lockward	9:14 AM	9:36 AM
	A	11/7/2013	Roger Radd	10:14 AM	11:59 AM	B	11/6/2014	Erin Lockward	7:10 AM	7:32 AM
	B	12/2/2013	Roger Radd	1:38 PM	3:24 PM	A	12/12/2014	Erin Lockward	7:18 AM	7:59 AM
	A	1/6/2014	Roger Radd	10:18 AM	12:09 PM	B	1/27/2015	Erin Lockward	11:05 AM	11:47 AM
	B	2/13/2014	Roger Radd	10:57 AM	12:45 PM	A	2/6/2015	Erin Lockward	10:11 AM	10:59 AM
T5	A	4/22/2013	Roger Radd	6:30 AM	7:38 AM	A	3/10/2014	Roger Radd	7:45 AM	9:19 AM
	B	5/3/2013	Roger Radd	6:50 AM	7:56 AM	B	4/23/2014	Roger Radd	7:05 AM	8:30 AM
	B	5/20/2013	Roger Radd	6:22 AM	7:33 AM	A	5/5/2014	Roger Radd	6:48 AM	8:21 AM
	A	9/17/2013	Roger Radd	6:33 AM	8:27 AM	A	9/18/2014	Erin Lockward	10:16 AM	10:38 AM
	B	10/10/2013	Roger Radd	7:02 AM	8:52 AM	A	10/9/2014	Erin Lockward	10:41 AM	11:03 AM
	A	11/4/2013	Roger Radd	6:56 AM	8:50 AM	B	11/8/2014	Erin Lockward	9:02 AM	9:32 AM
	B	12/2/2013	Roger Radd	10:29 AM	12:20 PM	A	12/5/2014	Erin Lockward	9:23 AM	10:18 AM
	A	1/7/2014	Roger Radd	10:39 AM	12:26 PM	B	1/29/2015	Erin Lockward	9:09 AM	9:49 AM
	B	2/4/2014	Roger Radd	2:05 PM	3:53 PM	A	2/3/2015	Erin Lockward	10:04 AM	10:48 AM

Transect ID	Start Point	Visit Date	Observer	Start Time	End Time	Start Point	Visit Date	Observer	Start Time	End Time
T6	B	4/22/2013	Roger Radd	8:15 AM	9:19 AM	A	3/7/2014	Roger Radd	9:28 AM	10:53 AM
	A	5/3/2013	Roger Radd	8:58 AM	9:44 AM	B	4/3/2014	Roger Radd	7:40 AM	9:17 AM
	A	5/20/2013	Roger Radd	8:43 AM	9:50 AM	A	5/8/2014	Roger Radd	6:55 AM	8:27 AM
	A	9/15/2013	Roger Radd	6:40 AM	8:31 AM	B	9/18/2014	Erin Lockward	7:03 AM	8:11 AM
	B	10/7/2013	Roger Radd	7:14 AM	9:01 AM	A	10/9/2014	Erin Lockward	7:08 AM	8:02 AM
	A	11/5/2013	Roger Radd	6:49 AM	8:38 AM	B	11/8/2014	Erin Lockward	6:44 AM	7:13 AM
	B	12/3/2013	Roger Radd	6:55 AM	8:46 AM	B	12/7/2014	Erin Lockward	8:06 AM	8:40 AM
	A	1/8/2014	Roger Radd	7:22 AM	9:13 AM	A	1/25/2015	Erin Lockward	7:50 AM	8:45 AM
	B	2/3/2014	Roger Radd	10:26 AM	12:17 PM	A	2/12/2015	Erin Lockward	10:14 AM	11:03 AM
T7	A	4/26/2013	Roger Radd	6:45 AM	7:35 AM	B	3/19/2014	Roger Radd	12:55 PM	2:06 PM
	B	5/6/2013	Roger Radd	6:50 AM	7:52 AM	A	4/24/2014	Roger Radd	12:03 PM	1:25 PM
	A	5/22/2013	Roger Radd	8:52 AM	9:45 AM	B	5/13/2014	Roger Radd	6:24 AM	7:49 AM
	B	9/15/2013	Roger Radd	9:51 AM	11:26 AM	A	9/20/2014	Erin Lockward	7:07 AM	7:50 AM
	B	10/10/2013	Roger Radd	10:00 AM	11:25 AM	B	10/10/2014	Erin Lockward	8:57 AM	9:33 AM
	A	11/7/2013	Roger Radd	1:34 PM	2:54 PM	A	11/9/2014	Erin Lockward	6:23 AM	6:52 AM

Transect ID	Start Point	Visit Date	Observer	Start Time	End Time	Start Point	Visit Date	Observer	Start Time	End Time
	B	12/3/2013	Roger Radd	1:22 PM	3:02 PM	A	12/7/2014	Erin Lockward	9:22 AM	10:05 AM
	A	1/7/2014	Roger Radd	1:53 PM	3:30 PM	A	1/24/2015	Erin Lockward	9:20 AM	10:12 AM
	B	2/10/2014	Roger Radd	10:16 AM	12:01 PM	A	2/19/2015	Erin Lockward	7:08 AM	7:51 AM
T8	B	4/25/2013	Roger Radd	7:08 AM	8:18 AM	A	3/11/2014	Roger Radd	7:42 AM	9:16 AM
	B	5/4/2013	Roger Radd	6:37 AM	7:42 AM	B	4/23/2014	Roger Radd	12:19 PM	1:37 PM
	A	5/22/2013	Roger Radd	6:24 AM	8:14 AM	A	5/16/2014	Roger Radd	6:27 AM	7:53 AM
	B	9/4/2013	Roger Radd	6:50 AM	8:12 AM	B	9/20/2014	Erin Lockward	9:12 AM	9:44 AM
	A	10/8/2013	Roger Radd	7:19 AM	8:58 AM	A	10/10/2014	Erin Lockward	11:37 AM	11:58 AM
	A	11/6/2013	Roger Radd	7:21 AM	8:58 AM	B	11/9/2014	Erin Lockward	8:32 AM	8:52 AM
	B	12/6/2013	Roger Radd	7:26 AM	9:19 AM	B	12/12/2014	Erin Lockward	9:15 AM	10:07 AM
	A	1/6/2014	Roger Radd	1:56 PM	3:44 PM	A	1/20/2015	Erin Lockward	10:45 AM	11:26 AM
	A	2/4/2014	Roger Radd	10:54 AM	12:46 PM	B	2/5/2015	Erin Lockward	7:40 AM	8:36 AM
T9						B	3/19/2014	Roger Radd	7:29 AM	9:05 AM
						A	4/24/2014	Roger Radd	9:42 AM	11:12 AM
						B	5/14/2014	Roger Radd	5:58 AM	7:17 AM

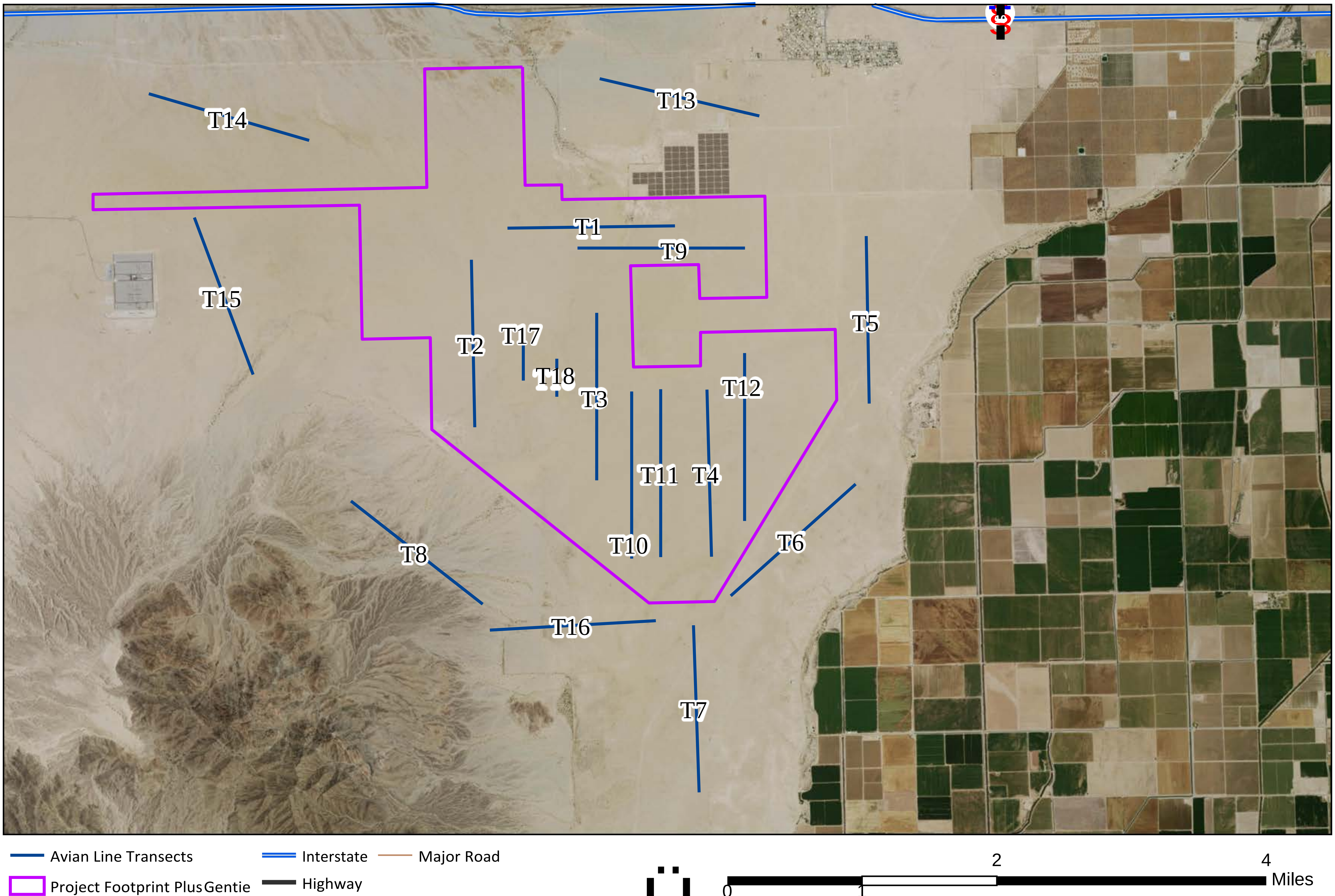
Transect ID	Start Point	Visit Date	Observer	Start Time	End Time	Start Point	Visit Date	Observer	Start Time	End Time
	B	9/24/2013	Roger Radd	7:04 AM	8:44 AM	A	9/28/2014	Erin Lockward	7:57 AM	8:23 AM
	A	10/21/2013	Roger Radd	7:31 AM	9:21 AM	B	10/25/2014	Erin Lockward	8:34 AM	8:56 AM
	B	11/19/2013	Roger Radd	10:03 AM	11:59 AM	A	11/17/2014	Erin Lockward	8:00 AM	8:19 AM
	A	12/11/2013	Roger Radd	2:10 PM	3:40 PM	A	12/11/2014	Erin Lockward	9:12 AM	9:46 AM
	B	1/15/2014	Roger Radd	7:16 AM	9:07 AM	B	1/27/2015	Erin Lockward	7:56 AM	8:37 AM
	B	2/13/2014	Roger Radd	2:14 PM	4:01 PM	A	2/5/2015	Erin Lockward	10:36 AM	11:18 AM
T10	A	9/23/2013	Roger Radd	6:47 AM	8:21 AM	A	9/27/2014	Erin Lockward	9:39 AM	10:04 AM
	B	10/16/2013	Roger Radd	10:20 AM	11:42 AM	B	10/14/2014	Brooks Hart	8:22 AM	9:02 AM
	A	11/19/2013	Roger Radd	6:58 AM	8:47 AM	A	11/15/2014	Erin Lockward	9:40 AM	9:58 AM
	B	12/9/2013	Roger Radd	7:14 AM	8:55 AM	A	12/11/2014	Erin Lockward	7:00 AM	7:44 AM
	A	1/15/2014	Roger Radd	2:16 PM	4:00 PM	A	1/28/2015	Erin Lockward	11:27 AM	12:02 PM
	B	2/7/2014	Roger Radd	7:26 AM	9:20 AM	B	2/11/2015	Erin Lockward	7:36 AM	8:11 AM
T11						B	3/26/2014	Roger Radd	9:56 AM	11:33 AM
						A	5/2/2014	Roger Radd	6:37 AM	8:09 AM
						B	5/15/2014	Roger Radd	8:27 AM	9:38 AM

Transect ID	Start Point	Visit Date	Observer	Start Time	End Time	Start Point	Visit Date	Observer	Start Time	End Time
	A	9/19/2013	Roger Radd	6:49 AM	8:33 AM	A	9/27/2014	Erin Lockward	7:50 AM	8:07 AM
	B	10/23/2013	Roger Radd	7:28 AM	9:26 AM	B	10/16/2014	Brooks Hart	9:50 AM	10:22 AM
	A	11/21/2013	Roger Radd	10:12 AM	12:02 PM	A	11/15/2014	Erin Lockward	8:10 AM	8:30 AM
	A	12/10/2013	Roger Radd	2:19 PM	3:52 PM	A	12/7/2014	Erin Lockward	10:58 AM	11:42 AM
	A	1/16/2014	Roger Radd	2:07 PM	3:53 PM	B	1/29/2015	Erin Lockward	7:14 AM	7:56 AM
	B	2/4/2014	Roger Radd	7:22 AM	9:16 AM	A	2/10/2015	Erin Lockward	11:23 AM	12:00 PM
T12						B	3/18/2014	Roger Radd	10:20 AM	11:44 AM
						A	4/23/2014	Roger Radd	9:17 AM	10:35 AM
						B	5/8/2014	Roger Radd	8:51 AM	10:09 AM
	B	9/25/2013	Roger Radd	6:52 AM	7:49 AM	A	9/28/2014	Erin Lockward	9:39 AM	10:04 AM
	A	10/17/2013	Roger Radd	7:10 AM	8:56 AM	B	10/25/2014	Erin Lockward	9:56 AM	10:19 AM
	B	11/20/2013	Roger Radd	7:05 AM	8:52 AM	A	11/17/2014	Erin Lockward	6:42 AM	7:08 AM
	A	12/11/2013	Roger Radd	7:06 AM	8:55 AM	A	12/11/2014	Erin Lockward	10:38 AM	11:17 AM
	B	1/16/2014	Roger Radd	7:26 AM	9:17 AM	B	1/28/2015	Erin Lockward	7:54 AM	8:42 AM
	A	2/10/2014	Roger Radd	6:58 AM	8:48 AM	B	2/6/2015	Erin Lockward	9:20 AM	9:58 AM

Transect ID	Start Point	Visit Date	Observer	Start Time	End Time	Start Point	Visit Date	Observer	Start Time	End Time
T13						B	3/6/2014	Roger Radd	6:57 AM	7:44 AM
						B	4/24/2014	Roger Radd	7:11 AM	8:39 AM
						B	5/14/2014	Roger Radd	8:00 AM	9:21 AM
	B	9/25/2013	Roger Radd	10:24 AM	11:26 AM					
	A	10/29/2013	Roger Radd	7:40 AM	9:22 AM					
	B	11/21/2013	Roger Radd	1:11 PM	2:55 PM					
	A	12/10/2013	Roger Radd	7:12 AM	9:12 AM	B	12/5/2014	Erin Lockward	7:33 AM	8:26 AM
	B	1/9/2014	Roger Radd	2:20 PM	4:09 PM	A	1/29/2015	Erin Lockward	10:02 AM	11:41 AM
	B	2/7/2014	Roger Radd	10:37 AM	12:24 PM	B	2/3/2015	Erin Lockward	7:45 AM	8:40 AM
T14						B	3/20/2014	Roger Radd	7:53 AM	9:42 AM
						A	4/22/2014	Roger Radd	6:59 AM	8:36 AM
						B	5/7/2014	Roger Radd	6:41 AM	8:12 AM
	B	9/19/2013	Roger Radd	10:36 AM	11:52 AM					
	A	10/30/2013	Roger Radd	7:44 AM	9:34 AM					
	B	11/19/2013	Roger Radd	2:09 PM	3:37 PM					

Transect ID	Start Point	Visit Date	Observer	Start Time	End Time	Start Point	Visit Date	Observer	Start Time	End Time
	A	12/9/2013	Roger Radd	2:12 PM	3:50 PM	B	12/6/2014	Erin Lockward	9:44 AM	10:42 AM
	B	1/30/2014	Roger Radd	1:30 PM	3:22 PM	A	1/25/2015	Erin Lockward	11:36 AM	12:27 PM
	A	2/10/2014	Roger Radd	2:20 PM	4:07 PM	B	2/10/2015	Erin Lockward	7:45 AM	8:46 AM
T15						B	3/5/2014	Roger Radd	6:54 AM	8:43 AM
						A	4/1/2014	Roger Radd	7:47 AM	9:21 AM
						B	5/20/2014	Roger Radd	6:28 AM	7:37 AM
	B	9/13/2013	Roger Radd	6:33 AM	7:57 AM					
	A	10/16/2013	Roger Radd	7:39 AM	9:07 AM					
	B	11/20/2013	Roger Radd	11:32 AM	1:17 PM					
	A	12/10/2013	Roger Radd	10:57 AM	12:40 PM	A	12/7/2014	Erin Lockward	6:46 AM	7:27 AM
	B	1/15/2014	Roger Radd	10:54 AM	12:44 PM	B	1/25/2015	Erin Lockward	9:52 AM	10:30 AM
	A	2/14/2014	Roger Radd	2:04 PM	3:50 PM	A	2/10/2015	Erin Lockward	10:00 AM	10:36 AM
T16						B	3/17/2014	Roger Radd	7:43 AM	9:17 AM
						A	4/28/2014	Roger Radd	9:22 AM	10:49 AM
						B	5/27/2014	Roger Radd	6:25 AM	7:44 AM

Transect ID	Start Point	Visit Date	Observer	Start Time	End Time	Start Point	Visit Date	Observer	Start Time	End Time
	B	9/18/2013	Roger Radd	6:39 AM	8:27 AM					
	B	10/15/2013	Roger Radd	7:23 AM	9:15 AM					
	A	11/21/2013	Roger Radd	7:17 AM	8:56 AM					
	B	12/11/2013	Roger Radd	10:40 AM	12:26 PM	B	12/12/2014	Erin Lockward	8:33 AM	9:09 AM
	A	1/16/2014	Roger Radd	10:57 AM	12:44 PM	A	1/24/2015	Erin Lockward	7:40 AM	8:18 AM
	A	2/13/2014	Roger Radd	7:00 AM	8:50 AM	B	2/3/2015	Erin Lockward	11:17 AM	12:02 PM
T17	B	12/6/2014	Erin Lockward	7:14 AM	7:26 AM					
	A	1/20/2015	Erin Lockward	9:15 AM	9:25 AM					
	A	2/12/2015	Erin Lockward	7:11 AM	7:30 AM					
T18	A	12/6/2014	Erin Lockward	6:53 AM	7:06 AM					
	A	1/20/2015	Erin Lockward	8:56 AM	9:04 AM					
	A	2/6/2015	Erin Lockward	6:47 AM	6:58 AM					


T14
T13
T1
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T15
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T3
T12
T11
T4
T10
T6
T8
T16
T7
Avian Line Transects
Interstate
Major Road
Project Footprint Plus Gentie
Highway
Ü
0
1
2
4
Miles

Figure 7

AVIAN LINE TRANSECT LOCATIONS

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2.8.3.3 Burrowing Owl Surveys

Burrowing owl *(Athene cunicularia)* surveys were scheduled and performed according to “Staff Report on Burrowing Owl Mitigation” (California Department of Fish and Wildlife, 2012) and the *Burrowing Owl Survey Protocols and Mitigation Guidelines* (California Burrowing Owl Consortium 1993). Phase II burrowing owl surveys (California Burrowing Owl Consortium 1993) were conducted across all portions of the Study Area.

Burrowing Owl surveys were conducted across all portions of the project site and within a 150-meter buffer of the proposed Project site, in an effort to assess occupancy, abundance, site use and distribution. Wildlife crews surveyed the entire Project site between October 22, 2012 and April 15, 2013, walking belt transects with 10 meter spacing. Surveys within the 150-meter buffer were conducted May 14-17, 2013, by walking straight-line belt transects spaced no more than 30-meters apart, adjusting for vegetation height and density (Rosenberg et al. 2007).

Additional surveys were conducted during the spring of 2014. Burrowing owls surveys conducted during 2014 followed a project-specific protocol which incorporates agency (California Department of Fish and Wildlife 2012) and resource-specific guidance *(*California Burrowing Owl Consortium 1993) to achieve management goals and effectively assess potential impacts. This project-specific Burrowing Owl Survey Protocol is included as Appendix D. From April 4, 2014 through April 16, 2014, a burrowing owl specific survey crew conducted comprehensive pedestrian belt transects spaced 7-20 meters, within suitable habitat. Follow-up surveys focused at confirming occupancy and determining site use and breeding success were conducted between May 6 and June 12, 2014.

During each of these survey efforts, at the start of each transect and at least every 100 meters, survey crews scanned the entire visible Project site for burrowing owls using binoculars. Some burrowing owls may be detected by their calls, so observers listened for burrowing owls while conducting the survey. Care was taken to minimize disturbance near occupied burrows during all seasons and not to “flush” burrowing owls from their burrows.

All burrowing owl sightings and burrows with burrowing owl sign (including: whitewash, tracks, pellets, feathers) were mapped and recorded using standardized data forms that include Pendragon mobile data management software and backup paper data sheets. Any burrow, with associated burrowing owl sign, was ranked by Class (1 to 4) depending on the age and type of sign present. Burrow Class are defined as follows:

- 1=Excellent (Usable burrow with burrowing owl present);
- 2=Good (Usable burrow, fresh sign but no burrowing owl present);
- 3=Fair (Usable burrow, inactive with old sign, no burrowing owl present); and
- 4=Poor (Inactive, burrow, no burrowing owl sign).

In addition to comprehensive presence/ absence site surveys and a burrow inventory (Phase II surveys), extended observational monitoring (Phase III) was conducted per the Staff Report on Burrowing Owl Mitigation (CDFG, 2012). Observational efforts were conducted from as many fixed points as necessary to provide full visual coverage using spotting scopes and binoculars.

Phase III surveys were conducted at every burrow recorded as a Class 1, Class 2 or Class 3. In 2013 these follow-up surveys consisted of 3-hour visits to each burrow that ranked Class 3 or better. In 2014 follow-up surveys followed a modified routine included in the Project-specific protocol (Appendix D). Follow-up visits conducted during 2014 were performed during the intervals: April 4-6, May 6-12, May 26-28 and June 2. During all follow-up efforts, observers recorded each burrow's current status and condition and visually searched the surrounding area for live owls. In February 2015, biologists re-visited all Class 1 and 2 burrows as well as any locations where adult burrowing owls had incidentally been reported.

2.8.3.4 Golden Eagle Surveys

Agency approval of the Quartzite Avian Work Plan was not granted until after the 2013 golden eagle breeding season ended. In 2013-14 and 2014-15, in addition to Unlimited Distance Extended Observation Surveys (Section 2.8.3.1), eagle surveys were conducted in December and January following the Interim Golden Eagle Inventory and Monitoring Protocols; and other recommendations (Pagel *et al*., 2010). Surveys for breeding and non-breeding bald and golden eagles were conducted within a 10-mile radius of the Project. Occurrence of non-breeding golden eagles within at least 10 miles of the Project boundary during the courtship season (*e.g.,* late December through early February) were documented in order to estimate potential Project-related impacts to golden eagles, including: juveniles, sub-adults, adult floaters, and breeding adults.

No potential golden eagle nesting habitat exists within the proposed Project site. Potential golden eagle nesting habitat exists within 10 miles of the Project site boundary; in the Little Chuckwalla Mountains, the Mule Mountains and the McCoy Mountains. There is one historic nest within the 10-mile buffer. Historic nest data for the entire region was used to model golden eagle habitat and assess the terrain for suitable nest sites within a 10-mile buffer of the proposed Project site. These data were used to optimally place Observation Points throughout the survey area. Eighteen (18) Observation Points were established in the study area and each was visited twice during the courtship/breeding season (Table 7; Figure 9). In 2014-15, some of the points were moved (renamed) and replaced some points with new locations with the end result being 18 points overall.

Table 7 Golden Eagle Observation Points and Survey Dates

Observation Point	2013/ 2014		2014/ 2015	
	Phase I Survey Date	Phase II Survey Date	Phase I Survey Date	Phase II Survey Date
QZ_GOEA_OP01	12/17/2013	1/25/2014	12/18/2014	1/21/2015
QZ_GOEA_OP02	12/16/2013	1/22/2014	12/17/2014	1/17/2015
QZ_GOEA_OP03	12/16/2013	1/21/2014	Dropped in 2014	
QZ_GOEA_OP04	12/17/2013	1/25/2014	12/17/2014	1/20/2015
QZ_GOEA_OP05	12/16/2013	1/22/2014	12/18/2014	1/18/2015
QZ_GOEA_OP06	12/19/2013	1/23/2014	Dropped in 2014	
QZ_GOEA_OP07	12/18/2013	1/22/2014	12/15/2014	1/20/2015
QZ_GOEA_OP08	12/19/2013	1/24/2014	12/15/2014	1/21/2015
QZ_GOEA_OP09	12/20/2013	1/21/2014	12/18/2015	1/18/2015
QZ_GOEA_OP10	12/16/2013	1/21/2014	12/18/2015	1/19/2015
QZ_GOEA_OP11	12/17/2013	1/25/2014	12/19/2015	1/24/2015
QZ_GOEA_OP12	12/18/2013	1/24/2014	Dropped in 2014	
QZ_GOEA_OP13	12/19/2013	1/24/2014	12/16/2014	1/26/2015
QZ_GOEA_OP14	12/20/2013	1/21/2014	Dropped in 2014	
QZ_GOEA_OP15	12/20/2013	1/22/2014	12/18/2015	1/20/2015
QZ_GOEA_OP16	12/19/2013	1/23/2014	Dropped in 2014	
QZ_GOEA_OP17	12/18/2013	1/23/2014	12/16/2014	1/27/2015
QZ_GOEA_OP20	12/18/2013	1/23/2014	12/16/2014	1/22/2015
QZ_GOEA_OP21			12/16/2014	1/20/2015
QZ_GOEA_OP22			12/16/2014	1/22/2015
QZ_GOEA_OP23			12/17/2014	1/17/2015
QZ_GOEA_OP24			12/19/2014	1/23/2015
QZ_GOEA_OP25			12/15/2014	1/27/2015

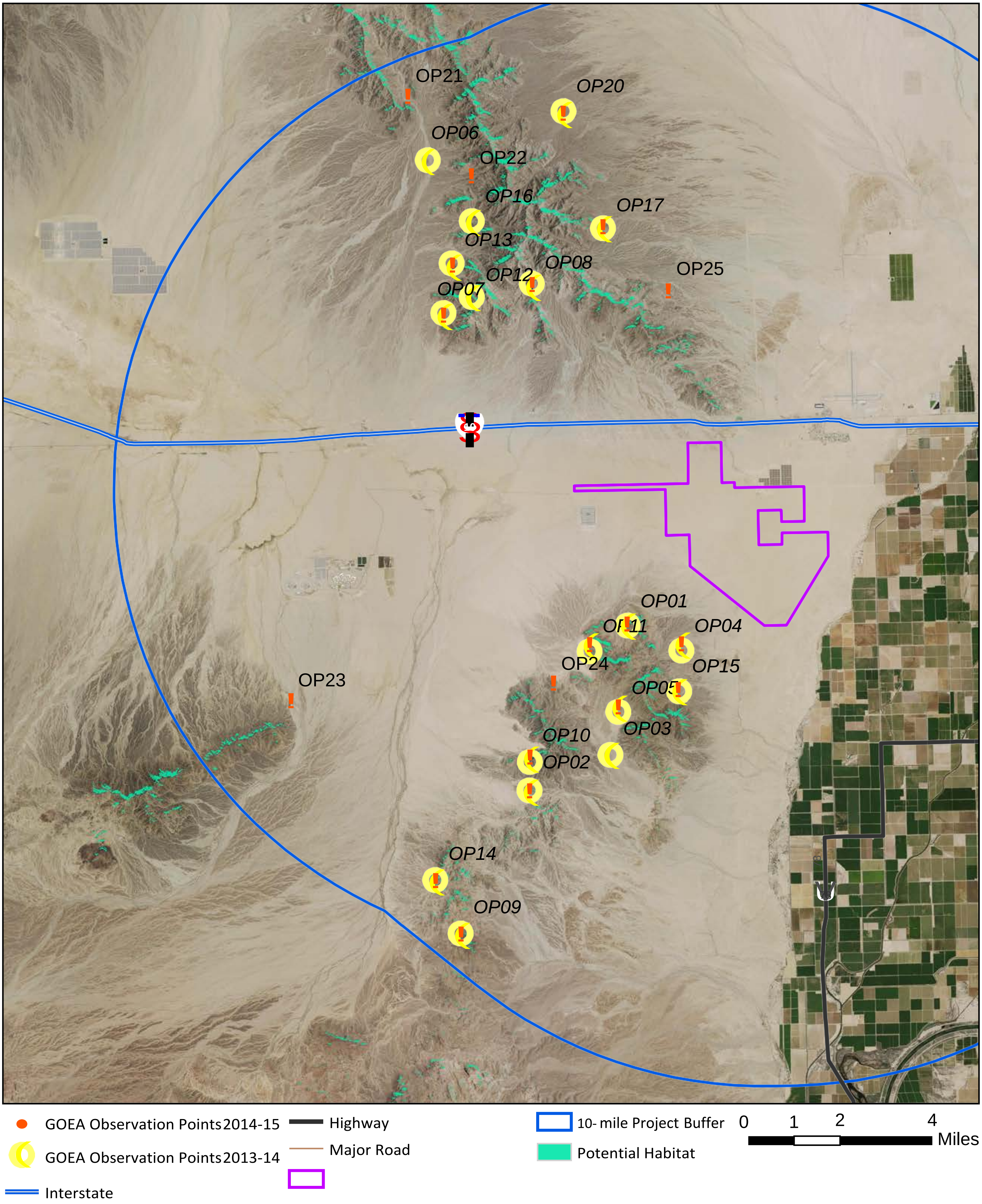
OP21
OP20
OP06
OP22
OP16
OP17
OP13
OP08
OP25
OP12
OP07
OP01
OP11
OP04
OP24
OP15
OP23
OP05
OP03
OP10
OP02
OP14
OP09
GOEA Observation Points 2014-15
GOEA Observation Points 2013-14
Interstate
Highway
Major Road
10- mile Project Buffer
Potential Habitat
0
1
2
4
Miles
Project Footprint Plus Gentie

Figure 8

2013-2015 GOLDEN EAGLE OBSERVATION POINT LOCATIONS

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There have been no golden eagle detections during avian-focused surveys, including: Avian Point Counts, Unlimited Distance Extended Observation Surveys and Line Transect surveys. There have been zero (0) reports of incidental sightings of golden eagles, which would have been reported on standardized, “General Sensitive Species” data forms that are included as required reporting for all of the various biological resource disciplines.

Golden eagle survey data includes:

- Assignment of identification number;
- Recording of Universal Tranverse Mercator (UTM) location via GPS;
- Assessment of any nests for condition (fresh greens, good, fair, old and decrepit); and
- Recording of any birds present (species, behavior).

Surveyors utilized high-powered spotting scopes from the greatest effective distance possible during the breeding season.

Black-tailed jackrabbits and cottontail rabbits were documented using line-transect surveys to estimate population densities within the Project site. Small mammal surveys were conducted across the entire proposed Project site, using pedestrian transects spaced at 10-meter intervals. Observers made their best effort to avoid double counting. This survey methodology assess prey abundance on the Project site as forage for golden eagles.

2.8.3.5 Elf Owl Surveys

In July 2013, an owl-specialist biologist, Dorothy Crowe with Great Basin Bird Observatory (GBBO), toured the Project site to determine whether habitat suitable for nesting elf owls was present. Dorothy Crowe was given a comprehensive tour of the Project site and a surrounding one-mile buffer zone, and examined some habitat features just outside of the one-mile buffer that merited attention. She took extensive notes on her observations and recorded coordinates of any notable features.

2.8.3.6 Nesting Raptor/Raven Surveys

Nesting raptor/Raven survey efforts focused on the detection of all raptor/raven nests within 1-mile of the Project site in order to collect baseline data on the following.

- The number and distribution of raptor/raven nests prior to project development; and
- Success rates of raptor/raven nests prior to project development.

All bird nests (including the incidental detection of resident passerine species) were mapped and recorded on standardized datasheets. Monthly monitoring efforts were completed to update the datasheets to include the development stage and breeding status at each raptor/raven nest.

2.8.4 Mammals

There were three mammal surveys performed for the Project; small mammal trapping, desert kit fox and bats.

2.8.4.1 Small Mammal Trapping

Small mammal trapping was performed to document species types, abundance and locations. Trapping grids were established at all baseline survey locations. Narrow grids consisting of 100 Sherman large (12 inches) live-traps were set at each location. For most baseline locations, the sampling location point represented the southwest corner of the trapping grid. Depending on the width of the habitat being sampled, either a 10 by 10 configuration or a 4 by 25 configuration was used. All traps were spaced approximately 10 m apart. Trapping grids were run for three consecutive nights at all baseline locations. Traps were opened near sunset and checked and closed at sunrise. Traps were not opened if scheduled temperatures were estimated to drop below 50 degrees Fahrenheit. Traps were baited with standard small mammal bait, which consisted of a mixture of birdseed, rolled oats and peanut butter. Individuals found in the first two morning checks on each grid were marked with a colored sharpie marker to indicate recapture status.

2.8.4.2 Desert Kit Foxes

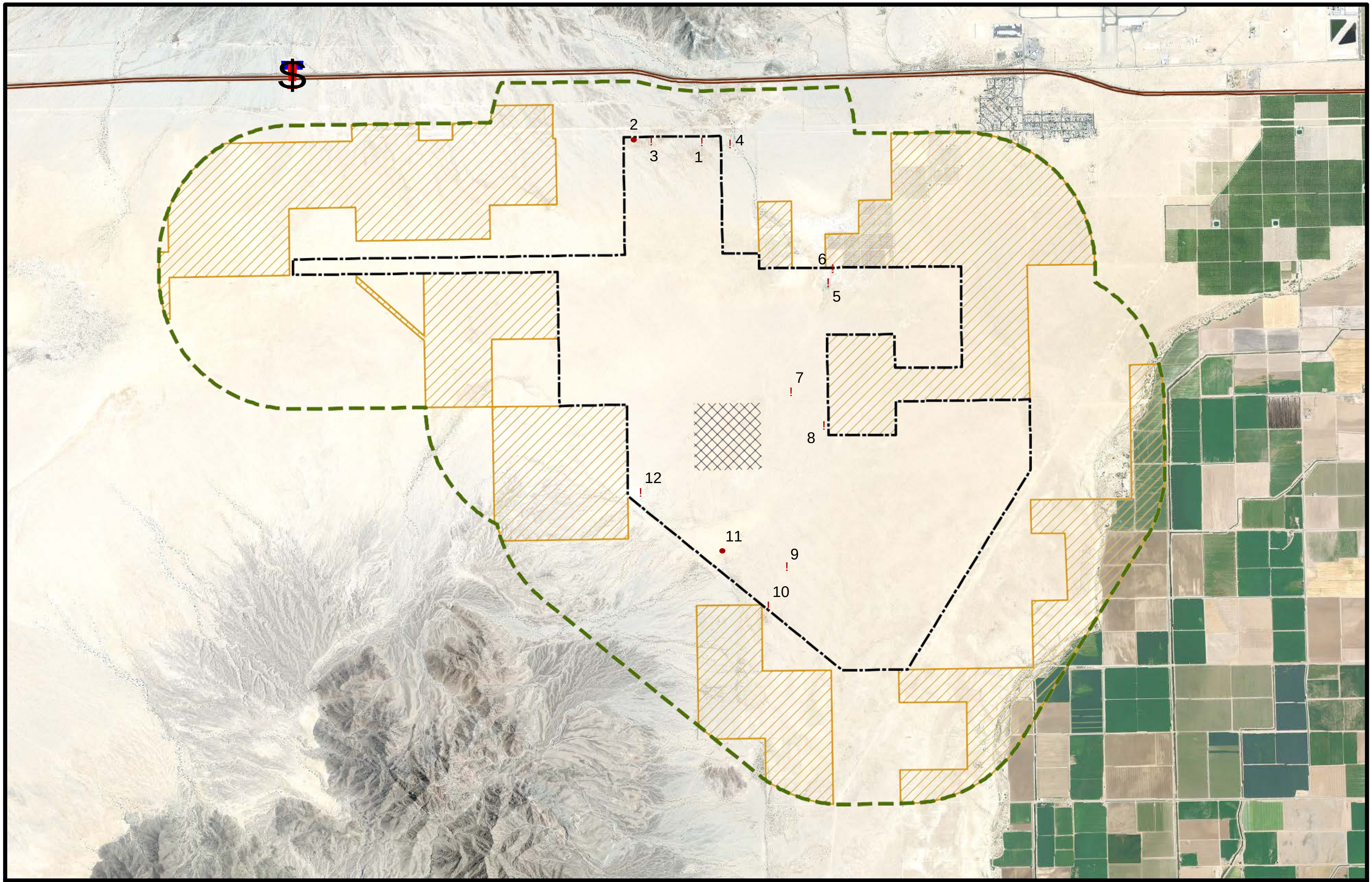
Surveys of the Project site were conducted by qualified biologists walking transects at 10 m spacing to ensure total visual coverage of the area. All desert kit fox single-entrance dens and canid complexes that could be occupied without modification were recorded. A camera station was set up at a total of eight dens and run for three consecutive days and nights.

A qualified biologist revisited each of these 24 dens to search for signs of activity such as lay-down spots on the entrance mounds and make a determination of active status. Up to 16 of the most active dens were monitored with cameras for three nights each. Photo images were analyzed to attempt to identify individual foxes, their sex and age group to try to determine a rough demographic index of desert kit fox presence on the Project site.

2.8.4.3 Bats

A bat assessment was performed by Patricia Brown, Ph.D. and William Rainey, Ph.D. (Brown-Berry Biological Consulting) to assess potential bat habitat within the Study Area. Suitable roosting and foraging habitat for several bat species that are known to occur in the vicinity (including pallid bats, cave myotis and California leaf-nosed bats) was reviewed in the field.

Acoustic monitoring was conducted for three nights to sample bat species utilizing the Study Area (Figure 10). Passive acoustic monitors consisted of a sealed enclosure containing a battery, broadband frequency-dividing ultrasound detector and a programmable data storage device (Anabat II and CF-ZCAIM; Titley Electronics, Ballina, NSW, Australia), with an extension cable microphone in a weather shroud, flat acoustic reflector and bracket (P). The microphone and reflector assemblies were elevated approximately 3 ft above the terrain on a metal stake (Photograph 2). Recorded data were stored on compact flash cards that were programmed with sampling start and stop times (1800-0600 PST) for a sampling interval longer than the time from local sunset to sunrise. An estimate of local sunset times (ignoring local horizon topography effects) was obtained from Project site coordinates and U.S. Naval Observatory web services (http://aa.usno.navy.mil/data/docs/RS_OneYear.php). Twelve monitors were deployed (Figure 10) at sites with different vegetative components to identify bat species and document activity levels at this season. Half of the monitors had standard microphones and half had low frequency microphones with higher sensitivity to sounds in the audio range [4.5 to 20 kilohertz (kHz)]. This enhances recording of certain bat sounds (e.g., pallid and California leaf-nosed bat social calls, western mastiff and other freetailed bat calls) along with insect and bird calls.



● Bat Monitoring Locations

Site Boundary Buffer

Desert Quartzite
Site Boundary

▨ Inholding

▨ Private Lands

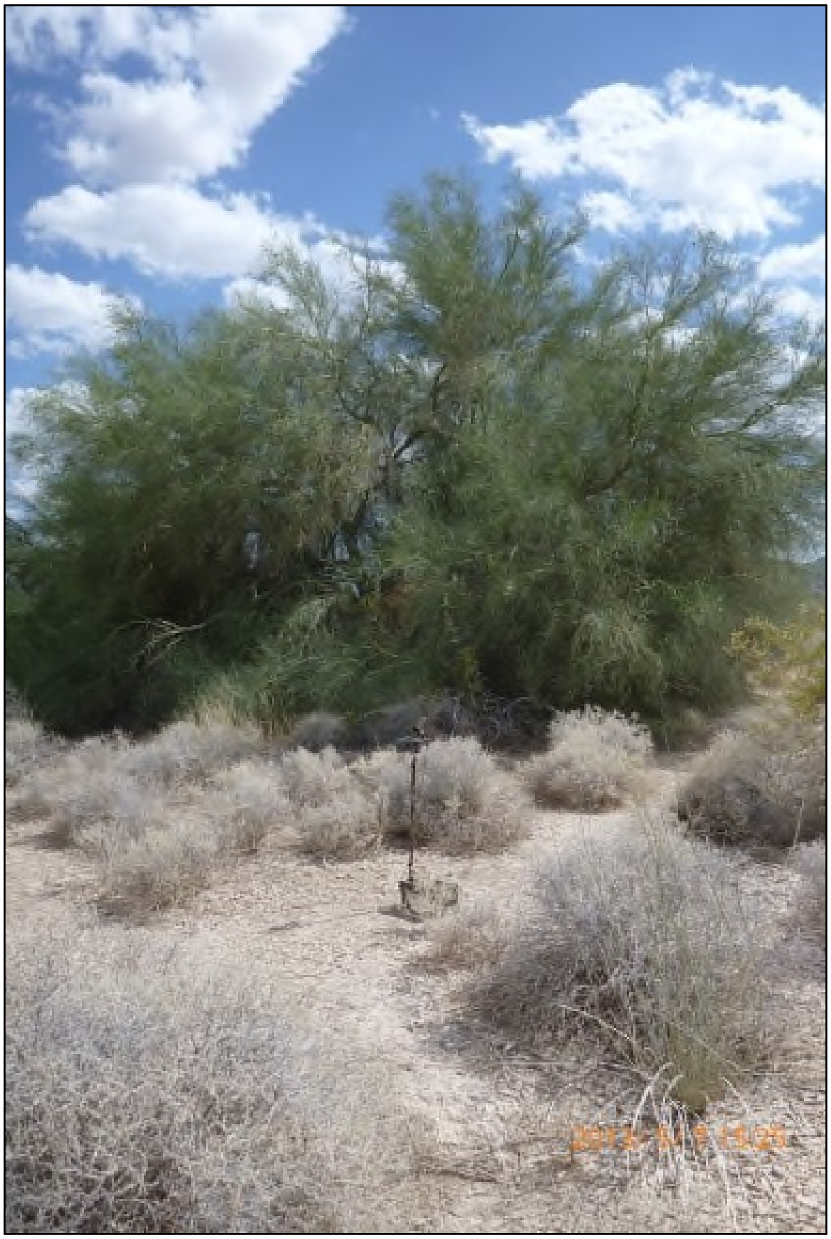
0 1,000 2,000
Meters

DESERT QUARTZITE SOLAR PROJECT
DESERT QUARTZITE, LLC

Figure 9
Acoustic Bat Monitor Locations

#343 P:\GIS\Ironwood\Shared\Projects\Projects\Quartzite\ArcGIS project files\Acoustic Bat Locs.mxd 8/26/2015

Photograph 2 Detector 5, Microphyll Woodland



Roost surveys were conducted of mines in the mountains adjacent to the Project site during the day and at night for evidence of bats and guano. Two mines in the southern McCoy Mountains (located approximately 4.4 miles northwest of the Study Area) had previously been identified by Dr. Brown as California leaf-nosed bat maternity colonies and had been gated with bat-compatible closures by the Bureau of Land Management in 2011. These mines were monitored on May 8, 2013 at dusk by surveyors with night vision equipment to obtain accurate exit and entry counts of bats and acoustic records with additional Anabat detectors. The surveyors kept two counts, entry and exit, for at least sixty minutes after the first bat exited of how many bats entered and exited the mines. Video cameras with auxiliary infrared lights were used to remotely monitor mines and to obtain permanent records of exiting bats.

Using topographic maps and Google Earth images, ground reconnaissance was conducted of possible mine features on the north end of the Mule Mountains (1.8 miles south of the Study Area) and no underground features that could shelter bats were discovered. The closest known bat colony in the Mule Mountains is the Hodge Mine (a.k.a. Stonehouse, 33.51145, -114.79383) situated 3.4 miles south of the Study Area. This mine contains the largest winter colony of California leaf-nosed bats (*Macrotus californicus*) in the United States, as well as a maternity colony. It is also one of four maternity colonies for the cave myotis (*Myotis velifer*) in California. This mine has been a research site for Dr. Brown since 1976.

3.0 RESULTS

3.1 RAINFALL ANALYSIS

Available historical winter rainfall data from the Blythe CAA Airport was summarized to obtain a useful average for the Blythe area (Tables 8, 9 and 10). The historical average monthly rainfall for the Blythe area was estimated to be 0.30 inches.

Table 8 Historical Winter Rainfall Data (inches)[1]

	October	November	December	January	February	March	Annual Total	Monthly Average
Blythe CAA Airport[1]	0.26	0.19	0.41	0.48	0.44	0.35	3.55	0.30

[1] Western Regional Climate Center (2013)

Table 9 Rainfall 2012 and 2013 (inches)[1]

	October	November	December	January	February	March	2012 Total	2012 Monthly Average
Blythe CAA Airport[1]	0.27	0.00	0.86	0.77	0.01	0.03	4.47	0.37

[1] Western Regional Climate Center (2013)

Table 10 Blythe Rainfall: October 2014-March 2015

Station ID	Location	OCT 2014	NOV 2014	DEC 2014	JAN 2015	FEB 2015	MAR 2015
BLH	Blythe	0.03	0	0.78	0.57	0.04	1.02

Notes:

Precipitation in inches
Source: National Weather Service California Nevada River Forecast Center Lower Colorado Region; Station: Blythe, http://www.cnrfc.noaa.gov/monthly_precip.php

3.2 BOTANICAL SURVEYS

Thirty-three special status plant species had been identified as potentially occurring in the vicinity of the Project site (Appendix C). This list was generated by searching multiple databases and reference sources for occurrence records.

3.2.1 Special Status Plant Species

On BLM lands, the fall 2012 survey on September 11 -19, 2012, and spring surveys were conducted March 18-30, 2013. The inholding surveys were conducted on March 10-12, 2015. Localized winter rainfall for each of the surveys was very good, enough to germinate abundant annual blooms, and timing was optimal for observing and identifying all potentially occurring target plants. For the fall survey, full coverage at 10 m spacing was achieved across about half of the Study Area and the remainder was surveyed at 20 m spacing. The spring surveys covered 100 percent of the site at 10 m spacing. Fall and spring 2013 surveys yielded a full plant list of 124 taxa, representing 25 plant families. Of this total, 114 are native and 10 are non-native. The inholding parcel, being an old jojoba farm, yielded 41 species of vascular plants. Figure 11 depicts a combination of all Special Status Plants observed. The floristic plant list is in Appendix E and F.

NOTE: Due to the fall special status plants having particularly high status rankings and any additional discoveries on these would be relatively insignificant in light of widely scattered documentation throughout the larger Project site during the fall 2012 plant surveys, fall 2015 plant surveys were not performed within the inholding (California Native Plant Society Electronic Inventory 2015).

3.2.1.1 Special Status Plants Found on Site

Table 11 below lists all the Special Status plants found onsite during fall and spring surveys. None of these plants are federally or state listed, but they all qualify as special status to different degrees by California State-ranking and CNPS ranking.

Table 11 Special Status Plants Found on Site

Scientific Name **Common Name**	**Status**		**Flowering Period**	**Occurrence on Site (does not include inholding)**	**Occurrence on Inholding (old jojoba farm)**
Astragalus insularis var. *harwoodii* Harwood's milkvetch	Global: Federal Listing: State Listing: **State Rank:** **CNPS Rank:** NECO:	G5T3 none none **S2** **2.2** covered	Jan - May	**PRESENT:** 13,712 individuals estimated on site.	**PRESENT:** 12,658 individuals estimated on site
Euphorbia abramsiana =Chamaesyce abramsiana Abrams' spurge	Global: Federal Listing: State Listing: **State Rank:** **CNPS:** NECO:	G4 none none **S2S3** **2.2** not covered	Sep – Nov	**PRESENT:** appx. 2104 individuals found during Fall 2012 surveys	**None Found during surveys.**
Cryptantha costata ribbed cryptantha	Global: Federal Listing: State Listing **State Rank:** **CNPS:** NECO:	G4G5 none none **S3.3** **4.3** not covered	Jan - May	**PRESENT:** appx. 56,748 individuals estimated on site	**PRESENT: 2 individuals**
Eriastrum harwoodii Harwood's eriastrum	Global: Federal Listing: State Listing: **State Rank:** **CNPS:** NECO:	G3 none; BLM sensitive none **S3** **1B.2** not covered	Mar - May	**PRESENT:** appx. 882 individuals found on site	**None found- Appropriate habitat was not present**
Funastrum utahense Utah vine milkweed	Global: Federal Listing: State Listing: **State Rank:** **CNPS:** NECO:	G4 none none **S3.2** **4.2** not covered	Apr - Sep	**PRESENT:** 1 individual found on site	**None Found during surveys**
Proboscidea althaeifolia desert unicorn-plant	Global: Federal Listing: State Listing: **State Rank:** **CNPS:** NECO:	G5 none none **S3.3** **4.3** covered	May - Aug	**PRESENT:** appx. 811 individuals estimated during Fall 2012 surveys	**None Found during surveys**

Ranking Source: CNPS 2012

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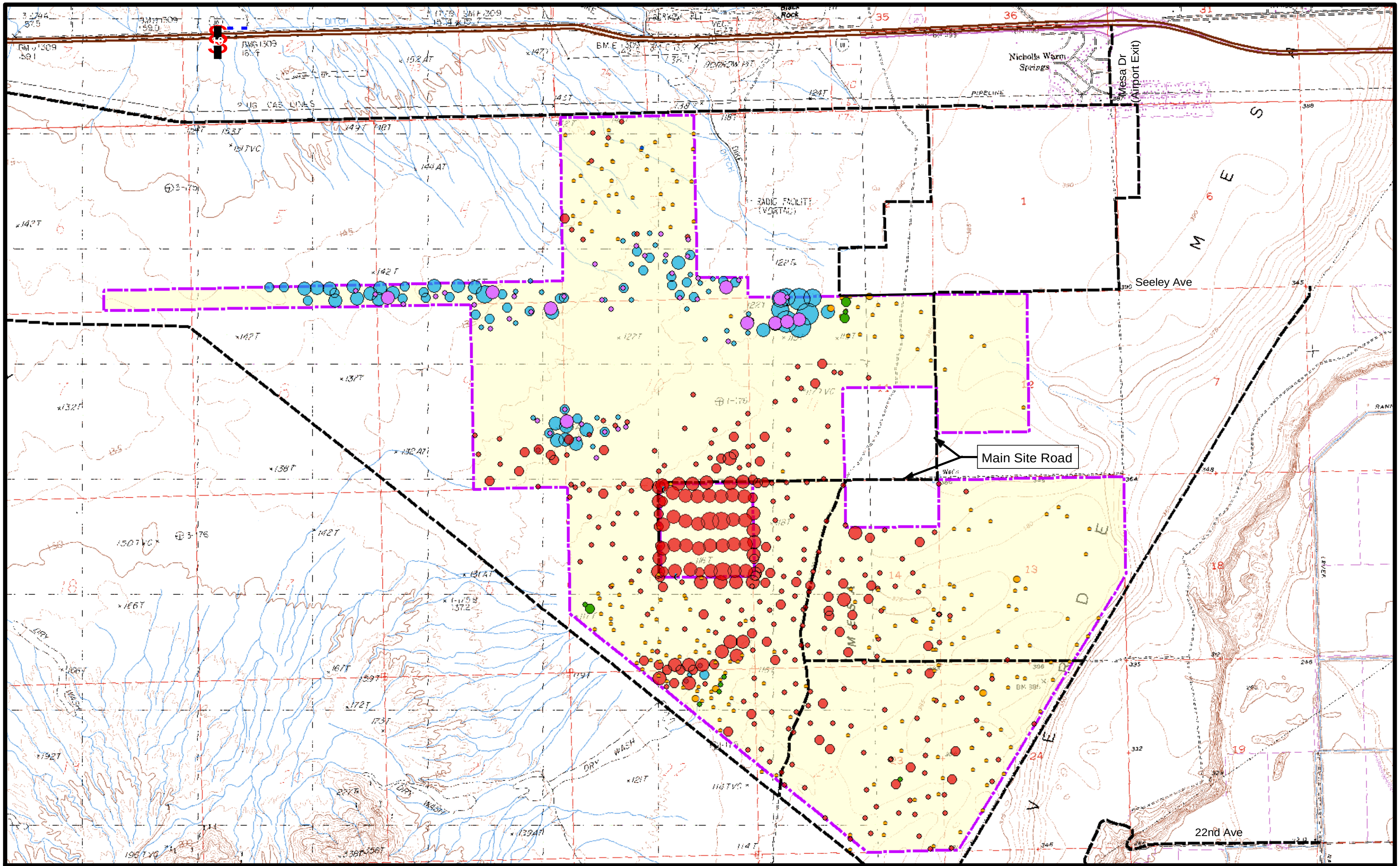

Nicholls Warm Springs
Mesa Dr (Airport Exit)
Seeley Ave
Main Site Road
22nd Ave
RADIO FACILITY
PIPELINE
BORROW PIT
DRY WASH
M E S A
V E R D E

Species

- ● Harwood's Eriastrum
- ● Ribbed Cryptantha
- ● Adam's Prostrate Spurge
- ● Desert Devil's Claw
- ● Harwood's Milkvetch
- ● Utah Vine Milkweed

Plant Density

- ○ 1 - 10
- ○ 10 -100
- ○ 100 - 1,000
- ○ 1,000 - 5,000
- ○ 5,000 - 12,200

Site Access Roads

Desert Quartzite Site Boundary

Note:
Dot size does not represent Area of Occurrence

0 500 1,000
Meters

DESERT QUARTZITE SOLAR PROJECT
DESERT QUARTZITE, LLC

Figure 10

Combined Rare Plants Map

3.2.1.2 Harwood’s Milkvetch

Harwood's milkvetch (*Astragalus insularis var. harwoodii*) is an annual herb in the Fabaceae family. It is historically known to occur in desert dunes and Mojavean and Sonoran desert scrub at elevations ranging from 0 to 2,300 feet (0 to 710 meters) amsl. Harwood's milkvetch has a State Rank of 2 and a CNPS Rank of 2.2, which means that it is fairly endangered in California but more common elsewhere.

Large populations of Harwood’s milkvetch, were documented in the spring 2013 survey (Photograph 3) (Figure 12). It was locally abundant in certain areas and the surveying botanists estimated numbers of individuals per waypoint. The total estimated count across the site was 13,712 individuals. It is distributed widely across most of south half of the Project site, with concentrated populations along the disturbed berm surrounding the inholding (abandoned jojoba farm) and some very shallow sand dunes at the southwest corner of the site. Its mechanism for dispersal is unknown, but most likely its inflated seed pods get carried by the stiff westerly winds and deposited at some wind-breaking disturbance such as soil berms.

The majority of the plants were in fertile condition, often both flowering and fruiting and there appeared to be a robust fruit and seed set in spring 2013. There is certainly a significant seed bank in the soil after that spring.

Other nearby solar projects (McCoy and Blythe) also documented large occurrences of this plant. These projects are in advanced stages of approval and share a common right-of-way with this proposed Project’s gen-tie line location.

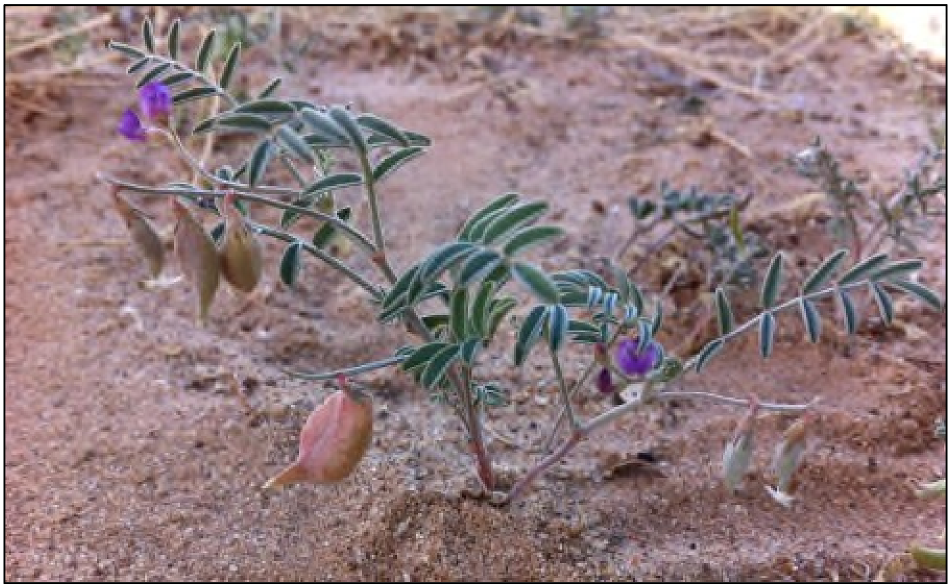
Harwood’s milkvetch was disturbed widely across the entire inholding, including the peripheral berms (Figure 13). There was no particular pattern of distribution. These plants could be found against the irrigation berms or within the interspaces. When found, they were usually in patches of 2 to 30 individuals, most often accompanied by other flowering native annuals.

The inholding, being a fallow jojoba farm, was a regular grid of shallow mounds and berms, providing micro-breaks in the flow of wind. Thus there are many opportunities for milkvetch seedpods to drop and accumulate anywhere within the inholding, leading to the large numbers of individuals counted during the survey.

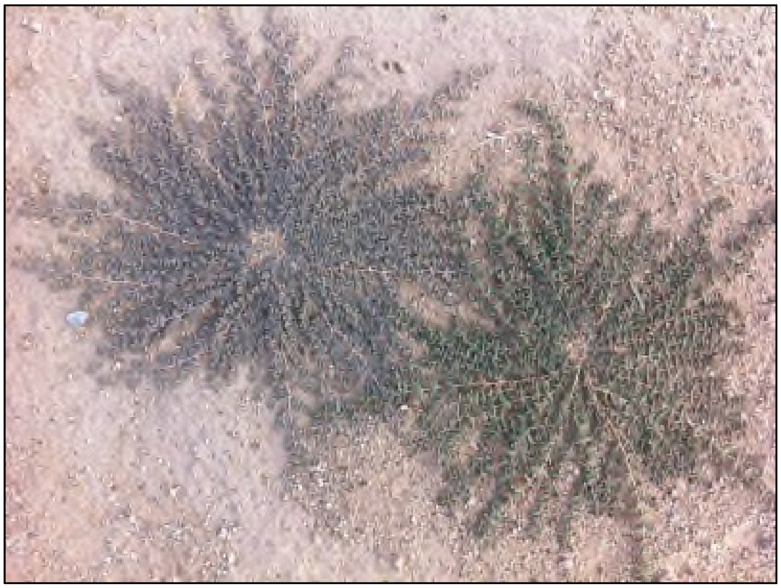
The linear distribution of Harwood’s milkvetch waypoints as depicted in Figure 13 is an artifact of the mapping protocol. Actual distribution of this plant was patchy and evenly dispersed across the entire inholding with no evident pattern visually observed.

This Project’s populations, however, are mostly spread across the main solar site. The proposed methods of site development involve intensive and comprehensive soil surface disturbance by grubbing, grading, compaction, and application of soil surface stabilizers. This type of development inhibits re-establishment of natural plant communities: essentially nothing is allowed to grow between the panels.

Photograph 3 Harwood’s Milkvetch (*Astragalus insularis* var. *harwoodii*)



Photograph 4 Abram’s Spurge (*Euphorbia abramisana*) (R), growing next to common *Euphorbia micromeria* (L)



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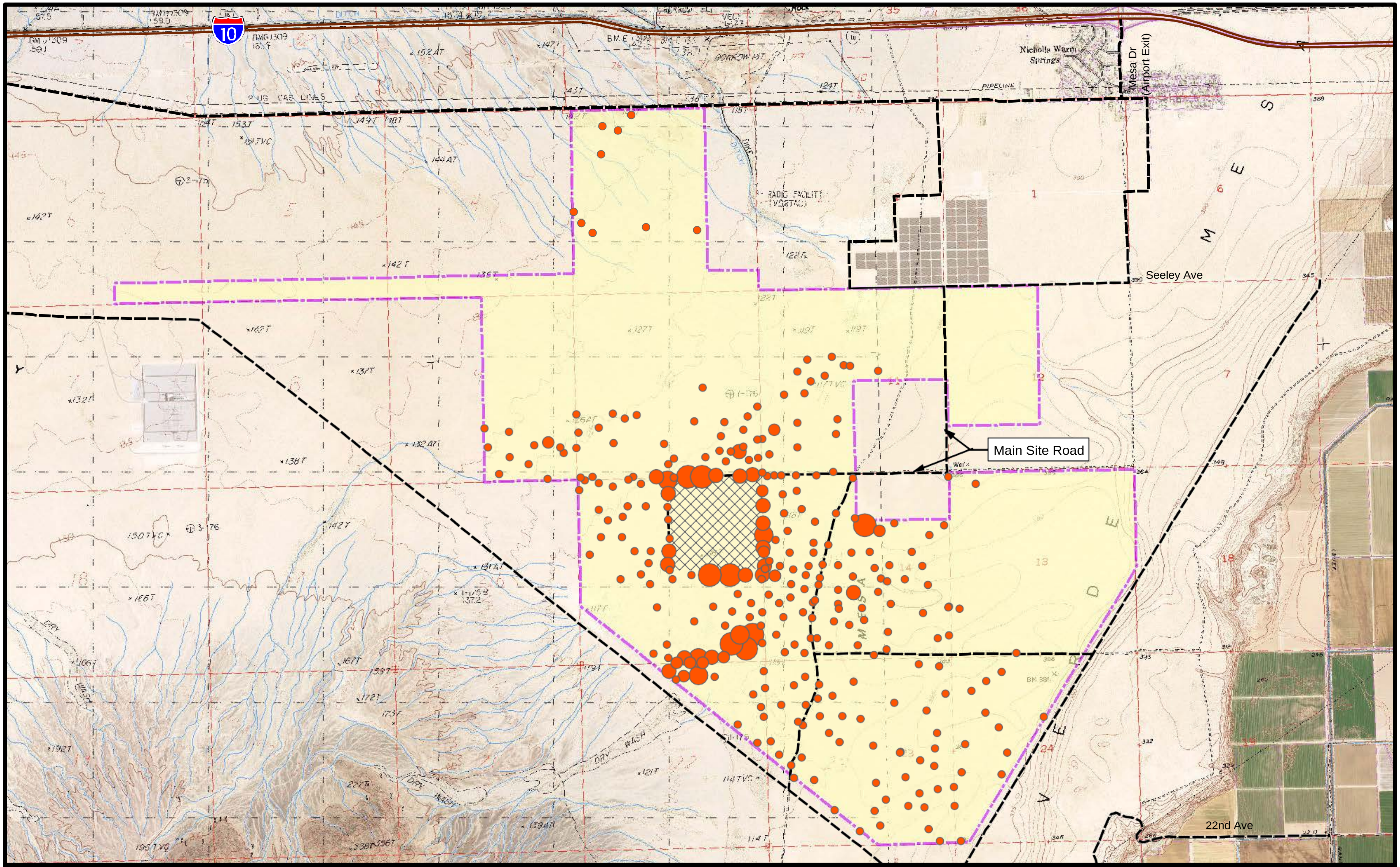

10
Nicholls Warm Springs
Mesa Dr (Airport Exit)
Seeley Ave
Main Site Road
22nd Ave
PIPELINE
RADIO FACILITY (VORTAC)
DRY WASH
MESA
MESA
VE DE

Harwood's Milk Vetch

- ● 1 - 50
- ● 50 - 100
- ● 100 - 300
- ● 300 - 500
- ● 500 - 975

— Site Access Roads

▨ Inholding

🟨 Desert Quartzite Site Boundary

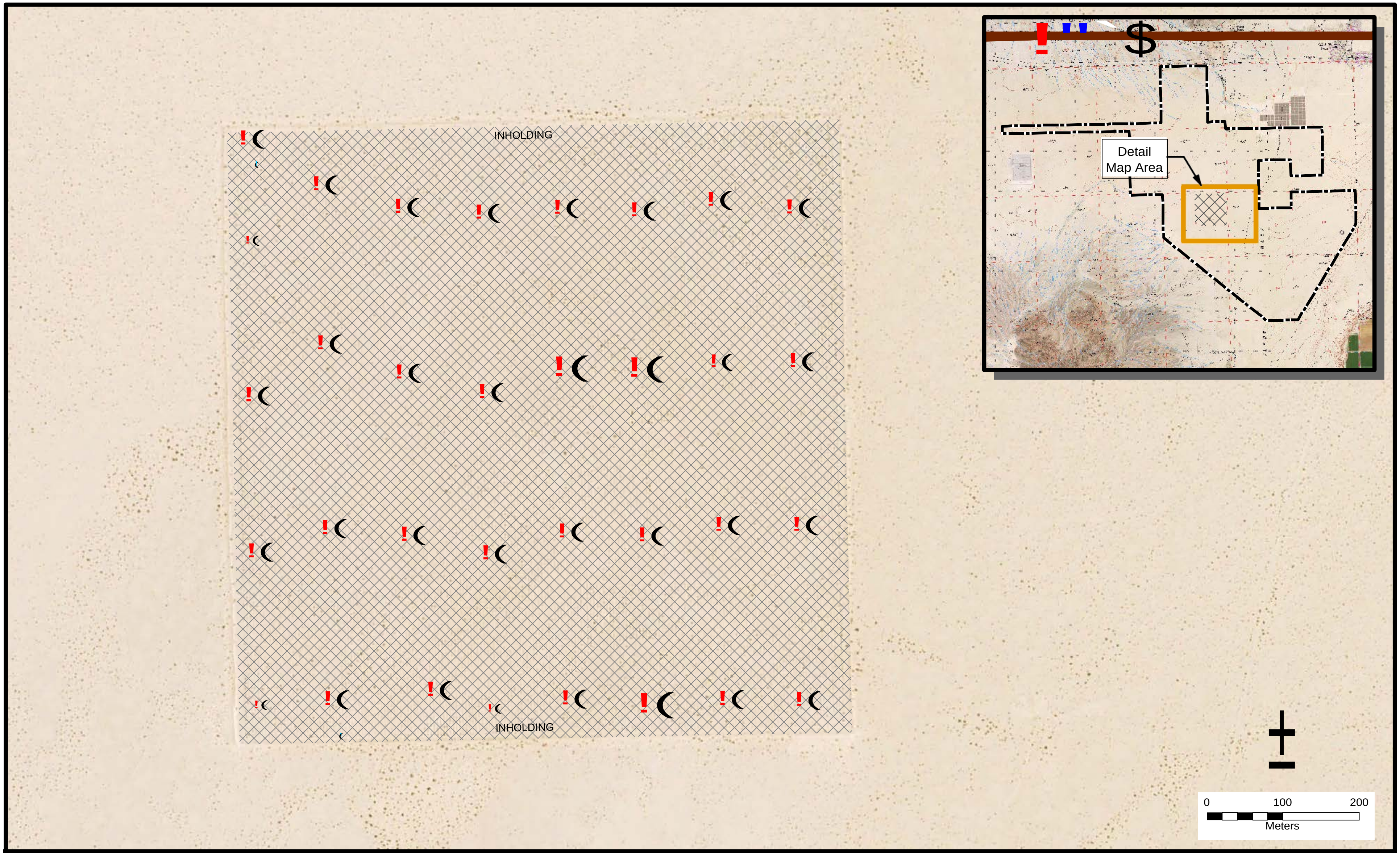
Note:
Dot size does not represent Area of Occurrence

N

0 500 1,000
Meters

DESERT QUARTZITE SOLAR PROJECT
DESERT QUARTZITE, LLC

Figure 11
Harwood's Milk Vetch
(Astragalus insularis var. harwoodii)
Distribution


INHOLDING
INHOLDING
Detail
Map Area
0
100
200
Meters

#300 P:\GIS\Ironwood\Shared\Projects\Projects\Quartzite\ArcGIS project files\Plants_Jojoba.mxd 8/26/2015

3.2.1.3 Abram’s Spurge

Abram's spurge (*Euphorbia abramsiana*) is a CNPS Rank 2.2 annual herb in the Euphorbiaceae family. It is historically known to occur in Mojavean desert scrub, playas, and sandy/silty Sonoran desert scrubs at elevations ranging from sea level to 3,000 feet (0 to 915 meters) amsl.

It was documented as a few small occurrences and one large population during the fall 2012 surveys (Photograph 4) (Figure 14). The total number of individuals was estimated to be approximately 2,104. The majority of these are existing as depauperate dwarf plants on a cracked-muddy flat at the southwest border of the site (called "population 1" in this document).

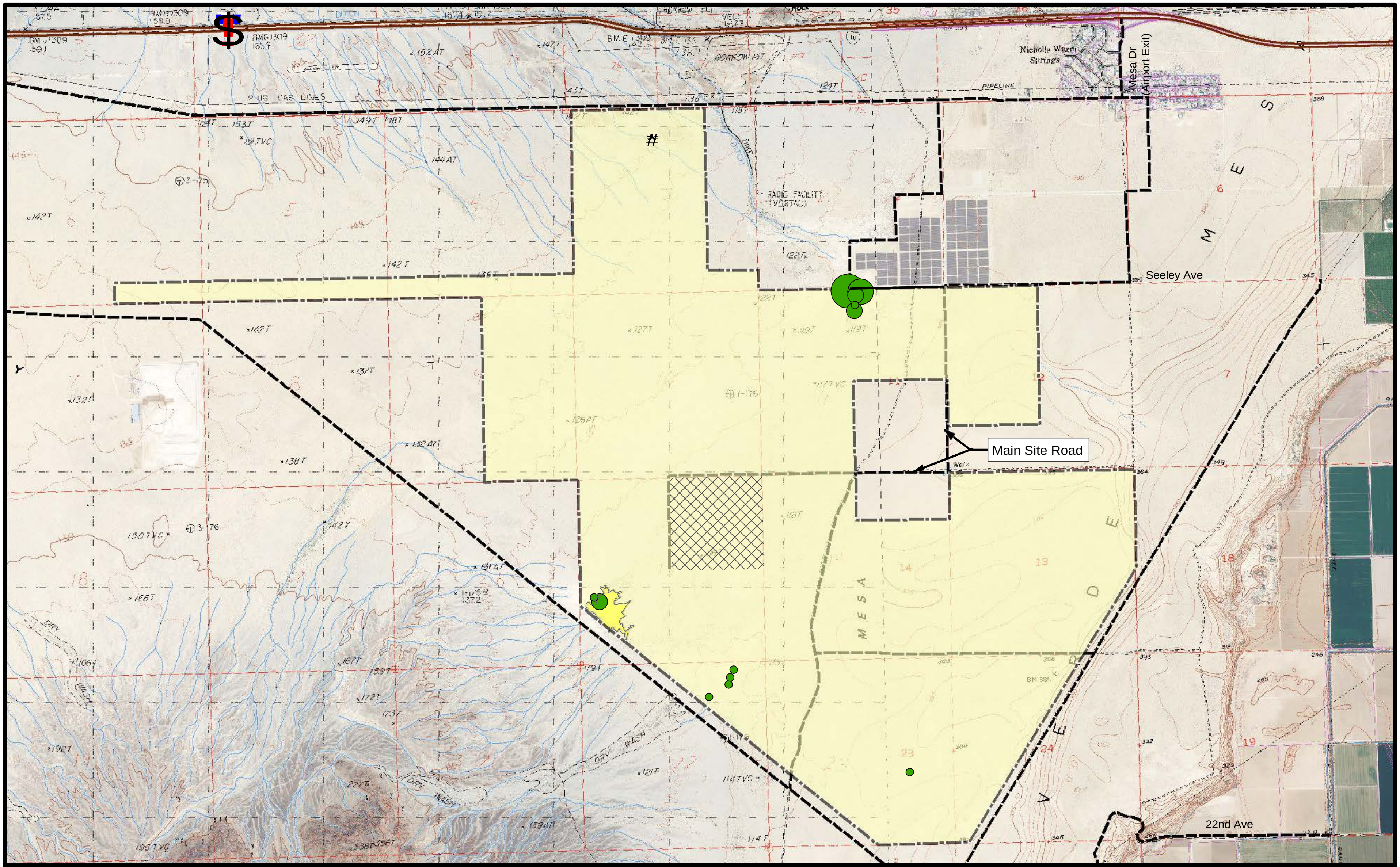
The regional distribution of Abram's spurge and its concept of rarity have been undergoing some revision lately. Recent surveys on the McCoy Solar Project have yielded over 4,000 individuals, and reports of populations in the "tens of thousands" have been observed on Ford Dry Lake and Hayfields Dry Lake (Karl, Pers. comm. 2012). Due to its fall-blooming phenology, this plant may have been overlooked during most botanical surveys, which typically occur in the spring. Consequently, its Special Status in California is presumed to be due to under-sampling.

Nonetheless, because of its State Ranking of S2 and CNPS Ranking as 2.2, any unavoidable disturbance will most likely require mitigation.

3.2.1.4 Utah Vine Milkweed

Utah vine milkweed (*Funastrum utahense*) is a perennial herb in the Apocynaceae family. It typically grows along wash margins and in sandy/gravelly areas throughout the Sonoran and Mojave deserts of California, sprawling and clambering over common shrubs for support. Flowering from April to September, its elevation range is 300 to 4,700 feet (100 to 1,436 meters) amsl.

Only one small individual of Utah vine milkweed was observed onsite in the spring 2013 survey (Figure 14). It was located near the northern most border of the site in a shallow runnel margin. This is an insignificant occurrence, especially with respect to large distributed populations found on the McCoy (5,180 individuals) and Blythe (398 individuals) Solar Projects. Utah vine milkweed has also been widely documented during solar project surveys across California and Nevada, and appears to be much more common than previously thought.


Nicholls Warm Springs
Mesa Dr (Airport Exit)
Seeley Ave
Main Site Road
22nd Ave
PIPELINE
2 US GAS LINES
MESA
DRY WASH

Utah_Vine_Milkweed

# 1

Adam's_Prostrate_Spurge

● 1 - 5

● 5 - 10

● 10 - 20

● 20 - 40

Chamaesyce abramsiana pop #1

▨ Inholding

Desert Quartzite Site Boundary

Site Access Roads

Note:

Dot size does not represent Area of Occurrence

0 500 1,000

Meters

DESERT QUARTZITE SOLAR PROJECT
DESERT QUARTZITE, LLC

Figure 13
Abram's Prostrate Spurge *(Chamaesyce abramsina)* and Utah Vine Milkweed *(Funastrum utahense)* Distribution

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3.2.1.5 Ribbed Cryptantha

Ribbed cryptantha (*Cryptantha costata*) is an annual herb in the Boraginaceae family. It occurs on fine sandy soil and shallow dunes within Sonoran and Mojavean creosote bush scrub, at an elevation range below 3,200 feet (1,000 meters) amsl. Flowering from January through May, it has been widely documented from California herbarium records, with several occurrences within five miles of the Quartzite Project site, as well as a reference population near the site.

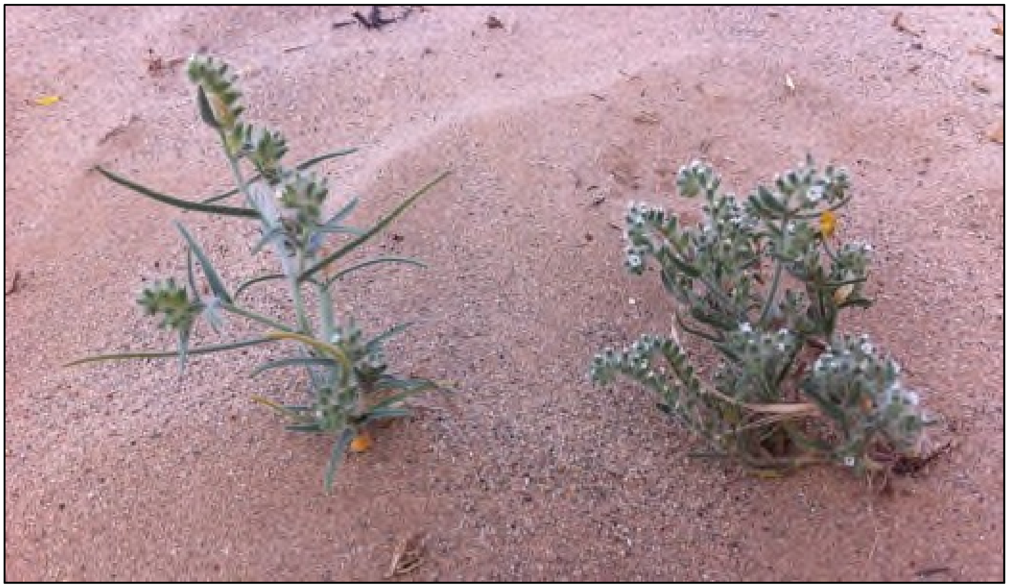
The spring 2013 surveys documented approximately 56,748 individuals of ribbed cryptantha, exclusively on sandy areas of the site (Photograph 5). Some occurrences were so dense that the numbers of individuals were estimated systematically. Very dense populations were recorded along the gen-tie line and on sandy areas southwest of the exiting solar facility (Figure 15).

From the many solar project surveys conducted throughout the region, several large populations of ribbed cryptantha have been documented. A total of 1,715 individuals, were observed at the McCoy Solar Project mostly around the sandy gen-tie line alignment to be shared with both the Blythe Solar Project and this Project. The Blythe Solar Project recorded around 71,000 individuals along the same gen-tie line; however, this record seems to also include individuals found in the existing substation footprint.

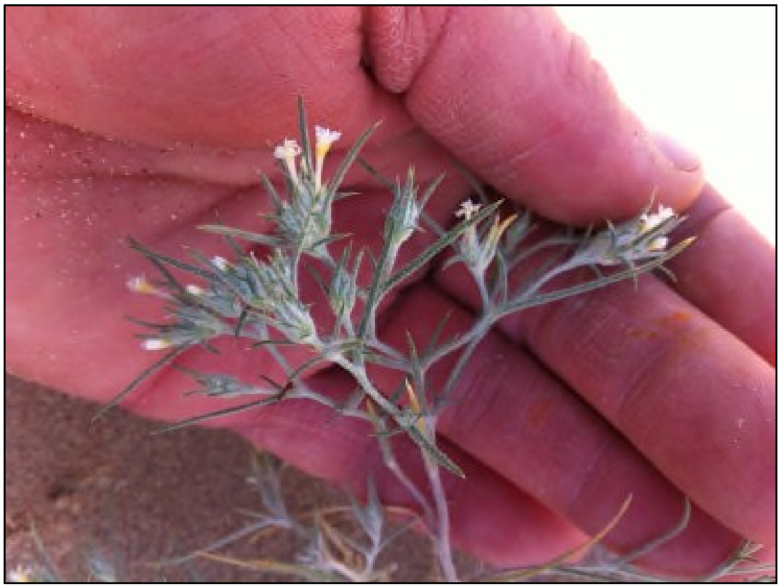
Only two individuals of ribbed cryptantha were found during the spring 2015 surveys on the inholding (Figure 13). Both appear to be waifs and it is unlikely that they will promote establishment of larger populations on the inholding. This occurrence is insignificant when compared to the approximately 56,000 individuals found on deeper sandy areas of the Project site and gen-tie line.

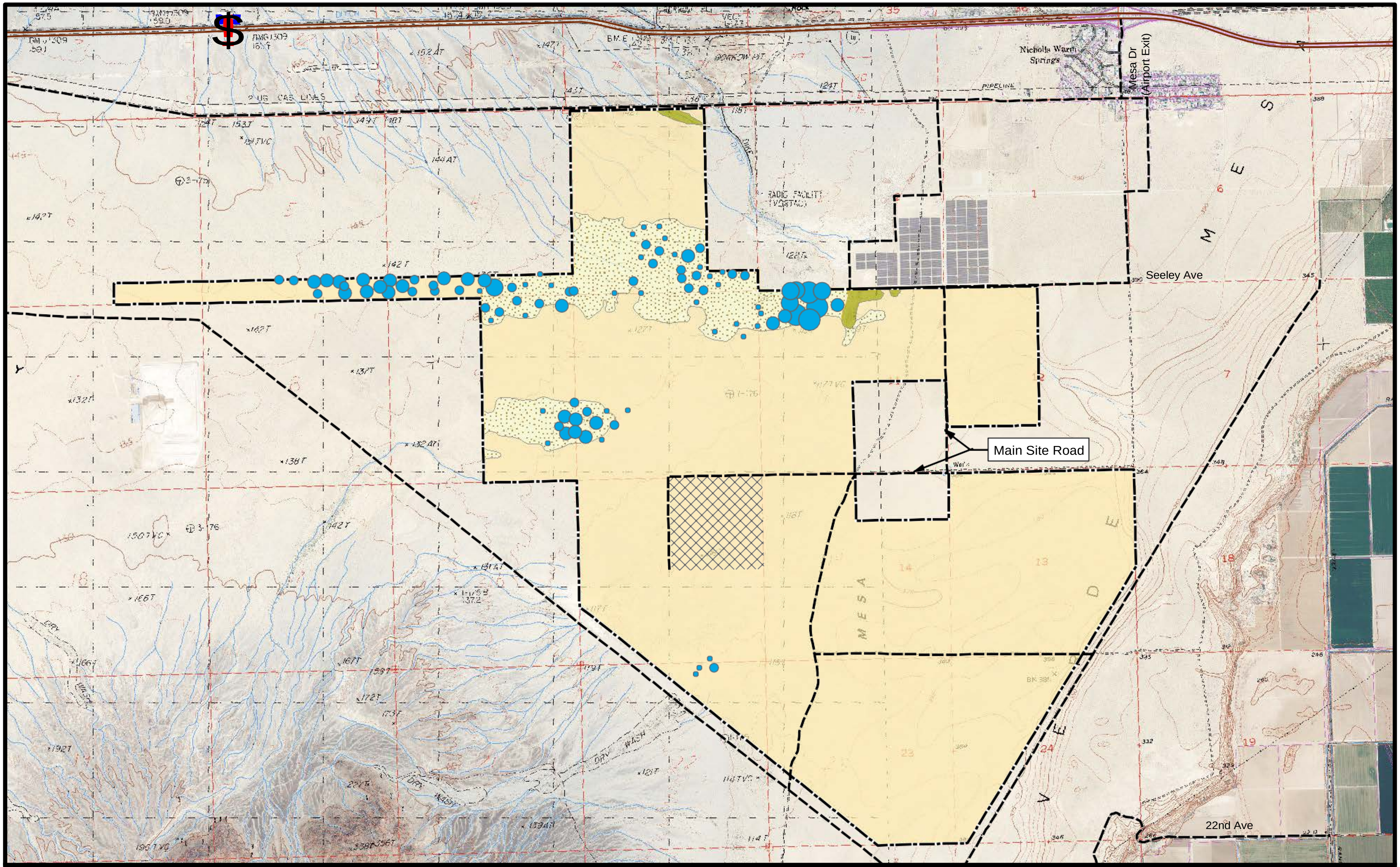
The main threats to this species are: major disturbances of sandy areas; disruption of sand transport processes and flows; and further introduction of weeds, especially Saharan mustard (*Brassica tournefortii*). Many of the sandy locations of the site are already infested with Saharan mustard, and construction of the gen-tie line most likely will increase this weed. The large population on sandy areas just southwest of the existing solar facility is on the Project site. These areas are highly populated with Saharan mustard, but mostly at the margins of the sand dunes.

Photograph 5 Ribbed Cryptantha (*Cryptantha costata*) (L) growing alongside the common *Cryptantha angustifolia*



Photograph 6 Harwood's Eriastrum (*Eriastrum harwoodii*)

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PIPELINE
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BORROW PIT
RADIO FACILITY (VORTAC)
DRY WASH
M E S A
D E V E
M E S

Ribbed Cryptantha

- ● 1 - 10
- ● 10 -100
- ● 100 - 1,000
- ● 1,000 - 5,000
- ● 5,000 - 12,200

🟩 Dry Desert Wash Woodland

▨ Sandy Dunes

🟨 Sonoran Desert Creosote Bush Scrub

Note:

Dot size does not represent Area of Occurrence

- - - Site Access Roads

▨ Inholding

Desert Quartzite Site Boundary

Desert Quartzite Site Boundary

0 500 1,000

Meters

DESERT QUARTZITE SOLAR PROJECT
DESERT QUARTZITE, LLC

Figure 14
Ribbed Cryptantha
(Cryptantha costata)
Distribution

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3.2.1.6 Harwood’s Eriastrum

Harwood's eriastrum *(Eriastrum harwoodii)* is an annual herb in the Polemoniaceae family. It is a California endemic, distributed on sand dunes in desert areas of Riverside, San Bernardino, and San Diego counties. Typically flowering occurs from March to May, its elevation range is 400–3,000 feet (125 - 915 meters) amsl.

Spring 2013 surveys on the Project site documented 882 individuals of this plant, exclusively on sandy areas of the gen -tie line and Study Area (Photograph 6) (Figure 16). Harwood's eriastrum appears to co-occur sympatrically with ribbed cryptantha, with similar substrate preferences and distribution, although in fewer numbers and more sporadically dispersed. It is vulnerable to the same threats, especially weeds as discussed in Section 3.1.4.

Ironwood looked carefully for any occurrences of Harwood’s eriastrum across the inholding but none were found. This plant is restricted to deeper sand dunes. Appropriate habitat was not present on the inholding.

Other nearby solar projects have likewise documented populations of Harwood's eriastrum on the same sandy gen-tie line alignment. A total of 386 individuals were found during the survey for the McCoy site. A total of 2,134 individuals were found during the survey for the Blythe Solar Project; however, this record appears to include individuals found in the existing substation footprint.

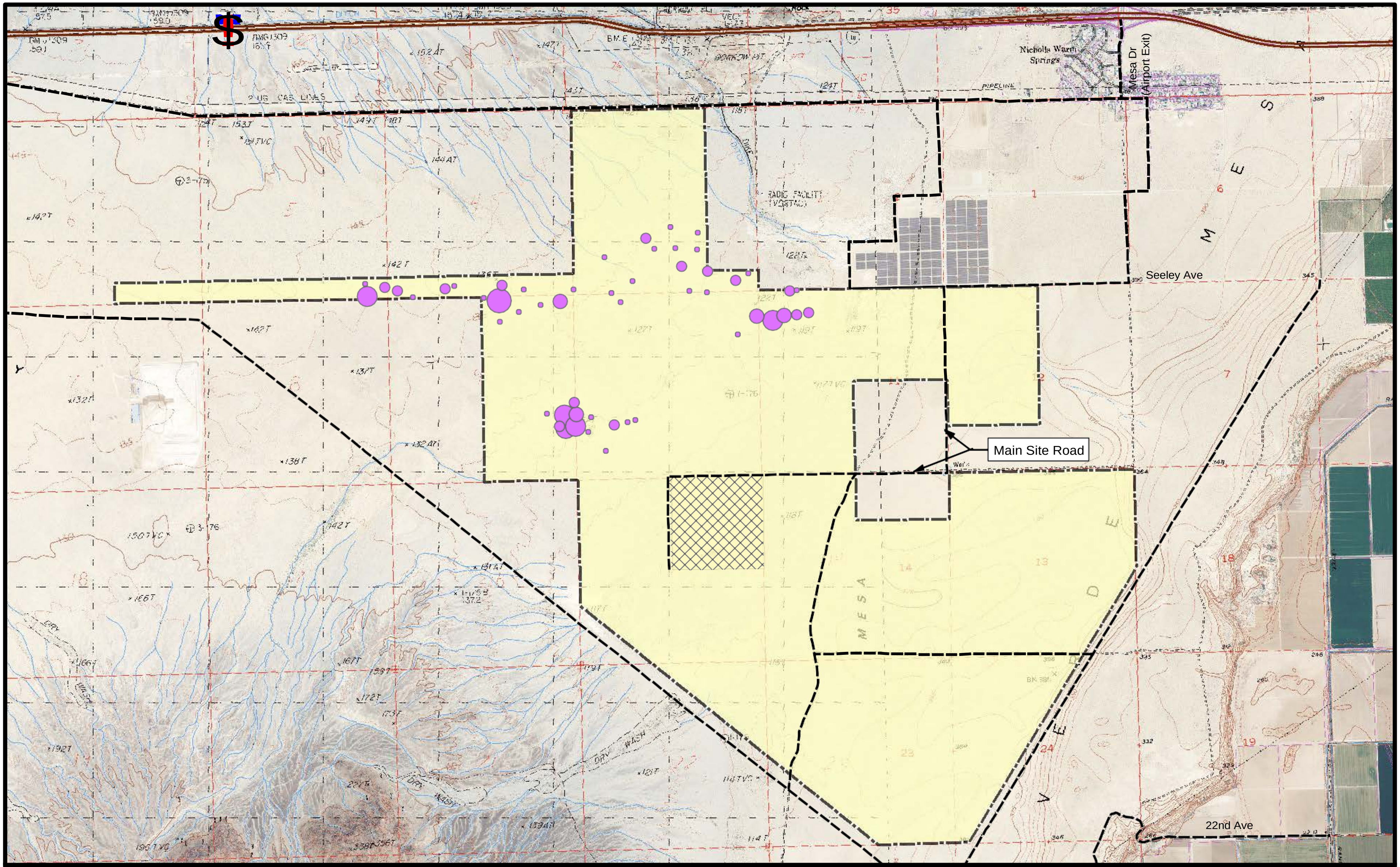
Although Harwood's eriastrum is assigned the State Rank of S3 (apparently requiring no compensatory mitigation), its CNPS Rank is 1B.2. This is the highest Special Status ranking of any of the plants on the Project site.

3.2.1.7 Desert Unicorn Plant

Desert unicorn plant (*Proboscidea altheifolia*) is a perennial herb belonging to the Martyniaceae family. It is historically known to occur in sandy Sonoran desert scrub at elevations ranging from 490 to 3,280 feet (150 to 1,000 meters) amsl.

811 individuals of desert unicorn plant were documented within the Study Area during fall 2012 Rare Plant Surveys (Photograph 7) (Figure 17). This is an estimate because sometimes a single root tuber might produce two to three above ground leaf rosettes, and closely spaced aboveground stems were counted as separate individuals.

Desert unicorn's distribution across the Project site followed no particular pattern. It was found occasionally on shallow sand sheets, but was mostly seen in innocuous creosote bush scrub, on both loose sandy-gravelly soils, and silty areas. It prefers shallow swales where summer monsoonal rainfall collects and soaks-down.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Mesa Dr (Airport Exit)
Seeley Ave
Main Site Road
22nd Ave
MESA
VERDE
MESA
PIPELINE
RADIO FACILITY
2 UG GAS LINES
BORROW PIT
DRY WASH

Harwood's Eriastrum

●	1 - 5
●	5 - 20
●	20 - 50
●	50 -100
●	100 - 171

—	Site Access Roads
▨	Inholding
▭	Desert Quartzite Site Boundary

Note:

Dot size does not represent Area of Occurrence

0 500 1,000

Meters

DESERT QUARTZITE SOLAR PROJECT
DESERT QUARTZITE, LLC

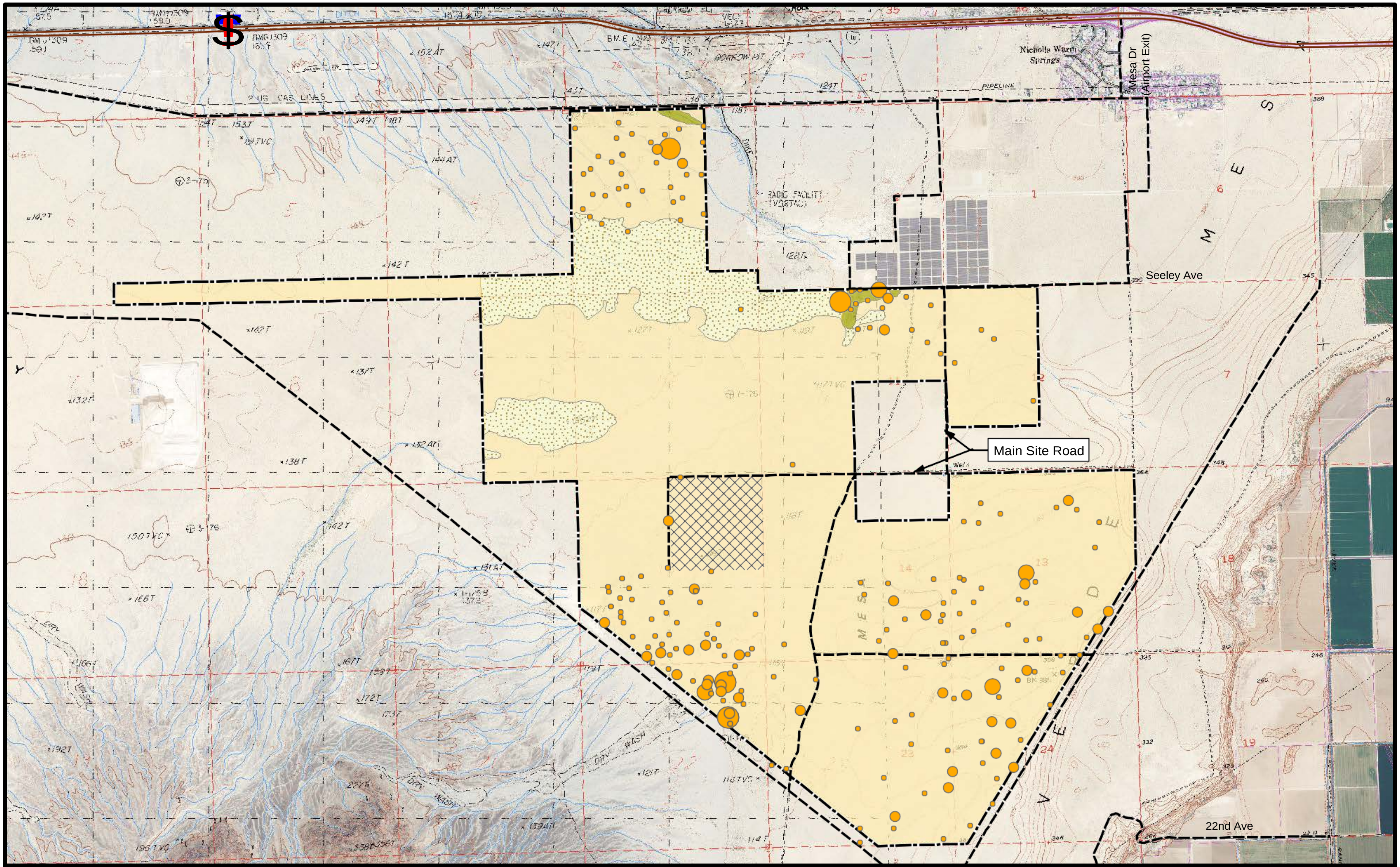
Figure 15
Harwood's Eriastrum
(Eriastrum harwoodii)
Distribution

The largest concentrations of this plant were the silty outwash flats on the southwest border of the site, and on similar silty areas near the existing solar facility.

Since fall rare plant surveys became required for desert solar projects, our knowledge of the distribution and abundance of desert unicorn has been significantly broadened. McCoy Solar surveys recorded 662 individuals distributed across its site. Blythe Solar also conducted fall surveys in 2012, documenting 1,687 individuals with many of these re-sprouting within a recently graded access road. It is presumed that this plant is much more common than believed, but has been misinterpreted as rare because of the limited number of fall surveys performed as seen with surveys not conducted at the correct time of the year for Abram's spurge noted earlier.

Photograph 7 Desert Unicorn Plant (*Proboscidea althaeifolia*)

Photograph 8 Desert Dry Wash Woodland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PIPELINE
2 UG GAS LINES
BORROW PIT
RADIO FACILITY
Seeley Ave
Main Site Road
Well
22nd Ave
MESA
EAST MESA
DRY WASH

Desert Unicorn Plant

- ● 1 - 5
- ● 5 - 10
- ● 10 - 15
- ● 15 - 25

Site Access Roads

▨ Inholding

Desert Quartzite Site Boundary

🟩 Dry Desert Wash Woodland

Sandy Dunes

Sonoran Desert Creosote Bush Scrub

Note:
Dot size does not represent Area of Occurrence

0 500 1,000
Meters

DESERT QUARTZITE SOLAR PROJECT
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Figure 16
Desert Unicorn Plant *(Probiscidea altheifolia)* Distribution

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3.2.2 Cacti and Yucca

Yuccas were not found on site, but three species of cactus were documented during the fall 2012 Plant Survey. Due to the fact that all cacti were already recorded, they were not documented in the spring 2013 surveys. The cacti were not recorded with GPS waypoints or in the electronic database; however, they were tallied by species on the paper datasheets by field surveyors, and represent a good census of all cacti onsite.

No cacti or yucca were observed on the inholding.

The estimated totals of all cacti found on site are presented as follows:

- *Cylindropuntia echinocarpa*: 106 individuals;
- *Mammillaria tetrancistra*: 11 individuals; and
- *Ferocactus cylindraceus*: 1 individual.

3.2.3 Special Status Vegetation Communities

The preliminary vegetation communities are mapped on Figure 18 and described as follows.

3.2.3.1 Desert Dry Wash Woodland

Desert Dry Wash Woodland (DDWW) is located in two distinct washes, comprising approximately 2 percent of the Project site. Desert Dry Wash Woodland habitat consists of small-leaved (microphyllous) leguminous trees, in association with sandy or gravelly washes with braided channels in active alluvial fans (Photograph 8). Dominant plants species include ironwood (*Olneya tesota*), blue palo verde (*Parkinsonia florida*), with occasional honey mesquite (*Prosopis glandulosa*). This community is considered sensitive by the California Resources Agency and BLM due its limited distribution, value to wildlife, and susceptibility to disturbance (Bureau of Land Management 2002 and Zeiner, et al., 1990). The presence of water at least on a seasonal flow regime is vital for this community to persist.

The NECO regulations consider DDWW as a sensitive resource and recommend avoidance of disturbance. There are three areas within the Study Area, which qualify as DDWW, and each of these are at the margins or borders of the proposed Project. One DDWW area is just south of the existing solar facility. It is a rich woodland environment with palo verdes, ironwoods, and a few mesquites, and is good habitat for many species of avian wildlife. The second DDWW area is down by the southwest powerlines where water flows and pools from the mountains to the southwest. Fine silty soil supports a lot of unicorn plant (*Proboscidea althaeifolia*), plus a nice diversity of common native plant species. The existing Project boundaries mostly avoid this area. There are, however, a few scattered palo verdes and ironwoods scattered in the scrub beyond this DDWW about one quarter to one half mile into the site. The third DDWW is at the northern

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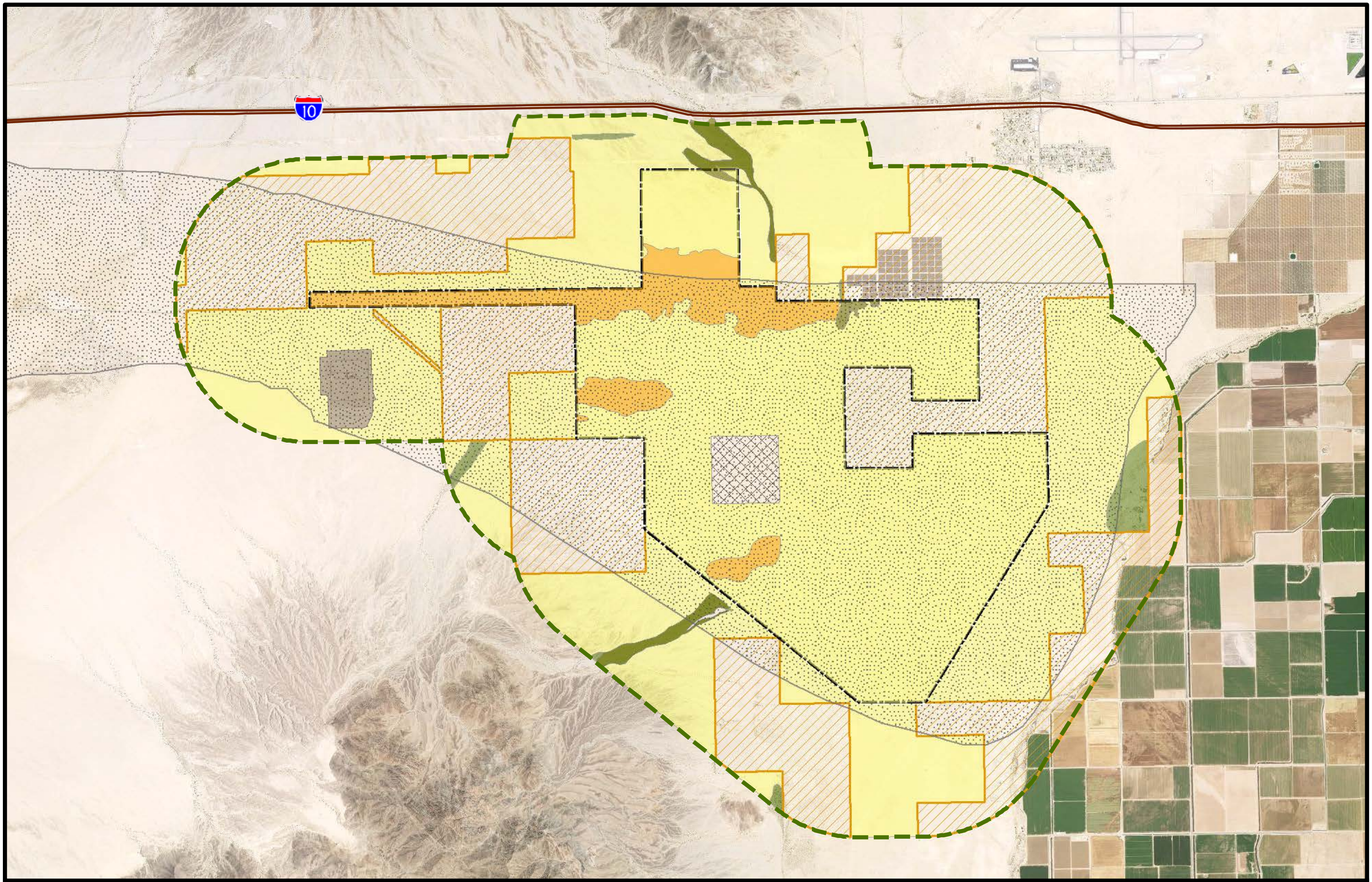


Vegetation Communities

🟩	Desert Wash Woodland (microphyll woodland)
🟨	Sonoran Creosote Bush Scrub
▨	Disturbed/Developed
🟧	Stabilized Sand Dune
- - -	1-Mile Site Boundary Buffer
⁘	Sand Corridor
▩	Inholding
▭	Desert Quartzite Site Boundary

N

0 1
Miles

DESERT QUARTZITE SOLAR PROJECT
DESERT QUARTZITE, LLC

Figure 17

Vegetation Map

edge of the site, starting on the north border and running downstream in a southeast direction. There are palo verdes and ironwoods in this area.

3.2.3.2 Sonoran Desert Scrub

Larrea tridentata-Ambrosia dumosa Shrubland Alliance (Sawyer et. al. 2009)

Sonoran Creosote Bush Scrub (Holland Code 33100)

Sonoran Desert Scrub covers approximately 98 percent (7,160 acres) of the Study Area (Photograph 9) This alliance on the site is dominated by creosote bush (*Larrea tridentata*), burro bush (*Ambrosia dumosa*), with scattered occurrences of cheese bush (*Ambrosia salsola*), brittlebush (*Encelia farinosa*), Emory's Indigo bush (*Psorothamnus emoryi*), big galleta grass (*Hilaria rigida*), and occasional cactus species. Most of this onsite scrub is sparsely vegetated with widely scattered relatively low-growing individual shrubs.

3.2.3.3 Sand Dunes

Pleuraphis (Hillaria) rigida Herbaceous Alliance (Sawyer et al. 2009)

Stabilized and Partially Stabilized Desert Dunes (Holland Code 22200)

Sand Dunes onsite are stabilized and partially stabilized accumulations supporting an herbaceous alliance dominated by the perennial bunch grass, big galleta grass (*Hilaria rigida*) (Photograph 10). Co-dominants are widely scattered creosotes (*Larrea tridentata*), with occasional occurrences of Emory's indigo bush (*Psorothamnus emoryi*), desert wire lettuce (*Stephanomeria pauciflora*), fan-leaved tiquilia (*Tiquilia plicata*) and desert dicoria (*Dicoria canescens*). This vegetation type is present on the sandiest areas around the northwest parts of the Project site and along the gen-tie alignment. It is important to note that dense infestations of the invasive weed Saharan mustard are evident on many areas of this vegetation type.

Photograph 9 Sonoran Desert Scrub

Photograph 10 Sand Dunes

3.2.4 Non-Native and Invasive Species

Ten non-native plant species were observed on the Study Area during the fall 2012 and spring 2013 surveys (Table 12).

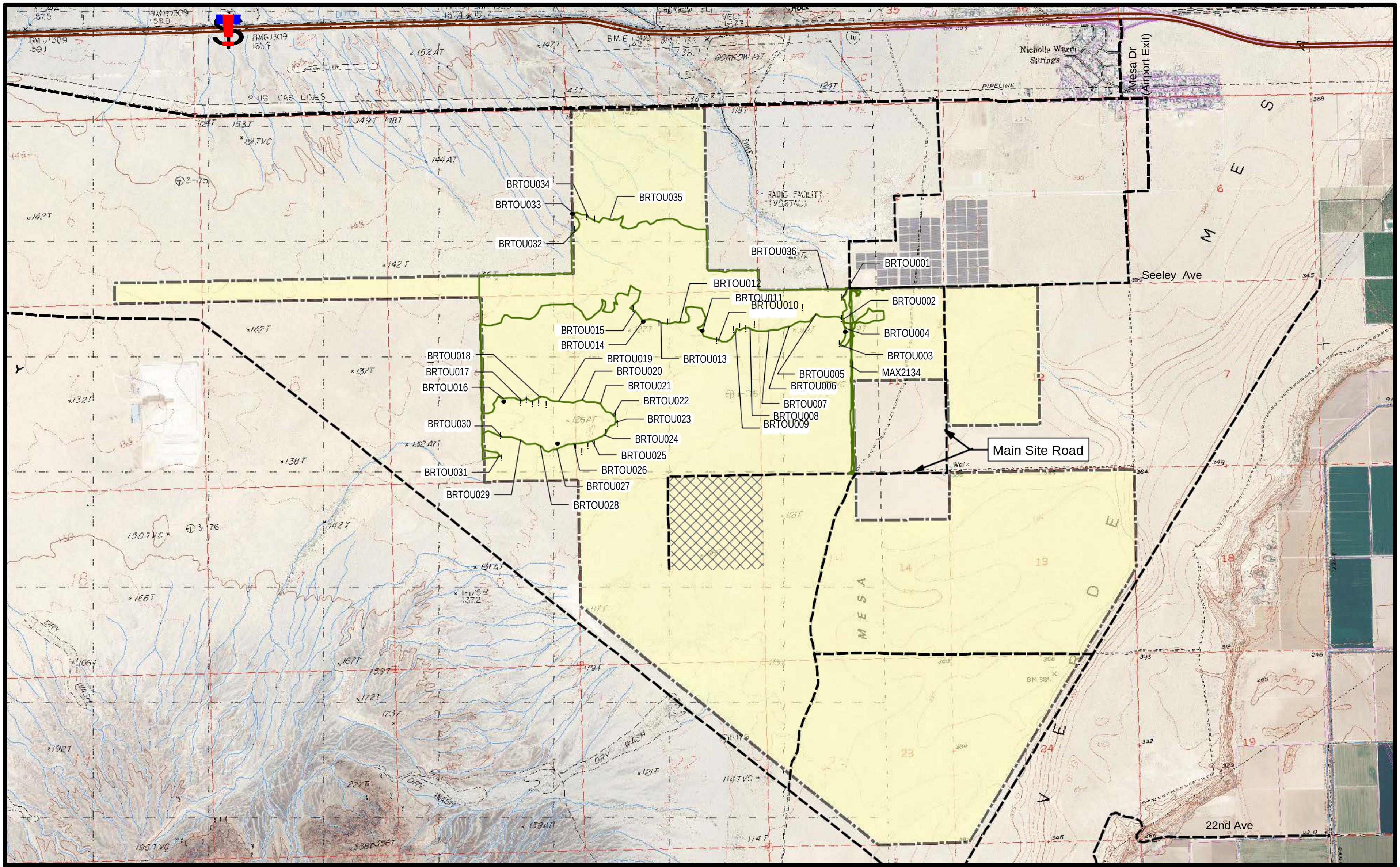
Table 12 Non-Native Plants Found on Project Site (Fall 2012 and Spring 2013 & 2015)

Taxon	Common Name	Abundance	Invasive Potential
**Brassica tournefortii*	Sahara mustard	Widespread, Locally abundant on sand	HIGHLY INVASIVE
**Chenopodium album*	Lamb's quarters	Scarce	Low
**Chenopodium murale*	Nettleleaf goosefoot	Scarce	Low
**Cynodon dactylon*	Bermuda grass	Scarce	Invasive but unlikely
**Eucalyptus sp.*	Eucalyptus	Scarce	Low invasivity in this situation
**Polygonum aviculare subsp. depressum*	Prostrate knotweed	Scarce	Low
**Salsola tragus*	Russian thistle	Abundant on sand	Invasive on sand and disturbed areas
**Schismus barbatus*	Mediterranean grass	Widespread	Moderately invasive with little consequence
**Tamarix ramosissima*	Tamarisk	Scarce	Non-invasive in this situation
**Tribulus terrestris*	Puncture vine	Scarce	Low

Sahara mustard *(Brassica tournefortii)* is by far the most aggressive and abundant invasive plant on the Project site. It is diffusely distributed throughout the Study Area on many habitats, and locally abundant throughout the sandier areas of the Project site and along the gen-tie line. Millions of individuals were observed flowering and fruiting during the spring 2013 survey.

Sahara mustard infestation remains the greatest invasive weed risk of the entire site. It is already well established on most of the sandier areas and a large seed bank is certain to exist. Minimal winter rains can germinate multiple leaf rosettes, many of which can bolt and produce seed in a short time. Potential for Sahara mustard to expand its presence across other less sandy areas of the site remains high, especially if aided by soil surface disturbance.

Figure 19 shows the heaviest infestations of Sahara mustard on the site. Although it generally invades sandy areas, the surveyors noticed that it is most abundant along the shallow margins and skirts of the major dune systems on the west portion of the Study Area. It also dominates shallow sand sheets elsewhere, as well as certain sand accumulations adjacent to abandoned agriculture fields.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MAX2134
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BRTOU021
BRTOU006
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BRTOU023
BRTOU008
BRTOU009
BRTOU024
BRTOU025
BRTOU031
BRTOU026
BRTOU027
BRTOU029
BRTOU028
Main Site Road
Seeley Ave
Mesa Dr (Airport Exit)
22nd Ave
Nicholls Warm Springs
M E S A
M E S A D E

● Sahara Mustard

Sand Dune Margins

Site Access Roads

▨ Inholding

Desert Quartzite Site Boundary

0 500 1,000

Meters

DESERT QUARTZITE SOLAR PROJECT
DESERT QUARTZITE, LLC

Figure 18
Sahara Mustard
(Brassica tournefortii)
Distribution

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It should be noted that Sahara mustard had very little presence on the disturbed and abandoned agriculture fields in the center of the site. This goes against the common association of disturbed areas becoming breeding grounds for weeds. In fact, both of the main agricultural fields seemed to support very few invasive weeds at all.

Control of Sahara mustard remains a challenge. In approximately the last 20 years, the mustard has become so widespread across southern California deserts that aggressive control is seemingly ineffective. Avoidance of disturbance seems the most prudent approach, but it still thrives on undisturbed areas. An Integrated Weed Management Plan will be designed to prevent, as much as possible, the further spread of this weed.

Russian thistle (*Salsola tragus*) was observed mostly on the gen-tie line sand dune areas, with occasional small occurrences across disturbed areas of the site. This plant represents the second most common weed onsite after Sahara mustard. Occasional locally abundant populations are to be expected associated with soil disturbance and loose sand. Russian thistle is known to thrive on disturbed soil, so monitoring and control measures will need to be incorporated into the Integrated Weed Management Plan.

Mediterranean grass (*Schismus barbatus*) is widespread across the site in many habitats but never "abundant." This plant is so widespread across many California deserts that it has become the dominant annual grass in many situations. Although it is very common, it poses only a slight ecological type conversion risk in this locally harsh situation. No control is proposed.

Bermuda grass (*Cynodon dactylon*) was observed in the Desert Dry Wash Woodland along the northern part of the site adjacent to an existing solar facility. Two small patches were seen growing in the shade of ironwoods. They were in robust condition, flowering and fruiting. Bermuda grasses' potential to spread is moderate to high, but would be limited by habitat preferences of reliably moist soil and shade.

Puncture vine (*Tribulus terrestris*) was observed on disturbed areas on the borders of the inholding near the center of the site. Only a couple of individuals were seen, and its potential to become invasive and widespread is low.

Lamb's quarters (*Chenopodium album*) was seen with only a few scattered occurrences on the Project site. Its potential for invasiveness and ecological damage is low.

Nettleleaf goosefoot (*Chenopodium murale*) was seen with only a few scattered occurrences on the Project site. A common agriculture weed, its potential for invasiveness and ecological damage is low.

Prostrate knotweed (*Polygonum aviculare subsp. depressum*) is a common agricultural and ruderal weed. It was seen only once during spring surveys, and is not considered a major invasive threat.

Eucalyptus (*Eucalyptus* sp.) occurs only as a couple of planted individuals on the north margin of the site on the border of an existing solar facility. Its potential for invasiveness is low due to the harsh conditions of the local landscape.

Tamarisk (*Tamarix ramosissima*) occurs as only a couple of dwarfed individuals on the north margin of the site at the border of the existing solar facility. It has a moderate potential to expand but would be limited by the lack of reliable water nearby. It should be removed promptly, in any case.

3.2.5 Inholding (Historical Jojoba Farm)

Although forty-one (41) species of vascular plants were recorded on the inholding during this survey (Appendix F), plant germination across the site was generally very patchy. Most annuals were observed within the row interspace swales where water would collect, but long stretches of the inholding yielded only barren sand. Occasional perennial species were seen, but the majority of vegetation was annual (Photograph 1).

Rows of jojoba (*Simmondsia chinensis*) were planted in a north-south orientation throughout the site and spaced about 4 m apart. These rows are slightly raised to cover the buried three-fourths inch perforated irrigation pipe running their entire length. There is a wellhead and some debris remaining at the northeast corner entrance to the site.

Of the thousands of jojoba (*Simmondsia chinensis*) that were planted across the site about one third are currently surviving without any maintenance. However, the health of the existing plants is diminished; most are dying-back from their center outwards but a few are still flowering and fruiting.

Since abandonment, native vegetation seems to be recovering slowly. Sparse creosote bush (*Larrea tridentata)* can be seen throughout the site and on the surrounding berms. This is probably re-growth from old root crowns, but some smaller new plants have taken hold. The only other common native perennials appearing occasionally are white bursage (*Ambrosia dumosa)* and brittlebrush (*Encelia farinosa)*. Native annual plants recolonizing the site include desert pincushion (*Chaenactis stevioides)*, brown-eyed primrose *(Chylismia claviformis)*, narrowed-leaved popcorn flower *(Cryptantha angustifolia)*, chuckwalla combseed *(Pectocarya heterocarpa)*, Harwood's milkvetch *(Astragalus insularis* var. *harwoodii)*, dwarf white milkvetch *(A. didymocarpus)*, stigose bird's-foot trefoil *(Acmispon strigosus)*, and hairy desert sunflower (*Gerea canescens)*.

Non-native annual weeds are not particularly abundant except for common Mediterranean grass (*Schismus barbatus)* (widespread), and occasional Sahara mustard (*Brassica tournefortii)*.

3.3 WILDLIFE SURVEYS

Twenty-two special status wildlife species (not including bat species, which are presented in Section 2.8.4.3) were evaluated for their potential to occur within the Study Area (Table 13). One wildlife species that is federal and state listed as threatened is found near the Study Area, the desert tortoise. Fourteen additional special status wildlife species were detected within or adjacent to the primary Study Area including golden eagle, burrowing owl, prairie falcon, loggerhead shrike, Swainson's hawk, and Le Conte's thrasher. Special status species detected within the Study Area or having a moderate or greater potential to occur are discussed further in this section of the report.

All wildlife species observed or detected within the Study Area are listed in Appendix B. Wildlife observed within the Study Area were representative of the eastern Sonoran Desert. Bird species common to the Study Area, listed in order of most-to-least frequently observed during the surveys, included black-throated sparrow (*Amphispiza bilineata*), horned lark (*Eremophila alpestris*), common raven (*Corvus corax*), brewer's sparrow (*Spizella breweri*), white-crowned sparrow (*Zonotrichia leucophrys*), house finch (*Carpodacus mexicanus*), and ash-throated flycatcher (*Myiarchus cinerascens*). Reptile species common to the Study Area, listed in order of most-to-least frequently observed during the surveys, included western whiptail (*Cnemidophorus tigris*), side-blotched lizard (*Uta stansburiana*), zebra-tailed lizard (*Callisaurus draconoides*), desert iguana (*Dipsosaurus dorsalis*), and desert horned lizard (*Phrynosoma platyrhinos*). Small mammals observed during baseline sampling included desert kangaroo rat (*Dipodomys deserti*), Merriam's kangaroo rat (*Dipodomys merriami*), desert woodrat (*Neotoma lepida*), pacific pocket mouse *(Perognathus longimembris)*, pocket mouse (*Chaetodipus spp.)*, southern grasshopper mouse *(Onychomys torridus)*, and round-tailed ground squirrel (*Spermophilus tereticaudus)*. The only amphibian with the potential to exist on site is the Couch's spadefoot (*Scaphiopus couchii*). No fish species are likely to inhabit the Study Area or immediately surrounding areas because of the absence of suitable aquatic habitat.

Table 13 Special Status Wildlife Species

Scientific Name	Common Name	Status	Source	Occurrence within Study Area
BIRDS				
Accipiter cooperi	Cooper's hawk	CDFW:SSC IUCN: LC	NEMO	**PRESENT – Foraging** Nesting habitat limited. May be present (foraging) year-round.
Aquila chrysaetos	golden eagle	BLM: Sensitive CDFW:Fully Protected, WL IUCN: LC	NEMO	**PRESENT –10 mile Study Area. Not observed on site-Low Potential** Nesting habitat absent within area, but nests and active territories are potentially located within 10 mile buffer. Foraging potential year-round.
Athene cunicularia	burrowing owl	BLM: Sensitive CDFW: SSC IUCN: LC USFWS:BCC	NEMO	**PRESENT – Likely Resident** Burrowing owl have been observed on the Project site.
Buteo regalis	ferruginous hawk	FWS: FSC, MNBMC; CDFW: WL IUCN: LC USFWS:BCC	NEMO	**PRESENT – Low Potential** Nesting habitat absent. May use site vicinity for overwintering.
Buteo swainsoni	Swainson's hawk	CDFW: Threatened IUCN: LC USFWS:BCC	NEMO	**PRESENT – Foraging/ Migration** Nesting habitat absent. May be present (foraging) during summer and during fall migration.
Chaetura vauxi	Vaux's swift	CDFW: SSC IUCN: LC	CDFW	**PRESENT – Foraging/Migration** Nesting habitat absent. May be present (foraging) during summer and fall prior to migration.
Charadrius alexandrinus nivosus	western snowy plover	ESA: Threatened CDFW: SSC USFWS:BCC	NEMO	**Not observed – Low Potential** May be a rare migrant to the area during winter months.
Circus cyaneus	northern harrier	CDFW: SSC IUCN: LC	NEMO	**PRESENT – Likely Resident** Nesting habitat limited. May use site vicinity for overwintering.
Falco mexicanus	prairie falcon	CDFW: WL IUCN: LC USFWS:BCC	NEMO	**PRESENT – Foraging** Nesting habitat absent from Primary Study Area. May be present (foraging) year-round.
Falco peregrinus anatum	peregrine falcon	ESA: Delisted CESA: Delisted CDFW: FP USFWS:BCC	CDFW	**PRESENT – Foraging** Nesting habitat absent from vicinity of Study Area. May be present (foraging) during migration.
Lanius ludovicianus	loggerhead shrike	CDFW: SSC IUCN: NT USFWS:BCC	NEMO	**PRESENT – Likely Resident** Many individuals observed within the Study Area. Nesting habitat present.
Pyrocephalus rubinus	vermilion flycatcher	CDFW: SSC IUCN: LC	NEMO, USGS	**Not observed - Low Potential** Nesting habitat limited. May be present (foraging) year-round.
Toxostoma bendirei	Bendire's thrasher	BLM: Sensitive CDFW: SSC IUCN: VU USFWS:BCC	NEMO	**Not observed - Low Potential** Nesting habitat present.
Toxostoma crissale	Crissale thrasher	CDFW: SSC IUCN: LC USFWS:BCC	NEMO, USGS	**Not observed - Low Potential** Nesting habitat present.

Scientific Name	Common Name	Status	Source	Occurrence within Study Area
Toxostoma lecontei	Le Conte's thrasher	BLM: Sensitive CDFW: SSC IUCN: LC USFWS:BCC	NEMO, USGS	**PRESENT – Likely Resident** Nesting habitat present.
REPTILES				
Gopherus agassizii	desert tortoise	CDFW: Threatened FWS: Threatened IUCN: VU	NEMO, BLM, USFWS	**PRESENT- Resident (Low numbers)** No live tortoises observed within Study Area. Five carcasses, all old (>>4 years), disarticulated found in Study Area. Study Area is located within BLM Category III desert tortoise habitat. One live desert tortoise was observed within the buffer area during avian surveys. There is no evidence of desert tortoise on the inholding.
Uma scoparia	Mojave Fringe-toed lizard	CDFW: SSC BLM: Sensitive	NEMO, BLM, CDFW	**PRESENT –Resident (High numbers)** Surveys determined that lizards on site are Mojave fringe-toed lizards. There are many fringe-toed in dune areas. No fringe-toed lizards were observed on the inholding.
Uma inornata	Coachella Valley Fringe-toed Lizard	CDFW:Endangered FWS: Threatened BLM:	NEMO, BLM, CDFW	**Not Present** Surveys determined that the only Uma species on site was *Uma scoparia.*
AMPHIBIANS				
Scaphiopus couchii	Couch's Spadefoot	CDFW: SSC BLM: Sensitive	NEMO, BLM	**Not present** Not observed after rain events. Standing water does not last eight days.
***MAMMALS*[1]**				
Taxidea taxus	American badger	CDFW: SSC IUCN: LC	CDFW	**PRESENT-Resident (Low numbers)** No live badgers were seen. Evidence that badgers utlize the Project site.
Vulpes macrotis arsipus	desert kit fox	CDFW: CCR	CDFW	**PRESENT- Resident (Moderate numbers)** Sign observed within the Study Area, generally associated within the lower alluvial fan where soils consist of silt and sand. A burrows with sign within Study Area.

[1] Bat species are listed in Section 3.3.4.3

CDFW - California Department of Fish and Wildlife
SSC - California Species of Special Concern
WL – Watch List
CCR – California Code of Regulations (Title 14, CCR: §460)

IUCN - The World Conservation Union
LC – Least Concern
NT – Near Threatened
VU - Vulnerable

FWS - Fish and Wildlife Service
BCC - Birds of Conservation Concern
BLM- Bureau of Land Management

Cooper's hawk (*Accipiter cooperi*) is a State species of Special Concern and addressed in the NEMO Plan. Cooper's hawk is an uncommon hawk species in the desert regions. This hawk is usually associated with riparian vegetation and open water. It feeds on small birds, small mammals, reptiles and amphibians.

Golden eagle (*Aquila chrysaetos*) is a California fully protected and BLM-sensitive species and is protected by the federal Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act. This large eagle is found throughout the United States typically occurring in open country, prairies, tundra, open coniferous forest and barren areas, especially in hilly or mountainous regions. Within the desert regions, this species usually builds nests on cliff ledges. Breeding in southern California starts in January, nest building and egg laying in February to March, and hatching and raising the young eagles occur from April through June. Once the young eagles are flying on their own, the adult eagles will continue to feed them and teach them to hunt until late November (WRI 2010). Due to the large investment in energy and time that an adult golden eagle is required to provide in raising young, some eagles will forgo a season of reproduction even when food supply is abundant (WRI 2010).

Western burrowing owl (*Athene cunicularia*) is a State Species of Special Concern and addressed in the NEMO Plan. Burrowing owls inhabit open dry grasslands and desert scrubs, and typically nests in mammal burrows although they may use man-made structures including culverts and debris piles. They exhibit strong nest site fidelity. Burrowing owls eat insects, small mammals and reptiles. Burrowing owls can be found from California to Texas and into Mexico. In some case, owls migrate into southern deserts during the winter.

Ferruginous Hawk (*Buteo regalis*) is a federal Species of Concern and addressed in the NEMO Plan. There are no records of this species breeding in California. Ferruginous Hawk prefer desert habitat with large perching structures. They can be found in desert scrub, sagebush flats and open grasslands in the arid regions. They prefer open low vegetation areas for foraging mostly on lagomorphs and rodents.

Swainson's hawk (*Buteo swainsonii*) is a state listed threatened raptor species that breeds in much of western North America. Within California, nesting occurs in the Central Valley, Great Basin and Mojave and Colorado Deserts. Arrival at breeding areas generally occurs from late February to early May depending on geographical characteristics of the breeding area (Woodbridge 2008). Nest sites have not been documented in the Sonoran Desert of California. This species was observed within the study area during migration. Swainson's hawks were documented feeding caterpillars of the Sphinx moth, which were out in large numbers during the survey period.

Vaux's swift (*Chaetura vauxi*) is a State Species of Special Concern. Uncommon in the desert, these birds prefer forested habitats but are found near man made open water sources. They migrate through desert scrub flying over a range of different habitats. They forage mostly on flying insects.

Northern harrier (*Circus cyaneus*) is a State Species of Special Concern and addressed in the NEMO Plan. An uncommon desert resident this bird prefers meadows and open grasslands and is usually associated with wetland/marsh areas. Harriers feed mostly on voles but will also consume small birds, small mammals, reptiles, insects and a variety of water related species.

Prairie falcon (*Falco mexicanus*) is a State Species of Special Concern and addressed in the NEMO Plan. This large falcon typically builds nest sites on cliffs, similar to the golden eagle. In the desert they are found in most vegetation types, although sparse vegetation provides the best foraging habitat. In the Mojave, mean home range size has been found to be approximately 50 to 70 km² (Harmata et al. 1978).

Peregrine falcon (*Falco peregrinus anatum*) is a State Fully Protected Species. This large falcon typically builds nest sites on cliffs, similar to the golden eagle and prairie falcon; however, peregrine falcon typically nests near large water bodies. This species primarily breeds in woodland, forest, and coastal habitats (California Department of Fish and Game 2010). Peregrine falcons are aerial predators and target birds of a variety of sizes; they occasionally prey on mammals, insects, and fish (California Department of Fish and Wildlife 2010).

Loggerhead shrike (*Lanius ludovicianus*) is a State Species of Special Concern and a year-round resident in parts of the southern California desert. It typically is found in open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. As a predatory bird its diet consists of insects, amphibians, small reptiles, small mammals, and other birds. Shrikes typically build nests one to three meters above the ground depending on the height of the vegetation.

Le Conte's thrasher (*Toxostoma lecontei*) is a State Species of Special Concern and year-round desert resident. These species inhabit various desert scrub and wash habitats and typically breeds in desert areas that support cactus, Mojave yucca (*Yucca schidigera*), Joshua trees (*Yucca brevifolia*), and large thorny shrubs such as *Lycium spp*. This species is distributed from the Mojave Desert east into southern Utah and northern Arizona, and south into northern Mexico.

Desert tortoise (*Gopherus agassizii*) is a federal and state listed threatened species. Desert tortoises are well adapted to living in a highly variable, and often harsh, desert environment. They spend much of their lives in burrows, even during their seasons of activity. In late winter or early spring, desert tortoises emerge from over-wintering burrows and typically remain active through fall. Activity does decrease in summer, but tortoises often emerge after summer rain storms. Activity and movement is generally influenced by temperature and precipitation, which correlate with potential food and water resources. Extreme temperatures, both high and low, and periods of drought typically result in reduced tortoise activity (Franks et. al. 2011). Mating occurs both during spring and fall. Tortoises are long-lived and grow slowly, requiring 13 to 20 years to reach sexual maturity [at approximately 180 millimeters (mm) mean carapace length (MCL)]. Eggs are generally laid in friable soil at near burrow entrances between April and June and occasionally September and October. Eggs hatch within three to four months.

Soils must be appropriately soft for digging burrows, but firm enough so that burrows do not collapse. Tortoises typically prefer habitats with abundant annual forbs, grasses and cactus, which constitute its primary food sources.

Desert tortoises occupy home ranges, which are generally defined as the area traversed while carrying out a range of normal activities (e.g., foraging and mating). The size of desert tortoise home ranges can vary with respect to sex, geographic location, substrate, topography, and year depending on climate factors such as rainfall and temperature.

Mojave Fringe-toed lizard (*Uma scoparia*) are a BLM sensitive and California Species of Special Concern and are endemic to southern California deserts, where it is restricted to aeloian sand habitats in the deserts of Los Angeles, Riverside and San Bernardino Counties. Mojave fringe-toed lizard diets consist of insects such as, but not limited to, ants, sand cockroaches, grasshoppers and spiders. Fringe-toed lizards can usually be found burrowed in the sand on the side of the dunes. Windblown sand is required for the lizard life cycle.

American badger (*Taxidea taxus*) is a State Species of Special Concern associated with open grassland and desert communities. This species is associated with dry open forest, shrub, and grassland communities with an adequate burrowing rodent population.

Desert kit fox (*Vulpes macrotis*) is protected by the California Code of Regulations (Title 14, CCR: §460) and Fish and Wildlife Commission Section 4000 as a fur-bearing mammal. Desert kit foxes are fossorial mammals that occur in arid open areas, shrub grassland, and desert ecosystems. Desert kit fox typically consume small rodents, primarily kangaroo rats, rabbits, lizards, insects, and in some cases immature desert tortoises. Dens typically support multiple entrances, but desert kit fox may utilize single burrows for temporary shelter.

3.3.1 Amphibians

3.3.1.1 Couch's Spadefoot

Overall, there were 27 different points that were identified as having standing water at some time on the Project site (Figure 5). Of these spots, two were identified as the most likely to support Couch’s spadefoot listed as a species of concern in California in the event of rains as they were not only the most extant areas for having held water, but because they also exhibited a strong component of dry desert wash woodland plant species.

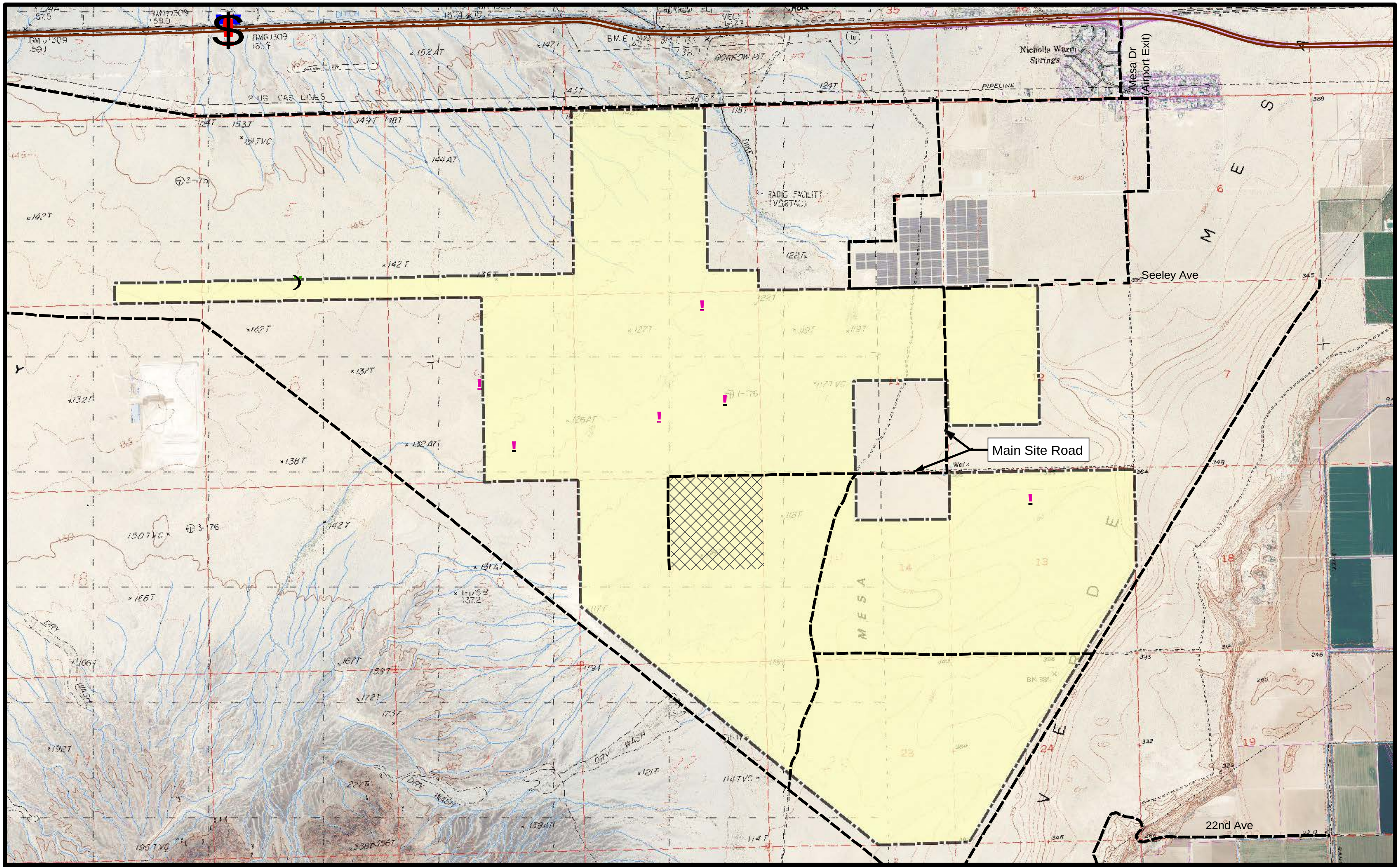
There has been an on-going effort since 2008 to check the Project site after heavy rains to search for ponding water that sustains itself for eight days, which is what is required for the reproduction of spadefoots. No areas held water for eight days.

3.3.2 Reptiles

3.3.2.1 Desert Tortoise

Desert tortoise sign (i.e., live tortoises, active burrows/pallets, and recent scat, and tracks) found in the Study Area were six disarticulated carcasses and a set of tracks (Figure 20). All carcasses were disarticulated and over four years of age. No desert tortoise burrows were detected. A set of tracks was found by Alice Karl, PhD. during the botany surveys on March 22, 2013 traveling north across the dunes. Although the entire Study Area could be considered tortoise habitat, few tortoises would be expected in most of the site because of the poor cover both in and out of the washes and such low species richness and stature that the forage base may be similarly under-developed.

No focused desert tortoise surveys were completed on the inholding. The general habitat and wildlife surveys performed on the inholding, which also included for burrowing owl and plants, did not find any burrows that would be associated with desert tortoise. Since the inholding historically was a farm, the potential for desert tortoise utilizing the inholding is low.


Main Site Road
Seeley Ave
Mesa Dr (Airport Exit)
22nd Ave
Nicholls Warm Springs
PIPELINE
2 UG GAS LINES
BORROW PIT
RADIO FACILITY (VORTAC)
MESA
DRY WASH

! Tortoise Carcass, >4 Years, Disarticulated

) Tortoise Track

- - - Site Access Roads

▨ Inholding

▭ Desert Quartzite Site Boundary

0 500 1,000
Meters

DESERT QUARTZITE SOLAR PROJECT
DESERT QUARTZITE, LLC

Figure 19

Desert Tortoise Sign

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3.3.2.2 Mojave Fringe-Toed Lizard and Herpetofaunal

Overall, 3,483 different individual squamates were observed over the span of all surveys undertaken (Table 14), with 98 percent of those sightings lizards. Of the lizard composition, ten different species were recorded with five species totaling over 95 percent of the total animals observed (Table 14). Western whiptail (*Aspidoscelis tigris*) was the most common lizard observed on the site with large numbers of common side-blotched lizard (*Uta stansburiana),* zebra-tailed lizard *(Callisaurus draconoides),* desert iguana *(Dipsosaurus dorsalis),* and Mojave fringe-toed lizard (*Uma scoparia)* was also observed. Six different species of snakes were encountered within the survey period with the majority comprised of the majority comprised of the species sidewinder rattlesnake (*Crotalus cerastes*) (Table 15). Due to the type of sampling methodology, the majority of observations were comprised of diurnal or day active, wide-ranging, foraging squamates.

Using species maps for southern California squamates, there could be two different California Species of Concern present upon the proposed Project site. These two species were the Mojave fringe-toed lizard and Colorado Desert fringe-toed lizard (*Uma notata*). To determine the extent of their presence on the site, waypoints were taken by survey crews upon encountering these species during all surveys (Figure 21).

Overall, members of the Uma species made up seven percent of the total squamates seen by species (Table 15). These individuals were confined to the fine sand or the sandy loam areas that occupy the northwest corner and the gen-tie line area of the Project site (Figure 21). After identifying lizards as members of this genus, 13 individuals (five male and eight females) were collected briefly to identify them down to species level. According to Stebbins and McGinnis (2012), a good method to do this is according to inter- naris scale patterns, where the Mojave will have five scales in a pattern across the snout and the Colorado Desert fringe-toed exhibits a scale pattern of three. All individuals that were scrutinized were identified as Mojave and not Colorado Desert individuals using this method (Photograph 11).

The surveyors determined that the inholding did not have suitable habitat for fringe-toed lizards. No lizards or evidence of lizards utilizing the site were found. After *Uma* protocols were followed, a generic survey was performed to determine all types of herps that were present, as well as 100 percent coverage for the wildlife survey. Both surveys were more than adequate for Uma presences/absences. Fringe-toed lizards were not observed within the inholding during any survey.

Table 14 Lizards Found on Project Site

Species	Aspidoscelis tigris	Uta stansburiana	Callisaurus draconoides	Dipsosaurus dorsalis	Uma scoparia	Phrynosoma platyrhinos calidiarum	Gambelia wislizenii	Urosaurus graciosus	Sceloporus magister	Coleonyx variegatus variegatus	**Total Lizards across the site**
Total Individuals	1,382	805	448	424	241	95	17	8	1	1	**3,422**
Individual species / overall species sightings	40%	23%	13%	12%	7%	3%	0.50%	0.20%	0.02%	0.02%	

Table 15 Snakes Found on Project Site

Species	Crotalus cerastes	Chionactis occipitalis	Masticophis flageiium piceus	Salvadora hexalepis	Pituophis catenifer	Arizona elegans	**Total Snakes across the site**	**Total Squamates across the entire site**
Total Individuals	44	7	6	2	1	1	**61**	**3,483**
Individual species / overall species sightings	1%	0.2%	0.2%	0.05%	0.02%	0.02%		

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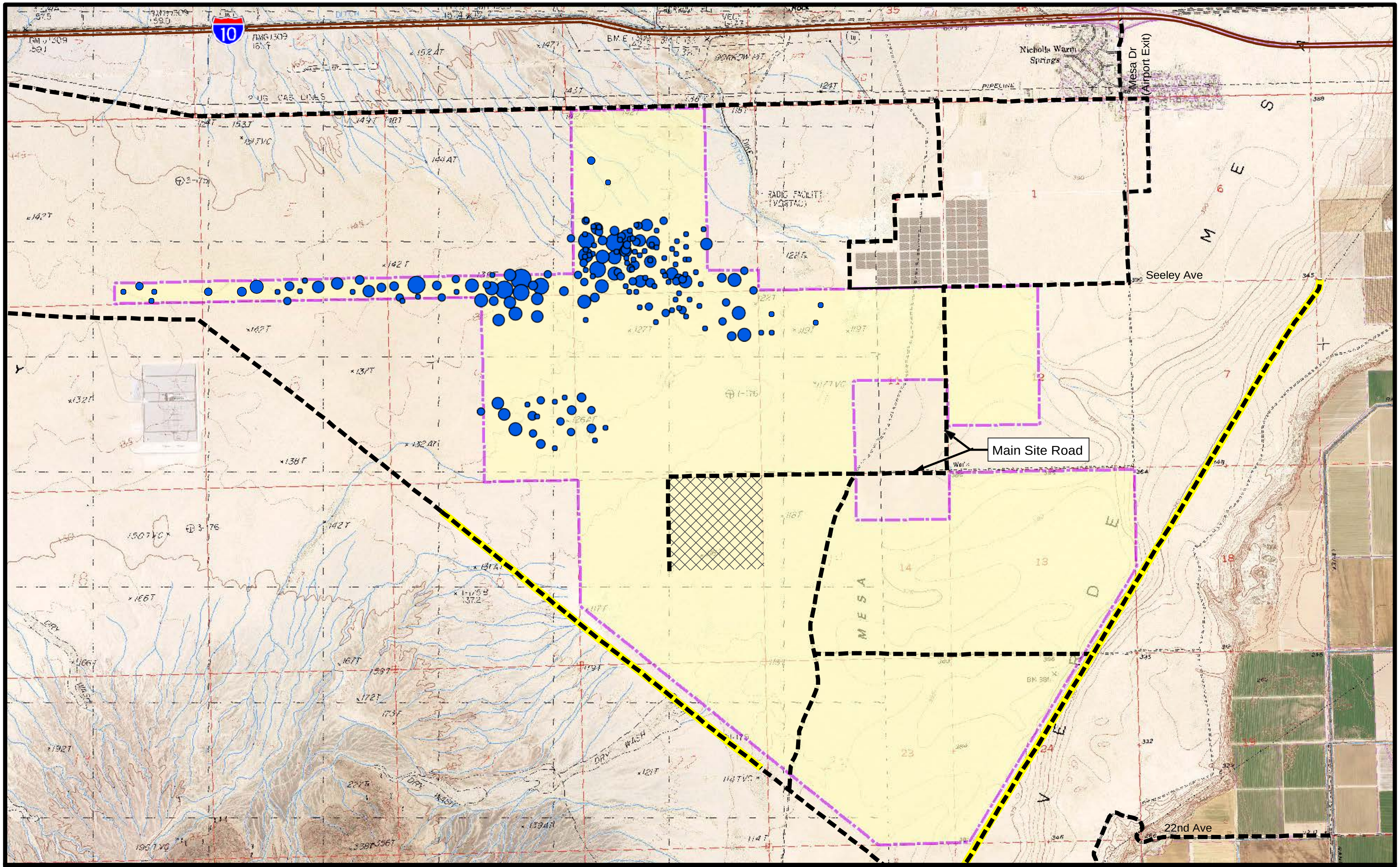

10
Nicholls Warm Springs
Mesa Dr (Airport Exit)
Seeley Ave
Main Site Road
22nd Ave
MESA
WEST MESA
PIPELINE
RADIO FACILITY

Fringe-toed Lizard Density

●	1
●	5
●	10

- Site Access Road
- Site Access Road (marginal conditions)
- ▨ Inholding
- Desert Quartzite Site Boundary

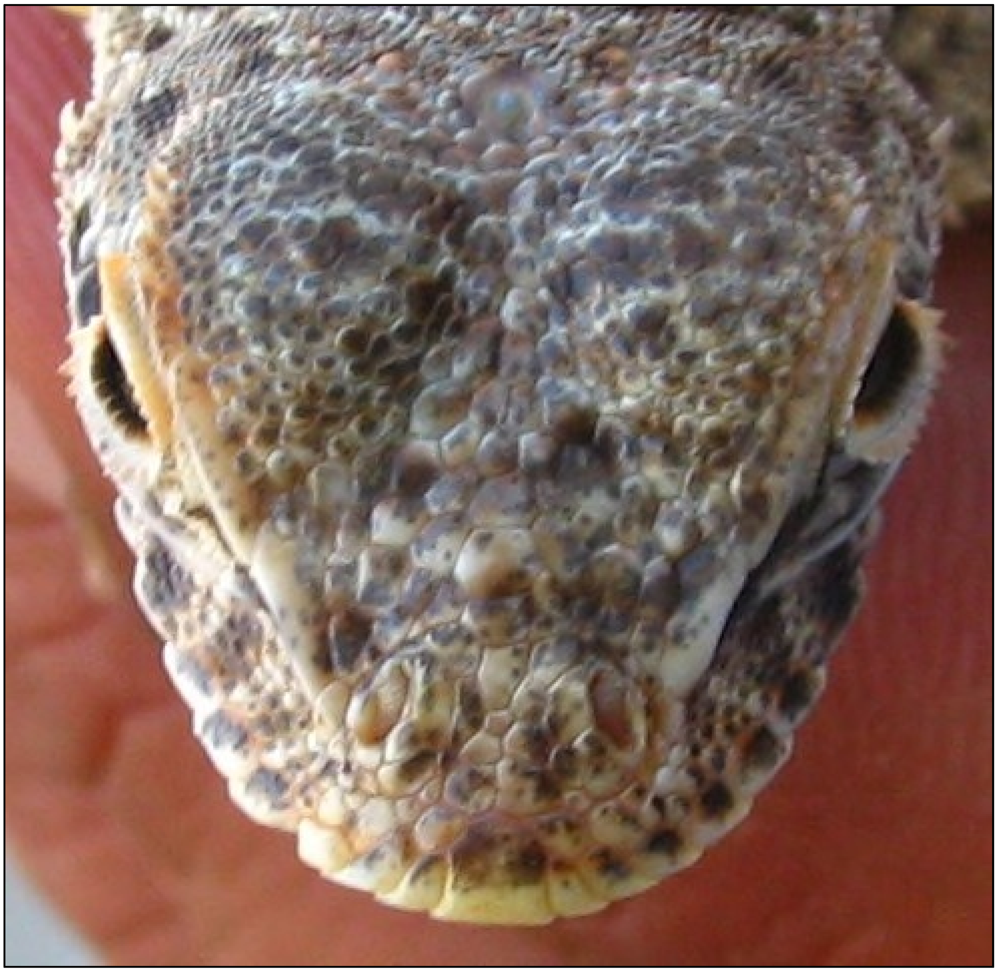
N

0 500 1,000
Meters

DESERT QUARTZITE SOLAR PROJECT
DESERT QUARTZITE, LLC

Figure 20
Mojave Fringe-toed Lizard
(Uma scoparia)
Distribution

Photograph 11 *Uma scoparia* Male, Captured for Identification to the Species Level



3.3.3 Avian

3.3.3.1 Migratory Bird Surveys

A close inspection of the data collected over the course of four seasons to date has revealed two distinct peaks in migration for the area in 2014 (Figure 22). The first is in the spring around March 24, 2014, and the second is in the fall around September 21, 2014. Data collected during the spring of 2013 resulted in fewer observations compared to efforts undertaken during the spring of 2014 and there was no clear peak in 2013. In the fall of 2013 there were two peaks: October 1, 2013 and October 9, 2013. Uncontrollable and variable factors including rainfall rates, temperatures, wind speed and wind direction could have an influence on these results and these peak migratory periods should be considered approximate due to the limited number of survey seasons represented. The greatest numbers of individual species detected at one time during the spring were flocks of unidentified swallows and tree swallows with numbers reaching 1000 and 950 birds respectively on a single day (all in 2014). Large number of turkey vultures (782 in one day for the highest count) and Swainson's hawks (620 in one day) were observed during fall migration. Totals of each species for each season and year can be found in Table 16.

For the eleven (11) species for which greater than or equal to 100 sightings were made during a particular survey period (excluding detections that did not result in identification to species), first and last observation dates of the species were noted (Table 17).

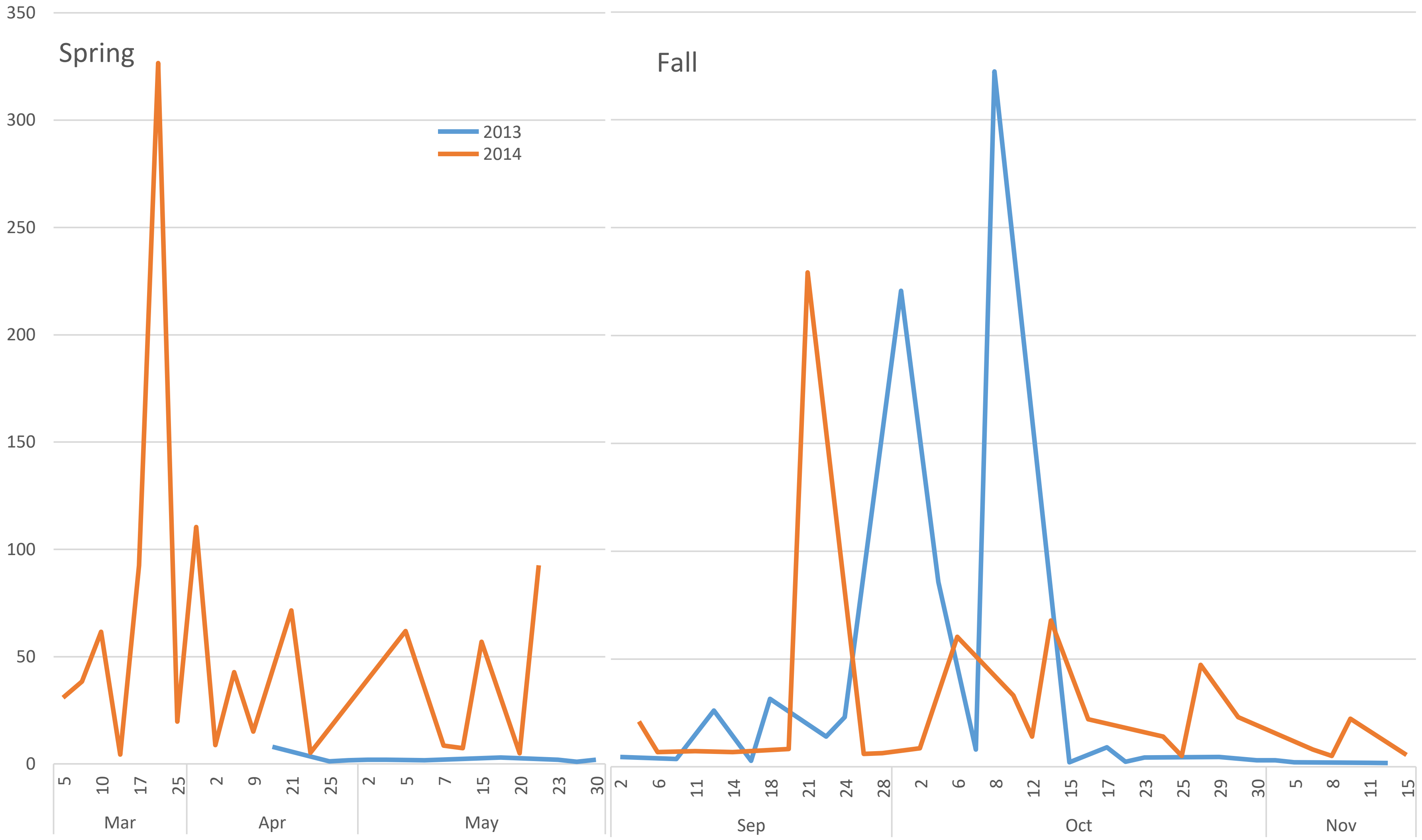


Figure 21. *Average # of Birds Recorded durign Migration Surveys by Date*

Table 16 Total Numbers of Each Species Detected by Season and Year

Common Name	Total # Birds Detected			
	Spring 2013	Fall 2013	Spring 2014	Fall 2014
American Kestrel	2	6	21	13
Ash-throated Flycatcher	1		8	
Barn Swallow	5	729	53	715
Black Phoebe				1
Black-headed Grosbeak			2	
Black-tailed Gnatcatcher			10	25
Black-throated Gray Warbler			1	1
Blue-gray Gnatcatcher			1	11
Brewer's Sparrow		8	7	
Bullock's Oriole			6	1
Cactus Wren			6	6
Cliff Swallow	33	2	7	26
Common Raven	1		27	26
Common Yellowthroat				1
Cooper's Hawk		5	8	1
Costa's Hummingbird			4	
Eurasian Collared-Dove			6	2
Ferruginous Hawk		6	6	
Gambel's Quail			4	24
Gray Flycatcher	1		1	
Great Blue Heron			5	12
Great Egret			4	8
Greater Roadrunner			3	4
Great-tailed Grackle				50
Horned Lark		111		61
House Finch			2	193
House Sparrow				2
House Wren				3
Lazuli Bunting				2
Le Conte’s Thrasher				7
Lesser Goldfinch			1	3
Lesser Nighthawk			3	
Loggerhead Shrike	1		7	16
MacGillivray's Warbler			2	
Mourning Dove	2		45	2
Northern Flicker		1		4
Northern Harrier	2	23	32	3
Northern Rough-winged Swallow	2	11	6	4
Orange-crowned Warbler			1	6
Osprey		3	2	
Phainopepla			6	6
Prairie Falcon		9	10	2

Common Name	**Total # Birds Detected**			
	Spring 2013	**Fall 2013**	**Spring 2014**	**Fall 2014**
Red-tailed Hawk	6	32	33	14
Red-winged Blackbird			100	
Rock Wren				15
Ruby-crowned Kinglet				3
Sage Sparrow (Unspecified)		1		3
Sandhill Crane			285	
Say's Phoebe		1		17
Sharp-shinned Hawk		5	3	3
Snowy Egret			42	
Swainson's Hawk	3	668	45	14
Tree Swallow	7	3	1618	
Turkey Vulture	22	1695	495	306
Unidentified Blackbird				32
Unidentified Empidonax Flycatcher			1	
Unidentified Hawk		104	82	4
Unidentified Hummingbird		1	9	
Unidentified Larus Gull			5	
Unidentified Sparrow		1	5	3
Unidentified Swallow	7	60	2646	381
Unidentified Warbler			5	7
Vaux's Swift		2	3	11
Verdin			6	23
Violet-green Swallow				154
Warbling Vireo			3	
Western Kingbird			16	
Western Meadowlark				26
Western Tanager			18	
White-crowned Sparrow				21
White-faced Ibis			12	
White-throated Swift	2		16	
White-winged Dove			547	1
Willow Flycatcher				1
Wilson's Warbler			5	4
Yellow Warbler			1	
Yellow-headed Blackbird			56	
Yellow-rumped Warbler		2	34	126

Table 17 Earliest and latest dates for most commonly detected species

	Spring 2013		Fall 2013		Spring 2014		Fall 2014	
Common Name	Earliest Date	Latest Date	Earliest Date	Latest Date	Earliest Date	Latest Date	Earliest Date	Latest Date
Barn Swallow	*18-Apr-13	18-May-13	17-Sep-13	17-Oct-13	21-Apr-14	05-May-14	* 05-Sep-14	15-Oct-14
Horned Lark			12-Sep-13	08-Oct-13			11-Sep-14	10-Nov-14
House Finch					17-Mar-14	25-Mar-14	06-Oct-14	15-Nov-14
Red-winged Blackbird					05-May-14	05-May-14		
Sandhill Crane					6-Mar-14	10-Mar-14		
Swainson's Hawk	02-May-13	28-May-13	17-Sep-13	08-Oct-13	24-Mar-14	15-May-14	* 05-Sep-14	13-Oct-14
Tree Swallow	*18-Apr-13	18-Apr-13	30-Oct-13	30-Oct-13	*05-Mar-14	05-May-14		
Turkey Vulture	*18-Apr-13	23-May-13	*02-Sep-13	*12-Nov-13	*05-Mar-14	*22-May-14	*05-Sep-14	08-Nov-14
Violet-green Swallow							21-Sep-14	9-Oct-14
White-winged Dove					21-Apr-14	*22-May-14	* 05-Sep-14	05-Sep-14
Yellow-rumped Warbler							6-Oct-14	15-Nov-14

*Indicates that this date corresponds to the earliest or latest date (respectively) of surveys for that particular season. In these cases, it is possible that we did not capture the true start or end of migration periods for that species.

3.3.3.2 Line Transect Sampling

A total of 3534 detections were made during the 345 surveys with 17,973 total birds sighted. To maintain consistency with regards to the number of transects sampled per season, we took a random subsample of the data to use in analysis. Fitting a model to estimate density at times also requires use of data truncation. The final subsample contained data from 259 transects, 2253 detections and 16507 birds (Table 18). We used Program Distance (Thomas et al. 2010) to conduct a preliminary analysis and determine a total density of birds on versus off project (Table 18). In every season the control transects had a higher species diversity than transects located on the project footprint, and in all but one season, the density estimate was also higher for those transects in the control areas. The one exception was the Spring of 2014, where the footprint transects had an unusually high density of birds.

Table 18 Analysis of Avian Line Transect Results Spring 2013 – Winter 2014-15.

Season / Year	# Detections	Estimated Density of Birds (Per Ha)		Estimated Density of Clusters (Per Ha)		Expected Cluster Size		Estimated # of Birds		Total # Species	
		Control	Footprint	Control	Footprint	Control	Footprint	Control	Footprint	Control	Footprint
Spring – 2013	119	.30	.18	0.19	0.08	1.62	2.25	2117	348	25	17
Fall – 2013	688	1.39	1.07	0.33	0.25	4.22	4.23	9429	2106	56	43
Winter – 2013-14	460	1.12	0.4	0.31	0.12	3.6	3.3	7614	790	37	21
Spring – 2014	495	0.4	2.18	0.19	0.52	2.12	4.2	2747	4287	47	42
Fall – 2014	211	0.14	0.13	0.07	0.04	2.03	3.22	937	266	18	15
Winter – 2014-15	283	0.2	0.15	0.09	0.07	2.15	2.32	1355	304	19	16

3.3.3.3 Western Burrowing Owl

During fall 2012 and spring 2013, 70 burrowing owl burrows within the Project site ranked Class 1, Class 2 or Class 3. However, Burrowing Owls were only detected at four burrows during breeding season surveys between 2013 and 2014. A single burrow within the 150-meter buffer indicated recent Burrowing Owl occupation/ use. (Table 19 and Figure 23).

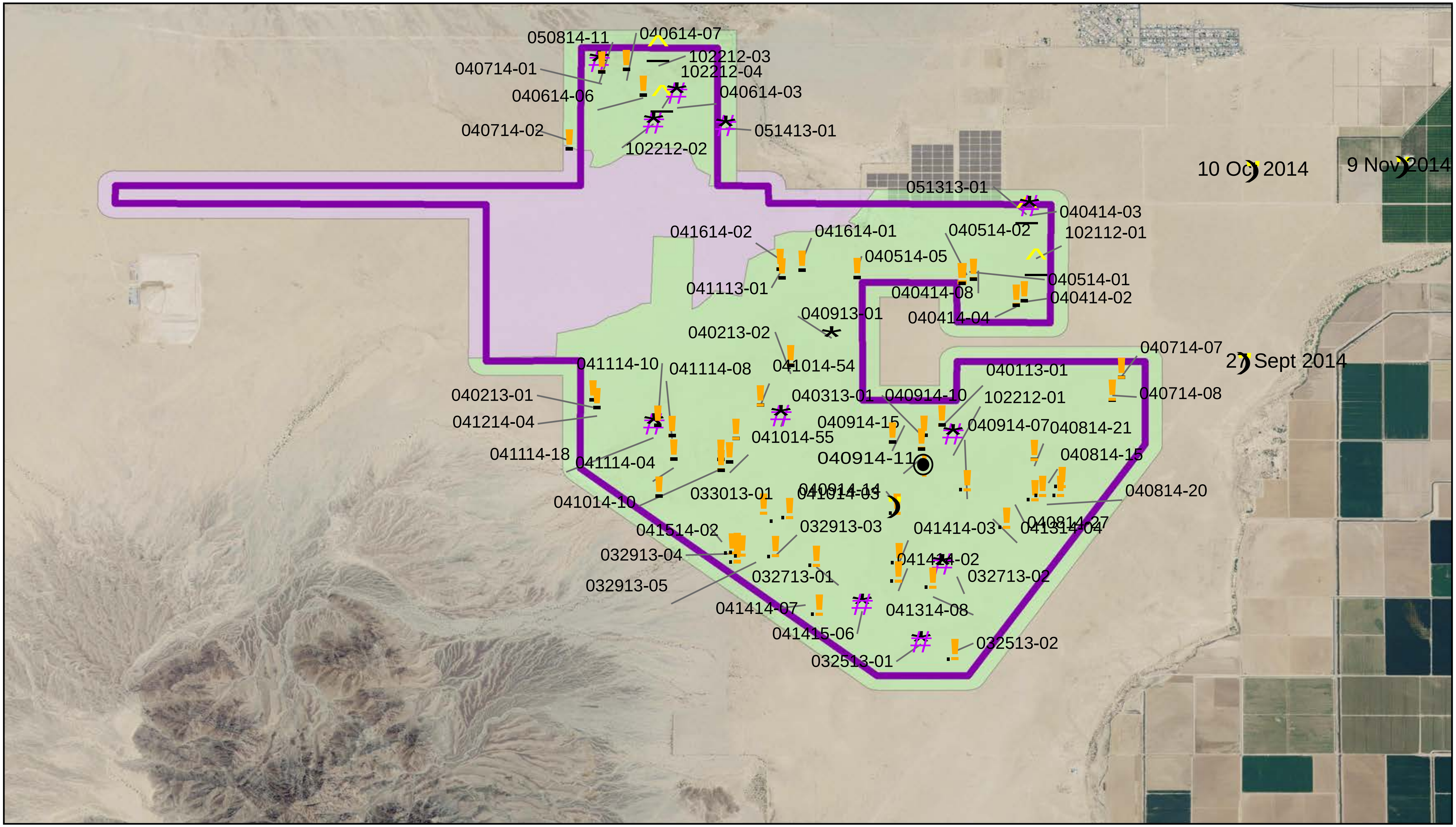
Table 19 Burrowing Owl Phase II Results from Fall 2012 and Spring 2013 and 2014

Waypoint ID	Date	Easting	Northing	Initial Class	Initial Sign
QZBOB-102112-01	10/21/2012	710018	3718263	1	Feathers; Tracks; Live Bird
QZBOB-102212-04	10/22/2012	706779	3719734	1	Feathers; Pellets; Tracks; Whitewash; Live Bird

Waypoint ID	Date	Easting	Northing	Initial Class	Initial Sign
QZBOB-102212-01	10/22/2012	709353	3716229	2	Feathers; Tracks; Whitewash
QZBOB-102212-02	10/22/2012	706710	3719571	2	Feathers; Pellets; Whitewash
QZBOB-102212-03	10/22/2012	706738	3720171	1	Pellets; Whitewash; Live Bird
QZBOB-032513-02	3/25/2013	709413	3714225	3	Whitewash
QZBOB-032513-01	3/25/2013	709118	3714288	2	Pellets; Whitewash
QZBOB-032713-01	3/27/2013	708204	3715061	3	Pellets; Whitewash
QZBOB-032713-02	3/27/2013	709410	3714989	2	Whitewash
QZBOB-032913-05	3/29/2013	707686	3715098	3	Pellets
QZBOB-032913-01	3/29/2013	707729	3715275	3	Pellets; Whitewash
QZBOB-032913-02	3/29/2013	707587	3715092	3	Pellets; Whitewash
QZBOB-032913-03	3/29/2013	707844	3715163	3	Whitewash
QZBOB-032913-04	3/29/2013	707522	3715184	3	Whitewash
QZBOB-033013-01	3/30/2013	707744	3715561	3	Whitewash
QZBOB-033013-03	3/30/2013	706837	3715796	3	Whitewash
QZBOB-033013-02	3/30/2013	707366	3715923	3	Whitewash
QZBOB-040113-01	4/1/2013	709249	3716527	3	Whitewash
QZBOB-040213-02	4/2/2013	707940	3717034	3	Whitewash
QZBOB-040213-01	4/2/2013	706253	3716657	3	Pellets; Whitewash
QZBOB-040313-01	4/3/2013	707869	3716491	2	Pellets; Whitewash
QZBOB-040413-01	4/4/2013	709711	3715680	3	Pellets; Whitewash
QZBOB-040913-01	4/9/2013	708282	3717411	2	Feathers; Pellets; Whitewash
QZBOB-041113-01	4/11/2013	707843	3718107	3	Whitewash
QZBOB-051313-01	5/13/2013	709927	3718713	1	Feathers; Pellets; Tracks; Whitewash; Live Bird
QZBOB-051413-01	5/14/2013	707327	3719545	2	Pellets
QZBOB-040414-03	4/4/2014	709952	3718707	2	Feathers; Pellets; Tracks; Whitewash; Other
QZBOB-040414-02	4/4/2014	709929	3717818	3	Pellets
QZBOB-040414-04	4/4/2014	709861	3717766	3	Whitewash
QZBOB-040414-08	4/4/2014	709525	3718129	3	Whitewash

Waypoint ID	Date	Easting	Northing	Initial Class	Initial Sign
QZBOB-040514-01	4/5/2014	709449	3718117	3	Whitewash; Pellets
QZBOB-040514-02	4/5/2014	709427	3718080	3	Whitewash
QZBOB-040514-05	4/5/2014	708488	3718121	3	Feathers; Whitewash
QZBOB-040614-07	4/6/2014	706469	3720013	3	Feathers; Whitewash
QZBOB-040614-03	4/6/2014	706908	3719741	2	Pellets; Whitewash
QZBOB-040614-06	4/6/2014	706614	3719837	3	Feathers; Whitewash
QZBOB-040714-02	4/7/2014	705989	3719389	3	Pellets; Whitewash
QZBOB-040714-01	4/7/2014	706259	3719971	3	Pellets; Whitewash
QZBOB-040714-07	4/7/2014	710776	3717068	3	Whitewash
QZBOB-040714-08	4/7/2014	710704	3716874	3	Whitewash
QZBOB-040814-21	4/8/2014	710050	3716134	3	Pellets; Whitewash
QZBOB-040814-15	4/8/2014	710176	3715963	3	Whitewash
QZBOB-040814-20	4/8/2014	710164	3715745	3	Whitewash
QZBOB-040814-27	4/8/2014	709893	3715738	3	Whitewash
QZBOB-040914-14	4/9/2014	708881	3715711	3	Pellets; Whitewash
QZBOB-040914-12	4/9/2014	709090	3715939	3	Whitewash
QZBOB-040914-10	4/9/2014	709098	3716406	3	Whitewash
QZBOB-040914-15	4/9/2014	708829	3716265	3	Pellets; Whitewash
QZBOB-040914-07	4/9/2014	709482	3715782	3	Whitewash
QZBOB-040914-11	4/9/2014	709081	3716193	3	Whitewash
QZBOB-041014-09	4/10/2014	707484	3716355	3	Whitewash
QZBOB-041014-03	4/10/2014	707960	3715637	3	Whitewash
QZBOB-041014-55	4/10/2014	707438	3716008	3	Pellets; Whitewash
QZBOB-041014-54	4/10/2014	707688	3716701	3	Feathers
QZBOB-041014-10	4/10/2014	707362	3716048	3	Feathers; Pellets; Whitewash
QZBOB-041114-18	4/11/2014	706779	3716354	2	Pellets; Whitewash
QZBOB-041114-04	4/11/2014	706956	3716052	3	Whitewash
QZBOB-041114-08	4/11/2014	706938	3716348	3	Whitewash
QZBOB-041114-10	4/11/2014	706810	3716464	3	Whitewash
QZBOB-041214-04	4/12/2014	706290	3716568	3	Whitewash

Waypoint ID	Date	Easting	Northing	Initial Class	Initial Sign
QZBOB-041314-04	4/13/2014	709707	3715588	3	Whitewash
QZBOB-041314-08	4/13/2014	709209	3714776	3	Feathers
QZBOB-041414-03	4/14/2014	708913	3715117	3	Pellets; Whitewash
QZBOB-041415-06	4/14/2014	708606	3714616	2	Whitewash
QZBOB-041414-07	4/14/2014	708118	3714668	3	Whitewash
QZBOB-041414-02	4/14/2014	708913	3714829	3	Feathers
QZBOB-041514-02	4/15/2014	707388	3715300	3	Whitewash
QZBOB-041614-02	4/16/2014	707822	3718205	3	Whitewash
QZBOB-041614-01	4/16/2014	708016	3718197	3	
QZBOB-050814-11	5/8/2014	706234	3719976	2	Whitewash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040614-06
040614-03
040714-02
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102212-02
10 Oct 2014
9 Nov 2014
051313-01
040414-03
041614-02
041614-01
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040514-05
041113-01
040514-01
040414-08
040414-02
040913-01
040414-04
040213-02
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27 Sept 2014
041114-10
041114-08
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040113-01
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040814-27
041314-04
032913-04
041414-02
032713-01
032713-02
032913-05
041414-07
041314-08
041415-06
032513-02
032513-01

☽ Incidental BUOW Observations

^ 1 = Excellent (BUOW present)

# 2 - Good (Usable, fresh sign, no BUOW)

! 3 - Fair (Usable, old sign, no BUOW)

▭ Quartzite Project Boundary

BUOW_Habitat
Including 150-m Buffer

🟪 Unsuitable BUOW Habitat

🟩 Suitable BUOW Habitat

0 1 2 4 Miles

CORVUS
ECOLOGICAL CONSULTING

Figure 22

BURROWING OWL CLASS 1-3 BURROWS

QUARTZITE SOLAR | RIVERSIDE COUNTY, CALIFORNIA

Phase III Burrowing Owl Survey Results

All three burrows at which live owls were detected in Fall of 2012 were determined to be vacant when Phase III surveys were conducted in the following spring (Table 20).

Table 20 Determination of Burrows Occupied by Burrowing Owls Prior to Breeding Season

Waypoint ID	Phase II Survey Date	Phase II burrow classification	Phase III Survey Date	Phase III burrow classification
QZBOB-102112-01	21 Oct 2012	1	18 May2013	4
QZBOB-102212-04	22 Oct 2012	1	27 May 2013	4
QZBOB-102212-03	22 Oct 2012	1	27 May 2013	4

QZBOB-102112-01 was collapsed and no longer serviceable without re-excavation. QZBOB-102212-04 was an active kit fox (*Vulpes macrotis*) den, and QZBOB-102212-03 appeared to have been re-excavated and potentially occupied by coyote (*Canis latrans*).

These spring 2013 Phase III surveys documented live owls at two additional burrows. One of these burrows was potentially occupied during Phase II surveys (Class 2); the other is believed to have been a previously undocumented rodent burrow (Table 21).

Table 21 Burrows Occupied During Breeding Season

Waypoint ID	Phase II Survey	Phase II burrow classification	Phase III Survey	Phase III burrow classification
QZBOB-051313-01	N.A.	N.A.	13 May 2013	1
QZBOB-040913-01	9 Apr 2013	2	24 May 2013	1

Burrowing owls occupying burrows during the breeding season were monitored in an attempt to determine territorial boundaries and home ranges.

Observations of the burrowing owl pair at QZBOB-051313-01, suggested dependent young were in the burrow on 15 July, although no non-adults were directly observed during a total of more than 15 hours of observation.

Observations of the burrowing owl pair at QZBOB-040913-01 (burrow apparently re-excavated), suggested the breeding attempt was abbreviated by a potential nest predator as the burrow was abandoned between 20 June when a pair was present, and 14 July when no owls were detected. No young-of-year were ever observed at this burrow and adults were not detected away from the burrow on a subsequent follow-up search on 15 July.

There were no nesting attempts by Burrowing Owls during 2014.

Burrowing owls were incidentally reported in or around the Project site on four (4) occasions from September 27, 2014 to February 6, 2015. Only one of these detections (made during the winter 2015 follow-up visit) was within the Project site

3.3.3.4 Golden Eagle Surveys

In March and April 2013, a total of seventeen black-tailed jackrabbits were detected across the 4,855 acre (19.65 sq km) Project during a 10-meter belt-transect survey of the entire Project. This effort yields an estimation of .0035 black-tailed jack rabbits/acre.

The only golden eagle detection made during the Territory Occupancy Surveys was made on January 21, 2014. An avian biologist detected an adult golden eagle soaring low heading southwest from the QZ_GOEA_OP10. Because this detection occurred during the Phase II visit, a follow-up visit was scheduled. During the follow-up visit on February 11, 2014, no golden eagles were observed in the area. In the vicinity of the eagle sighting, there were two nests observed, one was inactive and the other was an occupied red-tailed hawk nest. No active golden eagle nests were detected within the Study Area. There were no sightings during the 2014-15 surveys.

A total of 26 raptor or raven nests were documented during Golden Eagle Territory Occupancy Surveys (Figure 24). Sixteen of these nests were in cliff or rock outcrop substrates, nine (9) were in power line support structures, and one was located in an ironwood tree (*Olneya tesota*). In 2013-14, species associated with raptor nests included four (4) red-tailed hawks (*Buteo jamaicensis*), two (2) prairie falcons (*Falco mexicanus*), and 12 undetermined species of raptor. The one historic golden eagle territory was occupied by a pair of red-tailed hawks during this breeding season. Seven (7) of the observed nest were active, nine (9) were inactive, and two (2) were active and occupied. In 2014-15, there were two (2) active nests: one (1) red-tailed hawk and one (1) prairie falcon.

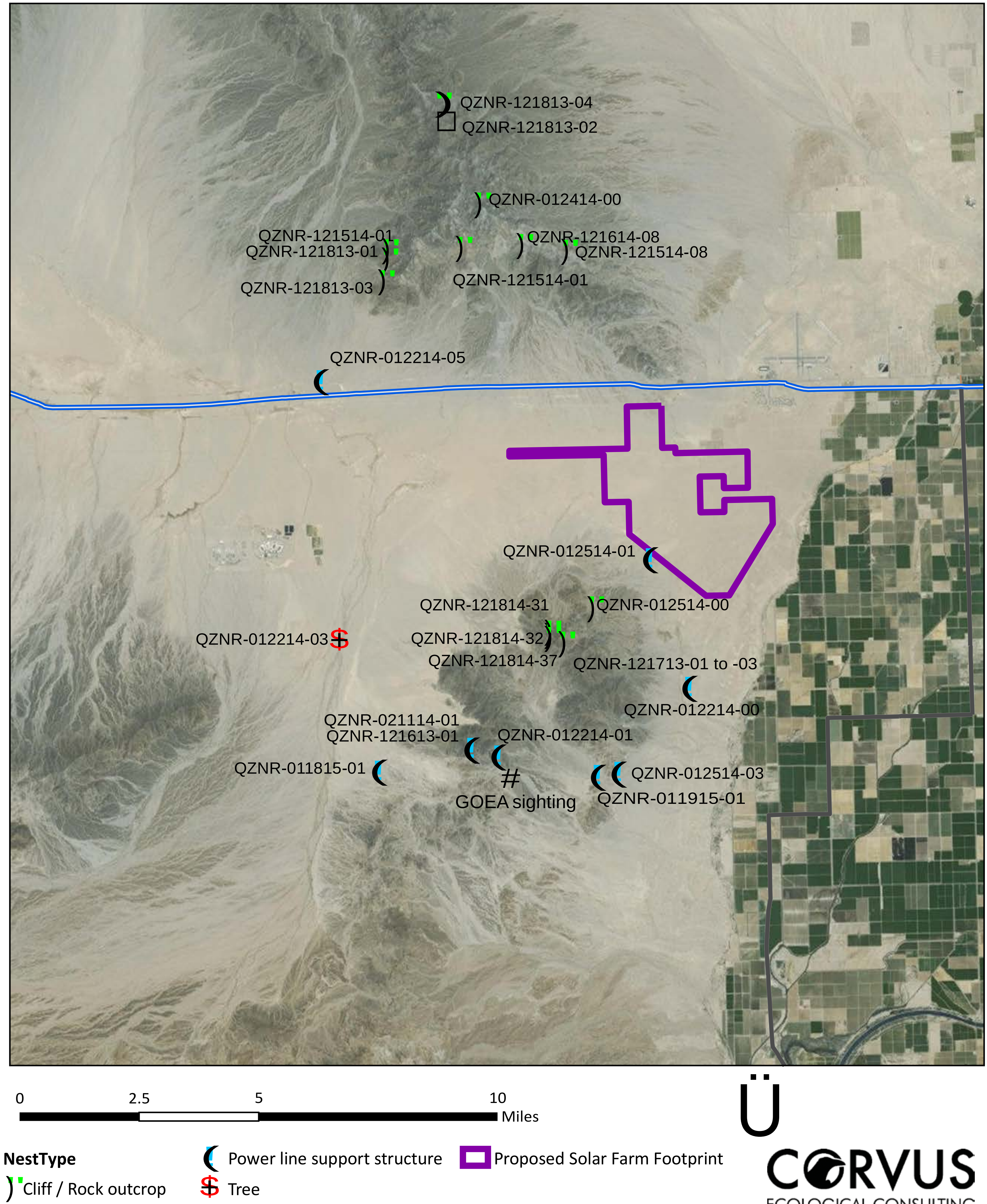

QZNR-121813-04
QZNR-121813-02
QZNR-012414-00
QZNR-121514-01
QZNR-121813-01
QZNR-121614-08
QZNR-121514-08
QZNR-121514-01
QZNR-121813-03
QZNR-012214-05
QZNR-012514-01
QZNR-121814-31
QZNR-012514-00
QZNR-012214-03
QZNR-121814-32
QZNR-121814-37
QZNR-121713-01 to -03
QZNR-012214-00
QZNR-021114-01
QZNR-121613-01
QZNR-012214-01
QZNR-011815-01
QZNR-012514-03
GOEA sighting
QZNR-011915-01
0
2.5
5
10
Miles
NestType
Cliff / Rock outcrop
Power line support structure
Tree
Proposed Solar Farm Footprint
CORVUS
ECOLOGICAL CONSULTING

Figure 23

RAPTOR NESTS DETECTED DURING GOLDEN EAGLE SURVEYS

QUARTZITE SOLAR | RIVERSIDE COUNTY, CALIFORNIA

3.3.3.5 Elf Owl Surveys

Elf owls (*Micrathene whitneyi*) are small cavity nesters typically inhabiting desert areas overgrown with saguaro cacti, and mesquite or deciduous riparian woodlands and adjacent tablelands. They are found in ravines, canyons, plateaus, and on mountain slopes. Most of the Project site and the adjoining buffer zone is comprised of scrubland dominated by creosote bush, and is therefore completely unsuitable for use by elf owls.

A small patch of microphyll woodland (Lower Colorado subdivision of Sonoran desert scrub) of less than one hectare (11 S 0708580 3718750) occurs immediately south of the present solar facility and contains widely scattered ironwood, and blue palo verde trees plus several nonnative trees.

A drainage from McCoy Mountains runs north (11 S 0706925 3720960) to south (11 S 0707924 3719323). Most (97 percent) of the wash is within the one mile Project buffer zone, but it also transects the most northeasterly corner of the Project site. This wash contains approximately 10 hectares of microphyll woodland with scattered ironwood and palo verde trees. It is between 30 to 70 m wide with trees spaced 15 to 60 m apart, and 7 to 9 m tall.

There are a series of braided drainages along the southwestern boundary of the Project site running west to east from the foothills of the Mule Mountains. The largest drainage contains approximately 16 hectares of scattered ironwood and palo verde trees, and runs 1.6 km west (11 S 0705570 3714515) to east (11 S 0707065 3715170) across the buffer zone and ends at the powerline road. The patch is between 50-150 m wide with trees spaced 5 to 30 m apart, 5 to 8 m tall, with an open canopy and little understory.

Scattered patches of honey mesquite occur on the slope between the upland desert scrub of the Palo Verde Mesa and the lower Colorado River floodplain, which contains extensive farmland. Mesquite trees growing along this slope were 3 to 5 m tall and found in thickets 20 to 40 m wide. There were no large trees, e.g., cottonwood (*Populus fremontii*), associated with these areas.

Assessments were made for two nearby areas that fell outside of the one-mile Project buffer zone.

The Mesa Verde housing area was assessed because it superficially resembles certain trailer parks or campgrounds along the lower Colorado River where elf owls have been detected. It consists of trailers and small homes with yards containing native trees including palo verde, mesquite (*Prosopis* sp.), saguaro cactus (*Carnegiea gigantea*, a total of eight individuals) and nonnative columnar cacti and trees including eucalyptus, palms, African sumac (*Rhus lancea*), and pines (*Pinus* sp.). However, no cavities were observed in this area and no cottonwood trees were present.

An area of microphyll woodland north of and adjacent to the I-10 freeway corridor located along Black Rock Road was assessed. This woodland patch is approximately 1.5 km long and 30 to 100 m wide (about 12 hectares). This area contains palo verde and widely scattered ironwood (7 to 11 m tall) and is generally located between a gas station and the truck stop facilities (east end, 11 S 0710795 3721265) and a weigh station (west end, 11 S 0709305 3721290). The woodland is crossed by numerous roads and contains several disturbed areas. Trees also occur on the south side and the center strip of the freeway.

In the surveyors' judgment, none of the habitat patches assessed and discussed above met minimal standards as elf owl nesting habitat. For most patches, this lack of potential was a function of inadequate tree density and/or cavity density, combined with inadequate or marginal patch size. The mesquite patches observed within the buffer zone are much less suitable in terms of patch size and tree density than the mesquite patches within which elf owls sometimes occur along the lower Colorado River. The most promising area for elf owls that was observed occurred outside the buffer zone and adjacent to the interstate, where there were some areas of large, closely spaced palo verde trees, but even here, surveyors determined that the potential for elf owls is very low, and mitigated against further by proximity of multiple disturbances, including the interstate highway itself.

3.3.3.6 Nesting Raptor/Raven Surveys

Nesting raptor/raven surveys were conducted monthly between May 1 and June 1, 2013. This effort focused on the detection of all raptor/raven nests within one mile of the Project site in order to collect baseline data for the following:

- The number and distribution of raptor/raven nests prior to project development; and
- Success rates of raptor/raven nests prior to project development.

All bird nests (including the incidental detection of resident passerine species) were recorded on standardized datasheets. A total of 38 nests were recorded during the two years within the project site and 1-mile buffer (Table 22). Monthly monitoring efforts were completed to update the datasheets to include the development stage and breeding status at each nest. Nests detected in both years were renamed in 2014 to employ a more consistent naming strategy.

Table 22 Bird Nests (Including Raptor/Raven) Detected on the Project Site, Spring 2013 and 2014.

Nest ID	Species	Easting	Northing	Date	Status	# Young
BH0001	RTHA	708278	3718453	2013		
RKR0001/ QZNR-031214-03	RTHA/ UNHA	704893	3716895	4/22/2013/ 5/13/2014	Incubation/ Inactive	
RKR0002/ QZNR-021414-01	CORA/ RTHA	703684	3717850	4/22/2013/ 5/31/2014	Incubation/ Nest Cycle Complete	
RKR0003	AMKE	709754	3714312	4/22/2013	Hatchling/ Nestling	
RKR0004/ QZNR-031214-02	RTHA/ RTHA	706970	3715231	5/9/2013/ 5/13/2014	Fledgling/Nest Cycle Complete	?/ 2
RKR0005	AMKE	711010	3716388	4/22/2013	Hatchling/ Nestling	
RKR0006/ QZNR-031214-08	RTHA/ RTHA	711168	3716543	4/22/2013/ 5/31/2014	Hatchling/ Nestling/ Nest Cycle Complete	?/2
RKR0007	WWDO	712577	3719443	5/3/2013	Nest Building	
RKR0008	NOMO	707682	3714578	5/4/2013	Hatchling/ Nestling	
RKR0009	CACW	707816	3714548	5/4/2013	Hatchling/ Nestling	
RKR0010	MODO	707758	3714628	5/4/2013	Incubation	
RKR0011	MODO	707787	3714549	5/4/2013	Incubation	
RKR0012	LOSH	707969	3720258	4/26/2013	Hatchling/Nestling	
RKR0013	WEKI	710941	3716160	5/9/2013	Nest Building	
RKR0014/ QZNR-031214-01	CORA/ CORA	708293	3714185	5/9/2013/ 5/31/2014	Hatchling/Nestling/ Nest Cycle Complete	

Nest ID	Species	Easting	Northing	Date	Status	# Young
RKR0015	WEKI	712594	3718948	5/15/2013	Incubation	
RKR0016	MODO	712579	3719532	5/15/2013	Incubation	
QZNP-021014-01	LOSH	703,269	3,719,933	2/10/2014	Incubation	
QZNP-021014-03	LCTH	703,187	3,720,192	2/10/2014	Hatchling/ Nestling	2
QZNP-021414-01	LOSH	703,708	3,710,209	4/25/2014	Incubation	
QZNP-030514-01	LCTH	704,408	3,717,229	3/12/2014	Incubation	
QZNP-031214-02	LOSH	704,010	3,716,939	3/12/2014	Hatchling/ Nestling	4
QZNP-031214-03	LOSH	706,044	3,715,983	3/12/2014	Incubation	
QZNP-031214-04	LOSH	708,654	3,712,415	3/12/2014	Incubation	
QZNP-032014-01	NOMO	703,193	3,720,186	3/20/2014	Incubation	
QZNP-040114-01	MODO	704,009	3,716,789	4/1/2014	Incubation	
QZNP-040314-01	CACW	703,152	3,720,310	4/3/2014	Undetermined	
QZNP-040614-01	LOSH	707,180	3,719,804	4/6/2014	Fledgling	
QZNP-041614-01	LOSH	704,413	3,717,316	4/16/2014	Incubation	1
QZNP-042214-01	LOSH	703,267	3,719,924	4/22/2014	Nest Building	
QZNR-031214-04	UNHA	701,352	3,718,549	5/13/2014	Inactive	
QZNR-031214-05	RTHA	700,831	3,718,568	5/13/2014	Nest Cycle Complete	
QZNR-031214-06	CORA	702,793	3,717,202	5/31/2014	Nest Cycle Complete	
QZNR-031214-07	RTHA	709,555	3,713,171	5/31/2014	Nest Cycle Complete	1
QZNR-032624-01	CORA	708,530	3,718,554	5/30/2014	Hatchling/ Nestling	2
QZNR-040314-01	AMKE	711,581	3,717,319	4/3/2014	Incubation	
QZNR-050814-01	AMKE	711,915	3,717,872	5/31/2014	Nest Cycle Complete	2
QZNR-051614	AMKE	705,762	3,716,306	5/31/2014	Undetermined	

3.3.4 Mammals

3.3.4.1 Small Mammal Surveys

Results fpr the small mammal surveys are summarized in Table 23. Pocket mouse (*Chaetodipus* spp.*)* species numbers were added together due to unreliability of field identification between long-tailed (*C. formosus*) and desert pocket mouse (*C. penicillatus)*. In total, seven species were found at the baseline points.

No special status small mammals were trapped during the surveys on the Project site. There is no evidence that any special status small mammals are utilizing the Project site.

Table 23 Baseline Points: Small Mammals, April 2013

Baseline Points	**Common Name**	DQ-01	DQ-02	DQ-03	DQ-04	DQ-05	DQ-06	DQ-07	DQ-08	DQ-09	DQ-10	OS-01	OS-02	Total
Dipodomys merriami	Merriam's kangaroo rat		23	13	43	20	24	1	20	22	23	33	35	**257**
Dipodomys deserti	Desert kangaroo rat	16	5	2	10	5	5	19				4	6	**72**
Perognathus longimembris	Little pocket mouse		6	6	3	19		1			1			**36**
Chaetodipus spp.	Pocket mouse		4	1	2	1	0	2	33	5	1	6	30	**85**
Onychomys torridus	Southern grasshopper mouse					1	1			3	1		1	**7**
Neotoma lepida	Desert woodrat								1	1			1	**3**
Spermophilus tereticaudus	Round-tailed ground squirrel		1		1	1	2			1				**6**
Total Individuals		**16**	**39**	**22**	**59**	**47**	**32**	**23**	**54**	**32**	**26**	**43**	**73**	**466**

3.3.4.2 Desert Kit Foxes

Desert kit fox is protected by the California Code of Regulations (Title 14, CCR: §460) and Fish and Wildlife Commission Section 4000 as a fur-bearing mammal. Desert kit foxes are fossorial mammals that occur in arid open areas, shrub grassland, and desert ecosystems. Desert kit fox typically consume small rodents, primarily kangaroo rats, rabbits, lizards, insects, and in some cases immature desert tortoises. Dens typically support multiple entrances, but desert kit fox may utilize single burrows for temporary shelter.

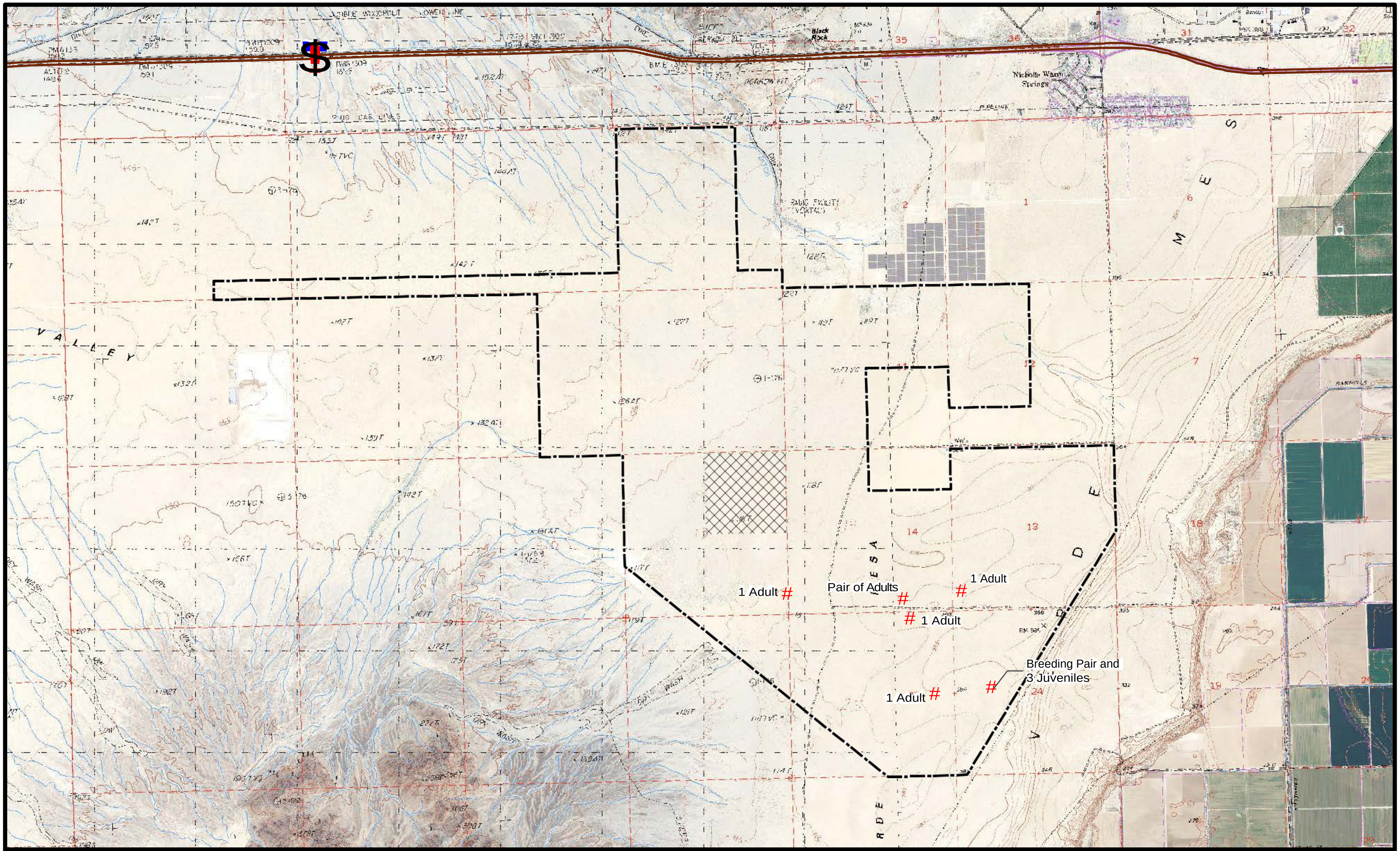
Litters of one to seven young are typically born in February through April (Egoscue 1962; McGrew 1979). This species was detected within the Study Area. Full-coverage burrow surveys revealed 46 canid complexes and 45 single-entrance dens (91 potentially occupied dens/complexes) with some kit fox sign within the Project site. Only 24 of those dens/complexes had signs of recent activity, (i.e., desert kit fox tracks, or scat). Each of these was revisited by an experienced mammal biologist for further inspection of signs of activity. Upon re-inspection, eight dens/complexes were determined to be potentially active, all of which were in the southern portion of the Project site (Figure 25). A camera station was set up at each of the eight dens and run for three consecutive days and nights (Photograph 12). Six of the eight cameras captured images of nine total individual desert kit fox as follows (Table 24):

Table 24 Desert Kit Fox Presence, April 2013

Den Location UTM WGS84	Number of Individuals Photographed	Dates
11 S 707745 3715760	1 Adult	April 29- May 1, 2013.
11 S 709777 3714817	Breeding Pair and 3 Juveniles	April 29- May 1, 2013.
11 S 709201 3714768	1 Adult	April 29- May 1, 2013.
11 S 708974 3715510	1 Adult	April 29- May 1, 2013.
11 S 708873 3715704	Pair of Adults	April 29- May 1, 2013.
11 S 709479 3715780	1 Adult	April 29- May 1, 2013.

3.3.4.3 Bats

Roost surveys were conducted of mines in the mountains adjacent to the Study Area during the day and at night for evidence of bats and guano. Two mines in the southern McCoy Mountains (located approximately 4.4 miles northwest of the Study Area) had previously been identified by Dr. Brown as California leaf-nosed bat maternity colonies and had been gated with bat compatible closures by the Bureau of Land Management in 2011. These mines were monitored on May 8 at dusk by surveyors with night vision equipment to obtain accurate exit and entry counts of bats and acoustic records with additional Anabat detectors. The surveyors kept two counts for at least sixty minutes after the first bat exited of how many bats entered and exited the mines. Video cameras with auxiliary infrared lights were used to remotely


1 Adult
Pair of Adults
1 Adult
1 Adult
Breeding Pair and 3 Juveniles
1 Adult
VALLEY
MESA
VERDE
MESA
Nicholls Warm Springs
Black Rock

Kit Fox Burrows

▨ Inholding

Desert Quartzite Site Boundary

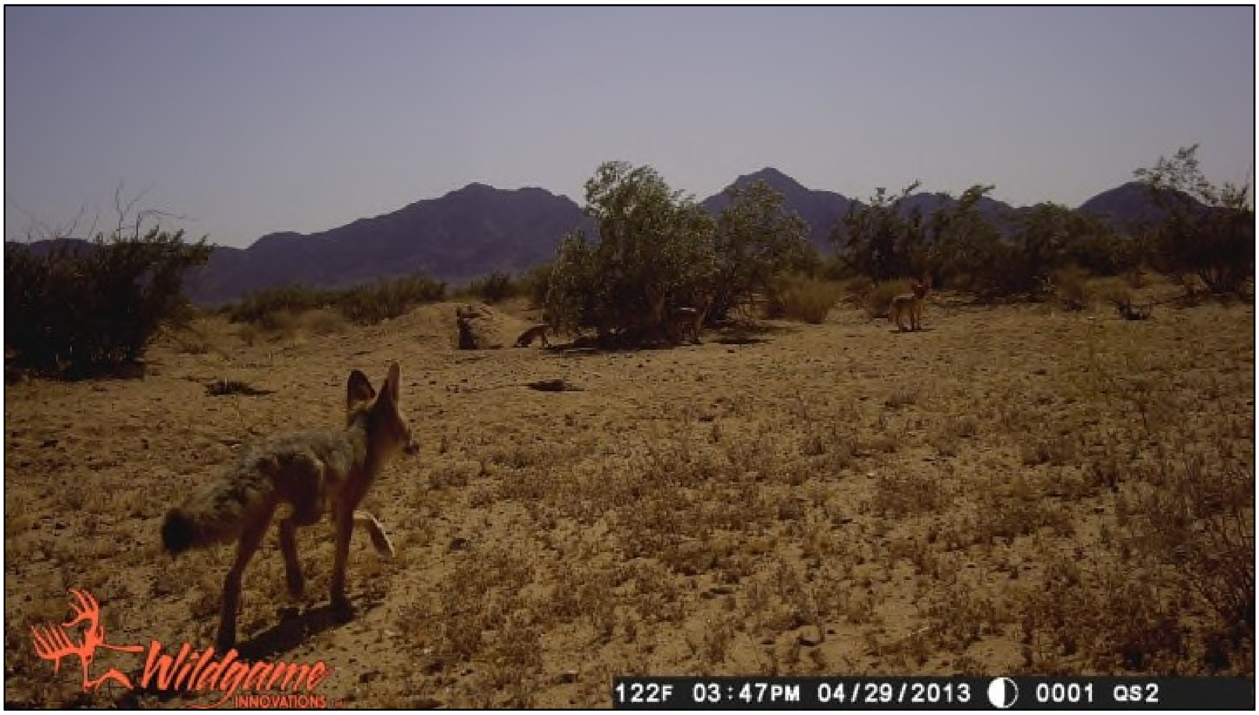
0
500
1,000
Meters

DESERT QUARTZITE SOLAR PROJECT
DESERT QUARTZITE, LLC

Figure 24
Active Kit Fox Burrows/ Camera Locations

#343 P:\GIS\Ironwood\Shared\Projects\Projects\Quartzite\ArcGIS project files\Kit Fox Burrows_20130710.mxd 8/26/2015

Photograph 12 Desert Kit Fox Family Captured on Camera on Project Site, April 29, 2013


Wildgame INNOVATIONS
122F 03:47PM 04/29/2013 0001 QS2

monitor mines and to obtain permanent records of exiting bats. During the current survey, pallid bats were observed and recorded at the mines in addition to California leaf-nosed bats. The size and flight pattern of the two species are similar, but the echolocation and social calls are distinctive. The Uvanum Mine (33.64064,-114.82957) is closest to the Study Area, and 33 bats exited and 26 entered the mine in the hour after dark. To the west in another canyon, 71 bats exited and 44 entered the McCoy #3. Non-resident bats may enter a mine to “night-roost”, so the exiting and entering bats may not be the same individuals or species.

Using topographic maps and Google Earth images, ground reconnaissance was conducted of possible mine features on the north end of the Mule Mountains (1.8 miles south of the Study Area) and no underground features that could shelter bats were discovered.

The closest known bat colony in the Mule Mountains is the Hodge Mine (a.k.a. Stonehouse, 33.51145,-114.79383) situated 3.4 miles south of the Study Area. This mine contains the largest winter colony of California leaf-nosed bats (*Macrotus californicus*) in the United States, as well as a maternity colony. It is also one of four maternity colonies for the cave myotis (*Myotis velifer*) in California. This mine has been a research site for Dr. Brown since 1976. On the evening of May 9, a net count of 3,348 bats exited from the five portals of the Stonehouse Mine.

At least seven bat species are interpreted as detected acoustically within the Study Area (Table 25). Pallid bat, canyon bat, California and cave myotis, Mexican and pocketed freetailed bats and Western mastiff bats yielded multiple diagnostic call sequences. For 50 kHz Myotis sequences (calls ending at this frequency) two species (*Myotis californicus* and *Myotis yumanensis*) are often not distinguishable. California myotis is far more common in open desert habitats distant from surface water, and these call sequences were interpreted as this species, however they might also have included some Yuma myotis calls. A small sample of 40 kHz Myotis call sequences was obtained at four monitors. In this area cave and Arizona myotis can produce similar calls at this frequency, but given the low likelihood of occurrence of Arizona myotis and the proximity to occupied cave myotis (*Myotis velifer)* roosts, surveyors conclude that these sequences represent the latter species. Four of the acoustically detected species are California State Species of Special Concern: pallid bat (*Antrozous pallidus*), cave myotis, Western mastiff bat *(Eumops perotis*) and pocketed free-tailed bat (*Nyctinomops femorosaccus*). Some additional species have the potential to occur at some time of the year (Table 25). The most likely species is the California leaf-nosed bat that roosts close to the Study Area, and can hunt without emitting echolocation signals, relying solely on vision and prey-produced sounds. In a telemetry study conducted in February 2015, California leaf-nosed bats with transmitters from the Stonehouse Mine foraged over the study area (P. Brown pers. comm). Townsend’s big-eared bats (a CDFW candidate for Threatened or Endangered status) emits very faint echolocation signals and is rarely detected acoustically even where it is known to occur. This bat was not detected acoustically, however the project area is within the range of this species.

Table 26 shows acoustic activity by site and night for species and one sonotype or frequency category. Q25 groups non-diagnostic calls from larger mid-frequency bats (19-35 kHz) and is included to show relative activity among sites. Values in the table are counts of minutes per night with activity by a species (Miller 2001). Canyon bats (*Parastrellus hesperus*) and 50 kHz California myotis (*Myotis californicus*) were the most common species detected during echolocation surveys. Over this short sampling interval, higher bat activity (especially pallid bats) occurred at sites with more extensive woody vegetation, notably in the wash immediately east of the Project's north boundary (Site 4), and south of the existing solar installation (Sites 5 and 6). Lower activity was detected at sites with scattered creosote bush and few or no trees (e.g., Site 7).

Table 25 Bat Species Potentially Occurring within Study Area

Family/Scientific Name	**Common Name**	**USFWS**	**CDFW**
Chiroptera	(Bats)		
Phyllostomatidae	(American leaf-nosed bats)		
Macrotus californicus	California leaf-nosed bat	SC	CSC
Vespertilionidae (Vesper bats)			
Myotis yumanensis	Yuma myotis	SC	-
Myotis velifer	**Cave myotis**	SC	CSC
Myotis occultus	Arizona myotis	SC	CSC
Myotis californicus	**California myotis**	-	-
Parastrellus hesperus	**Canyon bat**	-	-
Lasiurus blossevillii	Western Red bat	-	CSC
Lasiurus xanthinus	Western yellow bat	-	-
Lasiurus cinereus	Hoary bat	-	-
Corynorhinus townsendii	Townsend's big-eared bat	SC	CSC
Antrozous pallidus	**Pallid bat**	-	CSC
Molossidae	(Free-tailed bats)		
Tadarida brasiliensis	**Mexican free-tailed bat**	-	-
Nyctinomops femorosaccus	**Pocketed free-tailed bat**	-	CSC
Eumops perotis	**Western mastiff bat**	SC	CSC
USFWS= U.S. Fish and Wildlife Service	CDFW=California Department of Fish and Wildlife		
FSC =Federal Species of Concern	CSC = California Species of Concern		
SC = Former Category 2 candidate			
Bold = Species detected during current survey			
Red = Special status species potentially impacted			

Table 26 Minutes Per Night of Acoustic Activity by Site and Species or Acoustic Category

Map	Night	Pahe	Myca	Myve	Anpa	Tabr	Q25	Nyfe	Eupe	Total
1	5/8/17	6	1							7
1	5/9/17	8	2		2		4	1		17
1	5/10/17	8	2				1			11
2	5/8/17	4						1		5
2	5/9/17	5				2				7
2	5/10/17	3					1			4
3	5/8/17	3	1		1			1		6
3	5/9/17	6	2		1		2			11
3	5/10/17	3	1				2			6
4	5/8/17	30	158		4		5	1		198
4	5/9/17	33	137	1	8		5			184
4	5/10/17	38	167		3		4			212
5	5/8/17	11	27		1		1	2		42
5	5/9/17	6	15	3	2	1	6			33
5	5/10/17	29	22		7	1	4	1		64
6	5/8/17	4	6		2		2			14
6	5/9/17	3	14			1	9	1		28
6	5/10/17	30	13	1	4		5			53
7	5/8/17							1		1
7	5/9/17	1	1			1	1	2	2	8
7	5/10/17									0
8	5/8/17						1			1
8	5/9/17	1	2			1	4			8
8	5/10/17	7	2				1			10
9	5/8/17	1								1
9	5/9/17	8	7				1	1		17
9	5/10/17	6	1				1			8
10	5/8/17	3	1					4	2	10
10	5/9/17	18	7				1	1		27
10	5/10/17	8	7	1	1		1			18
11	5/8/17	2	4					1	2	9
11	5/9/17	9	14			1	2	2		28
11	5/10/17	11	13							24
12	5/8/17		1		1					2
12	5/9/17	1	2				1			4
12	5/10/17	2	1				1			4
	Total	308	631	6	37	8	66	20	6	

(Pahe=*P. hesperus*, Myca=*M. californicus*, Myve=*M. velifer*, Anpa=*A. pallidus*,Tabr=*T. braziliensis*, Nyfe=*N. femorosaccus*, Eupe=*E. perotis*, Q25=non-diagnostic 19-35 kHz sequences).

3.3.5 Other Sensitive Species Noted During Surveys

During various flora and fauna surveys, sign of general species were noted. A species list of general species detected on the site is in Appendix B. American badger (*Taxidea taxus*) was the only additional species of concern associated with the Project.

American badger (*Taxidea taxus*) is a State Species of Special Concern associated with open grassland and desert communities. This species is associated with dry open forest, shrub, and grassland communities with an adequate burrowing rodent population; therefore, this species has high potential to occur within the Study Area. Several badger digs and scat were found on the Study Area, mostly near the southwestern perimeter. This species was not directly observed during the focused surveys or on imagery from camera stations around the site.

4.0 RECOMMENDED PROTECTION MEASURES

The following information is intended to provide the California Environmental Quality Act (CEQA)/National Environmental Policy Act (NEPA) document preparers an outline for general avoidance and minimization measures potentially relevant to the Desert Quartzite Solar Project. The following measures are considered standard practices for large-scale utility projects and are consistent with the *Best Management Practices and Guidance Manual: Desert Renewable Energy Projects* (Renewable Energy Action Team 2010). Due to the initial stage of the Project and thus the lack of specific design and construction details, the following recommendations are non-specific and should be modified, as needed, as the Project progresses.

4.1 GENERAL MEASURES

This section describes a range of design features, construction and operation best management practices (BMPs), and avoidance practices that when implemented as part of Project construction and/or operation, should collectively avoid, reduce or eliminate potential adverse effects to biological resources. Each category of features, practices and plans is described separately below.

Environmental Inspection and Compliance Monitoring Program and Plan

A comprehensive Environmental Inspection and Compliance Monitoring Program and Plan, covering both construction and operation and maintenance (O&M), should be developed. A qualified individual should be designated to serve as the Project Environmental Manager. The Environmental Manager should be responsible for the following tasks.

- Development and implementation of the overall Project compliance program;
- Communication and coordination with the applicable regulatory agencies;
- Ensuring compliance with the various conditions and requirements of permits and approvals;
- Record keeping and reporting required by permits and approvals;
- Ensuring that all applicable environmental plans are up to date;
- Advising management of actual and potential compliance issues; and
- Ensuring that Project planning takes appropriate account of compliance issues in advance.

Construction Related Plans

The following construction-related plans should be developed, as necessary. These plans have specific objectives that would indirectly help reduce potential adverse effects to biological resources.

- Storm Water Pollution Prevention Plan;
- Dust Control Plan;
- Waste Management Plan;
- Spill Prevention Control and Countermeasure Plan;
- Hazardous Materials Management Plan; and

- Fire Prevention Plan.

Construction-Related BMPs

The following general measures should be implemented during construction, which would assist with reducing potential adverse effects to biological resources,

- Construction and O&M activities should be limited to daylight hours to the extent possible;
- Water required for construction purposes should only be stored in closed containers or structures and should be transported throughout the site in enclosed water trucks;
- Water sources (such as wells) should be checked periodically by monitors to ensure they are not creating open water sources through leaking or consistently overfilling trucks;
- All vehicles leaking fuel or other liquids should be immediately removed to the staging area and repaired – all spills should be cleaned up promptly and disposed of correctly;
- All construction activities conducted outside the fenced areas should be monitored by a qualified biological monitor;
- Vegetation removal should be limited to the smallest area necessary;
- Construction traffic should remain on existing roads when possible – new roads, passing areas, and turning areas should be limited to permitted area of direct effect;
- Speed limits on all unpaved areas of the Project site should be a maximum of 15 miles per hour;
- Trash should always be contained within raven-proof receptacles and removed from the site frequently, including trash collected in vehicles in the field;
- No dogs or firearms should be allowed on the Project site during construction or O&M; and
- Plant and wildlife collection by Project staff during construction or operation should be prohibited except as allowed by the Project's permits.

Worker Environmental Awareness Program

A formal Worker Environmental Awareness Program (WEAP) should be completed for every individual working on the Project site. All individuals completing the training should sign an attendance sheet and receive wallet cards and stickers to show they have completed this training. The training should include the photographs of all environmental resources and the following information:

- Discussion of the fragile desert ecosystem, vegetation and wildlife communities within and surrounding the Project site;
- Discussion of rare plant species and other sensitive species found within and surrounding the Project site;
- Desert tortoise ecology, threats, legal protections, permitting, and penalties (including both legal and imposed by Project permits);
- Project-specific protection measures for species;
- Any safety measures personnel should be aware of as it relates to the species or environment on the Project site; and

- Worker responsibilities, communication protocol, and monitor responsibilities, including the authority for monitors to halt Project activities if warranted.

4.2 BOTANICAL RECOMMENDATIONS

4.2.1 Special Status Plant Species

The Vegetation Resources Management Plan (VRMP) will provide details regarding the proposed salvage and transplantation of target species; the VRMP will include the following,

- Distribution of target plants within the Project site;
- Criteria for determining whether an individual plant is appropriate for salvage;
- Equipment and methods for salvage, propagation, transport, and planting;
- Procedures for marking and flagging target plants during preconstruction clearances surveys;
- Storage and/or pre-planting requirements;
- Proposed transplantation sites;
- A requirement for ten years of maintenance of the transplanted individuals, including removal of invasive species and irrigation (if necessary); and
- A requirement for ten years of monitoring to determine the percentage of surviving plants each year and to adjust maintenance activities using an adaptive management approach.

4.2.2 Cactus and Yucca

Cactus and yucca found onsite could be relocated to a nursery for future restoration areas or relocated if adjacent land was purchased for mitigation, these actions would be covered in the VRMP.

4.2.3 Special Status Vegetation Communities

Desert Dry Wash Woodland is considered sensitive by the California Resources Agency and BLM due its limited distribution, value to wildlife, and susceptibility to disturbance (Bureau of Land Management 2002 and Zeiner, et al., 1990). The presence of water at least on a seasonal flow regime is vital for this community to persist. Due to this fact, and that the community covers very little of the Project site, project boundaries could be adjusted to avoid impacts the Desert Dry Wash Woodland and add a distance buffer between this vegetation community and the Project site.

4.2.4 Non-Native and Invasive Species

An IWMP should be prepared to reduce and/or eliminate the propagation and further spread of noxious and invasive weeds within and outside the Project site due to construction, operation and decommissioning of the Project. The objectives of the IWMP would be as follows.

- Identify weed species currently present within the Project components;
- Identify weeds not seen on the Project components that may have the potential to be present in the Project site and have the potential to invade the Project site due to construction activities;

- Identify construction and maintenance activities that may increase the presence of weeds or introduce new weed species on and adjacent to the Project components; and
- Specify steps that should be taken to ensure that the presence of weed populations on and adjacent to the Project components should not increase because of construction activities. These steps should be intended to prevent weeds not currently found on the Project site from becoming established there, and prevent weeds already present on the site from spreading to other areas.

4.3 WILDLIFE RECOMMENDATIONS

4.3.1 Amphibians

It is recommended that Project site be surveyed for ponding after heavy rains until construction to determine if suitable habitat for occupation of amphibians is present.

4.3.2 Reptiles

4.3.2.1 Desert Tortoise

Due to the potential presence of desert tortoise within the Project site, formal consultation between the BLM and USFWS would be necessary. A biological assessment that fully addresses the impacts to desert tortoise would be required to initiate formal consultation. Additionally, an incidental take permit would be required from the California Department of Fish and Wildlife in compliance with the California Endangered Species Act.

The measures described in this section reflect standard requirements and may be incorporated as part of the proposed Project, which would also be included in the biological assessment. The Biological Opinion (BO) would provide specific conditions and requirements that may supersede some of the following measures. A Lead Biologist should be designated for the Project and should be responsible for all aspects of clearance surveys, monitoring, desert tortoise translocation, contacts with agency personnel, reporting, and long-term monitoring and reporting.

Exclusion Fencing

Prior to beginning clearance surveys, desert tortoise exclusion fencing should be constructed in specified areas consistent with clearance survey areas. The Project site should be completely fenced with security and desert tortoise exclusion fencing, including desert tortoise exclusion gates at access points. Fence installation should be monitored as a linear component. Exclusion fencing should be maintained over the course of construction and operations, as necessary.

Preconstruction Clearance Surveys

Clearance surveys should be conducted consistent with the USFWS Desert Tortoise Field Manual and current translocation guidance (United States Fish and Wildlife Service 2009b and 2010a). If a desert tortoise or active burrow is found within a planned area of construction, surveys should stop at that time until the tortoise is translocated in the active season and per the Desert Tortoise Translocation Plan. If two complete passes are completed in a construction area (north-south and east-west) without a desert tortoise being found, construction may commence within that area outside of active season. Fencing should continue to be checked on a daily basis throughout construction.

Translocation

A Desert Tortoise Translocation Plan should be prepared for the Project. The purpose of the plan is to describe the process of translocation, minimize mortality of desert tortoises, and assess the effectiveness of the translocation effort through a long-term monitoring program. Injured tortoises should be transported to a rehabilitation facility approved by the USFWS and CDFW. Tortoises found recently killed should be salvaged and transported to a veterinary pathologist, who is familiar with desert tortoise and approved by the USFWS and CDFW. Procedures for salvaging and transport should generally follow Guidelines for the Field Evaluation of Desert Tortoise Health and Disease (Berry and Christopher 2001). Individuals approved and permitted by the USFWS and CDFW to conduct such assessments should conduct detailed health assessments on all live tortoises following current USFWS guidance. Detailed health assessments should be performed prior to translocation and repeated periodically during long-term monitoring.

Avoidance – Construction

During the construction of linear features (fencing, transmission lines, and access roads), all live tortoises and active burrows should be avoided to the extent possible. All activities should be monitored by qualified biologists. The biological monitor should instruct crews to provide approximately one hour for a live tortoise to leave an active construction area without assistance. If the tortoise does not leave the area on its own, an Authorized Biologist (listed under the BO to handle tortoises) should carefully move the tortoise out of the construction area and into a translocation area pursuant to the conditions of the BO. Biological monitors should flag an avoidance area approximately 20 m from any active burrow to be avoided and construction activities should continue around this avoidance area while a biologist monitors the burrow. If an active burrow cannot be avoided by construction activities, the burrow should be excavated using protocols in USFWS Desert Tortoise Field Manual (United States Fish and Wildlife Service 2009b).

Avoidance – Operations and Maintenance

During the operation phase of the Project, all applicable desert tortoise protection measures identified under construction should be implemented. For example, this may include the need for a biological monitor outside the fenced facility during road, fence and utility maintenance involving ground disturbance, annual WEAP refresher training, actions to take if a tortoise is encountered, etc. Additionally, a biological monitor should be designated and responsible for overseeing compliance with the desert tortoise protection measures. The biological monitor should have a copy of all measures including the BO when work is being conducted on site. The monitor should be on site during all Project maintenance activities to ensure compliance with the desert tortoise measures. The monitor should have the authority to halt all non-emergency activities that are in violation of the measures. Work should proceed only after hazards to desert tortoise are removed, the species is no longer at risk, or the individual has been moved from harm's way by an Authorized Biologist. An annual compliance report should be submitted to the BLM annually.

Common Raven Management Plan

A BBCS should be written that will include the Raven Management Plan, see section 4.5.2 and section 4.5.4.

4.3.2.2 Mojave Fringe-Toed Lizard and Herptofauna

The only listed species found on the Project site was the Mojave fringe-toed lizard. This lizard is found in loose-sand habitats and areas that have loose sand deposits. It is recommended to construct the Project with trying to avoid loose sand areas as much as possible.

4.3.3 Avian

Due to the potential presence of sensitive species on or near the Desert Quartzite project, a Bird and Bat Conservation Strategy (BBCS) should be written for the project. The goal of the BBCS would be to reduce the potential risks for avian and bat mortality potentially resulting from construction and operation of the Project. The objectives of this plan are as follows:

- Identify baseline conditions for raptor and bat species currently present at the Project components;
- Identify construction and operational activities that may increase the potential of adverse effects to these species on and adjacent to the Project components;

- Specify steps that should be taken to avoid, minimize and mitigate any potential adverse effects on these species; and
- Detail long-term monitoring and reporting goals.

Avian survey results will be used in the development of an avian risk characterization (illustrating species use and occurrence within the proposed Project site) as part of the Project Bird and Bat Conservation Strategy (BBCS).

4.3.3.2 Burrowing Owl

The BBCS for the project should include the Burrowing Owl Mitigation Plan. The intent of this plan would be to identify actions that will need to be taken for burrowing owls should they be detected on the Project.

Burrowing Owl site use changes temporally. Survey evidence suggests greater use of the Desert Quartzite footprint by BUOW outside of the breeding season, with only two (2) pairs observed remaining to attempt reproduction in 2013 and none in 2014.

If the intent of surveys is limited to the detection of burrowing owls prior to construction, it is recommended that no further action is taken until the Project nears construction. Phase II and Phase III surveys should be conducted 30-days prior to construction in an effort to confirm BUOW occupancy and give Project managers enough time to respond to findings.

Burrowing Owls Phase II and Phase III surveys should be conducted according to the methods described in, “Burrowing Owl Survey Protocol and Mitigation Guidelines” (Burrowing Owl Consortium, 1993). Burrowing owl surveys should adhere to the frequency and timing described by the “Staff Report on Burrowing Owl Mitigation” (California Department of Fish and Wildlife 2012).

4.3.3.3 Golden Eagles

Given the absence of confirmed Golden Eagle breeding pairs within 10-miles of the project site during our two years of surveys and overall lack of Golden Eagle sightings (with one exception), we do not recommend continuing to survey for Golden Eagles using Territory Occupancy Surveys going forth into the construction phase of the project. We do recommend that Migration Surveys, Line Transect Surveys, and Incidental Observations continue to document the presence of Golden Eagle and other sensitive species during the construction and post-construction phases of the project.

4.3.3.4 Elf Owl

No mitigation or further survey is recommended for this species.

4.3.3.5 Nesting Raptor/Raven

The BBCS will incorporate a Common Raven Management Plan. The primary objective of the raven plan is to protect the juvenile and hatchling desert tortoises from predation by common ravens. This should be accomplished in part by eliminating or minimizing all aspects of human impact that attract ravens (i.e., garbage, surface water, animal and plant waste materials, perching sites, nesting sites, and roosting sites). The secondary objective is to avoid lethal removal of ravens by installing passive bird deterrents. The final objective of this plan is to comply with the regional management actions of the agencies cooperating in the effort to promote tortoise recovery (United States Fish and Wildlife Service 2008b).

4.3.4 Mammals

4.3.4.1 Small Mammals

No special status species were found during the trapping activities, therefore, there are no recommendations.

4.3.4.2 Desert Kit Fox

Six dens were found to be active on the Project site. A Desert Kit Fox Management Plan should be developed, covering avoidance, exclusion and a hazing methodology.

4.3.4.3 Bats

Due to the potential presence of bat species within the Project site, a BBCS should be developed. The goal of the BBCS would be to reduce the potential risks for avian and bat mortality potentially resulting from construction and operation of the Project. The objectives of this plan are as follows:

- Identify baseline conditions for raptor and bat species currently present at the Project components;
- Identify construction and operational activities that may increase the potential of adverse effects to these species on and adjacent to the Project components;
- Specify steps that should be taken to avoid, minimize and mitigate any potential adverse effects on these species; and
- Detail long-term monitoring and reporting goals.

4.4 COMPENSATORY MITIGATION

Consistent with BLM NECO requirements and conditions likely to be imposed on the Project by CDFW and USFWS, areas of desert tortoise habitat should be acquired to partially offset the potential adverse effects of the Project. A Compensatory Mitigation Plan, or Habitat Compensation Plan, would be a valuable tool to document the details of mitigation opportunities. Land acquisition should be considered the first priority; however, it is evident that the land purchase opportunities within the Colorado Desert are limited. Supplemental mitigation actions may need to be considered and approved by the agencies. These actions could be in the form of habitat restoration and enhancement throughout the Colorado Desert. Continued coordination with the BLM, CDFW, and USFWS would be beneficial in identifying all possible compensatory mitigation opportunities as they arise.

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APPENDIX A RAINFALL DATA

Appendix A: Rainfall Data

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1983	0.13	0.37	1.75	0.00	0.00	0.00	0.00	2.07	0.88	0.00	0.03	0.73	5.96
1984	0.06	0.00	0.00	0.00	0.02	0.00	2.44	0.11	0.00	0.00	0.10	3.33	6.06
1985	0.27	0.29	0.03	0.06	0.00	0.00	0.00	0.00	1.61	0.90	1.84	0.07	5.07
1986	0.07	0.40	0.19	0.02	0.00	0.00	0.11	0.05	0.90	0.50	0.69	0.75	3.68
1987	0.00	0.03	0.00	0.05	0.00	0.03	1.40	0.00	0.01	0.42	0.71	0.68	3.33
1988	0.42	0.61	0.02	0.98	0.00	0.00	0.00	0.83	0.00	0.07	0.00	0.00	2.93
1989	1.08	0.00	0.06	0.00	0.00	0.00	0.32	0.15	0.01	0.00	0.00	0.00	1.62
1990	0.14	0.01	0.21	0.00	0.02	0.00	0.22	1.47	0.13	0.06	0.00	0.00 z	2.26
1991	0.00 z	0.76	0.00 z	0.00 z	0.00	0.00	0.01	0.28	1.52	0.14	0.04	0.31	3.06
1992	0.78	1.59	2.15	0.28	0.03	0.00	0.00	1.93	0.00	0.20	0.00	2.20	9.16
1993	2.33	2.19	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.87	0.01	5.62
1994	0.01	0.29	0.68	0.02	0.12	0.00	0.69	0.14	0.00	0.00	0.06	1.23	3.24
1995	2.29	0.00 z	0.49	0.09	0.00 z	0.00	0.05	1.37	0.08	0.00	0.00	0.00	4.37
1996	0.10	0.27	0.09	0.00	0.22	0.00	0.00	0.00	0.85	0.01	0.04	0.01	1.59
1997	0.47	0.00	0.00	0.06	0.00	0.00	0.61	0.03	2.05	0.01	0.03	1.06	4.32
1998	0.28	3.03	1.29	0.01	0.01	0.00	0.05	0.47	0.52	0.04	0.16	0.21	6.07
1999	0.00	0.34	0.00	1.00	0.04	0.00	1.20	0.00	0.74	0.00	0.00	0.00	3.32
2000	0.00	0.08	0.38	0.00	0.00	0.01	0.00	1.03	0.00	0.00	0.00 b	0.00	1.50
2001	0.81	0.67	1.55	0.01	0.00	0.00	0.00	0.00 c	0.00	0.00	0.11	0.03	3.18
2002	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.75	0.04	0.03	0.00	0.86
2003	0.11	1.08	0.28	0.08	0.00	0.00	0.06	0.00	0.07	0.00	0.33	0.00	2.01
2004	0.02	0.57	0.81	0.06	0.00	0.00	0.00	0.02	0.12	1.02	0.31	0.57	3.50
2005	1.55	2.83	0.21	0.00	0.00	0.00	0.00	1.35	0.00	0.85	0.00	0.00	6.79
2006	0.00	0.00	0.25	0.00	0.00	0.20	0.15	1.46	1.44	0.04	0.00	0.00	3.54
2007	0.16	0.07	0.53	0.00	0.00	0.00	0.00	0.00	0.06	0.00	1.11	0.00	1.93
2008	0.77	0.02	0.00	0.00	0.18	0.00	0.27	0.15	0.06	0.00	0.24	0.65	2.34
2009	0.02	0.43	0.00	0.00	0.03	0.01	0.07	0.02	0.03	0.00	0.00	0.85	1.46
2010	2.12	0.90	0.67	0.01	0.00	0.00	0.00	0.03	0.00	0.26	0.00	0.54	4.53
2011	0.00	1.17	0.06	0.00	0.00	0.00	1.64	0.00	0.08	0.12	0.29	0.60	3.96
2012	0.00	0.01	0.19	0.14	0.00	0.00	1.88	1.05	0.07	0.27	0.00	0.86	4.47
2013	0.77	0.01	0.03	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.81

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[1] Western Regional Climate Center (2011)

[2] Missing data

APPENDIX B SPECIES DETECTED (NON-AVIAN)

Appendix B: Species Detected-(Non-Avian)-Primary Study Area

Reptiles		
Desert Tortoise	Gopherus agassizii	O,C
California Kingsnake	*Lampropeltis getula californiae*	O
Coachwhip	*Masticophis flagellum*	O
Desert Horned Lizard	*Phrynosoma platyrhinos*	O, S
Desert Iguana	*Dipsosaurus dorsalis*	O, S
Desert Spiny Lizard	*Sceloporus magister*	O
Glossy Snake	*Arizona elegans*	O
Long-nosed Leopard Lizard	*Gambelia wislizenii*	O
Long-tailed Brush Lizard	*Urosaurus graciosus*	O
Mojave Fringe Toed Lizard	*Uma scoparia*	O
Side-blotched Lizard	*Uta stansburiana*	O
Sidewinder	*Crotlus cerastes*	O
Western Banded Gecko	*Coleonyx variegatus variegatus*	O
Western Patch-nosed Snake	*Salvadora hexalepis*	O
Western Shovel-nosed Snake	*Chionactis occipitalis*	O
Western Whiptail	*Cnemidophorus tigris*	O
Zebra-tailed Lizard	*Callisaurus draconoides*	O
Mammals		
Black-tailed Jackrabbit	*Lepus californicus*	O, T, S
Burro Deer	*Odocoileus hemionus eremicus*	O, T, S
California Myotis	*Myotis californicus*	V
Canyon Bat	Parastrellus hesperus	V
Cave Myotis	Myotis velifer	V
Coyote	*Canis latrans*	T, S, B
Desert Cottontail	*Sylvilagus audubonii*	O, T, S, B
Desert Kangaroo Rat	*Diodomys deserti*	O, B
Desert Kit Fox	*Vulpes macrotis arsipus*	B, T, S
Desert Woodrat	*Neotoma lepida*	O, B
Little Pocket Mouse	Perognathus longimembris	O
Long-tailed Pocket Mouse	Chaetodipus spp.	O
Merriam's Kangaroo Rat	*Dipodomys merriami*	O, B
Mexican Free-tailed Bat	Tadarida brasiliensis	V
Pallid Bat	Antrozous pallidus	V
Palm Spring Round-tailed Ground Squirrel	Spermophilus teriticaudus chlorus	O
Pocketed Free-Tailed Bat	Nyctinomops femorosaccus	V
Southern Grasshopper Mouse	Onychomys torridus	O, B
Western Mastiff Bat	Eumops perotis~~s~~	V
White-tailed Antelope Ground Squirrel	*Ammospermophilus leucurus*	**O**

0-Observed Directly
B- Burrow
T-Tracks
V- Vocalization
S-Scat
C- Carcass

APPENDIX C SPECIAL STATUS TARGET PLANT SPECIES

Appendix C: Special Status Target Plant Species

Scientific Name **Common Name**	**Status**		**Flowering Period**	**Occurrence on site**
Abronia villosa var. *aurita* chaparral sand-verbena	Global Rank: Federal Listing: State Listing: State Rank: CNPS Rank: NECO:	G5T3T4 none, BLM sensitive none S2 1B.1 not covered	Jan - Sept	Presumed absent; potential habitat present on site but not found during surveys
Acleisanthes longiflora angel trumpets	Global: Federal: State Listing: State Rank: CNPS Rank: NECO:	G5 none none S1 2.3 covered	May	Presumed absent: no suitable habitat onsite (rocky carbonate canyon bottoms).
Astragalus insularis var. *harwoodii* Harwood's milkvetch	Global: Federal Listing: State Listing: State Rank: CNPS Rank: NECO:	G5T3 none none S2 2.2 covered	Jan - May	**PRESENT:** 13,712 individuals estimated on site.
Astragalus lentiginosus var. borreganus Borrego milk-vetch	Global: Federal Listing: State Listing: State Rank: CNPS Rank: NECO:	G5T4T5 none none S3.3 4.3 covered	Feb - May	Presumed absent: potential habitat present on site but not found during surveys
Astragalus lentigunosis var. *coachellae* Coachella valley milk-vetch	Global: Federal Listing: State Listing: State Rank: CNPS: NECO:	G5T2 none; BLM sensitive none S2 1B.2 covered	Feb - May	Presumed absent: potential habitat present on site but not found during surveys

Scientific Name **Common Name**	**Status**		**Flowering Period**	**Occurrence on site**
Astragalus sabulonum	Global:	G5	Feb - July	Presumed absent: potential habitat present on site but not found during surveys
gravel milk-vetch	Federal Listing:	none		
	State Listing:	none		
	State Rank:	S2		
	CNPS:	2.2		
	NECO:	not covered		
Calliandra eriophylla	Global:	G5	Jan - Mar	Presumed absent: potential habitat present on site but not found during surveys
pink fairy-duster	Federal Listing:	none		
	State Listing:	none		
	State Rank:	S2S3		
	CNPS:	2.3		
	NECO:	not covered		
Carnegia gigantea	Global:	G5	May - June	Absent: not found during surveys, little potential habitat on site.
saguaro	Federal Listing:	none		
	State Listing:	none		
	State Rank:	S1		
	CNPS:	2.2		
	NECO:	covered		
Castela emoryi	Global:	G4	Apr - Jul	Absent; potential habitat present on site but not found during surveys
Emory's crucifixion-thorn	Federal Listing:	none		
	State Listing:	none		
	State Rank:	S2S3		
	CNPS:	2.3		
	NECO:	covered		
Euphorbia abramsiana	Global:	G4	Sep – Nov	**PRESENT:** appx. 2104 individuals found during Fall 2012 surveys
=Chamaesyce abramsiana	Federal Listing:	none		
Abrams' spurge	State Listing:	none		
	State Rank:	S2S3		
	CNPS:	2.2		
	NECO:	not covered		

Appendix C: Special Status Target Plant Species

Scientific Name **Common Name**	**Status**		**Flowering Period**	**Occurrence on site**
Euphorbia parryi *=Chamaesyce parryi* Parry's spurge	Global: Federal Listing: State Listing: State Rank: CNPS: NECO:	G5 none none S1 2.3 not covered	May - June	Presumed absent: potential habitat present on site but not found during surveys
Euphorbia platysperma *=Chamaesyce platysperma* flat-seeded spurge	Global: Federal Listing: State Listing: State Rank: CNPS: NECO:	G3 none; BLM sensitive none S1 1B.2 not covered	Feb - Sep	Presumed absent: potential habitat present on site but not found during surveys
Colubrina californica Las Animas colubrina	Global: Federal Listing: State Listing: State Rank: CNPS: NECO:	G4 none none S2S3.3 2.3 not covered	Apr - Jun	Absent: not found during surveys; no potential habitat on site (rocky wash bottoms & margins)
Coryphantha alversonii foxtail cactus	Global: Federal Listing: State Listing State Rank: CNPS: NECO:	G3 none none S3.2 4.3 covered	Apr - Jun	Absent: potential habitat present on site but not found during surveys
Cryptantha costata ribbed cryptantha	Global: Federal Listing: State Listing State Rank: CNPS: NECO:	G4G5 none none S3.3 4.3 not covered	Jan - May	**PRESENT:** appx. 56,748 individuals estimated on site

Scientific Name **Common Name**	**Status**		**Flowering Period**	**Occurrence on site**
Ditaxis clariana	Global:	G4G5	Dec - Mar	Presumed absent: potential habitat present on site but not found during surveys
glandular ditaxis	Federal Listing:	none		
	State Listing:	none		
	State Rank:	S1		
	CNPS:	2.2		
	NECO:	covered		
Ditaxis serrata var. *californica*	Global:	G5T2T3	Apr - Nov	presumed absent: potential habitat present on site but not found during surveys
California ditaxis	Federal Listing:	none		
	State Listing:	none		
	State Rank:	S2		
	CNPS:	3.2		
	NECO:	covered		
Eriastrum harwoodii	Global:	G3	Mar - May	**PRESENT:** appx. 882 individuals found on site
Harwood's eriastrum	Federal Listing:	none; BLM sensitive		
	State Listing:	none		
	State Rank:	S3		
	CNPS:	1B.2		
	NECO:	not covered		
Funastrum utahense	Global:	G4	Apr - Sep	**PRESENT:** 1 individual found on site
Utah vine milkweed	Federal Listing:	none		
	State Listing:	none		
	State Rank:	S3.2		
	CNPS:	4.2		
	NECO:	not covered		
Helianthus niveus ssp. *tephrodes*	Global:	G4T2	Mar - May	Absent: potential habitat present on site but not found during surveys
Algodones Dunes sunflower	Federal Listing:	none	Oct - Jan	
	State Listing:	Endangered		
	State Rank:	S2		
	CNPS:	1B.2		
	NECO:	not covered		

Scientific Name **Common Name**	**Status**		**Flowering Period**	**Occurrence on site**
Hymenoxys odorata bitter hymenoxys	Global: Federal Listing: State Listing: State Rank: CNPS: NECO:	G5 none none S2 2 not covered	Feb - Aug	Absent: no suitable habitat on site (moist river margins and benches)
Imperata brevifolia California satintail	Global: Federal Listing: State Listing: State Rank: CNPS: NECO:	G2 none none S2.1 2.1 not covered	Sep - May	Absent: no suitable habitat on site (moist river plains & canal margins)
Koeberlinia spinosa ssp. *tennuispina* Crown-of-Thorns	Global: Federal Listing: State Listing: State Rank: CNPS: NECO:	G4T4 none none S2.2 2.2 covered	Mar - Jul	Absent: potential habitat present on site but not found during surveys
Mammillaria grahamii var. grahamii Graham's fishhook cactus	Global: Federal Listing: State Listing: State Rank: CNPS: NECO:	G4T4 none none S2 2.2 not covered	Apr	Absent: potential habitat present on site but not found during surveys
Mentzelia puberula Darlington's blazing star	Global: Federal Listing: State Listing: State Rank: CNPS: NECO:	G4 none none S2 2.2 not covered	Mar - May	Absent: no potential habitat present on site (rocky limestone and granite slopes)

Scientific Name **Common Name**	**Status**		**Flowering Period**	**Occurrence on site**
Opuntia wigginsii Wiggins' cholla	Global: Federal Listing: State Listing: State Rank: CNPS: NECO:	G3?Q none none S1? 3.3 covered	Mar - June	Absent: potential habitat occurs on site but not found during surveys. Questionable taxonomic validity.
Penstemon pseudospectabilis ssp. *speudospectabilis* desert beardtongue	Global: Federal Listing: State Listing: State Rank: CNPS: NECO:	G4G5T3T5 none none S3 2.2 not covered	Mar - May	Presumed absent: potential habitat present on site but not found during surveys
Physalis lobata lobed cround cherry	Global: Federal Listing: State Listing: State Rank: CNPS: NECO:	G5 none none S2 2.3 covered	May - Jan	Presumed absent: potential habitat present on site but not found during surveys
Portulaca halimoides desert portulaca	Global: Federal Listing: State Listing: State Rank: CNPS: NECO:	G5 none none S3 4.2 not covered	Sept	Presumed absent: potential habitat present on site but not found during surveys
Proboscidea althaefolia desert unicorn-plant	Global: Federal Listing: State Listing: State Rank: CNPS: NECO:	G5 none none S3.3 4.3 covered	May - Aug	**PRESENT:** appx. 811 individuals estimated during Fall 2012 surveys

Appendix C: Special Status Target Plant Species

Scientific Name **Common Name**	**Status**		**Flowering Period**	**Occurrence on site**
Teucrium cubense ssp. *depressum* dwarf germander	Global:	G4G5T3T4	Mar - Nov	Presumed absent: marginal habitat present on site but not found during surveys
	Federal Listing:	none		
	State Listing:	none		
	State Rank:	S2		
	CNPS:	2.2		
	NECO:	not covered		
Wislizenia refracta var. *refracta* jackass clover	Global:	G5T5?	Apr - Nov	Presumed absent: potential habitat present on site but not found during surveys
	Federal Listing:	none		
	State Listing:	none		
	State Rank:	S1		
	CNPS:	2.2		
	NECO:	not covered		
Wislizenia refracta var. *palmeri* Palmer's jackass clover	Global:	G5T2T4	Jan - Dec	Presumed absent: potential habitat present on site but not found during surveys
	Federal Listing:	none		
	State Listing:	none		
	State Rank:	S1		
	CNPS:	2.2		
	NECO:	covered		

APPENDIX D DESERT QUARTZITE AVIAN WORK SUMMARY

Desert Quartzite Avian Work Summary
Spring 2013 – Winter 2015

Prepared for:

Ironwood Consulting, Inc.
1030 Nevada Street, Suite 201
Redlands, CA 92374

Prepared by:

***Corvus* Ecological Consulting, LLC**
7810 Highway 89, Suite 270
Flagstaff, AZ 86004

June, 2015

Table of Contents

1. Overview 4
2. Migratory Bird Surveys 4
  2.1 Unlimited Distance Extended Observation Surveys 4
  2.2 Migration Survey Results to Date 7
3. Upland Bird Surveys 12
  3.1. Line Transect Sampling 12
4. Sensitive Species / Species Specific Surveys 19
  4.1 Burrowing Owl (*Athene cunicularia*) Surveys 19
    4.1.1 Presence/ Absence Surveys and Assessment of Site Use 19
    4.1.2 Burrowing Owl Presence/ Absence Survey Results 20
    4.1.3 Assessment of Burrowing Owl Occupancy and Site Use 24
    4.1.5 Conclusions and Recommended Actions 29
  4.2 Golden Eagle (*Aquila chrysaetos*) Surveys 29
    4.2.1 Golden Eagle Territory Occupancy Results 32
    4.2.2 Raptor Nest Observations During Golden Eagle Territory Occupancy Surveys 32
5. Nesting Raptor / Raven Surveys 38
6. Avian Results Analysis and Reporting 40
7. References Cited 43

List of Tables

Table 1. Migration Point Locations 5
Table 2. Migration Point Visits -- Spring 2013-Fall 2014 6
Table 3. Total Numbers of Each Species Detected by Season and Year 9
Table 4. Earliest and latest dates for most commonly detected species. 11
Table 5. Transect Beginning and End Points (A and B) 13
Table 6. Summary of Line Transect Surveys Conducted April 2013 through February 2015 15
Table 7. Preliminary Analysis of Avian Line Transect Results Spring 2013 -- Winter 2014-15 19
Table 8. Burrowing Owl Phase II Results from Fall 2012 and Spring 2013 and 2014 20
Table 9. Comprehensive Chronology of Burrowing Owl Burrows on Quartzite 2013-2014. 24
Table 10. Golden Eagle Observation Points and Survey Dates 30
Table 11. Raptor Nests Observed During Territory Occupancy Surveys 33
Table 12. Bird Nests (including raptor/raven) detected on Quartzite Project, Spring 2013 and 2014. 38
Table 13. Comprehensive List of Species Detected Incidentally or during avian-focused surveys on the Desert Quartzite Solar Project. 40

List of Figures

Figure 1. Quartzite Migration Point Locations 5
Figure 2. Average # of Birds Recorded durign Migration Surveys by Date 8

Figure 3. Quartzite Line-transect Locations, Fall 2013 to Winter 2014-15 14
Figure 4. Phase II Class 1-3 Burrows 2014 23
Figure 5. Placement of Golden Eagle Territory Occupancy Survey Observation Points 31
Figure 6. Raptor Nests Detected During Golden Eagle Surveys 37

Appendices

Appendix A. Quartzite Migratory Bird Survey Protocol
Appendix B. Quartzite Avian Line-Transect Protocol
Appendix C. Quartzite Elf Owl Habitat Assessment

1. Overview

Avian Surveys at Quartzite used various sampling methodologies to depict the occurrence and habitat (site) use by birds during all critical life stages. Sampling models and survey techniques were designed to maximize the detection of migratory birds and local residents; including all raptor, shorebird, waterfowl and passerine species. Each sampling methodology was selected to increase the potential for species detection respective to habitat type, and particular attention was focused on the detection of sensitive and/ or listed species.

2. Migratory Bird Surveys

The purpose of the Migratory Bird Surveys was to record observed avian migration and use patterns at, and adjacent to, the Project site. Data on diurnal bird migration will provide information on:

- Seasonal and individual population pulses
- Range of daily behavior and movements
- Flight elevation through and near the Project
- Duration of visitation by migratory birds, including raptors

Survey results will be used in the development of an avian risk characterization (illustrating species use and occurrence within the proposed Project Site) as part of the Project’s Bird and Bat Conservation Strategy (BBCS).

2.1 Unlimited Distance Extended Observation Surveys

An avian biologist monitored migration trends following guidance provided by BLM, USFWS, and CDFW, and protocol based on Hawk Migration Association of North America (HMANA) standard field survey techniques. The HMANA protocol, modeled after Cape May Raptor observation methods, is now standard for hawk migration counts (Bird and Bildstein 2007, Bildstein et al. 2007). A survey-specific protocol (Appendix A) was developed based on the above referenced documents.

Two migration points (MP) bisect the proposed Project Site footprint along the central east-west axis, and exhibit near 360 degree views of the distant horizon to maximize visual capture of migrating birds passing over the area (Table 1). After the Fall 2013 season, avian biologists determined that, due to the pattern of migratory movement prevalent in the area, the survey points should be adjusted to maximize visibility of migrating birds to the observer. Beginning during the spring of 2014, MP01 and MP02 were replaced with MP03 and MP04 (Table 1; Figure 1). During peak migration periods during the spring and fall of 2013 and 2014 an avian biologist conducted a survey at each MP, once per week, using unlimited-distance bird migration survey methods.

Table 1. Migration Point Locations

Survey Point	UTM (WGS 84)	
	Easting	Northing
MP01	706914	3717172
MP02	710176	3717195
MP03	712050	3717046
MP04	707330	3720406

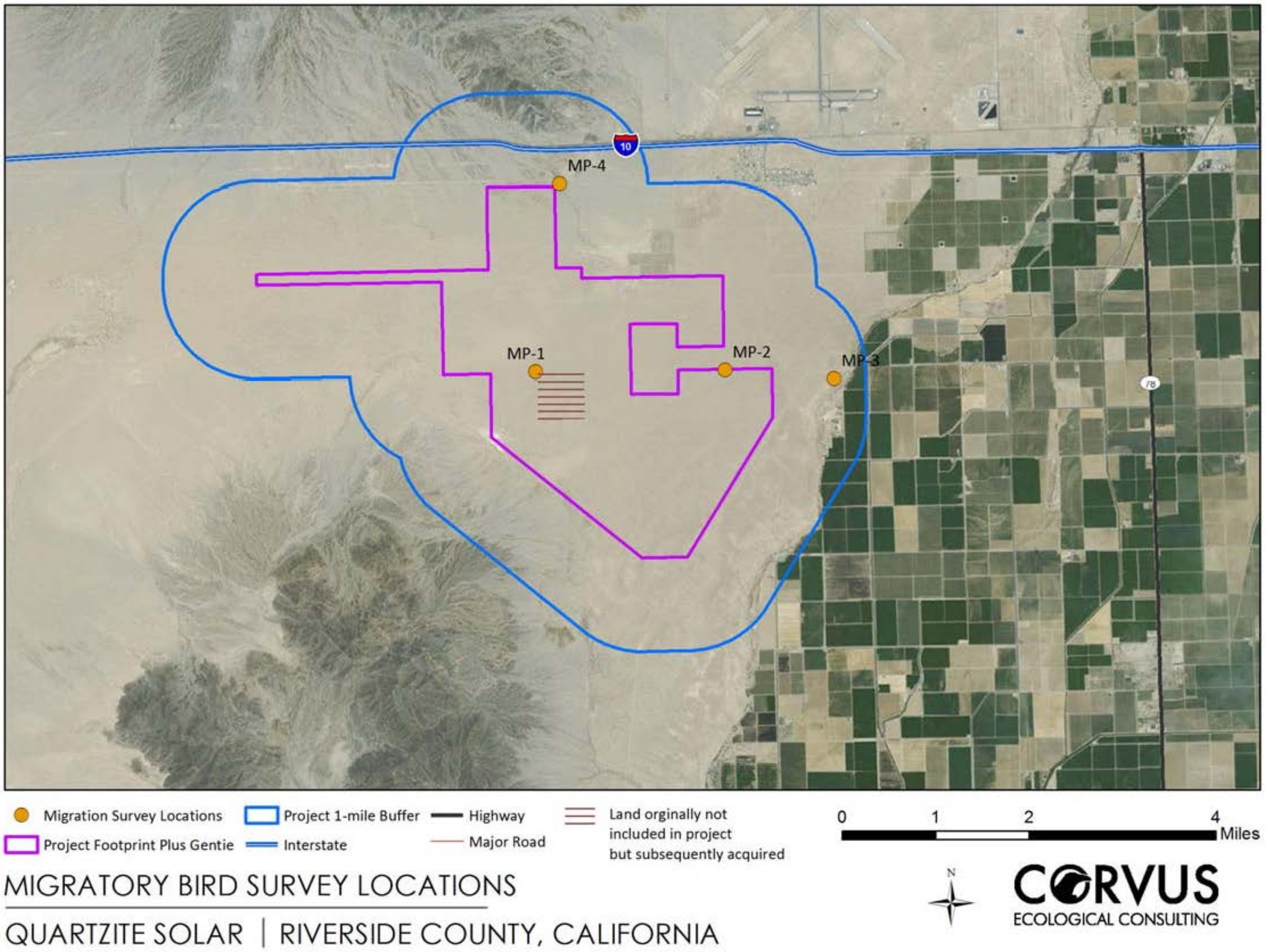
10
MP-4
MP-1
MP-2
MP-3
78
Migration Survey Locations
Project Footprint Plus Gentie
Project 1-mile Buffer
Interstate
Highway
Major Road
Land orginally not included in project but subsequently acquired
0
1
2
4
Miles
N
MIGRATORY BIRD SURVEY LOCATIONS
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Figure 1. Quartzite Migration Point Locations

Each migration point was visited 6 times between 18 April, 2013 and 18 May, 2013 and 11 times between 2 September 2013 and 12 November 2013. The number of visits was limited during the spring 2013 migration period by delays surrounding agency acceptance of a project-specific Avian Work Plan (Table 2). During the spring of 2014, the new MPs were each visited 11 times between 3 March and 22 May and between 5 September and 15 November.

Table 2. Migration Point Visits -- Spring 2013-Fall 2014

2013			2014		
Point ID	**Visit Date**	**Observer**	**Point ID**	**Visit Date**	**Observer**
MP-1	4/18/2013	J. Yerger	MP-3	3/5/2014	Roger Radd
	4/25/2013	Roger Radd		3/10/2014	Roger Radd
	4/28/2013	Roger Radd		3/17/2014	Roger Radd
	5/3/2013	Roger Radd		3/24/2014	Roger Radd
	5/10/2013	Roger Radd		4/1/2014	Roger Radd
	5/13/2013	Roger Radd		4/1/2014	Roger Radd
	5/23/2013	Roger Radd		4/8/2014	Roger Radd
	5/30/2013	Roger Radd		4/21/2014	Roger Radd
	9/3/2013	Roger Radd		5/5/2014	Roger Radd
	9/11/2013	Roger Radd		5/15/2014	Roger Radd
	9/17/2013	Roger Radd		5/22/2014	Roger Radd
	9/23/2013	Roger Radd		9/5/2014	Erin Lockward
	10/2/2013	Roger Radd		9/11/2014	Erin Lockward
	10/7/2013	Roger Radd		9/21/2014	Erin Lockward
	10/15/2013	Roger Radd		9/27/2014	Erin Lockward
	10/21/2013	Roger Radd		10/2/2014	Erin Lockward
	10/29/2013	Roger Radd		10/9/2014	Erin Lockward
	11/4/2013	Roger Radd		10/13/2014	Brooks Hart
MP-2	11/11/2013	Roger Radd		10/23/2014	Erin Lockward
	4/18/2013	Roger Radd		10/27/2014	Erin Lockward
	4/26/2013	Roger Radd		11/6/2014	Erin Lockward
	5/2/2013	Roger Radd		11/10/2014	Erin Lockward
	5/6/2013	Roger Radd	MP-4	3/6/2014	Roger Radd
	5/11/2013	Roger Radd		3/11/2014	Roger Radd
	5/18/2013	Roger Radd		3/17/2014	Roger Radd
	5/22/2013	Roger Radd		3/25/2014	Roger Radd
	5/28/2013	Roger Radd		4/2/2014	Roger Radd
	9/2/2013	Roger Radd		4/9/2014	Roger Radd
	9/12/2013	Roger Radd		4/22/2014	Roger Radd
	9/18/2013	Roger Radd		5/7/2014	Roger Radd
	9/24/2013	Roger Radd		5/14/2014	Roger Radd

2013			2014		
Point ID	**Visit Date**	**Observer**	**Point ID**	**Visit Date**	**Observer**
	10/3/2013	Roger Radd		5/20/2014	Roger Radd
	10/8/2013	Roger Radd		9/6/2014	Erin Lockward
	10/17/2013	Roger Radd		9/14/2014	Erin Lockward
	10/23/2013	Roger Radd		9/18/2014	Erin Lockward
	10/30/2013	Roger Radd		9/28/2014	Erin Lockward
	11/5/2013	Roger Radd		10/6/2014	Erin Lockward
	11/12/2013	Roger Radd		10/12/2014	Erin Lockward
				10/15/2014	Brooks Hart
				10/25/2014	Erin Lockward
				10/29/2014	Brooks Hart
				11/8/2014	Erin Lockward
				11/15/2014	Erin Lockward

2.2 Migration Survey Results to Date

A close inspection of the data collected over the course of four seasons to date has revealed two distinct peaks in migration for the area in 2014 (Figure 2). The first is in the spring around 24 March, and the second is in the fall around 21 September. Data collected during the spring of 2013 resulted in fewer observations compared to efforts undertaken during the spring of 2014 and there was no clear peak in 2013. In fall of 2013 there were two peaks: 1 October and 9 October. Uncontrollable and variable factors including rainfall rates, temperatures, wind speed and wind direction could have an influence on these results and these peak migratory periods should be considered approximate due to the limited number of survey seasons represented.

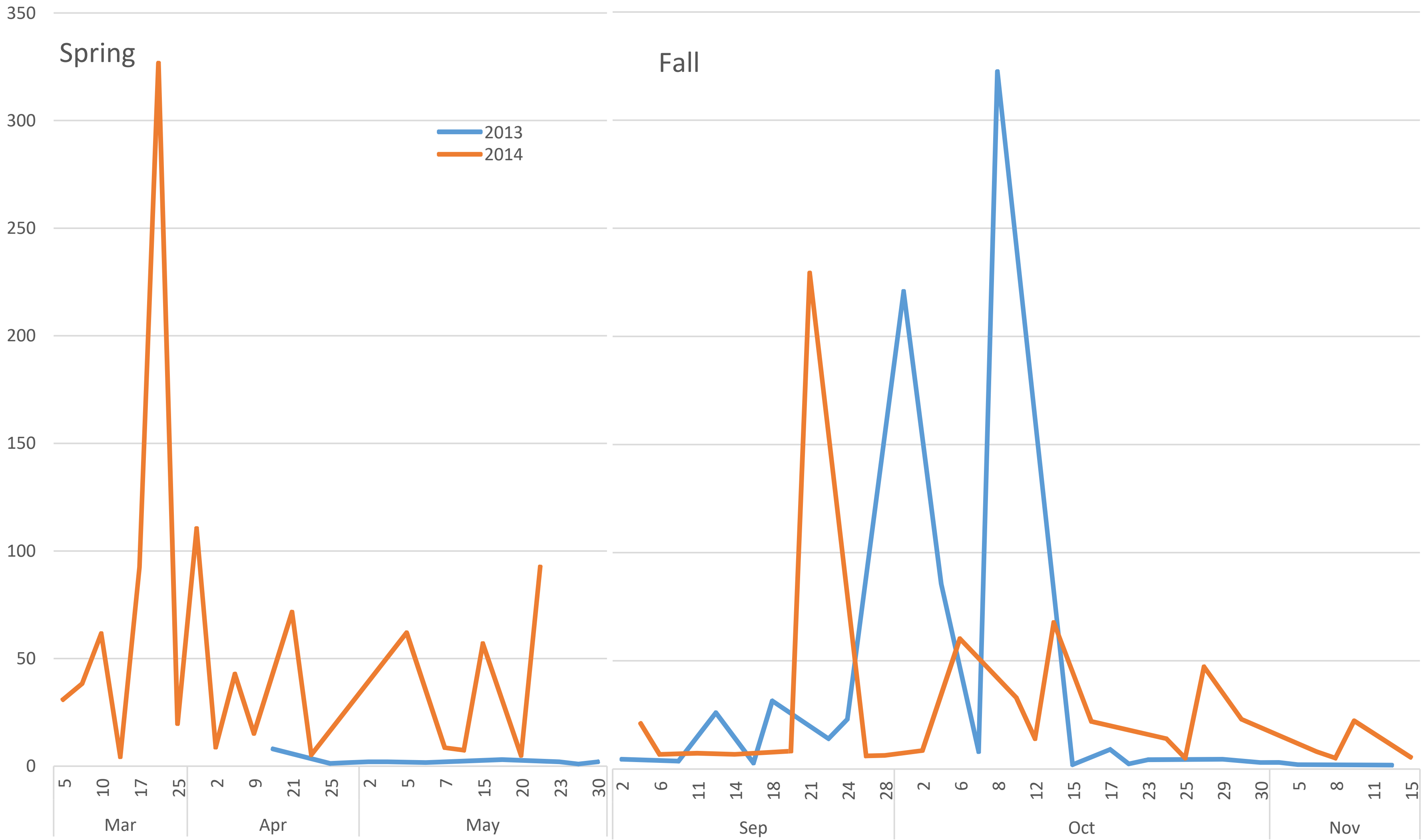


Figure 2. Average # of Birds Recorded durign Migration Surveys by Date

The greatest numbers of individual species detected at one time during the spring were flocks of unidentified swallows and tree swallows with numbers reaching 1000 and 950 birds respectively on a single day (all in 2014). Large number of Turkey Vultures (782 in one day for the highest count) and Swainson's Hawks (620 in one day) were observed during fall migration. Totals of each species for each season and year can be found in Table 3.

For the 7 species for which we detected >=100 individuals during a particular survey period (excluding detections that did not result in identification to species), we also looked at first and last observation dates for those periods (Table 4).

Table 3. Total Numbers of Each Species Detected by Season and Year

Common Name	Total # Birds Detected			
	Spring 2013	Fall 2013	Spring 2014	Fall 2014
American Kestrel	2	6	21	13
Ash-throated Flycatcher	1		8	
Barn Swallow	5	729	53	715
Black Phoebe				1
Black-headed Grosbeak			2	
Black-tailed Gnatcatcher			10	25
Black-throated Gray Warbler			1	1
Blue-gray Gnatcatcher			1	11
Brewer's Sparrow		8	7	
Bullock's Oriole			6	1
Cactus Wren			6	6
Cliff Swallow	33	2	7	26
Common Raven	1		27	26
Common Yellowthroat				1
Cooper's Hawk		5	8	1
Costa's Hummingbird			4	
Eurasian Collared-Dove			6	2
Ferruginous Hawk		6	6	
Gambel's Quail			4	24
Gray Flycatcher	1		1	
Great Blue Heron			5	12
Great Egret			4	8
Greater Roadrunner			3	4
Great-tailed Grackle				50
Horned Lark		111		61
House Finch			2	193
House Sparrow				2
House Wren				3
Lazuli Bunting				2
Le Conte's Thrasher				7
Lesser Goldfinch			1	3
Lesser Nighthawk			3	
Loggerhead Shrike	1		7	16
MacGillivray's Warbler			2	
Mourning Dove	2		45	2

Common Name	Total # Birds Detected			
	Spring 2013	Fall 2013	Spring 2014	Fall 2014
Northern Flicker		1		4
Northern Harrier	2	23	32	3
Northern Rough-winged Swallow	2	11	6	4
Orange-crowned Warbler			1	6
Osprey		3	2	
Phainopepla			6	6
Prairie Falcon		9	10	2
Red-tailed Hawk	6	32	33	14
Red-winged Blackbird			100	
Rock Wren				15
Ruby-crowned Kinglet				3
Sage Sparrow (Unspecified)		1		3
Sandhill Crane			285	
Say's Phoebe		1		17
Sharp-shinned Hawk		5	3	3
Snowy Egret			42	
Swainson's Hawk	3	668	45	14
Tree Swallow	7	3	1618	
Turkey Vulture	22	1695	495	306
Unidentified Blackbird				32
Unidentified Empidonax Flycatcher			1	
Unidentified Hawk		104	82	4
Unidentified Hummingbird		1	9	
Unidentified Larus Gull			5	
Unidentified Sparrow		1	5	3
Unidentified Swallow	7	60	2646	381
Unidentified Warbler			5	7
Vaux's Swift		2	3	11
Verdin			6	23
Violet-green Swallow				154
Warbling Vireo			3	
Western Kingbird			16	
Western Meadowlark				26
Western Tanager			18	
White-crowned Sparrow				21
White-faced Ibis			12	
White-throated Swift	2		16	
White-winged Dove			547	1
Willow Flycatcher				1
Wilson's Warbler			5	4
Yellow Warbler			1	
Yellow-headed Blackbird			56	
Yellow-rumped Warbler		2	34	126

Table 4. Earliest and latest dates for most commonly detected species.

Common Name	Spring 2013		Fall 2013		Spring 2014		Fall 2014	
	Earliest Date	Latest Date	Earliest Date	Latest Date	Earliest Date	Latest Date	Earliest Date	Latest Date
Barn Swallow	*18-Apr-13	18-May-13	17-Sep-13	17-Oct-13	21-Apr-14	05-May-14	* 05-Sep-14	15-Oct-14
Horned Lark			12-Sep-13	08-Oct-13			11-Sep-14	10-Nov-14
Red-winged Blackbird					05-May-14	05-May-14		
Swainson's Hawk	02-May-13	28-May-13	17-Sep-13	08-Oct-13	24-Mar-14	15-May-14	* 05-Sep-14	13-Oct-14
Tree Swallow	*18-Apr-13	18-Apr-13	30-Oct-13	30-Oct-13	*05-Mar-14	05-May-14		
Turkey Vulture	*18-Apr-13	23-May-13	*02-Sep-13	*12-Nov-13	*05-Mar-14	*22-May-14	*05-Sep-14	08-Nov-14
White-winged Dove					21-Apr-14	*22-May-14	* 05-Sep-14	05-Sep-14
Violet-green Swallow							21-Sep-14	9-Oct-14
Yellow-rumped Warbler							6-Oct-14	15-Nov-14

*Indicates that this date corresponds to the earliest or latest date (respectively) of surveys for that particular season. In these cases, it is possible that we did not capture the true start or end of migration periods for that species.

3. Upland Bird Surveys

The purpose of Upland Bird Surveys is to depict avian use patterns at and adjacent to the proposed Project site. Data will provide information on:

- Sedentary and migratory populations
- Species richness (number of different species present)
- Species diversity (species richness combined with species evenness)
- Species use, behavior and movements
- Species distribution across the project

Qualified biologists conducted surveys from the spring of 2013 to the winter of 2014-15, not including the summer months, recording all species observed and documenting their site use. Surveyors followed a sampling model that implemented a line-transect survey methodology. The project-specific survey protocol is available in Appendix B.

Survey results will be used in the development of an avian risk characterization (illustrating species use and occurrence within the proposed Project Site) as part of the Project Bird and Bat Conservation Strategy (BBCS).

3.1. Line Transect Sampling

Line-transect sampling was conducted by traveling a predetermined route and recording all bird detections (visual or aural) on either side of the transect line. The distance a bird was detected from the transect line was estimated and recorded as an absolute measure. The observer scanned the sky as well as the surrounding habitat and recorded bird use and movement data under good weather conditions (i.e., good visibility, no sustained precipitation and average wind speeds less than 15 mph). Each line-transect was surveyed in an effort to capture species occurrences and temporal site use through the spring season. Surveys were timed to capture migrants, breeding birds and local residents.

Recorded information included:

- transect start time
- species identification
- number of birds seen
- flight height
- time of day
- horizontal distance (perpendicular) to line
- bearing from the transect line to the point of detection
- behavior during observation
- transect end time

A project-specific survey protocol was developed to ensure consistent data collection (Appendix B).

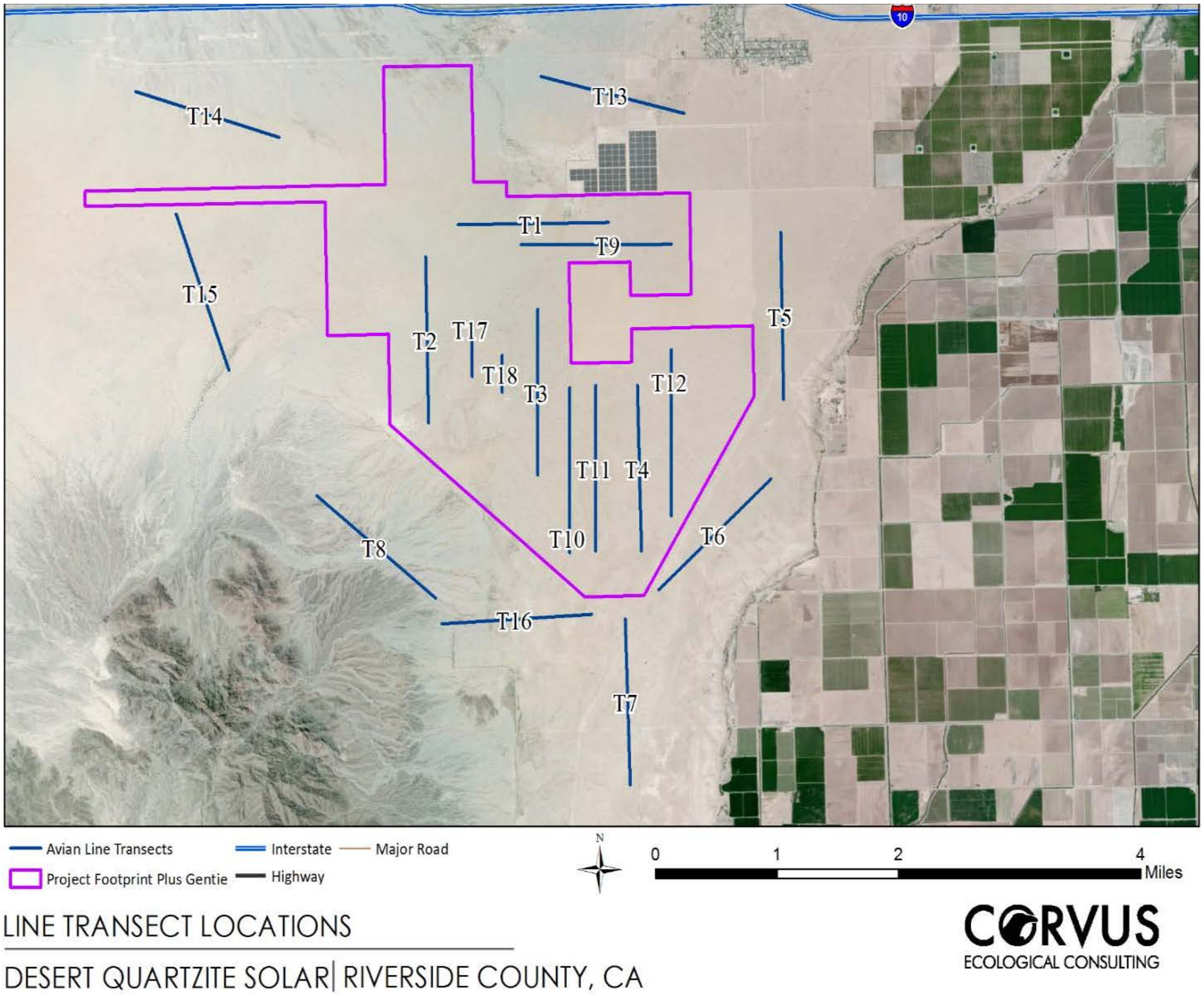
A total of eight 2000 meter long transects were established in spring 2013 and 8 more were added in fall of 2013 (Table 5). To facilitate robust data analysis, half (8) of the line-transects were situated within the Project footprint and half were located outside the project area on public lands with similar habitat composition. One transect of each subset samples microphyll woodland. The control to sample ratio is therefore; 1:1. In October of 2014, we were notified to begin surveying the small 162-acre in holding that was previously excluded from surveys (shown in Figure 1). Two shorter (500 m) transects were added in this area.

Table 5. Transect Beginning and End Points (A and B)

Transect ID	Site Name	Start Point		End Point	
		Easting	Northing	Easting	Northing
T1	Project Footprint	707,056	3,718,437	709,056	3,718,464
T2	Project Footprint	706,625	3,718,060	706,666	3,716,060
T3	Project Footprint	708,120	3,717,427	708,120	3,715,427
T4	Project Footprint	709,439	3,716,511	709,494	3,714,512
T5	Project Control	711,338	3,718,342	711,378	3,716,343
T6	Project Control	711,213	3,715,380	709,722	3,714,047
T7	Project Control	709,278	3,713,697	709,344	3,711,698
T8	Project Control	705,184	3,715,178	706,759	3,713,945
T9	Project Footprint	707,892	3,718,197	709,892	3,718,200
T10	Project Footprint	708,539	3,716,485	708,539	3,714,490
T11	Project Footprint	708,886	3,716,512	708,886	3,714,510
T12	Project Footprint	709,888	3,716,943	709,888	3,714,940
T13	Project Control	708,156	3,720,221	710,062	3,719,778
T14	Project Control	702,774	3,720,043	704,686	3,719,486
T15	Project Control	703,314	3,718,563	704,016	3,716,690
T16	Project Control	706,845	3,713,635	708,829	3,713,748
T17	Project Footprint	707,245	3,717,067	707,245	3,716,617
T18	Project Footprint	707,645	3,716,876	707,645	3,716,426

Transects within the project footprint, were aligned to promote continuity with post-construction surveys unimpeded by installed solar panel arrays (Figure 2). While transect locations may not be identical witin the Project footprint post-construction, the same distance (effort) can be covered between the varous phases.

To reduce temporal bias, transects randomized with respect to order performed and also at which end to start for each survey. At least three visits per transect per season were used in analysis (Table 6).


10
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T10
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T8
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Avian Line Transects
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Miles
LINE TRANSECT LOCATIONS
DESERT QUARTZITE SOLAR| RIVERSIDE COUNTY, CA
CORVUS
ECOLOGICAL CONSULTING

Figure 3. Quartzite Line-transect Locations, Fall 2013 to Winter 2014-15

Table 6. Summary of Line Transect Surveys Conducted April 2013 through February 2015

Transect ID	Start Point	Visit Date	Observer	Start Time	End Time	Start Point	Visit Date	Observer	Start Time	End Time
T1	B	4/18/2013	John Yerger	6:39 AM	7:43 AM	B	3/24/2014	Roger Radd	7:17 AM	8:46 AM
	A	4/28/2013	Roger Radd	6:45 AM	7:40 AM	A	4/21/2014	Roger Radd	7:07 AM	8:36 AM
	B	5/2/2013	Roger Radd	6:16 AM	7:09 AM	B	5/9/2014	Roger Radd	6:06 AM	7:37 AM
	B	9/2/2013	Roger Radd	6:29 AM	7:59 AM	A	9/11/2014	Erin Lockward	6:43 AM	7:07 AM
	A	10/4/2013	Roger Radd	7:12 AM	8:38 AM	B	10/2/2014	Erin Lockward	9:53 AM	10:15 AM
	A	11/7/2013	Roger Radd	6:55 AM	8:47 AM	A	11/6/2014	Erin Lockward	6:25 AM	6:51 AM
	A	12/2/2013	Roger Radd	7:09 AM	8:55 AM	B	12/11/2014	Erin Lockward	8:19 AM	8:56 AM
	B	1/6/2014	Roger Radd	7:07 AM	8:58 AM	A	1/27/2015	Erin Lockward	8:56 AM	9:41 AM
	B	2/3/2014	Roger Radd	7:11 AM	9:09 AM	B	2/5/2015	Erin Lockward	9:41 AM	10:20 AM
T2	A	4/19/2013	John Yerger	6:28 AM	7:32 AM	A	3/26/2014	Roger Radd	7:25 AM	8:43 AM
	A	5/2/2013	Roger Radd	7:25 AM	8:06 AM	B	4/28/2014	Roger Radd	12:13 PM	1:35 PM
	A	5/24/2013	Roger Radd	9:21 AM	10:37 AM	A	5/15/2014	Roger Radd	6:06 AM	7:29 AM
	A	10/2/2013	Roger Radd	7:04 AM	8:36 AM	A	9/12/2014	Erin Lockward	10:40 AM	10:59 AM
	B	10/16/2013	Roger Radd	2:52 PM	4:08 PM	B	10/3/2014	Erin Lockward	8:40 AM	8:58 AM
	A	11/11/2013	Roger Radd	7:22 AM	9:08 AM	A	11/7/2014	Erin Lockward	9:36 AM	10:02 AM
	B	12/3/2013	Roger Radd	10:10 AM	11:52 AM	A	12/6/2014	Erin Lockward	8:05 AM	8:46 AM
	A	1/8/2014	Roger Radd	10:39 AM	12:29 PM	B	1/28/2015	Erin Lockward	10:03 AM	10:47 AM
	A	2/7/2014	Roger Radd	2:06 PM	3:54 PM	A	2/12/2015	Erin Lockward	8:08 AM	8:43 AM
T3	B	4/19/2013	John Yerger	8:21 AM	9:20 AM	A	3/17/2014	Roger Radd	7:44 AM	9:17 AM
	A	4/28/2013	Roger Radd	8:32 AM	9:30 AM	B	5/2/2014	Roger Radd	10:45 AM	12:08 PM
	A	5/23/2013	Roger Radd	6:15 AM	7:22 AM	A	5/9/2014	Roger Radd	9:46 AM	10:52 AM
	A	9/3/2013	Roger Radd	6:23 AM	7:50 AM	A	9/12/2014	Erin Lockward	7:10 AM	7:40 AM
	B	10/10/2013	Roger Radd	1:11 PM	2:28 PM	B	10/3/2014	Erin Lockward	7:38 AM	8:12 AM
	A	11/12/2013	Roger Radd	7:03 AM	8:53 AM	A	11/7/2014	Erin Lockward	8:08 AM	8:32 AM
	B	12/6/2013	Roger Radd	10:43 AM	12:12 PM	A	12/5/2014	Erin Lockward	11:02 AM	11:50 AM
	A	1/7/2014	Roger Radd	7:18 AM	9:08 AM	A	1/20/2015	Erin Lockward	8:03 AM	9:37 AM
	B	2/3/2014	Roger Radd	1:42 PM	3:30 PM	B	2/6/2015	Erin Lockward	7:23 AM	8:07 AM
T4	B	4/22/2013	Roger Radd	9:45 AM	10:48 AM	A	3/25/2014	Roger Radd	7:20 AM	8:48 AM
	B	5/10/2013	Roger Radd	7:12 AM	8:13 AM	A	4/28/2014	Roger Radd	6:52 AM	8:18 AM
	A	5/23/2013	Roger Radd	8:33 AM	9:35 AM	B	5/22/2014	Roger Radd	6:55 AM	8:21 AM
	A	9/13/2013	Roger Radd	6:34 AM	8:24 AM	B	9/11/2014	Erin Lockward	7:38 AM	8:01 AM
	B	10/3/2013	Roger Radd	7:19 AM	9:22 AM	A	10/2/2014	Erin Lockward	9:14 AM	9:36 AM
	A	11/7/2013	Roger Radd	10:14 AM	11:59 AM	B	11/6/2014	Erin Lockward	7:10 AM	7:32 AM
	B	12/2/2013	Roger Radd	1:38 PM	3:24 PM	A	12/12/2014	Erin Lockward	7:18 AM	7:59 AM
	A	1/6/2014	Roger Radd	10:18 AM	12:09 PM	B	1/27/2015	Erin Lockward	11:05 AM	11:47 AM
	B	2/13/2014	Roger Radd	10:57 AM	12:45 PM	A	2/6/2015	Erin Lockward	10:11 AM	10:59 AM
T5	A	4/22/2013	Roger Radd	6:30 AM	7:38 AM	A	3/10/2014	Roger Radd	7:45 AM	9:19 AM
	B	5/3/2013	Roger Radd	6:50 AM	7:56 AM	B	4/23/2014	Roger Radd	7:05 AM	8:30 AM
	B	5/20/2013	Roger Radd	6:22 AM	7:33 AM	A	5/5/2014	Roger Radd	6:48 AM	8:21 AM
	A	9/17/2013	Roger Radd	6:33 AM	8:27 AM	A	9/18/2014	Erin Lockward	10:16 AM	10:38 AM

Transect ID	Start Point	Visit Date	Observer	Start Time	End Time	Start Point	Visit Date	Observer	Start Time	End Time
	B	10/10/2013	Roger Radd	7:02 AM	8:52 AM	A	10/9/2014	Erin Lockward	10:41 AM	11:03 AM
	A	11/4/2013	Roger Radd	6:56 AM	8:50 AM	B	11/8/2014	Erin Lockward	9:02 AM	9:32 AM
	B	12/2/2013	Roger Radd	10:29 AM	12:20 PM	A	12/5/2014	Erin Lockward	9:23 AM	10:18 AM
	A	1/7/2014	Roger Radd	10:39 AM	12:26 PM	B	1/29/2015	Erin Lockward	9:09 AM	9:49 AM
	B	2/4/2014	Roger Radd	2:05 PM	3:53 PM	A	2/3/2015	Erin Lockward	10:04 AM	10:48 AM
T6	B	4/22/2013	Roger Radd	8:15 AM	9:19 AM	A	3/7/2014	Roger Radd	9:28 AM	10:53 AM
	A	5/3/2013	Roger Radd	8:58 AM	9:44 AM	B	4/3/2014	Roger Radd	7:40 AM	9:17 AM
	A	5/20/2013	Roger Radd	8:43 AM	9:50 AM	A	5/8/2014	Roger Radd	6:55 AM	8:27 AM
	A	9/15/2013	Roger Radd	6:40 AM	8:31 AM	B	9/18/2014	Erin Lockward	7:03 AM	8:11 AM
	B	10/7/2013	Roger Radd	7:14 AM	9:01 AM	A	10/9/2014	Erin Lockward	7:08 AM	8:02 AM
	A	11/5/2013	Roger Radd	6:49 AM	8:38 AM	B	11/8/2014	Erin Lockward	6:44 AM	7:13 AM
	B	12/3/2013	Roger Radd	6:55 AM	8:46 AM	B	12/7/2014	Erin Lockward	8:06 AM	8:40 AM
	A	1/8/2014	Roger Radd	7:22 AM	9:13 AM	A	1/25/2015	Erin Lockward	7:50 AM	8:45 AM
	B	2/3/2014	Roger Radd	10:26 AM	12:17 PM	A	2/12/2015	Erin Lockward	10:14 AM	11:03 AM
T7	A	4/26/2013	Roger Radd	6:45 AM	7:35 AM	B	3/19/2014	Roger Radd	12:55 PM	2:06 PM
	B	5/6/2013	Roger Radd	6:50 AM	7:52 AM	A	4/24/2014	Roger Radd	12:03 PM	1:25 PM
	A	5/22/2013	Roger Radd	8:52 AM	9:45 AM	B	5/13/2014	Roger Radd	6:24 AM	7:49 AM
	B	9/15/2013	Roger Radd	9:51 AM	11:26 AM	A	9/20/2014	Erin Lockward	7:07 AM	7:50 AM
	B	10/10/2013	Roger Radd	10:00 AM	11:25 AM	B	10/10/2014	Erin Lockward	8:57 AM	9:33 AM
	A	11/7/2013	Roger Radd	1:34 PM	2:54 PM	A	11/9/2014	Erin Lockward	6:23 AM	6:52 AM
	B	12/3/2013	Roger Radd	1:22 PM	3:02 PM	A	12/7/2014	Erin Lockward	9:22 AM	10:05 AM
	A	1/7/2014	Roger Radd	1:53 PM	3:30 PM	A	1/24/2015	Erin Lockward	9:20 AM	10:12 AM
	B	2/10/2014	Roger Radd	10:16 AM	12:01 PM	A	2/19/2015	Erin Lockward	7:08 AM	7:51 AM
T8	B	4/25/2013	Roger Radd	7:08 AM	8:18 AM	A	3/11/2014	Roger Radd	7:42 AM	9:16 AM
	B	5/4/2013	Roger Radd	6:37 AM	7:42 AM	B	4/23/2014	Roger Radd	12:19 PM	1:37 PM
	A	5/22/2013	Roger Radd	6:24 AM	8:14 AM	A	5/16/2014	Roger Radd	6:27 AM	7:53 AM
	B	9/4/2013	Roger Radd	6:50 AM	8:12 AM	B	9/20/2014	Erin Lockward	9:12 AM	9:44 AM
	A	10/8/2013	Roger Radd	7:19 AM	8:58 AM	A	10/10/2014	Erin Lockward	11:37 AM	11:58 AM
	A	11/6/2013	Roger Radd	7:21 AM	8:58 AM	B	11/9/2014	Erin Lockward	8:32 AM	8:52 AM
	B	12/6/2013	Roger Radd	7:26 AM	9:19 AM	B	12/12/2014	Erin Lockward	9:15 AM	10:07 AM
	A	1/6/2014	Roger Radd	1:56 PM	3:44 PM	A	1/20/2015	Erin Lockward	10:45 AM	11:26 AM
	A	2/4/2014	Roger Radd	10:54 AM	12:46 PM	B	2/5/2015	Erin Lockward	7:40 AM	8:36 AM
T9						B	3/19/2014	Roger Radd	7:29 AM	9:05 AM
						A	4/24/2014	Roger Radd	9:42 AM	11:12 AM
						B	5/14/2014	Roger Radd	5:58 AM	7:17 AM
	B	9/24/2013	Roger Radd	7:04 AM	8:44 AM	A	9/28/2014	Erin Lockward	7:57 AM	8:23 AM
	A	10/21/2013	Roger Radd	7:31 AM	9:21 AM	B	10/25/2014	Erin Lockward	8:34 AM	8:56 AM
	B	11/19/2013	Roger Radd	10:03 AM	11:59 AM	A	11/17/2014	Erin Lockward	8:00 AM	8:19 AM
	A	12/11/2013	Roger Radd	2:10 PM	3:40 PM	A	12/11/2014	Erin Lockward	9:12 AM	9:46 AM
	B	1/15/2014	Roger Radd	7:16 AM	9:07 AM	B	1/27/2015	Erin Lockward	7:56 AM	8:37 AM
	B	2/13/2014	Roger Radd	2:14 PM	4:01 PM	A	2/5/2015	Erin Lockward	10:36 AM	11:18 AM

Transect ID	Start Point	Visit Date	Observer	Start Time	End Time	Start Point	Visit Date	Observer	Start Time	End Time
T10	A	9/23/2013	Roger Radd	6:47 AM	8:21 AM	A	9/27/2014	Erin Lockward	9:39 AM	10:04 AM
	B	10/16/2013	Roger Radd	10:20 AM	11:42 AM	B	10/14/2014	Brooks Hart	8:22 AM	9:02 AM
	A	11/19/2013	Roger Radd	6:58 AM	8:47 AM	A	11/15/2014	Erin Lockward	9:40 AM	9:58 AM
	B	12/9/2013	Roger Radd	7:14 AM	8:55 AM	A	12/11/2014	Erin Lockward	7:00 AM	7:44 AM
	A	1/15/2014	Roger Radd	2:16 PM	4:00 PM	A	1/28/2015	Erin Lockward	11:27 AM	12:02 PM
	B	2/7/2014	Roger Radd	7:26 AM	9:20 AM	B	2/11/2015	Erin Lockward	7:36 AM	8:11 AM
T11						B	3/26/2014	Roger Radd	9:56 AM	11:33 AM
						A	5/2/2014	Roger Radd	6:37 AM	8:09 AM
						B	5/15/2014	Roger Radd	8:27 AM	9:38 AM
	A	9/19/2013	Roger Radd	6:49 AM	8:33 AM	A	9/27/2014	Erin Lockward	7:50 AM	8:07 AM
	B	10/23/2013	Roger Radd	7:28 AM	9:26 AM	B	10/16/2014	Brooks Hart	9:50 AM	10:22 AM
	A	11/21/2013	Roger Radd	10:12 AM	12:02 PM	A	11/15/2014	Erin Lockward	8:10 AM	8:30 AM
	A	12/10/2013	Roger Radd	2:19 PM	3:52 PM	A	12/7/2014	Erin Lockward	10:58 AM	11:42 AM
	A	1/16/2014	Roger Radd	2:07 PM	3:53 PM	B	1/29/2015	Erin Lockward	7:14 AM	7:56 AM
	B	2/4/2014	Roger Radd	7:22 AM	9:16 AM	A	2/10/2015	Erin Lockward	11:23 AM	12:00 PM
T12						B	3/18/2014	Roger Radd	10:20 AM	11:44 AM
						A	4/23/2014	Roger Radd	9:17 AM	10:35 AM
						B	5/8/2014	Roger Radd	8:51 AM	10:09 AM
	B	9/25/2013	Roger Radd	6:52 AM	7:49 AM	A	9/28/2014	Erin Lockward	9:39 AM	10:04 AM
	A	10/17/2013	Roger Radd	7:10 AM	8:56 AM	B	10/25/2014	Erin Lockward	9:56 AM	10:19 AM
	B	11/20/2013	Roger Radd	7:05 AM	8:52 AM	A	11/17/2014	Erin Lockward	6:42 AM	7:08 AM
	A	12/11/2013	Roger Radd	7:06 AM	8:55 AM	A	12/11/2014	Erin Lockward	10:38 AM	11:17 AM
	B	1/16/2014	Roger Radd	7:26 AM	9:17 AM	B	1/28/2015	Erin Lockward	7:54 AM	8:42 AM
	A	2/10/2014	Roger Radd	6:58 AM	8:48 AM	B	2/6/2015	Erin Lockward	9:20 AM	9:58 AM
T13						B	3/6/2014	Roger Radd	6:57 AM	7:44 AM
						B	4/24/2014	Roger Radd	7:11 AM	8:39 AM
						B	5/14/2014	Roger Radd	8:00 AM	9:21 AM
	B	9/25/2013	Roger Radd	10:24 AM	11:26 AM					
	A	10/29/2013	Roger Radd	7:40 AM	9:22 AM					
	B	11/21/2013	Roger Radd	1:11 PM	2:55 PM					
	A	12/10/2013	Roger Radd	7:12 AM	9:12 AM	B	12/5/2014	Erin Lockward	7:33 AM	8:26 AM
	B	1/9/2014	Roger Radd	2:20 PM	4:09 PM	A	1/29/2015	Erin Lockward	10:02 AM	11:41 AM
	B	2/7/2014	Roger Radd	10:37 AM	12:24 PM	B	2/3/2015	Erin Lockward	7:45 AM	8:40 AM
T14						B	3/20/2014	Roger Radd	7:53 AM	9:42 AM
						A	4/22/2014	Roger Radd	6:59 AM	8:36 AM
						B	5/7/2014	Roger Radd	6:41 AM	8:12 AM
	B	9/19/2013	Roger Radd	10:36 AM	11:52 AM					
	A	10/30/2013	Roger Radd	7:44 AM	9:34 AM					
	B	11/19/2013	Roger Radd	2:09 PM	3:37 PM					
	A	12/9/2013	Roger Radd	2:12 PM	3:50 PM	B	12/6/2014	Erin Lockward	9:44 AM	10:42 AM

Transect ID	Start Point	Visit Date	Observer	Start Time	End Time	Start Point	Visit Date	Observer	Start Time	End Time
	B	1/30/2014	Roger Radd	1:30 PM	3:22 PM	A	1/25/2015	Erin Lockward	11:36 AM	12:27 PM
	A	2/10/2014	Roger Radd	2:20 PM	4:07 PM	B	2/10/2015	Erin Lockward	7:45 AM	8:46 AM
T15						B	3/5/2014	Roger Radd	6:54 AM	8:43 AM
						A	4/1/2014	Roger Radd	7:47 AM	9:21 AM
						B	5/20/2014	Roger Radd	6:28 AM	7:37 AM
	B	9/13/2013	Roger Radd	6:33 AM	7:57 AM					
	A	10/16/2013	Roger Radd	7:39 AM	9:07 AM					
	B	11/20/2013	Roger Radd	11:32 AM	1:17 PM					
	A	12/10/2013	Roger Radd	10:57 AM	12:40 PM	A	12/7/2014	Erin Lockward	6:46 AM	7:27 AM
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	A	2/14/2014	Roger Radd	2:04 PM	3:50 PM	A	2/10/2015	Erin Lockward	10:00 AM	10:36 AM
T16						B	3/17/2014	Roger Radd	7:43 AM	9:17 AM
						A	4/28/2014	Roger Radd	9:22 AM	10:49 AM
						B	5/27/2014	Roger Radd	6:25 AM	7:44 AM
	B	9/18/2013	Roger Radd	6:39 AM	8:27 AM					
	B	10/15/2013	Roger Radd	7:23 AM	9:15 AM					
	A	11/21/2013	Roger Radd	7:17 AM	8:56 AM					
	B	12/11/2013	Roger Radd	10:40 AM	12:26 PM	B	12/12/2014	Erin Lockward	8:33 AM	9:09 AM
	A	1/16/2014	Roger Radd	10:57 AM	12:44 PM	A	1/24/2015	Erin Lockward	7:40 AM	8:18 AM
	A	2/13/2014	Roger Radd	7:00 AM	8:50 AM	B	2/3/2015	Erin Lockward	11:17 AM	12:02 PM
T17	B	12/6/2014	Erin Lockward	7:14 AM	7:26 AM					
	A	1/20/2015	Erin Lockward	9:15 AM	9:25 AM					
	A	2/12/2015	Erin Lockward	7:11 AM	7:30 AM					
T18	A	12/6/2014	Erin Lockward	6:53 AM	7:06 AM					
	A	1/20/2015	Erin Lockward	8:56 AM	9:04 AM					
	A	2/6/2015	Erin Lockward	6:47 AM	6:58 AM					

A total of 3534 detections were made during the 345 surveys with 17,973 total birds sighted. To maintain consistency with regards to the number of transects sampled per season, we took a random subsample of the data to use in analysis. Fitting a model to estimate density at times also requires use of data truncation. The final subsample contained data from 259 transects, 2253 detections and 16507 birds (Table 7). We used Program Distance (Thomas et al. 2010) to conduct a preliminary analysis and determine a total density of birds on versus off project (Table 7).

Table 7. Preliminary Analysis of Avian Line Transect Results Spring 2013 -- Winter 2014-15

Season / Year	**# Detections**	**Estimated Density of Birds (Per Ha)**		**Estimated Density of Clusters (Per Ha)**		**Expected Cluster Size**		**Estimated # of Birds**		**Total # Species**	
		Control	**Footprint**	**Control**	**Footprint**	**Control**	**Footprint**	**Control**	**Footprint**	**Control**	**Footprint**
Spring – 2013	119	.30	.18	0.19	0.08	1.62	2.25	2117	348	25	17
Fall – 2013	688	1.39	1.07	0.33	0.25	4.22	4.23	9429	2106	56	43
Winter – 2013-14	460	1.12	0.4	0.31	0.12	3.6	3.3	7614	790	37	21
Spring – 2014	495	0.4	2.18	0.19	0.52	2.12	4.2	2747	4287	47	42
Fall – 2014	211	0.14	0.13	0.07	0.04	2.03	3.22	937	266	18	15
Winter – 2014-15	283	0.2	0.15	0.09	0.07	2.15	2.32	1355	304	19	16

4. Sensitive Species / Species Specific Surveys

4.1 Burrowing Owl (*Athene cunicularia*) Surveys

Burrowing Owls typically inhabit open areas with scattered vegetation and friable soils, including agricultural areas. The dominant vegetative community within the project site - sparsely-vegetated, upland creosote scrub - provides suitable habitat for Burrowing Owls.

4.1.1 Presence/ Absence Surveys and Assessment of Site Use

Burrowing Owl surveys were conducted across all portions of the project site and within a 150-meter buffer of the proposed Project Site (Figure 4), in an effort to assess occupancy, abundance, site use and distribution. Wildlife crews surveyed the entire proposed project footprint between 22 October 2012 and 15 April 2013, walking belt transects with 10 meter spacing. Surveys within the 150-meter buffer were conducted between 14 and 17 May 2013, by walking straight-line belt transects spaced no more than 30-meters apart, adjusting for vegetation height and density (Rosenberg et al. 2007).

Additional surveys were conducted during the spring of 2014. Burrowing Owls surveys conducted during 2014 followed a project-specific protocol which incorporates agency (*Staff Report on Burrowing Owl Mitigation*; CDFG 2012) and resource-specific guidance *(Burrowing Owl Survey Protocol and Mitigation Guidelines*; CBOC 1993) to achieve management goals and effectively assess potential impacts. This project-specific Burrowing Owl Survey Protocol is included as Appendix C. From April 4th 2014 through April 16th 2014, a Burrowing Owl specific survey crew conducted comprehensive pedestrian belt transects spaced 7-20 meters, within suitable habitat (Figure 4). Follow-up surveys focused at confirming occupancy and determining site use and breeding success were conducted between May 6th and June 12th 2014.

During each of these survey efforts, at the start of each transect and at least every 100 meters, survey crews scanned the entire visible project area for Burrowing Owls using binoculars. Some Burrowing Owls may be detected by their calls, so observers listened for Burrowing Owls while conducting the survey. Care was taken to minimize disturbance near occupied burrows during all seasons and not to "flush" Burrowing Owls from their burrows.

All Burrowing Owl sightings and burrows with Burrowing Owl sign (including: whitewash, tracks, pellets, feathers) were mapped and recorded using standardized data forms that include Pendragon mobile data management software and backup paper data sheets. Any burrow with associated Burrowing Owl sign was ranked by class (1-4) depending on the age and type of sign present. Burrow Class:

1=Excellent	(Usable burrow with BUOW present)
2 = Good	(Usable burrow, fresh sign but no BUOW present)
3 = Fair	(Usable burrow, inactive with old sign, no BUOW present)
4 = Poor	(Inactive burrow, no BUOW sign)

4.1.2 Burrowing Owl Presence/ Absence Survey Results

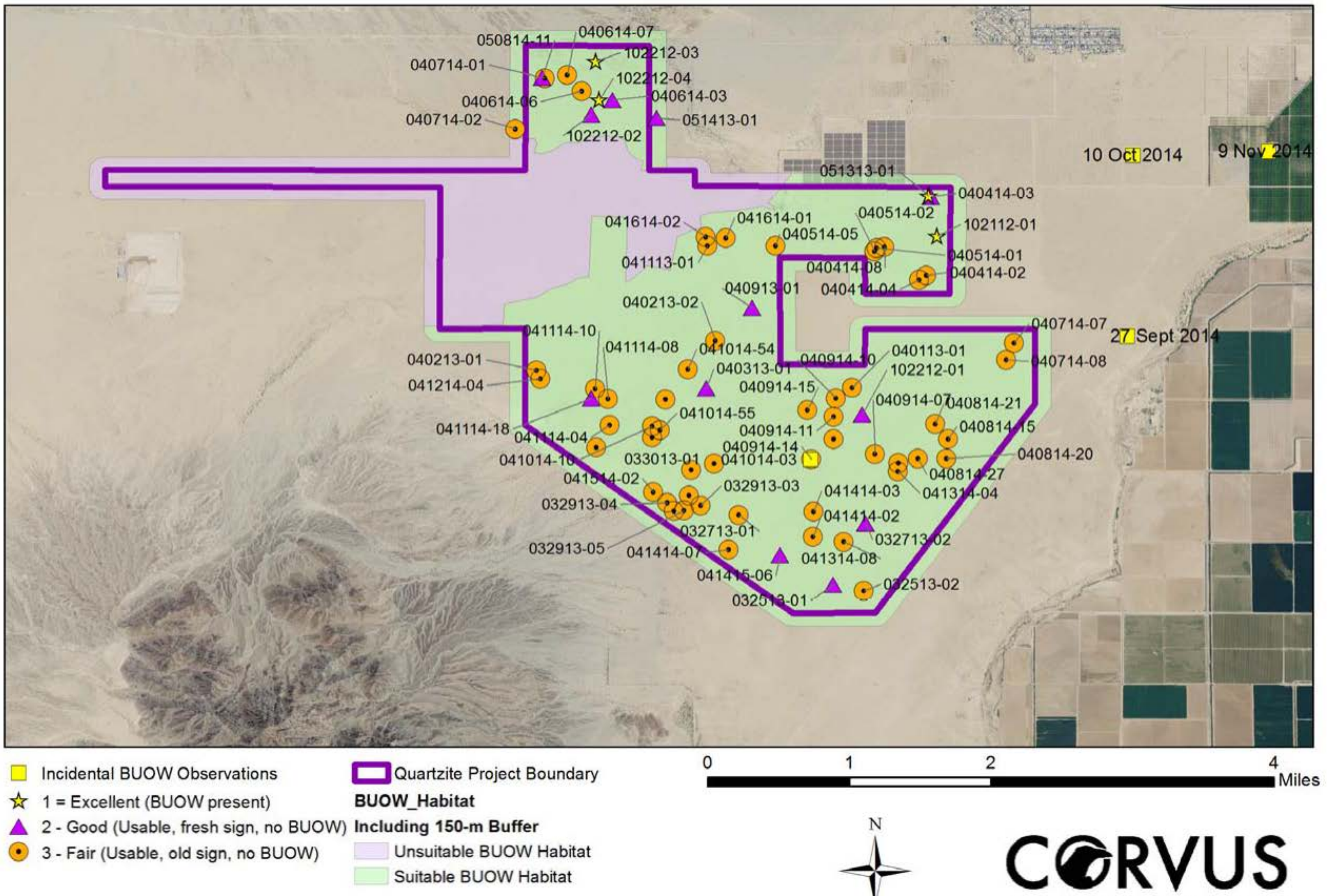
During Fall 2012, Spring 2013, and Spring 2014, 70 burrows ranked Class 1, Class 2 and Class 3 were detected within the Project footprint. However, Burrowing Owls were only detected at four burrows during breeding season surveys between 2013 and 2014. A single burrow within the 150-meter buffer indicated recent Burrowing Owl occupation/ use (Table 8 and Figure 4).

Table 8. Burrowing Owl Phase II Results from Fall 2012 and Spring 2013 and 2014

Waypoint ID	Date	Easting	Northing	Initial Class	Initial Sign
QZBOB-102112-01	10/21/2012	710018	3718263	1	Feathers; Tracks; Live Bird
QZBOB-102212-04	10/22/2012	706779	3719734	1	Feathers; Pellets; Tracks; Whitewash; Live Bird
QZBOB-102212-01	10/22/2012	709353	3716229	2	Feathers; Tracks; Whitewash
QZBOB-102212-02	10/22/2012	706710	3719571	2	Feathers; Pellets; Whitewash
QZBOB-102212-03	10/22/2012	706738	3720171	1	Pellets; Whitewash; Live Bird
QZBOB-032513-02	3/25/2013	709413	3714225	3	Whitewash
QZBOB-032513-01	3/25/2013	709118	3714288	2	Pellets; Whitewash
QZBOB-032713-01	3/27/2013	708204	3715061	3	Pellets; Whitewash
QZBOB-032713-02	3/27/2013	709410	3714989	2	Whitewash
QZBOB-032913-05	3/29/2013	707686	3715098	3	Pellets
QZBOB-032913-01	3/29/2013	707729	3715275	3	Pellets; Whitewash
QZBOB-032913-02	3/29/2013	707587	3715092	3	Pellets; Whitewash
QZBOB-032913-03	3/29/2013	707844	3715163	3	Whitewash
QZBOB-032913-04	3/29/2013	707522	3715184	3	Whitewash
QZBOB-033013-01	3/30/2013	707744	3715561	3	Whitewash
QZBOB-033013-03	3/30/2013	706837	3715796	3	Whitewash
QZBOB-033013-02	3/30/2013	707366	3715923	3	Whitewash
QZBOB-040113-01	4/1/2013	709249	3716527	3	Whitewash
QZBOB-040213-02	4/2/2013	707940	3717034	3	Whitewash
QZBOB-040213-01	4/2/2013	706253	3716657	3	Pellets; Whitewash

Waypoint ID	Date	Easting	Northing	Initial Class	Initial Sign
QZBOB-040313-01	4/3/2013	707869	3716491	2	Pellets; Whitewash
QZBOB-040413-01	4/4/2013	709711	3715680	3	Pellets; Whitewash
QZBOB-040913-01	4/9/2013	708282	3717411	2	Feathers; Pellets; Whitewash
QZBOB-041113-01	4/11/2013	707843	3718107	3	Whitewash
QZBOB-051313-01	5/13/2013	709927	3718713	1	Feathers; Pellets; Tracks; Whitewash; Live Bird
QZBOB-051413-01	5/14/2013	707327	3719545	2	Pellets
QZBOB-040414-03	4/4/2014	709952	3718707	2	Feathers; Pellets; Tracks; Whitewash; Other
QZBOB-040414-02	4/4/2014	709929	3717818	3	Pellets
QZBOB-040414-04	4/4/2014	709861	3717766	3	Whitewash
QZBOB-040414-08	4/4/2014	709525	3718129	3	Whitewash
QZBOB-040514-01	4/5/2014	709449	3718117	3	Whitewash; Pellets
QZBOB-040514-02	4/5/2014	709427	3718080	3	Whitewash
QZBOB-040514-05	4/5/2014	708488	3718121	3	Feathers; Whitewash
QZBOB-040614-07	4/6/2014	706469	3720013	3	Feathers; Whitewash
QZBOB-040614-03	4/6/2014	706908	3719741	2	Pellets; Whitewash
QZBOB-040614-06	4/6/2014	706614	3719837	3	Feathers; Whitewash
QZBOB-040714-02	4/7/2014	705989	3719389	3	Pellets; Whitewash
QZBOB-040714-01	4/7/2014	706259	3719971	3	Pellets; Whitewash
QZBOB-040714-07	4/7/2014	710776	3717068	3	Whitewash
QZBOB-040714-08	4/7/2014	710704	3716874	3	Whitewash
QZBOB-040814-21	4/8/2014	710050	3716134	3	Pellets; Whitewash
QZBOB-040814-15	4/8/2014	710176	3715963	3	Whitewash
QZBOB-040814-20	4/8/2014	710164	3715745	3	Whitewash
QZBOB-040814-27	4/8/2014	709893	3715738	3	Whitewash
QZBOB-040914-14	4/9/2014	708881	3715711	3	Pellets; Whitewash
QZBOB-040914-12	4/9/2014	709090	3715939	3	Whitewash
QZBOB-040914-10	4/9/2014	709098	3716406	3	Whitewash
QZBOB-040914-15	4/9/2014	708829	3716265	3	Pellets; Whitewash
QZBOB-040914-07	4/9/2014	709482	3715782	3	Whitewash
QZBOB-040914-11	4/9/2014	709081	3716193	3	Whitewash
QZBOB-041014-09	4/10/2014	707484	3716355	3	Whitewash
QZBOB-041014-03	4/10/2014	707960	3715637	3	Whitewash
QZBOB-041014-55	4/10/2014	707438	3716008	3	Pellets; Whitewash
QZBOB-041014-54	4/10/2014	707688	3716701	3	Feathers
QZBOB-041014-10	4/10/2014	707362	3716048	3	Feathers; Pellets; Whitewash
QZBOB-041114-18	4/11/2014	706779	3716354	2	Pellets; Whitewash
QZBOB-041114-04	4/11/2014	706956	3716052	3	Whitewash
QZBOB-041114-08	4/11/2014	706938	3716348	3	Whitewash

Waypoint ID	Date	Easting	Northing	Initial Class	Initial Sign
QZBOB-041114-10	4/11/2014	706810	3716464	3	Whitewash
QZBOB-041214-04	4/12/2014	706290	3716568	3	Whitewash
QZBOB-041314-04	4/13/2014	709707	3715588	3	Whitewash
QZBOB-041314-08	4/13/2014	709209	3714776	3	Feathers
QZBOB-041414-03	4/14/2014	708913	3715117	3	Pellets; Whitewash
QZBOB-041415-06	4/14/2014	708606	3714616	2	Whitewash
QZBOB-041414-07	4/14/2014	708118	3714668	3	Whitewash
QZBOB-041414-02	4/14/2014	708913	3714829	3	Feathers
QZBOB-041514-02	4/15/2014	707388	3715300	3	Whitewash
QZBOB-041614-02	4/16/2014	707822	3718205	3	Whitewash
QZBOB-041614-01	4/16/2014	708016	3718197	3	
QZBOB-050814-11	5/8/2014	706234	3719976	2	Whitewash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040714-01
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040614-06
040614-03
040714-02
051413-01
102212-02
10 Oct 2014
9 Nov 2014
051313-01
040414-03
041614-02
041614-01
040514-02
102112-01
040514-05
041113-01
040514-01
040414-08
040414-02
040913-01
040414-04
040213-02
040714-07
041114-10
27 Sept 2014
041114-08
041014-54
040113-01
040213-01
040914-10
040714-08
040313-01
102212-01
041214-04
040914-15
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041414-03
041314-04
032913-03
032913-04
041414-02
032713-01
032713-02
032913-05
041414-07
041314-08
041415-06
032513-02
032513-01
Incidental BUOW Observations
1 = Excellent (BUOW present)
2 - Good (Usable, fresh sign, no BUOW)
3 - Fair (Usable, old sign, no BUOW)
Quartzite Project Boundary
BUOW_Habitat
Including 150-m Buffer
Unsuitable BUOW Habitat
Suitable BUOW Habitat
0
1
2
4
Miles
N
CORVUS
ECOLOGICAL CONSULTING

BURROWING OWL CLASS 1-3 BURROWS

QUARTZITE SOLAR | RIVERSIDE COUNTY, CALIFORNIA

Figure 4. Phase II Class 1-3 Burrows 2014

4.1.3 Assessment of Burrowing Owl Occupancy and Site Use Methods and Results

In addition to comprehensive presence/ absence site surveys and a burrow inventory (Phase II surveys), extended observational monitoring (Phase III) was conducted per the, Staff Report on Burrowing Owl Mitigation (CDFG, 2012). Observational efforts were conducted from as many fixed points as necessary to provide full visual coverage using spotting scopes and binoculars.

Phase III surveys were conducted at every burrow recorded as a Class 1, Class 2 or Class 3 (Table 8). In 2013 these follow-up surveys consisted of 3-hour visits to each burrow that ranked Class 3 or better. In 2014 follow-up surveys followed a modified routine included in the Project-specific protocol (Appendix C). Follow-up visits conducted during 2014 were performed during the intervals: 4-16 April, 6-12 May, 26-28 May and 2 June. During all follow-up efforts, observers recorded each burrow's current status and condition, and visually searched the surrounding area for live owls. In February 2015, biologists re-visited all Class 1 and 2 burrows as well as any locations where adult Burrowing Owls had incidentally been reported.

During the fall 2013, comprehensive site surveys documented live owls at three burrows prior to the breeding season. However, all three of these burrows were determined vacant during follow-up surveys. One previously active burrow was collapsed and no longer serviceable without re-excavation, another was an active kit fox den, and the third appeared to have been re-excavated and potentially occupied by a coyote.

Occupancy use surveys conducted during the breeding season of 2013 documented live owls at 2 burrows. One of these burrows was potentially occupied during Phase II surveys (Class 2), the other was a previously undocumented rodent burrow. Burrowing owls occupying burrows during the breeding season were monitored in an attempt to determine territorial boundaries and home ranges. We did not detect any positive identification of young at either burrow in 2013.

No live burrowing owls were detected during the occupancy use surveys in 2014. A comprehensive chronology of burrow class for burrows initially identified as Class 3 or better can be found in Table 9.

Burrowing owls were incidentally reported in or around the project site on 4 occasions from 27 September 2014 to 6 February 2015. Only 1 of these detections (made during the winter 2015 follow-up visit) was within the project boundary (Figure 4).

Table 9. Comprehensive Chronology of Burrowing Owl Burrows on Quartzite 2013-2014. Observations in gray indicate 2013.

Waypoint ID	Detection Date	Initial Class	Observation Class	Observation Date	# Adults
QZBOB-032513-01	3/25/2013	2	4	5/30/2013	0
			4	4/13/2014	0
QZBOB-032513-02	3/25/2013	3	3	5/30/2013	0
			3	6/21/2013	0
			3	7/14/2013	0
			4	4/13/2014	0
QZBOB-032713-01	3/27/2013	3	3	5/31/2013	0
			3	6/19/2013	0
			2	4/14/2014	0

Waypoint ID	Detection Date	Initial Class	Observation Class	Observation Date	# Adults
			2	5/9/2014	0
			4	5/27/2014	0
QZBOB-032713-02	3/27/2013	2	3	5/31/2013	0
			3	6/21/2013	0
			3	7/15/2013	0
			4	4/13/2014	0
QZBOB-032913-01	3/29/2013	3	3	5/30/2013	0
			3	6/20/2013	0
			3	7/15/2013	0
			4	4/14/2014	0
			4	5/27/2014	0
QZBOB-032913-02	3/29/2013	3	3	5/30/2013	0
			3	6/20/2013	0
			3	7/12/2013	0
			4	4/15/2014	0
QZBOB-032913-03	3/29/2013	3	3	5/28/2013	0
			3	6/19/2013	0
			3	7/15/2013	0
			4	4/14/2014	0
			3	5/10/2014	0
			4	5/27/2014	0
QZBOB-032913-04	3/29/2013	3	3	5/28/2013	0
			3	6/20/2013	0
			3	7/13/2013	0
			4	4/15/2014	0
			4	5/27/2014	0
QZBOB-032913-05	3/29/2013	3	4	5/28/2013	0
			4	7/12/2013	0
			4	4/14/2014	0
			3	5/27/2014	0
			4	6/2/2014	0
QZBOB-033013-01	3/30/2013	3	4	5/25/2013	0
			3	6/20/2013	0
			3	7/12/2013	0
			3	7/13/2013	0
			4	4/14/2014	0
QZBOB-033013-02	3/30/2013	3	3	5/29/2013	0
			3	6/19/2013	0
			3	7/13/2013	0
QZBOB-033013-03	3/30/2013	3	4	5/29/2013	0
			3	6/19/2013	0
			3	7/12/2013	0
			4	4/11/2014	
QZBOB-040113-01	4/1/2013	3	2	5/29/2013	0
			3	6/21/2013	0

Waypoint ID	Detection Date	Initial Class	Observation Class	Observation Date	# Adults
			3	7/15/2013	0
			3	4/9/2014	0
			3	5/28/2014	0
			4	6/2/2014	0
QZBOB-040213-01	4/2/2013	3	3	5/31/2013	0
			3	6/21/2013	0
			3	7/15/2013	0
			4	4/12/2014	0
QZBOB-040213-02	4/2/2013	3	3	5/31/2013	0
			3	6/20/2013	0
			3	7/13/2013	0
			4	4/10/2014	0
QZBOB-040313-01	4/3/2013	2	3	5/31/2013	0
			3	6/20/2013	0
			3	7/13/2013	0
			4	4/10/2014	0
QZBOB-040413-01	4/4/2013	3	3	5/23/2013	0
			3	6/22/2013	0
			3	7/14/2013	0
QZBOB-040414-02	4/4/2014	3	3	5/6/2014	0
			4	5/28/2014	0
QZBOB-040414-03	4/4/2014	2	2	5/9/2014	0
			4	5/28/2014	0
QZBOB-040414-04	4/4/2014	3	4	5/6/2014	0
			4	5/28/2014	0
QZBOB-040414-08	4/4/2014	3	3	5/6/2014	0
			4	5/28/2014	0
QZBOB-040514-01	4/5/2014	3	3	5/6/2014	0
			4	5/28/2014	0
QZBOB-040514-02	4/5/2014	3	3	5/6/2014	0
			3	5/28/2014	0
			3	6/2/2014	0
QZBOB-040514-05	4/5/2014	3	3	5/9/2014	0
			3	5/28/2014	0
			4	6/2/2014	0
QZBOB-040614-03	4/6/2014	2	2	5/6/2014	0
			3	5/10/2014	0
			3	5/26/2014	0
			4	6/2/2014	0
QZBOB-040614-06	4/6/2014	3	4	5/8/2014	0
			4	5/26/2014	0
QZBOB-040614-07	4/6/2014	3	2	5/6/2014	0
			2	5/6/2014	0
			3	5/8/2014	0
			4	5/26/2014	0

Waypoint ID	Detection Date	Initial Class	Observation Class	Observation Date	# Adults
QZBOB-040714-01	4/7/2014	3	2	5/6/2014	0
			2	5/6/2014	0
			3	5/10/2014	0
			3	5/26/2014	0
			4	6/2/2014	0
QZBOB-040714-02	4/7/2014	3	3	5/6/2014	0
			3	5/6/2014	0
			4	5/26/2014	0
QZBOB-040714-07	4/7/2014	3	4	5/9/2014	0
QZBOB-040714-08	4/7/2014	3	3	5/9/2014	0
			3	5/28/2014	0
			4	6/2/2014	0
QZBOB-040814-15	4/8/2014	3	4	5/28/2014	0
QZBOB-040814-20	4/8/2014	3	4	5/28/2014	0
QZBOB-040814-21	4/8/2014	3	4	5/28/2014	0
QZBOB-040814-27	4/8/2014	3	4	5/28/2014	0
QZBOB-040913-01	4/9/2013	2	1	5/24/2013	2
			1	6/20/2013	1
			2	7/14/2013	0
			3	7/15/2013	0
			3	4/5/2014	0
			3	5/9/2014	0
			4	5/28/2014	0
QZBOB-040914-07	4/9/2014	3	3	5/28/2014	0
			3	6/2/2014	0
QZBOB-040914-10	4/9/2014	3	3	5/28/2014	0
			3	6/2/2014	0
QZBOB-040914-11	4/9/2014	3	4	5/28/2014	0
QZBOB-040914-12	4/9/2014	3	4	5/28/2014	0
QZBOB-040914-14	4/9/2014	3	3	5/28/2014	0
QZBOB-040914-15	4/9/2014	3	3	5/10/2014	0
			4	5/28/2014	0
QZBOB-041014-03	4/10/2014	3	3	5/9/2014	0
			4	5/27/2014	0
QZBOB-041014-09	4/10/2014	3	4	5/9/2014	0
QZBOB-041014-10	4/10/2014	3	4	5/9/2014	0
QZBOB-041014-54	4/10/2014	3	4	5/9/2014	0
QZBOB-041014-55	4/10/2014	3	4	5/9/2014	0
QZBOB-041113-01	4/11/2013	3	4	5/29/2013	0
			3	6/22/2013	0
			3	7/16/2013	0
			3	4/16/2014	0
			3	5/9/2014	0
			4	5/28/2014	0
QZBOB-041114-04	4/11/2014	3	4	5/9/2014	0

Waypoint ID	Detection Date	Initial Class	Observation Class	Observation Date	# Adults
QZBOB-041114-08	4/11/2014	3	3	5/9/2014	0
			4	5/27/2014	0
QZBOB-041114-10	4/11/2014	3	4	5/27/2014	0
QZBOB-041114-18	4/11/2014	2	2	5/9/2014	0
			4	5/27/2014	0
QZBOB-041214-04	4/12/2014	3	4	5/9/2014	0
			4	5/28/2014	0
QZBOB-041314-08	4/13/2014	3	3	5/9/2014	0
		3	4	5/27/2014	0
QZBOB-041414-02	4/14/2014		4	5/9/2014	0
QZBOB-041414-03	4/14/2014	3	4	5/9/2014	0
QZBOB-041414-07	4/14/2014	3	3	5/8/2014	0
QZBOB-041415-06	4/14/2014	2	4	5/27/2014	0
QZBOB-041514-02	4/15/2014	3	3	5/9/2014	0
			4	5/27/2014	0
QZBOB-041614-01	4/16/2014	3	4	5/9/2014	0
			4	5/28/2014	0
QZBOB-041614-02	4/16/2014	3	3	5/9/2014	0
			3	5/28/2014	0
			4	6/2/2014	0
QZBOB-050814-11	5/8/2014	2	3	5/26/2014	0
			3	6/2/2014	0
QZBOB-051313-01	5/13/2013	1	1	5/22/2013	2
			1	5/30/2013	2
			1	6/20/2013	2
			1	7/13/2013	2
			1	7/15/2013	2
			4	4/4/2014	0
			4	5/28/2014	0
QZBOB-051413-01	5/14/2013	2	4	5/31/2013	0
			4	4/6/2014	0
QZBOB-102112-01	10/21/2012	1	4	5/18/2013	0
			3	4/4/2014	0
			3	5/6/2014	0
			3	5/6/2014	0
			3	5/6/2014	0
			3	5/12/2014	0
			4	5/28/2014	0
QZBOB-102212-01	10/22/2012	2	4	5/25/2013	0
			4	4/9/2014	0
QZBOB-102212-02	10/22/2012	2	4	5/27/2013	0
			3	4/6/2014	0
			4	5/6/2014	0
			4	5/26/2014	0
QZBOB-102212-03	10/22/2012	1	4	4/6/2014	0

Waypoint ID	Detection Date	Initial Class	Observation Class	Observation Date	# Adults
QZBOB-102212-04	10/22/2012	1	3	4/6/2014	0
			3	5/6/2014	0
			3	5/26/2014	0

4.1.5 Conclusions and Recommended Actions

Burrowing Owl site use changes temporally. Survey evidence suggests greater use of the Desert Quartzite footprint by BUOW outside of the breeding season, with only 2 pairs observed remaining to attempt reproduction in 2013 and none in 2014.

Although Burrowing Owls exhibit high burrow fidelity, surveys at Desert Quartzite documented dynamic occupancy of burrows in response to changing conditions. If an annual determination of site use and/ or breeding success is intended, Phase II and Phase III surveys should be implemented **annually across the site, beginning every spring**.

If the intent of surveys is limited to the detection of Burrowing Owls prior to construction, it is recommended that no further action is taken until the project nears construction. Phase II and Phase III surveys should be conducted 30-days prior to construction in an effort to confirm BUOW occupancy and give project managers enough time to respond to findings.

Burrowing Owls Phase II and Phase III surveys should be conducted according to the methods described in, “Burrowing Owl Survey Protocol and Mitigation Guidelines” (Burrowing Owl Consortium, 1993). Burrowing owl surveys should adhere to the frequency and timing described by the “Staff Report on Burrowing Owl Mitigation” (CDFW, 2012).

4.2 Golden Eagle (*Aquila chrysaetos*) Surveys

Golden Eagle is the most widely distributed species of eagle. Although they maintain home ranges as large as 80 sq miles in open country across a variety of biomes, including desert-like habitats in the American south-west, Golden Eagle is uncommon in the true deserts.

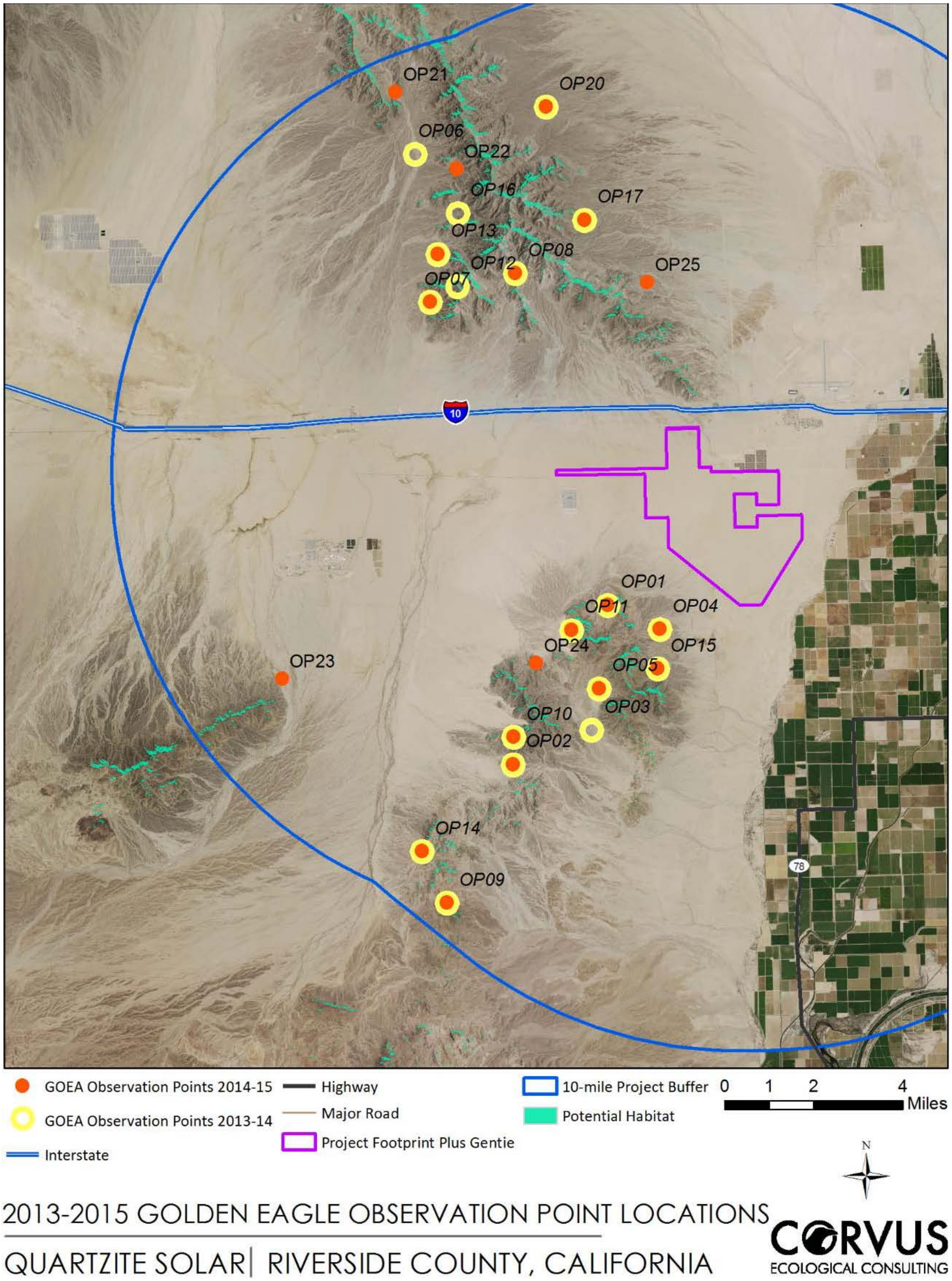
Agency approval of the Quartzite Avian Work Plan was not granted until after the 2013 Golden Eagle breeding season ended, but in 2013-14 and 2014-15, in addition to Unlimited Distance Extended Observation Surveys (Section 2.1), eagle surveys were conducted in December and January following the Interim Golden Eagle Inventory and Monitoring Protocols; and other recommendations (Pagel *et al*., 2010 *et seg*.). Surveys for breeding and non-breeding Bald and Golden Eagles were conducted within a 10-mile radius of the Project. Occurrence of non-breeding Golden Eagles within at least 10 miles of the project boundary during the courtship season (*e.g.,* late December through early February) were documented in order to estimate potential project-related impacts to Golden Eagles, including: juveniles, sub-adults, adult floaters, and breeding adults.

No potential Golden Eagle nesting habitat exists within the proposed project footprint. Potential Golden Eagle nesting habitat exists within 10 miles of the project boundary; in the Little Chuckwalla Mountains, the Mule Mountains and the McCoy Mountains. There is one historic nest within the 10-mile buffer.

Historic nest data for the entire region was used to model Golden Eagle habitat and assess the terrain for suitable nest sites within a 10-mile buffer of the proposed project footprint. These data were used to optimally place Observation Points throughout the survey area. Eighteen (18) Observation Points were established in the study area and each was visited twice during the courtship/breeding season (Table 10; Figure 5). In 2014-15, we moved some of the points (renaming them) and replaced some with new locations with the end result being 18 points overall.

Table 10. Golden Eagle Observation Points and Survey Dates

Observation Point	**2013/ 2014**		**2014/ 2015**	
	Phase I Survey Date	**Phase II Survey Date**	**Phase I Survey Date**	**Phase II Survey Date**
QZ_GOEA_OP01	12/17/2013	1/25/2014	12/18/2014	1/21/2015
QZ_GOEA_OP02	12/16/2013	1/22/2014	12/17/2014	1/17/2015
QZ_GOEA_OP03	12/16/2013	1/21/2014	Dropped in 2014	
QZ_GOEA_OP04	12/17/2013	1/25/2014	12/17/2014	1/20/2015
QZ_GOEA_OP05	12/16/2013	1/22/2014	12/18/2014	1/18/2015
QZ_GOEA_OP06	12/19/2013	1/23/2014	Dropped in 2014	
QZ_GOEA_OP07	12/18/2013	1/22/2014	12/15/2014	1/20/2015
QZ_GOEA_OP08	12/19/2013	1/24/2014	12/15/2014	1/21/2015
QZ_GOEA_OP09	12/20/2013	1/21/2014	12/18/2015	1/18/2015
QZ_GOEA_OP10	12/16/2013	1/21/2014	12/18/2015	1/19/2015
QZ_GOEA_OP11	12/17/2013	1/25/2014	12/19/2015	1/24/2015
QZ_GOEA_OP12	12/18/2013	1/24/2014	Dropped in 2014	
QZ_GOEA_OP13	12/19/2013	1/24/2014	12/16/2014	1/26/2015
QZ_GOEA_OP14	12/20/2013	1/21/2014		1/19/2015
QZ_GOEA_OP15	12/20/2013	1/22/2014	12/18/2015	1/20/2015
QZ_GOEA_OP16	12/19/2013	1/23/2014	Dropped in 2014	
QZ_GOEA_OP17	12/18/2013	1/23/2014	12/16/2014	1/27/2015
QZ_GOEA_OP20	12/18/2013	1/23/2014	12/16/2014	1/22/2015
QZ_GOEA_OP21			12/16/2014	1/20/2015
QZ_GOEA_OP22			12/16/2014	1/22/2015
QZ_GOEA_OP23			12/17/2014	1/17/2015
QZ_GOEA_OP24			12/19/2014	1/23/2015
QZ_GOEA_OP25			12/15/2014	1/27/2015


OP21
OP20
OP06
OP22
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OP25
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OP11
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OP24
OP15
OP23
OP05
OP03
OP10
OP02
OP14
OP09
78
GOEA Observation Points 2014-15
GOEA Observation Points 2013-14
Interstate
Highway
Major Road
Project Footprint Plus Gentie
10-mile Project Buffer
Potential Habitat
0 1 2 4 Miles
N
2013-2015 GOLDEN EAGLE OBSERVATION POINT LOCATIONS
QUARTZITE SOLAR| RIVERSIDE COUNTY, CALIFORNIA
CORVUS
ECOLOGICAL CONSULTING

Figure 5. Placement of Golden Eagle Territory Occupancy Survey Observation Points

There have been no (0) Golden Eagle detections during avian-focused surveys, including: Avian Point Counts, Unlimited Distance Extended Observation Surveys and Line Transect surveys. There have been zero (0) reports of incidental sightings of Golden Eagles, which would have been reported on standardized, “General Sensitive Species” data forms that are included as required reporting for all of the various biological resource disciplines.

In March and April 2013, a total of seventeen black-tailed jackrabbits were detected across the 4,855 acre (19.65 sq km) project during a 10-meter belt-transect survey of the entire project. This effort yields an estimation of .0035 black-tailed jack rabbits/ acre.

Black-tailed jackrabbits and cottontail rabbits will be documented using line-transect surveys to estimate population densities within the project area. Small mammal surveys will be conducted across the entire proposed Project Site, using pedestrian transects spaced at 10-meter intervals. Observers will make their best effort to avoid double counting. This survey methodology will assess prey abundance on the project site as forage for Golden Eagles.

Golden Eagle survey data included:

- assign ID #
- record UTM via GPS
- assess any nests for condition (fresh greens, good, fair, old and decrepit)
- record any birds present (species, behavior)

Surveyors will utilize high-powered spotting scopes from the greatest effective distance possible during the breeding season.

4.2.1 Golden Eagle Territory Occupancy Results

The only Golden Eagle detection made during the Territory Occupancy Surveys was made on 21 January 2014. An avian biologist detected an adult Golden Eagle soaring low heading southwest from the QZ_GOEA_OP10. Because this detection occurred during the Phase II visit, a follow-up visit was scheduled. During the follow-up visit on February 11th no Golden Eagles were observed in the area. In the vicinity of the eagle sighting, there were two nests observed, one was inactive and the other was an occupied Red-tailed Hawk nest. No active Golden Eagle nests were detected within the study area. There were no sightings during the 2014-15 surveys.

4.2.2 Raptor Nest Observations During Golden Eagle Territory Occupancy Surveys

A total of 26 raptor or raven nests were documented during Territory Occupancy Surveys (Table 11; Figure 6). Sixteen of these nests were in cliff or rock outcrop substrates, 9 were in power line support structures, and one was located in an ironwood tree (*Olneya tesota*). In 2013-14, species associated with raptor nests included 4 Red-tailed hawks (*Buteo jamaicensis*), 2 Prairie Falcons (*Falco mexicanus*), and 12 undetermined species of raptor. The one historic Golden Eagle territory was occupied by a pair of Red-tailed Hawks during this breeding season. Seven of the observed nest were active, 9 were inactive, and two were active and occupied (Table 11). In 2014-15, there were only 2 active nests: 1 Red-tailed Hawk and 1 Prairie Falcon.

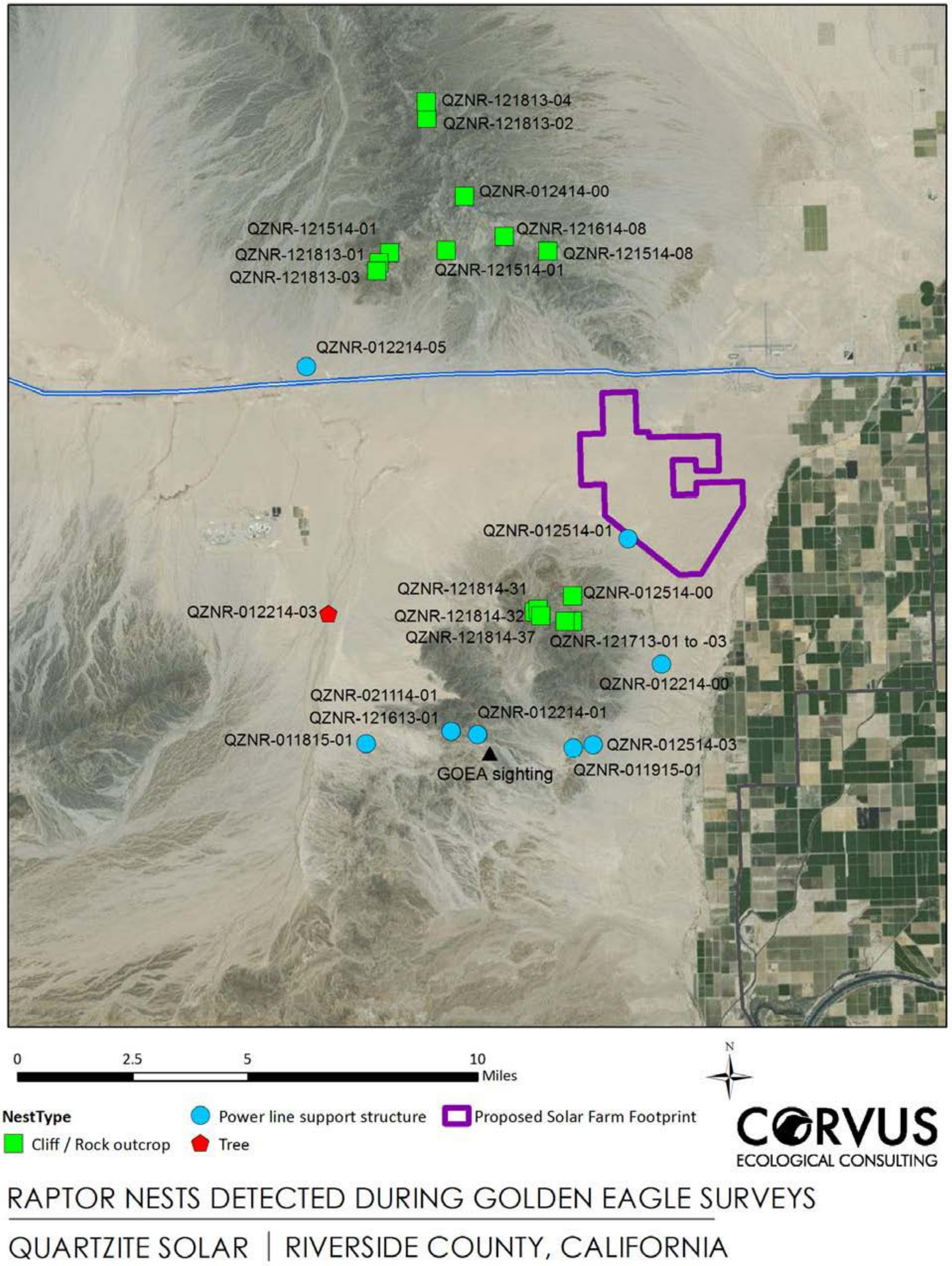
Table 11. Raptor Nests Observed During Territory Occupancy Surveys

Nest ID	Nest Type	Nest Height (m)	Aspect	Date	Time	Species	Condition	Activity	Breeding Status	Comments
QZNR-011815-01	Power line support structure	15	N/A	18-Jan-15	6:53 AM	RTHA	Fair	Occupied	Undetermined	There were two RTHA, one sitting in nest, and 1 on pole next to nest. Nest doesn't look complete, but they weren't actively building. At 4pm, there were 0 hawks on the nest.
				19-Jan-15	9:02 AM	UNHA	Fair	Inactive	Inactive / Unoccupied	No activity seen today
QZNR-011915-01	Power line support structure	20	N/A	19-Jan-15	5:14 PM	UNHA	Poor	Inactive	Inactive / Unoccupied	
QZNR-012214-00	Power line support structure	6	E	22-Jan-14	1:38 PM	RTHA	Good	Active	Courtship / copulation	
QZNR-012214-01	Power line support structure	22	N/A	22-Jan-14	9:30 AM	RTHA	Good	Occupied	Nest Building	2 RTHA PRESENT ON POWERLINE SUPPORT STURCTURE
				19-Jan-15	5:14 PM	UNHA	Poor	Inactive	Inactive / Unoccupied	
QZNR-012214-03	Tree	22	NE	22-Jan-14	12:15 PM	UNHA	Good	Active	Undetermined	
QZNR-012214-05	Power line support structure	22	N/A	22-Jan-14	12:30 AM	RTHA	Good	Active	Undetermined	RTHA PRESENT
QZNR-012414-00	Cliff / Rock outcrop	75	NE	24-Jan-14	2:32 PM	RTHA	Good	Active	Courtship / copulation	Previously known as GOEA nest McCoy1
				16-Dec-14	10:40 AM	UNHA	Good	Inactive	Inactive / Unoccupied	

Nest ID	Nest Type	Nest Height (m)	Aspect	Date	Time	Species	Condition	Activity	Breeding Status	Comments
QZNR-012414-01	Cliff / Rock outcrop	75	N	24-Jan-14	11:50 AM	UNHA	Good	Inactive	Inactive	
				15-Dec-14	12:10 PM	NONE		Inactive	Destroyed / Does Not Exist	Could not located a nest in vicinity of coordinates.
QZNR-012514-00	Cliff / Rock outcrop	75	N	25-Jan-14	9:00 AM	UNHA	Good	Inactive	Inactive	
QZNR-012514-01	Power line support structure	22	N/A	25-Jan-14	3:00 PM	UNHA	Good	Active	Undetermined	
				20-Jan-15	5:43 PM	UNHA	Fair	Inactive	Inactive / Unoccupied	Looks to be falling apart a bit.
QZNR-012514-03	Power line support structure	22	N/A	25-Jan-14	3:30 AM	UNHA	Good	Active	Undetermined	
				19-Jan-15	5:21 PM	UNHA	Good	Inactive	Inactive / Unoccupied	
QZNR-021114-01	Power line support structure	25	S	11-Feb-14	4:16 PM	UNHA	Good	Inactive	Inactive	Power line adjacent to Bradshaw Trail.
QZNR-121514-01	Cliff / Rock outcrop	20	N	15-Dec-14	3:00 PM	UNHA	Good	Inactive	Inactive / Unoccupied	Scrape with lots of whitewash
QZNR-121514-08	Cliff / Rock outcrop	60	NE	15-Dec-14	2:32 PM	UNHA	Good	Inactive	Inactive / Unoccupied	
QZNR-121613-01	Power line support structure	22	N/A	16-Dec-13	8:30 AM	UNHA	Good	Inactive	Inactive	
				17-Jan-15	1:00 PM	UNHA	Good	Inactive	Inactive / Unoccupied	
QZNR-121613-01	Power line support structure	22	N/A	19-Jan-15	1:50 PM	UNHA	Good	Inactive	Inactive / Unoccupied	RTHA spotted close and were seen roosting on power pole to the west on this same line, but no activity here.
QZNR-121614-08	Cliff / Rock outcrop	80	NE	16-Dec-14	8:59 AM	UNHA	Fair	Inactive	Inactive / Unoccupied	
QZNR-121713-01	Cliff / Rock outcrop	518	N	17-Dec-13		UNHA	Good	Inactive	Inactive	Large stick nest in good condition

Nest ID	Nest Type	Nest Height (m)	Aspect	Date	Time	Species	Condition	Activity	Breeding Status	Comments
				25-Jan-14	9:00 AM	UNHA	Good	Inactive	Inactive	
				17-Dec-14	11:37 AM	UNHA	Good	Inactive	Inactive / Unoccupied	Whitewash around, no new sign
				20-Jan-15	12:15 PM	UNHA	Good	Inactive	Inactive / Unoccupied	There were 2 rtha in the area, 1 perched on cliff above for quite some time, but neither visited this nest.
QZNR-121713-02	Cliff / Rock outcrop	689	W	17-Dec-13	11:20 AM	UNHA	Good	Inactive	Inactive	
				17-Dec-14	12:52 PM	UNHA	Fair	Inactive	Inactive / Unoccupied	
				20-Jan-15	1:37 PM	UNHA	Poor	Inactive	Inactive / Unoccupied	This nest is in poor shape, looks to be sliding of its perch
QZNR-121713-03	Cliff / Rock outcrop	685	NW	17-Dec-13	11:25 AM	UNHA	Fair	Inactive	Inactive	Old stick nest, compacted adjacent to QZNR-121713-02 and is likely replacement/alternate
				25-Jan-14	11:47 AM	PRFA	Good	Active	Courtship / copulation	
				20-Jan-15	1:38 PM	UNHA	Good	Inactive	Inactive / Unoccupied	There were 2 rtha in area perched on cliff above, but neither visited this nest and it doesn't look worked on this year. Of the three here, this seems most likely to me
QZNR-121813-01	Cliff / Rock outcrop	22	NW	18-Dec-13		PRFA	Good	Occupied	Undetermined	
				22-Jan-14	1:15 PM	PRFA	Good	Occupied	Undetermined	

Nest ID	Nest Type	Nest Height (m)	Aspect	Date	Time	Species	Condition	Activity	Breeding Status	Comments
				24-Jan-14	4:00 PM	PRFA	Good	Occupied	Undetermined	
				15-Dec-14	1:50 PM	UNHA	Good	Inactive	Inactive / Unoccupied	Lots of old whitewash below nest, sticks oxidized
				20-Jan-15	11:15 PM	PRFA	Good	Active		
QZNR-121813-02	Cliff / Rock outcrop	660	N	18-Dec-13	1:30 PM	UNHA	Good	Inactive	Inactive	K10D
QZNR-121813-03	Cliff / Rock outcrop	22	N	18-Dec-13	1:45 PM	UNHA	Good	Inactive	Inactive	POSSIBLE ALTERNATE PRFA NEST
				20-Jan-15	11:00 PM	UNHA	Good	Inactive	Inactive / Unoccupied	prairie falcon seen at adjacent nest site. Multiple PRFA nesting opportunities in the area, too early to know which nest will be selected for 2015 breeding attempt.
QZNR-121813-04	Cliff / Rock outcrop	514	N	18-Dec-13	1:30 PM	UNHA	Good	Inactive	Inactive	K10D
QZNR-121814-31	outcrop	460	N	18-Dec-14	2:34 PM	UNHA	Good	Inactive	Inactive / Unoccupied	Good structure. 2 photos taken
QZNR-121814-32	Cliff / Rock outcrop	350	NE	18-Dec-14	3:00 PM	UNHA	Good	Inactive	Inactive / Unoccupied	
QZNR-121814-37	Cliff / Rock outcrop	35	N	18-Dec-14	4:15 PM	UNHA	Good	Inactive	Inactive / Unoccupied	Stick nest.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QZNR-121813-02
QZNR-012414-00
QZNR-121514-01
QZNR-121614-08
QZNR-121813-01
QZNR-121514-08
QZNR-121813-03
QZNR-121514-01
QZNR-012214-05
QZNR-012514-01
QZNR-121814-31
QZNR-012514-00
QZNR-012214-03
QZNR-121814-32
QZNR-121814-37
QZNR-121713-01 to -03
QZNR-012214-00
QZNR-021114-01
QZNR-121613-01
QZNR-012214-01
QZNR-011815-01
QZNR-012514-03
GOEA sighting
QZNR-011915-01
0
2.5
5
10
Miles
N
NestType
Power line support structure
Proposed Solar Farm Footprint
Cliff / Rock outcrop
Tree
CORVUS
ECOLOGICAL CONSULTING
RAPTOR NESTS DETECTED DURING GOLDEN EAGLE SURVEYS
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Figure 6. Raptor Nests Detected During Golden Eagle Surveys

5. Nesting Raptor / Raven Surveys

Nesting raptor/ Raven surveys were conducted monthly between 1 May and 1 June. This effort focused on the detection of all raptor/ Raven nests within 1-mile of the proposed project footprint in order to collect baseline data on:

- The number and distribution of raptor/ Raven nests prior to project development.
- Success rates of raptor/ Raven nests prior to project development.

All bird nests (including the incidental detection of resident passerine species) were mapped and recorded on standardized data sheets (Table 12). Monthly monitoring efforts updated development stage and breeding status at each raptor/ Raven nest.

Table 12. Bird Nests (including raptor/raven) detected on Quartzite Project, Spring 2013 and 2014. Nests detected in both years were renamed in 2014 to employ a more consistent naming strategy.

Nest ID	Species	Easting	Northing	Date	Status	# Young
BH0001	RTHA	708278	3718453	2013		
RKR0001/ QZNR-031214-03	RTHA/ UNHA	704893	3716895	4/22/2013/ 5/13/2014	Incubation**/** Inactive	
RKR0002/ QZNR-021414-01	CORA/ RTHA	703684	3717850	4/22/2013/ 5/31/2014	Incubation**/** Nest Cycle Complete	
RKR0003	AMKE	709754	3714312	4/22/2013	Hatchling/ Nestling	
RKR0004/ QZNR-031214-02	RTHA/ RTHA	706970	3715231	5/9/2013/ 5/13/2014	Fledgling**/**Nest Cycle Complete	?/ 2
RKR0005	AMKE	711010	3716388	4/22/2013	Hatchling/ Nestling	
RKR0006/ QZNR-031214-08	RTHA/ RTHA	711168	3716543	4/22/2013/ 5/31/2014	Hatchling/ Nestling**/** Nest Cycle Complete	?/2
RKR0007	WWDO	712577	3719443	5/3/2013	Nest Building	
RKR0008	NOMO	707682	3714578	5/4/2013	Hatchling/ Nestling	
RKR0009	CACW	707816	3714548	5/4/2013	Hatchling/ Nestling	
RKR0010	MODO	707758	3714628	5/4/2013	Incubation	
RKR0011	MODO	707787	3714549	5/4/2013	Incubation	
RKR0012	LOSH	707969	3720258	4/26/2013	Hatchling/Nestling	
RKR0013	WEKI	710941	3716160	5/9/2013	Nest Building	

Nest ID	Species	Easting	Northing	Date	Status	# Young
RKR0014/ QZNR-031214-01	CORA/ CORA	708293	3714185	5/9/2013/ 5/31/2014	Hatchling/Nestling/ Nest Cycle Complete	
RKR0015	WEKI	712594	3718948	5/15/2013	Incubation	
RKR0016	MODO	712579	3719532	5/15/2013	Incubation	
QXNP-042214-01	LOSH	703,267	3,719,924	4/22/2014	Nest Building	
QZNP-021014-01	LOSH	703,269	3,719,933	2/10/2014	Incubation	
QZNP-021014-03	LCTH	703,187	3,720,192	2/10/2014	Hatchling/ Nestling	2
QZNP-021414-01	LOSH	703,708	3,710,209	4/25/2014	Incubation	
QZNP-030514-01	LCTH	704,408	3,717,229	3/12/2014	Incubation	
QZNP-031214-02	LOSH	704,010	3,716,939	3/12/2014	Hatchling/ Nestling	4
QZNP-031214-03	LOSH	706,044	3,715,983	3/12/2014	Incubation	
QZNP-031214-04	LOSH	708,654	3,712,415	3/12/2014	Incubation	
QZNP-032014-01	NOMO	703,193	3,720,186	3/20/2014	Incubation	
QZNP-040114-01	MODO	704,009	3,716,789	4/1/2014	Incubation	
QZNP-040314-01	CACW	703,152	3,720,310	4/3/2014	Undetermined	
QZNP-040614-01	LOSH	707,180	3,719,804	4/6/2014	Fledgling	
QZNP-041614-01	LOSH	704,413	3,717,316	4/16/2014	Incubation	1
QZNP-042214-01	LOSH	703,267	3,719,924	4/22/2014	Nest Building	
QZNR-031214-04	UNHA	701,352	3,718,549	5/13/2014	Inactive	
QZNR-031214-05	RTHA	700,831	3,718,568	5/13/2014	Nest Cycle Complete	
QZNR-031214-06	CORA	702,793	3,717,202	5/31/2014	Nest Cycle Complete	
QZNR-031214-07	RTHA	709,555	3,713,171	5/31/2014	Nest Cycle Complete	1
QZNR-032624-01	CORA	708,530	3,718,554	5/30/2014	Hatchling/ Nestling	2
QZNR-040314-01	AMKE	711,581	3,717,319	4/3/2014	Incubation	
QZNR-050814-01	AMKE	711,915	3,717,872	5/31/2014	Nest Cycle Complete	2
QZNR-051614	AMKE	705,762	3,716,306	5/31/2014	Undetermined	

6. Avian Results Analysis and Reporting

Overall 101 species have been detected on or near the Desert Quartzite solar project (Table 13). Eleven species have been found nesting, 46 have been detected in the winter months (December through February), 76 have been detected in the Spring (March through May), and 76 in the Fall (September through November).

Table 13. Comprehensive List of Species Detected Incidentally or during avian-focused surveys on the Desert Quartzite Solar Project.

Species Code	Species Common Name	Species Scientific Name	Nesting	Winter	Spring	Fall
AMKE	American Kestrel	*Falco sparverius*	TRUE	TRUE	TRUE	TRUE
ANHU	Anna's Hummingbird	*Calypte anna*	FALSE	TRUE	FALSE	FALSE
ATFL	Ash-throated Flycatcher	*Myiarchus cinerascens*	FALSE	FALSE	TRUE	FALSE
AWPE	American White Pelican	*Pelecanus erythrorhynchos*	FALSE	FALSE	FALSE	TRUE
BANS	Bank Swallow	*Riparia riparia*	FALSE	FALSE	FALSE	TRUE
BARS	Barn Swallow	*Hirundo rustica*	FALSE	FALSE	TRUE	TRUE
BEWR	Bewick's Wren	*Thryomanes bewickii*	FALSE	TRUE	FALSE	FALSE
BGGN	Blue-gray Gnatcatcher	*Polioptila caerulea*	FALSE	TRUE	TRUE	TRUE
BHCO	Brown-headed Cowbird	*Molothrus ater*	FALSE	FALSE	TRUE	FALSE
BHGR	Black-headed Grosbeak	*Pheucticus melanocephalus*	FALSE	FALSE	TRUE	FALSE
BLPH	Black Phoebe	*Sayornis nigricans*	FALSE	FALSE	TRUE	TRUE
BRBL	Brewer's Blackbird	*Euphagus cyanocephalus*	FALSE	FALSE	FALSE	TRUE
BRSP	Brewer's Sparrow	*Spizella breweri*	FALSE	FALSE	TRUE	TRUE
BTGN	Black-tailed Gnatcatcher	*Polioptila melanura*	FALSE	TRUE	TRUE	TRUE
BTSP	Black-throated Sparrow	*Amphispiza bilineata*	FALSE	TRUE	TRUE	FALSE
BTYW	Black-throated Gray Warbler	*Setophaga nigrescens*	FALSE	FALSE	TRUE	TRUE
BUOR	Bullock's Oriole	*Icterus bullockii*	FALSE	FALSE	TRUE	TRUE
BUOW	Burrowing Owl	*Athene cunicularia*	TRUE	TRUE	TRUE	TRUE
CACW	Cactus Wren	*Campylorhynchus brunneicapillus*	TRUE	TRUE	TRUE	TRUE
CANG	Canada Goose	*Branta canadensis*	FALSE	FALSE	FALSE	TRUE
CHSP	Chipping Sparrow	*Spizella passerina*	FALSE	FALSE	TRUE	TRUE
CLSW	Cliff Swallow	*Petrochelidon pyrrhonota*	FALSE	FALSE	TRUE	TRUE
COHA	Cooper's Hawk	*Accipiter cooperii*	FALSE	TRUE	TRUE	TRUE
COHU	Costa's Hummingbird	*Calypte costae*	FALSE	TRUE	TRUE	FALSE
COME	Common Merganser	*Mergus merganser*	FALSE	FALSE	TRUE	FALSE
COPO	Common Poorwill	*Phalaenoptilus nuttallii*	FALSE	FALSE	TRUE	TRUE
CORA	Common Raven	*Corvus corax*	TRUE	TRUE	TRUE	TRUE
COYE	Common Yellowthroat	*Geothlypis trichas*	FALSE	FALSE	FALSE	TRUE
DEJU	Dark-eyed Junco	*Junco hyemalis*	FALSE	TRUE	FALSE	FALSE
EUCD	Eurasian Collared-Dove	*Streptopelia decaocto*	FALSE	TRUE	TRUE	TRUE
EUST	European Starling	*Sturnus vulgaris*	FALSE	TRUE	FALSE	TRUE
FEHA	Ferruginous Hawk	*Buteo regalis*	FALSE	TRUE	TRUE	TRUE
GAQU	Gambel's Quail	*Callipepla gambelii*	FALSE	TRUE	TRUE	TRUE

Species Code	Species Common Name	Species Scientific Name	Nesting	Winter	Spring	Fall
GBHE	Great Blue Heron	*Ardea herodias*	FALSE	FALSE	TRUE	TRUE
GHOW	Great Horned Owl	*Bubo virginianus*	FALSE	TRUE	FALSE	TRUE
GOEA	Golden Eagle	*Aquila chrysaetos*	TRUE	TRUE	TRUE	FALSE
GREG	Great Egret	*Ardea alba*	FALSE	FALSE	TRUE	TRUE
GRFL	Gray Flycatcher	*Empidonax wrightii*	FALSE	FALSE	TRUE	FALSE
GRRO	Greater Roadrunner	*Geococcyx californianus*	FALSE	FALSE	TRUE	TRUE
GTGR	Great-tailed Grackle	*Quiscalus mexicanus*	FALSE	TRUE	TRUE	TRUE
HOFI	House Finch	*Haemorhous mexicanus*	FALSE	TRUE	TRUE	TRUE
HOLA	Horned Lark	*Eremophila alpestris*	FALSE	TRUE	TRUE	TRUE
HOSP	House Sparrow	*Passer domesticus*	FALSE	FALSE	FALSE	TRUE
HOWR	House Wren	*Troglodytes aedon*	FALSE	FALSE	FALSE	TRUE
KILL	Killdeer	*Charadrius vociferus*	FALSE	FALSE	FALSE	TRUE
LARB	Lark Bunting	*Calamospiza melanocorys*	FALSE	FALSE	TRUE	FALSE
LAZB	Lazuli Bunting	*Passerina amoena*	FALSE	FALSE	FALSE	TRUE
LCTH	Le Conte's Thrasher	*Toxostoma lecontei*	TRUE	TRUE	TRUE	TRUE
LEGO	Lesser Goldfinch	*Spinus psaltria*	FALSE	FALSE	TRUE	TRUE
LENI	Lesser Nighthawk	*Chordeiles acutipennis*	FALSE	FALSE	TRUE	TRUE
LEOW	Long-eared Owl	*Asio otus*	FALSE	TRUE	FALSE	FALSE
LOSH	Loggerhead Shrike	*Lanius ludovicianus*	TRUE	TRUE	TRUE	TRUE
MERL	Merlin	*Falco columbarius*	FALSE	FALSE	FALSE	TRUE
MGWA	MacGillivray's Warbler	*Geothlypis tolmiei*	FALSE	FALSE	TRUE	TRUE
MOBL	Mountain Bluebird	*Sialia currucoides*	FALSE	TRUE	FALSE	FALSE
MODO	Mourning Dove	*Zenaida macroura*	TRUE	TRUE	TRUE	TRUE
MOPL	Mountain Plover	*Charadrius montanus*	FALSE	FALSE	FALSE	TRUE
NAWA	Nashville Warbler	*Oreothlypis ruficapilla*	FALSE	FALSE	FALSE	TRUE
NOFL	Northern Flicker	*Colaptes auratus*	FALSE	TRUE	FALSE	TRUE
NOHA	Northern Harrier	*Circus cyaneus*	FALSE	TRUE	TRUE	TRUE
NOMO	Northern Mockingbird	*Mimus polyglottos*	TRUE	FALSE	TRUE	TRUE
NRWS	Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	FALSE	FALSE	TRUE	TRUE
OCWA	Orange-crowned Warbler	*Oreothlypis celata*	FALSE	FALSE	TRUE	TRUE
OSPR	Osprey	*Pandion haliaetus*	FALSE	FALSE	TRUE	TRUE
PHAI	Phainopepla	*Phainopepla nitens*	FALSE	FALSE	TRUE	TRUE
PRFA	Prairie Falcon	*Falco mexicanus*	TRUE	TRUE	TRUE	TRUE
RCKI	Ruby-crowned Kinglet	*Regulus calendula*	FALSE	TRUE	FALSE	TRUE
ROPI	Rock Pigeon	*Columba livia*	FALSE	TRUE	TRUE	TRUE
ROWR	Rock Wren	*Salpinctes obsoletus*	FALSE	TRUE	TRUE	TRUE
RTHA	Red-tailed Hawk	*Buteo jamaicensis*	TRUE	TRUE	TRUE	TRUE
RWBL	Red-winged Blackbird	*Agelaius phoeniceus*	FALSE	TRUE	TRUE	TRUE
SACR	Sandhill Crane	*Grus canadensis*	FALSE	FALSE	TRUE	FALSE

Species Code	Species Common Name	Species Scientific Name	Nesting	Winter	Spring	Fall
SAGS	Sage Sparrow (Unspecified)	*Artemisiospiza nevadensis/bell*	FALSE	TRUE	TRUE	TRUE
SAPH	Say's Phoebe	*Sayornis saya*	FALSE	TRUE	TRUE	TRUE
SATH	Sage Thrasher	*Oreoscoptes montanus*	FALSE	TRUE	TRUE	FALSE
SAVS	Savannah Sparrow	*Passerculus sandwichensis*	FALSE	FALSE	FALSE	TRUE
SEOW	Short-eared Owl	*Asio flammeus*	FALSE	TRUE	FALSE	TRUE
SNEG	Snowy Egret	*Egretta thula*	FALSE	FALSE	TRUE	FALSE
SSHA	Sharp-shinned Hawk	*Accipiter striatus*	FALSE	TRUE	TRUE	TRUE
SUTA	Summer Tanager	*Piranga rubra*	FALSE	TRUE	FALSE	FALSE
SWHA	Swainson's Hawk	*Buteo swainsoni*	FALSE	FALSE	TRUE	TRUE
TRES	Tree Swallow	*Tachycineta bicolor*	FALSE	TRUE	TRUE	TRUE
TUVU	Turkey Vulture	*Cathartes aura*	FALSE	TRUE	TRUE	TRUE
VASW	Vaux's Swift	*Chaetura vauxi*	FALSE	FALSE	TRUE	TRUE
VERD	Verdin	*Auriparus flaviceps*	FALSE	TRUE	TRUE	TRUE
VESP	Vesper Sparrow	*Pooecetes gramineus*	FALSE	FALSE	TRUE	TRUE
VGSW	Violet-green Swallow	*Tachycineta thalassina*	FALSE	FALSE	TRUE	TRUE
WAVI	Warbling Vireo	*Vireo gilvus*	FALSE	FALSE	TRUE	FALSE
WCSP	White-crowned Sparrow	*Zonotrichia leucophrys*	FALSE	TRUE	TRUE	TRUE
WEKI	Western Kingbird	*Tyrannus verticalis*	FALSE	FALSE	TRUE	FALSE
WEME	Western Meadowlark	*Sturnella neglecta*	FALSE	FALSE	TRUE	TRUE
WETA	Western Tanager	*Piranga ludoviciana*	FALSE	FALSE	TRUE	FALSE
WEWP	Western Wood-Pewee	*Contopus sordidulus*	FALSE	FALSE	TRUE	FALSE
WFIB	White-faced Ibis	*Plegadis chihi*	FALSE	FALSE	TRUE	TRUE
WIFL	Willow Flycatcher	*Empidonax traillii*	FALSE	FALSE	FALSE	TRUE
WIWA	Wilson's Warbler	*Cardellina pusilla*	FALSE	FALSE	TRUE	TRUE
WTSW	White-throated Swift	*Aeronautes saxatalis*	FALSE	TRUE	TRUE	FALSE
WWDO	White-winged Dove	*Zenaida asiatica*	FALSE	FALSE	TRUE	TRUE
YEWA	Yellow Warbler	*Setophaga petechia*	FALSE	FALSE	TRUE	FALSE
YHBL	Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	FALSE	FALSE	TRUE	FALSE
YRWA	Yellow-rumped Warbler	*Setophaga coronata*	FALSE	TRUE	TRUE	TRUE

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Appendix A.

Quartzite Migratory Bird Survey Protocol

Prepared for
IRONWOOD CONSULTING INC.
1030 Nevada Street, Suite 201
Redlands, CA 92374

Prepared By:
***Corvus* Ecological Consulting, LLC**
7810 Highway 89, Suite 270
Flagstaff, AZ 86004

April, 2013

I. Equipment:

Binoculars (8-10X)
Spotting Scope (30X or greater)
GPS
Kestrel (thermometer/ anemometer)
Clipboard
Quartzite Migratory Bird Survey Data Sheet (s)
Pen (permanent ink)
Time-keeper (e.g. watch or cell phone)
Compass

II. Migration Survey Point Explanation

The purpose of these surveys is to record the passage of birds migrating over the Desert Quartzite Solar Project (Project) and depict their activity during transit.

- Migration surveys are conducted weekly from each observation survey point from 15 March through 31 May (spring migration) and from 1 September through 15 November(fall migration).

The two Migration survey Points (MP01 and MP02) are strategically located to bisect the Project footprint along the central east-west axis, 3.25 km apart, and are situated with near 360 degree views of the distant horizon to maximize visual capture of migrating birds as they pass over the area.

Survey Point	UTM (WGS 84)	
MP01	706914	3717172
MP02	710176	3717195

Flapping flight is energetically expensive and therefore migratory flights are strongly correlated with advantageous weather conditions. Many birds (especially raptors) select the warmest part of the day for migratory movement. Because the Project topography is generally flat and lacking in features likely to generate orographic lift;

- Migration point surveys will be conducted from 10 a.m. through 3 p.m. when thermal lift is greatest.
- Infinite distance visual surveys

A portion of the Project avian community is resident (non-migratory). Residents and some migrants (e.g. soaring raptors) can be expected to circulate and have the potential to be tallied more than once. To reduce the influence of resident birds on the survey data;

- Birds will only be recorded as they pass the axis line and not on subsequent returns. (See IV. Migration Survey Procedures.)

III. Data Sheet Explanation:

Surveyors will use the Quartzite Migratory Bird Survey Data Sheet to record;

A. Daily Information

- Observer: First initial of the first name followed by entire last name. Example, John Doe is recorded as: J. DOE
- Date: (DD Mmm YYYY): e.g. 15 Apr 2013
- Location: Quartzite
- Point ID: Unique identifier for the survey point (MP01 or MP02)

B. Environmental Observations

Weather data is collected for correlation of migration activity with environmental conditions.

- Start Time: 10 a.m.
- Time**:** Start of hourly weather interval
- Precipitation (Yes or No)
- Visibility (in kilometers): Estimate of how far the observer can see across the landscape. Use visible landmarks to aid in this determination.
- Wind Speed (Average MPH): Record the Average Wind Speed in miles per hour. A Kestrel (or similar measuring tool) should be used to record current wind conditions.
    i. First, determine the direction from which the wind is blowing. Position the anemometer in a location that is free from wind obstruction (clear from the leeward side of a tree, shrub or vehicle; top of a wash bank rather than a drainage bottom).
    ii. Hold the anemometer above head height and turn it on. Scroll to the device's "average" setting and allow it to record for two minutes. **NOTE: These devices will begin to average the wind speed from the second they are turned on and therefore they should be in position to record accurate conditions from the moment they are turned on until the moment the value is captured*.
- Wind Direction (8-point cardinal): Direction from which the wind is emanating (e.g. SW)
- Temperature (ºC): *Temp (°C)* = Record the Temperature in degrees Celsius.
    i. Hold the Kestrel or thermometer in a shaded location, approximately three-feet above the ground surface.
    ii. Allow the temperature reading to stabilize before recording the value. With a digital thermometer (such as a Kestrel) this point can be determined by the appearance of an unchanged value for 20 seconds or when the value suddenly

changes direction from which it was adjusting, such as when the value increases after a consistent downward adjustment.

- Cloud cover (%): Visually estimate the amount of the sky covered by cloud

C. Bird Observations

1. Time: Timestamp at which a bird crosses the east-west axis
2. Species Code: 4-letter Alpha code (Institute for Bird Populations 2012; http://www.birdpop.org/DownloadDocuments/Alpha_codes_eng.pdf)
3. Number of Individuals: The number of birds (of the same species) detected passing over the axis and not returning. If birds are obviously grouped together, record the number of individuals in the same-species group. If birds are separated by enough space to warrant recording significantly different distances, flight heights or behaviors for each, record those birds on separate lines (e.g. write CLSW in "Species code" on three different lines if there are three Cliff Swallows detected at three completely different height codes).
4. Flight Direction: (8-point cardinal): Direction in which the bird is flying away from the observer and travelling across the Project (e.g. NW).
5. Distance from Observer: Record (in meters) the distance of each bird from the observation point as it crosses the axis.
6. Flight Height: Record the **lowest flight height observed** with one of the following codes:

- 1 = 0-4m (height of a PV Panel)
- 2 = 4-10m (height of a 3-storey building)
- 3= 10-50m (height of a transmission tower)
- 4=50m+ (higher than a transmission tower)

7. Behavior: Record the **behavior best characterizing use of the Project area** with one of the following codes;

- F=Foraging
- FA= Flapping
- SO=Soaring
- GL=Gliding
- S=Singing
- C=Calling
- O=Other

8. Age Class: Record A=Adult or I=Immature for raptors

IV. Migration Survey Procedures:

1. Fatigue: Fatigue lowers data resolution – observers should consider chairs, umbrellas, sunglasses and other tools to reduce fatigue. Scan using binoculars, switching to a scope only if necessary to complete an identification.

2. Data collection: It is better to be conservative with identifications and estimations than inaccurate.

- **Counting**. Flocking birds should be counted directly (1,2,3…) when possible or estimated in groups (5,10,15 …). Errors increase as in parallel with the multiple used - use the lowest practical multiple when estimating bird numbers.
- **Double-Counting**: Care must be taken to avoid double-counting. The goal of these surveys is to account for individuals of a given species no more than one time during the migration survey period. Some birds may be expected to be residents with territories that encompass the survey point. For example, a Red-tailed Hawk may be foraging over the area even as others are passing through, so the surveyor should attempt to exclude repeat tallies of such (and all other) non-migrants.

3. UN-codes: Infinite distance visual surveys rely on surveyors competently combining subtle clues such as silhouetted profile, wing beat rate, and flight pattern to accurately identify distant birds under less than ideal lighting conditions. Recognizing that not all birds can be identified to species under all conditions at all distances, the Alpha abbreviations contain UN-codes;

Alpha	Bird Group
UNBI	Unidentified Bird
UNEM	Unidentified Empidonax Flycatcher
UNGU	Unidentified Gull
UNHA	Unidentified Hawk
UNHU	Unidentified Hummingbird
UNWA	Unidentified Warbler

- Use UN- codes to record birds to the highest resolution possible

Additional Observations. There may be additional bird sightings that observers wish to record that can provide benefit to the project but are not relevant to the particular survey, e.g. breeding or wintering bird observations. These observations should be recorded and passed along to the Avian Lead to assist with the depiction of avian breeding or distributional data within the Project area. To be of maximum value, each observation should include UTMs, a date and timestamp, and thorough details.

If surveyors have any questions about this protocol, please ask them *before* conducting the survey!

Appendix B

Quartzite Avian Line-Transect Survey Protocol

Prepared for
IRONWOOD CONSULTING INC.
1030 Nevada Street, Suite 201
Redlands, CA 92373

Prepared By:
***Corvus* Ecological Consulting, LLC**
7810 Highway 89, Suite 270
Flagstaff, AZ 86004

March, 2013

Materials/ Supplies:

Binoculars
GPS
Kestrel (thermometer/ anemometer)
Rangefinder
Clipboard
Data Sheet(s)
Notepad (for recording personal notes not relevant to data sheets)
Pen (permanent ink)
Watch or other portable clock (e.g. cell phone)
Compass

Line-Transect Explanation

- Check your GPS settings to insure that the Map Datum is “WGS 84;” that the Compass Heading > North Reference is set to, “Magnetic;” and that “Metric” is the selected unit of measurement for “distance/speed.”
- Line-transect will be 2000 meters in length, with a starting point and ending point (Fig. 1).

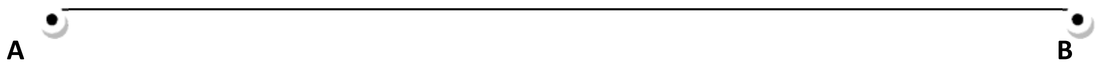

Figure 1.0. Line-transect route, 2000 meters long from point A to point B.

- Surveyors will begin the route from either point. For each line, point A should be used as a starting point 50% of the occasions it is surveyed, point B serving as starting point the other 50% of occasions it is surveyed.
- Surveyors will record distance (in meters) to each bird detected, measuring distance perpendicular (90°) to the line. Birds will not be recorded more than 90° from the line before the starting point or after the ending point. [See Methods/ Procedures for details.]
- ***Please be sure to read this entire document prior to starting your first survey***.

Data Sheet Explanation:

Surveyors will use the Quartzite Avian Line-Transect Data Sheet.

1. Line-Transect Data Sheet fields:

    a. Complete the data sheet header including: Observer name, Date, Location, Transect ID, Starting point (circle A or B), Start time, and weather data prior to beginning a point count.

    b. Observer(s) names: First initial of first name followed by entire last name. Example, John Doe is recorded as: J. DOE

    c. Date: In DD MMM YYYY format. For example: 02 MAR 2011

d. Site Name: Locations to include: Project Footprint (within the proposed project boundary) or Project Control (outside of the proposed Project Footprint).

e. Transect ID: Unique identifier for the transect.

f. WGS 84, UTM: Provide the UTM coordinates for the starting location (A or B).

To Record Start Times and Weather Data: The purpose of collecting weather data is to provide support that environmental conditions are conducive to performing an avian line-transect survey. If conditions cause the observer to feel that results of a survey would be biased due to poor weather, the survey should be postponed until weather conditions improve. Some examples of weather conditions that are grounds for postponement include: average wind speeds greater than 15 miles per hour, visibility 2.0 miles or less, heavy rain/ fog or extreme temperatures.

2. *Record the start time*.
    i. The start time should represent the moment when observers initiate a search effort exclusive to the "transect" being surveyed; i.e. after initial information is recorded in the header of the data sheet, immediately before beginning to search for birds.
3. *Precip (Y/N)* = Precipitation, "Yes" or "No" for the entire survey period.
4. *Visibility (Miles)* = Estimate of how far the observer can see (in miles) across the landscape. Use visible landmarks to aid in this determination.
5. *Wind (AVG MPH)* = Record the Average Wind Speed in miles per hour. A Kestrel (or similar measuring tool) should be used to record current wind conditions.
    i. First, determine the direction from which the wind is blowing. Position the anemometer in a location that is free from wind obstruction (clear from the leeward side of a tree, shrub or vehicle; top of a wash bank rather than a drainage bottom).
    ii. Hold the anemometer above head height and turn it on. Scroll to the device's "average" setting and allow it to record for two minutes. **NOTE: These devices will begin to average the wind speed from the second they are turned on and therefore they should be in position to record accurate conditions from the moment they are turned on until the moment the value is captured*.
6. *Temp (^oC)* = Record the Temperature in degrees Celsius.
    i. Hold the Kestrel or thermometer in a shaded location, approximately three-feet above the ground surface.
    ii. Allow the temperature reading to stabilize before recording the value. With a digital thermometer (such as a Kestrel) this point can be determined by the appearance of an unchanged value for 20 seconds or when the value suddenly changes direction from which it was adjusting, such as when the value increases after a consistent downward adjustment.
6. *Cloud Cover (%)* = A visual estimation which determines the percentage of visible sky that is covered by clouds.

- Recording Data

A. *Species code*: This is a bird's standardized four letter code. Appendix A contains the project related short list of codes for easy reference, if any are missing please reference: http://www.birdpop.org/DownloadDocuments/Alpha_codes_eng.pdf

B. *Detection type* (A, V): How the bird was **initially** detected; A = Audio and V = Visual. **NOTE: these codes are listed at the bottom of the data sheet.*

C. *Flight height (1, 2, 3 or 4)*: Record **lowest flight height observed** as one of the following numbers (1 through 4): 1 = 0-4m (height of a tall PV panel), 2 = 4-10m (height of a three-story building), 3 = 10-50m (height to top of transmission tower), 4 = 50m+ (higher than top of transmission tower). **NOTE: these codes are listed at the bottom of the data sheet.*

F. *Number (#) of individuals*: the number of birds detected (of the same species). If birds are obviously grouped together, record the number of individuals in the same-species group. If birds are separated by enough space to warrant recording significantly different distances for each, or if birds are located in significantly different directions, record those birds on separate lines (e.g. you can write BTSP in "Species code" on three different lines if there are three Black-throated Sparrows detected in three completely different directions; for each BTSP you would write "1" under "# of individuals.") **Important note:** Do not count eggs or young birds that are not yet independent from their parents as "individuals."

G. *Radial distance (meters)*: perpendicular (90°) distance from the transect, in meters. If distance cannot be accurately recorded at 90° from the line-transect: record a straight line distance from the observer to the bird, AND record the size of the angle formed between the straight line to the bird and the line-transect itself. (*This is recorded in the column "Bearing (degrees)" – see below.*) **Important note:** If recording a single distance for a "cluster" of the same species, use the estimated distance to the *center of the cluster*. These are "unlimited distance surveys" and there is no limit to the perpendicular distance which detections may be made.

H. *Bearing (degrees)*: if the distance recorded to the bird(s) is made at a 90° angle, leave this field blank. Generally, this will be the case. However, if the surveyor finds it necessary to record a straight line distance to the bird - for example if writing furiously after encountering a flock of birds, or if a large obstruction such as a tree blocks the view at 90° - use this column to record the size of the angle (in degrees) formed where the surveyor is the axis, the line-transect is the adjacent side of the angle, and the straight line between the surveyor and the bird is the hypotenuse side of the angle. (The "opposite" side, which is situated 90° from the line-transect, can then be automatically calculated during data analysis.)

I. *Behavior code*: See Appendix B for a complete explanation of each behavior code. Multiple codes can be used, separated by commas (for example: C, S), but please list the *initial* behavior code first. **NOTE: these codes are listed with brief definitions at the bottom of the data sheet.*

J. *Comments*: Observers may enter comments that they feel are relevant to any detection. It is a good idea to enter a comment such as "no data" if observers did not have a detection on the line-transect so that data checkers can keep track of progress and know that there is not data missing. If an individual bird is counted as an "incidental" and recorded again during the station survey, a comment should be made indicating such. **Note**: Any incidental sightings should be entered into pendragon, not on the transect data form.

Line-Transect Survey Methods/ Procedures:

Once observers/ surveyors are within 200 meters of a start point they should record the initial data found in the header of the data sheet, except for Start Time. Start Time should be recorded when the surveyor arrives at the beginning of the line-transect, immediately before beginning to survey the transect.

Access the starting point and record any incidental (I) sightings while in route into pendragon. Because line-transect surveys tend to generate many more detections than a traditional point-count or point-transect, and therefore take longer to conduct, incidental sightings should be limited to noteworthy detections. Examples include: a new species for the project site list; a species not likely to be encountered again during the particular line-transect survey; a bird exhibiting breeding behavior; or any other reason the surveyor feels it necessary to document a particular incidental sighting as “data.”

Once at the starting point for the line-transect, begin the count period by recording the Start Time. Birds that flush from the line-transect during approach should be included in the survey period and documented by recording the distance to the bird’s initial position, prior to flushing. Detections should include a value for: “Species code,” “Detection type,” “Flight height,” “Number (#) of individuals,” “Radial distance,” “Bearing,” and “Behavior code” (if applicable). Observers should travel slowly or stop occasionally along the line to listen for vocalizations and to search dense areas of cover. Try to move as quietly as possible to maximize aural detections. A relatively constant pace should be maintained, but take the time needed to confidently identify every bird detected. Don’t forget to scan the sky as well as the surrounding habitat, to maximize probability of detection for all upland species (especially raptors).

Once a line-transect has been completed, observers should record “End time”. The surveyor should then access the next line-transect as soon as possible, if surveying a second transect that day. Any bird detection made after the “End time” has been recorded at the ending point should be recorded as an incidental detection in pendragon (even if surveyor is still at the ending point). Bird detections made between transects are recorded as incidental sightings, as well.

Care must be taken to avoid double-counting. The goal is to account for individuals of a given species no more than one time during the line-transect survey period; the exception to this rule being “incidental” detections. A bird recorded as an incidental may be recorded again during the official line-transect survey, but observers should provide a comment that indicates as much. It is important to separate incidental sightings from transect sightings for the purpose of data analysis but it is also important that we account for as many species/ individuals as possible during each survey. Once an observer has traveled more than 200 meters from the last station they should take final weather data and record any final comments on the data sheet.

There may be additional bird sightings that observers wish to record that can provide benefit to the project but are not relevant to the particular survey. Additional sighting should be recorded in the Incidental pendragon form, where they may provide beneficial migratory or distributional data.

Quartzite Avian Line-Transect Survey Protocol - Appendix B:
Species Codes

Desert Sunlight Bird List

AMERICAN AVOCET	AMAV	GRAY FLYCATCHER	GRFL	ROCK WREN	ROWR
AMERICAN KESTREL	AMKE	GREAT BLUE HERON	GBHE	SAGE SPARROW	SAGS*
AMERICAN ROBIN	AMRO	GREAT EGRET	GREG	SAGE THRASHER	SATH
AMERICAN WHITE PELICAN	AWPE	GREAT HORNED OWL	GHOW	SAVANNAH SPARROW	SAVS*
ANNA'S HUMMINGBIRD	ANHU	GREATER ROADRUNNER	GRRO	SAY'S PHOEBE	SAPH
ASH-THROATED FLYCATCHER	ATFL	GREAT-TAILED GRACKLE	GTGR	SHARP-SHINNED HAWK	SSHA
BARN OWL	BANO*	GREEN-TAILED TOWHEE	GTTO	SHORT-EARED OWL	SEOW
BARN SWALLOW	BARS*	HORNED LARK	HOLA	SNOWY EGRET	SNEG
BENDIRE'S THRASHER	BETH**	HOUSE FINCH	HOFI	SPOTTED TOWHEE	SPTO
BLACK PHOEBE	BLPH	HOUSE SPARROW	HOSP	SWAINSON'S HAWK	SWHA
BLACK-CROWNED NIGHT HERON	BCNH	HOUSE WREN	HOWR	TOWNSEND'S WARBLER	TOWA
BLACK-NECKED STILT	BNST	KENTUCKY WARBLER	KEWA	TREE SWALLOW	TRES*
BLACK-TAILED GNATCATCHER	BTGN	KILLDEER	KILL	TURKEY VULTURE	TUVU
BLACK-THROATED GRAY WARBLER	BTYW*	LARK BUNTING	LARB	UNIDENTIFIED BIRD	UNBI
BLACK-THROATED SPARROW	BTSP	LARK SPARROW	LASP	UNIDENTIFIED EMPIDONAX	UNEM
BLUE-GRAY GNATCATCHER	BGGN	LAZULI BUNTING	LAZB*	UNIDENTIFIED GULL	UNGU
BREWER'S BLACKBIRD	BRBL	LE CONTE'S THRASHER	LCTH	UNIDENTIFIED HAWK	UNHA
BREWER'S SPARROW	BRSP	LESSER GOLDFINCH	LEGO	UNIDENTIFIED HUMMINGBIRD	UNHU
BROWN-HEADED COWBIRD	BHCO	LESSER NIGHTHAWK	LENI	UNIDENTIFIED SWALLOW	UNSW
BULLOCK'S ORIOLE	BUOR	LINCOLN'S SPARROW	LISP	UNIDENTIFIED WARBLER	UNWA
BURROWING OWL	BUOW	LOGGERHEAD SHRIKE	LOSH	VAUX'S SWIFT	VASW
CACTUS WREN	CACW*	MERLIN	MERL	VERDIN	VERD
CATTLE EGRET	CAEG	MOUNTAIN BLUEBIRD	MOBL	VIOLET-GREEN SWALLOW	VGSW
CEDAR WAXWING	CEDW*	MOURNING DOVE	MODO	WESTERN BLUEBIRD	WEBL
CHIPPING SPARROW	CHSP	NORTHERN FLICKER	NOFL	WESTERN KINGBIRD	WEKI

CLIFF SWALLOW	CLSW	NORTHERN HARRIER	NOHA	WESTERN MEADOWLARK	WEME
COMMON POORWILL	COPO	NORTHERN MOCKINGBIRD	NOMO	WESTERN SCRUB-JAY	WESJ
COMMON RAVEN	CORA	NORTHERN PARULA	NOPA	WESTERN TANAGER	WETA
COMMON YELLOWTHROAT	COYE	NORTHERN ROUGH-WINGED SWALLOW	NRWS	WHITE-CROWNED SPARROW	WCSP
COOPER'S HAWK	COHA	ORANGE-CROWNED WARBLER	OCWA	WHITE-FACED IBIS	WFIB
COSTA'S HUMMINGBIRD	COHU	OSPREY	OSPR	WHITE-THROATED SPARROW	WTSP
DARK-EYED JUNCO	DEJU	PEREGRINE FALCON	PEFA	WHITE-THROATED SWIFT	WTSW
EUROPEAN STARLING	EUST	PHAINOPEPLA	PHAI	WILSON'S WARBLER	WIWA
FERRUGINOUS HAWK	FEHA	PRAIRIE FALCON	PRFA	YELLOW-HEADED BLACKBIRD	YHBA
FRANKLIN'S GULL	FRGU	PURPLE MARTIN	PUMA**	YELLOW-RUMPED WARBLER	YRWA
GAMBEL'S QUAIL	GAQU	RED-TAILED HAWK	RTHA	YELLOW WARBLER	YWAR*
GOLDEN EAGLE	GOEA**	ROCK PIGEON	ROPI		

*four letter codes that are not 'first order' due to conflict. **birds known to occur, or that may potentially occur, that were not from Desert Sunlight Surveys

If there is a code missing from the list, please refer to: http://www.birdpop.org/DownloadDocuments/Alpha_codes_eng.pdf for the four letter code.

Quartzite Avian Line-Transect Survey Protocol - Appendix C:

Behavior Codes

The following is a detailed explanation of all possible behavior codes, some of them were taken from the Cornell Lab of Ornithology's "eBird" protocol. These codes are fairly standard across many Breeding Bird Atlases and other breeding bird surveys. Each code represents a Confirmed, Probable or Possible breeding record (You do NOT need to record anything other than the two-letter code on your data sheet! This is information is presented for reference only.)

NY = Confirmed--Nest with Young -- Nest with young seen or heard.
NE = Confirmed--Nest with Eggs -- Nest with eggs.
ON = Confirmed--Occupied Nest -- Occupied nest presumed by parent entering and remaining, exchanging incubation duties, etc.
FL = Confirmed--Recently Fledged young -- Recently fledged or downy young observed while still dependent upon adults.
FY = Confirmed--Feeding Young -- Adult feeding young that have left the nest, but are not yet flying and independent (should not be used with raptors, terns, and other species that may move many miles from the nest site).
CS = Confirmed--Carrying Fecal Sac -- Adult carrying fecal sac.
CF = Confirmed--Carrying Food -- Adult carrying food for young (should not be used for corvids, raptors, terns, and certain other species that regularly carry food for courtship or other purposes).
DD = Confirmed--Distraction Display -- Distraction display, including feigning injury.

NB = Confirmed/Probable--Nest Building -- Nest building at apparent nest site (should not be used for certain wrens, and other species that build dummy nests).
CN = Confirmed/Probable--Carrying Nesting Material -- Adult carrying nesting material; nest site not seen.
T = Probable--Territory held for 7+ days -- Territorial behavior or singing male present at the same location 7+ days apart.
CO = Probable--Courtship, Display or Copulation -- Courtship or copulation observed, including displays and courtship feeding.
N = Probable--Visiting probable Nest site -- Visiting repeatedly probable nest site (primarily hole nesters).
A = Probable--Agitated behavior -- Agitated behavior or anxiety calls from an adult (ex. "pishing" and strong tape responses).
PA = Possible--Pair in suitable habitat -- Pair observed in suitable breeding habitat within breeding season.

The following are behavior codes included on the data sheet.

S = Singing

P = Perched

F = Foraging

C = Calling

FO = Flyover

O = Other (explain: wing noise, drumming, etc),

Quartzite Avian Line-Transect Survey Protocol - Appendix D:

Assumptions Of Line Distance Sampling

Both line-transects and point-transects, as well as point-counts that record distances as data, are all classified as various types of “distance sampling” (Buckland et al. 1993, Rosenstock et al. 2002). Line-transects are a form of “Line distance sampling.” It is important that surveyors make every effort to avoid violating each of the three main assumptions of line distance sampling:

1) Birds on the line are detected with certainty. Observers should travel slowly or stop occasionally along the line to listen for vocalizations and to search dense areas of cover. Try to move as quietly as possible to maximize aural detections. Conduct the survey such that you are reasonably sure to detect all birds with a distance of “0 meters.”
2) Birds are detected before evasive movement is triggered by the observer. This sampling method obtains an instantaneous “snapshot” of birds around the line. However, some species may take evasive actions and move some distance before being detected by the observer (e.g. quail); some species such as ravens may even be attracted to the observer! We should do our best as observers to keep our senses sharp and try to make those detections before the birds change positions.
3) Distances are estimated or measured accurately. Angles in particular must be measured accurately if taking a radial distance and bearing to a bird, rather than measuring from 90°. Using rangefinders for measuring distance and a good compass for measuring angles are the surest ways to eliminate error.

There are other minor assumptions, but these are the most important. Naturally, it is also critical that observers be competent in identifying birds by sight and sound, and well-trained in the survey methods.

One quick side note is that line-transects work very well in areas where surveyors do not need to focus as much on their footing. This sampling method does not work very well in steep or broken terrain…

Finally: if you have any questions about this protocol, please ask before beginning any surveys!

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Buckland, S.T., Anderson, D.R., Burnham, K.P. and Laake, J.L. 1993. Distance Sampling: Estimating Abundance of Biological Populations. Chapman and Hall, London. 446pp.

Rosenstock, S.S., Anderson, D.R., Giesen, K.M., Leukering, T. and Carter, M.F. 2002. Landbird Counting Techniques: Current Practices and an Alternative. Auk 119(1): 46-53.

APPENDIX E QUARTZITE FALL 2012 AND SPRING 2013 PLANT LIST

Appendix E Quartzite Fall 2012 and Spring 2013 Plant List

Scientific Name	Family	Abundance
Abronia villosa	Nyctaginaceae	Common
Achyronchia cooperi	Caryophyllaceae	Occasional
Acmispon strigosus	Fabaceae	Common
Allionia incarnata	Nyctaginaceae	Occasional
Ambrosia dumosa	Asteraceae	Common
Ambrosia salsola	Asteraceae	Scarce
Aristida adscensionis	Poaceae	Occasional
Aristida oligantha	Poaceae	Scarce
Asclepias subulata	Apocynaceae	Scarce
Astragalus aridus	Fabaceae	Locally common
Astragalus didymocarpus	Fabaceae	Occasional
Astragalus insularis var. harwoodii	Fabaceae	Locally common
Astragalus nuttallianus var. imperfectus	Fabaceae	Locally abundant
Atriplex canescens	Chenopodiaceae	Scarce
Atriplex polycarpa	Chenopodiaceae	Scarce
Baileya pauciradiata	Asteraceae	Occasional
Bebbia juncea	Asteraceae	Scarce
Boerhavia triquetra var. intermedia	Nyctaginaceae	Locally common
Boerhavia wrightii	Nyctaginaceae	Common
Bouteloua aristidoides	Poaceae	Occasional
Bouteloua barbata	Poaceae	Occasional
**Brassica tournefortii*	Brassicaceae	Common / Locally abundant
Calocoseris wrightii	Asteraceae	Occasional
Caulanthus lasiophyllus	Brassicaceae	Occasional
Chaenactis carphoclinia	Asteraceae	Occasional
Chaenactis stevioides	Asteraceae	Abundant
**Chenopodium album*	Chenopodiaceae	Scarce

Scientific Name	Family	Abundance
**Chenopodium murale*	Chenopodiaceae	Scarce
Chorizanthe brevicornu	Polygonaceae	Occasional
Chorizanthe corrugata	Polygonaceae	Occasional
Chorizanthe rigida	Polygonaceae	Occasional
Chylismia brevipes	Onagraceae	Scarce
Chylismia claviformis ssp. aurantiaca	Onagraceae	Common
Croton californicus	Euphorbiaceae	Scarce
Cryptantha angustifolia	Boraginaceae	Abundant
Cryptantha costata	Boraginaceae	Occasional
Cryptantha maritima	Boraginaceae	Occasional
Cryptantha micrantha	Boraginaceae	Occasional
Cryptantha nevadensis	Boraginaceae	Scarce
Cryptantha pterocarya var. pterocarya	Boraginaceae	Scarce
Cylindropuntia echinocarpa	Cactaceae	Scarce
**Cynodon dactylon*	Poaceae	Scarce
Dalea mollis	Fabaceae	Occasional
Dalea mollissima	Fabaceae	Occasional
Dicoria canescens	Asteraceae	Occasional
Ditaxis neomexicana	Euphorbiaceae	Scarce
Dithyrea californica	Brassicaceae	Occasional
Encelia farinosa	Asteraceae	Scarce
Encelia frutescens	Asteraceae	Scace
Eremalche exilis	Malvaceae	Occasional
Eremalche rotundifolia	Malvaceae	Scarce
Eremothera boothii	Onagraceae	Occasional
Eriastrum harwoodii	Polemoniaceae	Scarce
Eriogonum inflatum	Polygonaceae	Scarce

Scientific Name	Family	Abundance
Eriogonum pusillum	Polygonaceae	Scarce
Eriogonum reniforme	Polygonaceae	Scarce
Eriogonum thomasii	Polygonaceae	Occasional
Eriogonum trichopes	Polygonaceae	Occasional
Erodium texanum	Geraniaceae	Common
Eschscholzia minutiflora	Papaveraceae	Scarce
Eschscholzia parishii	Papaveraceae	Scarce
**Eucalyptus sp.*	Myrtaceae	Scarce
Euphorbia abramsiana	Euphorbiaceae	Scarce
Euphorbia micromera	Euphorbiaceae	Common
Euphorbia polycarpa	Euphorbiaceae	Common
Euphorbia setiloba	Euphorbiaceae	Occasional
Ferocactus cylindraceus	Cactaceae	Scarce
Funastrum cynanchoides	Apocynaceae	Scarce
Funastrum hirtellum	Apocynaceae	Scarce
Funastrum utahense	Apocynaceae	Scarce
Geraea canescens	Asteraceae	Common
Hesperocallis undulata	Agavaceae	Common
Hilaria rigida	Poaceae	Locally common
Kallstroemia californica	Zygophyllaceae	Common / Locally abundant
Krameria bicolor	Krameriaceae	Occasional
Larrea tridentata	Zygophyllaceae	Common / Dominant shrub
Langloisia setosissima ssp. setosissima	Polemoniaceae	Scarce
Lepidium lasiocarpum var. lasiocarpum	Brassicaceae	Common
Loeseliastrum schottii	Polemoniaceae	Occasional
Lupinus arizonicus	Fabaceae	Scarce
Malacothrix glabrata	Asteraceae	Occasional

Appendix E: Quartzite Fall 2012 and Spring 2013 Plant List

Scientific Name	Family	Abundance
Mammillaria tetrancistra	Cactaceae	Scarce
Marina parryi	Fabaceae	Occasional
Mentzelia albicaulis	Loasaceae	Occasional
Mentzelia longiloba	Loasaceae	Occasional
Monoptilon bellioides	Asteraceae	Occasional
Nama demissum	Boraginaceae	Scarce
Oenothera deltoides	Onagraceae	Common / Locally abundant
Oenothera primiveris	Onagraceae	Scarce
Oligomeris linifolia	Resedaceae	Occasional
Olneya tesota	Fabaceae	Scarce
Palafoxia arida	Asteraceae	Occasional
Parkinsonia florida	Fabaceae	Scarce
Pectis papposa	Asteraceae	Common / Locally abundant
Pectocarya heterocarpa	Boraginaceae	Common
Pectocarya platycarpa	Boraginaceae	Common
Pectocarya recurvata	Boraginaceae	Scarce
Perityle emoryi	Asteraceae	Scarce
Phacelia crenulata var. ambigua	Boraginaceae	Occasional
Phacelia crenulata var. crenulata	Boraginaceae	Occasional
Phacelia crenulata var minutiflora	Boraginaceae	Occasional
Phacelia ivesiana	Boraginaceae	Scarce
Plagiobothrys jonesii	Boraginaceae	Scarce
Plantago ovata	Plantaginaceae	Common
Probiscidea althaeifolia	Martyniaceae	Occasional
Prenanthella exigua	Asteraceae	Scarce
**Polygonum aviculare subsp. depressum*	Polygonaceae	Scarce
Prosopis glandulosa	Fabaceae	Scarce

Appendix E: Quartzite Fall 2012 and Spring 2013 Plant List

Scientific Name	Family	Abundance
Psathyrotes ramosissima	Asteraceae	Scarce
Psorothamnus emoryi	Fabaceae	Occasional
Rafinesquia neomexicana	Asteraceae	Common
**Salsola tragus*	Chenopodiaceae	Occasional / Locally abundant
**Schismus barbatus*	Poaceae	Common, widespread
Sphaeralcea angustifolia	Malvaceae	Scarce
Stephanomeria exigua	Asteraceae	Occasional
Stephanomeria pauciflora	Asteraceae	Occasional
Stillingia spinulosa	Euphorbiaceae	Scarce
Stipa hymenoides	Poaceae	Occasional
Streptanthella longirostris	Brassicaceae	Occasional
**Tamarix ramosissima*	Tamaricaceae	Scarce
Tidestromia suffruticosa var. oblongifolia	Amaranthaceae	Scarce
Tiquilia palmeri	Boraginaceae	Scarce
Tiquilia plicata	Boraginaceae	Locally common
**Tribulus terrestris*	Zygophyllaceae	Scarce

All nomenclature conforms to Baldwin, 2012: The Jepson Manual, 2nd edition.

*denotes non-native taxa

APPENDIX F DESERT QUARTZITE INHOLDING PLANT REPORT

DRAFT

Spring 2015 Rare Plant Survey
DESERT QUARTZITE SOLAR PROJECT
PRIVATE LAND STUDY AREA
RIVERSIDE COUNTY, CALIFORNIA

Prepared for
DESERT QUARTZITE, LLC
135 Main Street, 6th floor
San Francisco, CA 94105

Prepared by
IRONWOOD CONSULTING INC.
1030 Nevada Street, Suite 201
Redlands, CA 92374

June 2015

TABLE OF CONTENTS

1.0 INTRODUCTION 1
  1.1 PURPOSE 1
  1.2 SITE LOCATION 1
  1.3 PROPOSED PROJECT 1
  1.4 STUDY AREA 4
2.0 METHODS 6
  2.1 SURVEY TIMING 6
  2.2 SURVEYOR QUALIFICATIONS 6
  2.3 SURVEY INTENSITY 6
3.0 RESULTS 7
  3.1 FLORISTIC SUMMARY 7
  3.2 SPECIAL STATUS PLANTS FOUND 7
    3.2.1 *Astragalus insularis* var. *harwoodii* 7
    3.2.2 *Cryptantha costata* 8
    3.2.3 Other Target Plants 8
4.0 REFERENCES 9

LIST OF FIGURES

Figure 1: Combined Rare Plants Map 2
Figure 2 Combined rare plants map 3

LIST OF TABLES

Table 1: Blythe Rainfall: October 2014-March 2015 6

LIST OF PHOTOGRAPHS

Photograph 1: View of Jojoba Farm from top of southern berm, looking north 4
Photograph 2: Typical annual plant distribution seen on interspace swales 7

APPENDICIES

Appendix 1: Quartzite Private Lands Plant List: March 2015

1.0 INTRODUCTION

1.1 PURPOSE

Desert Quartzite, LLC, has requested special status plant surveys across the 160-acre abandoned jojoba farm, a privately held property located in the center of the larger Desert Quartzite project site. The private land was excluded from the full coverage plant surveys in 2012 and 2013 because it was not then considered a part of the project. This parcel is now included as part of the larger project, triggering the need for additional botany surveys.

Full coverage special status plant surveys were conducted across the site from March 10 through12, 2015. This survey's objectives, methodologies, and target plants are identical to the original plant surveys of 2012 and 2013, and were designed and timed to conform to current plant survey protocols (BLM 2009 and CDFG 2009).

1.2 SITE LOCATION

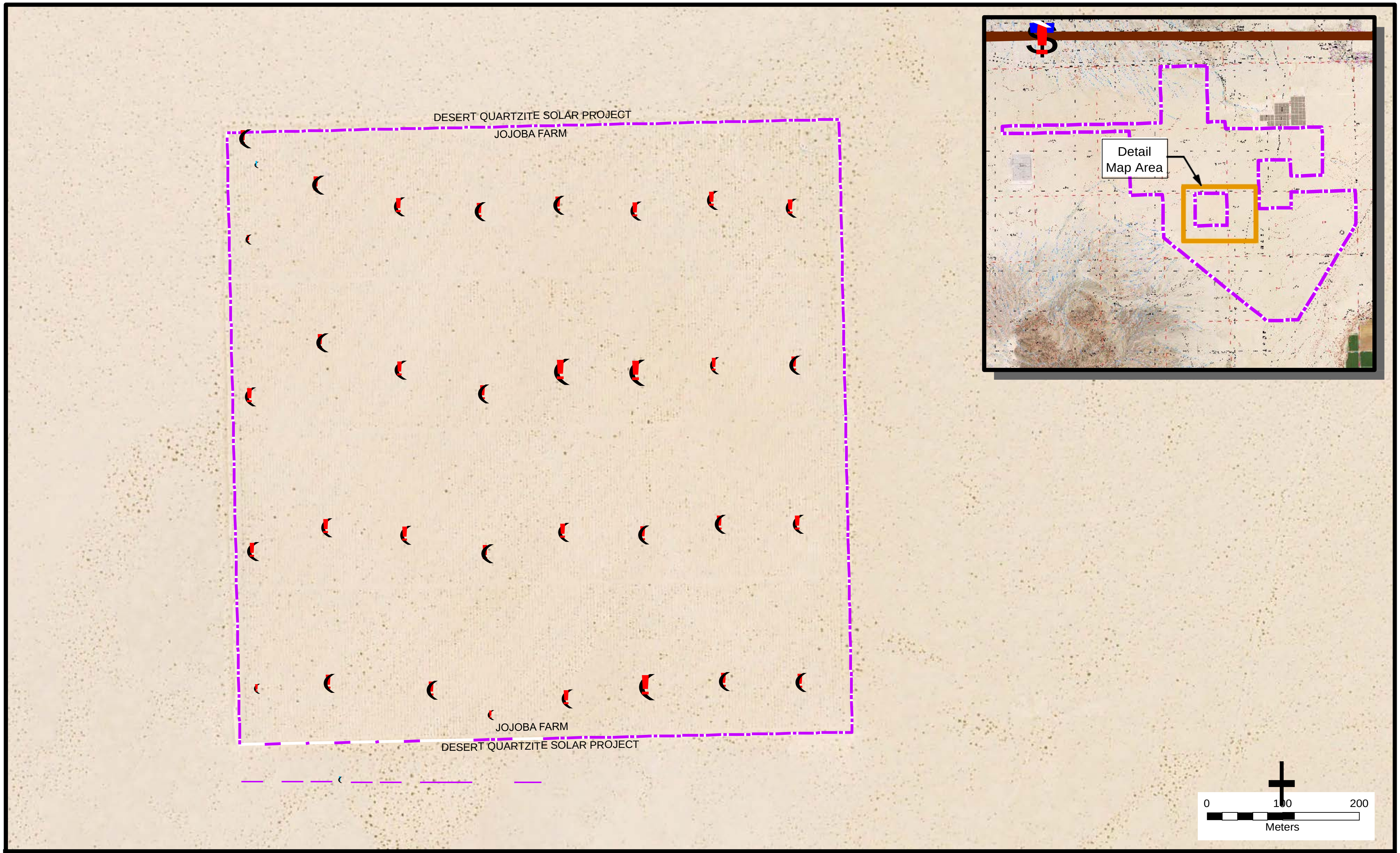
The Desert Quartzite Solar Project Private Land (Project) site is located on privately owned fallow farmland in unincorporated eastern Riverside County, California (Figure 1). The 160-acre private parcel is surrounded by the proposed Desert Quartzite Solar Project which is on lands managed by the Bureau of Land Management (BLM). This 160-acre parcel was originally excluded from the biological surveys that took place in 2008 and 2012 on the surrounding BLM lands. The Project Study Area (as defined in Section 1.3) is situated south of Interstate 10, approximately ten miles west of the City of Blythe. Elevations range from 370 feet (113 meters) above mean sea level (amsl) in the center of the site to over 410 feet (125 meters) amsl on the berm that surrounds the private land. The site is found on the Roosevelt mine and Ripley U.S. Geological Survey 7.5 minute quadrangles. The Project Study Area is located on the Palo Verde Mesa. The site is not located within any Desert Wildlife Management Area (DWMA) or Critical Habitat Unit (CHU).

1.3 PROPOSED PROJECT

The Project components are described in general terms below and are referring to the entire Desert Quartzite Solar Project including the Private Land Study Area (Figure 2). The entire Desert Quartzite Solar Project would include the Solar Facility (where the electrical power will be generated) and a 220-kilovolt (kV) transmission line (gen-tie Line) and the private lands being evaluated in this document. The Solar Facility would consist of several main components, all located within the Desert Quartzite Solar Project security fencing and permanent desert tortoise fencing:

- Main Generation Area - PV arrays, combining switchgear, overhead lines, and access corridors;
- Operations and Maintenance (O&M) Facility;
- On-site substation; and
- Site Security, Fencing, and Lighting.

The Desert Quartzite Solar Project would interconnect with the regional transmission system via a 220-kV single-circuit gen-tie Line that would exit the western portion of the Solar Farm site and follow a 160-foot-wide transmission right of way (ROW) to the planned Southern California Edison (SCE) Colorado River Substation located approximately one mile west of the proposed Quartzite Solar site western boundary.


DESERT QUARTZITE SOLAR PROJECT
JOJOBA FARM
JOJOBA FARM
DESERT QUARTZITE SOLAR PROJECT
Detail
Map Area
0
100
200
Meters

Species
- Ribbed Cryptantha
- Harwood's Milkvetch

Plant Density
- ○ 1 - 10
- ○ 10 -100
- ○ 100 - 1,000
- ○ 1,000 - 5,000
- ○ 5,000 - 12,200

Desert Quartzite Site Boundary

Note:

Dot size does not represent Area of Occurrence

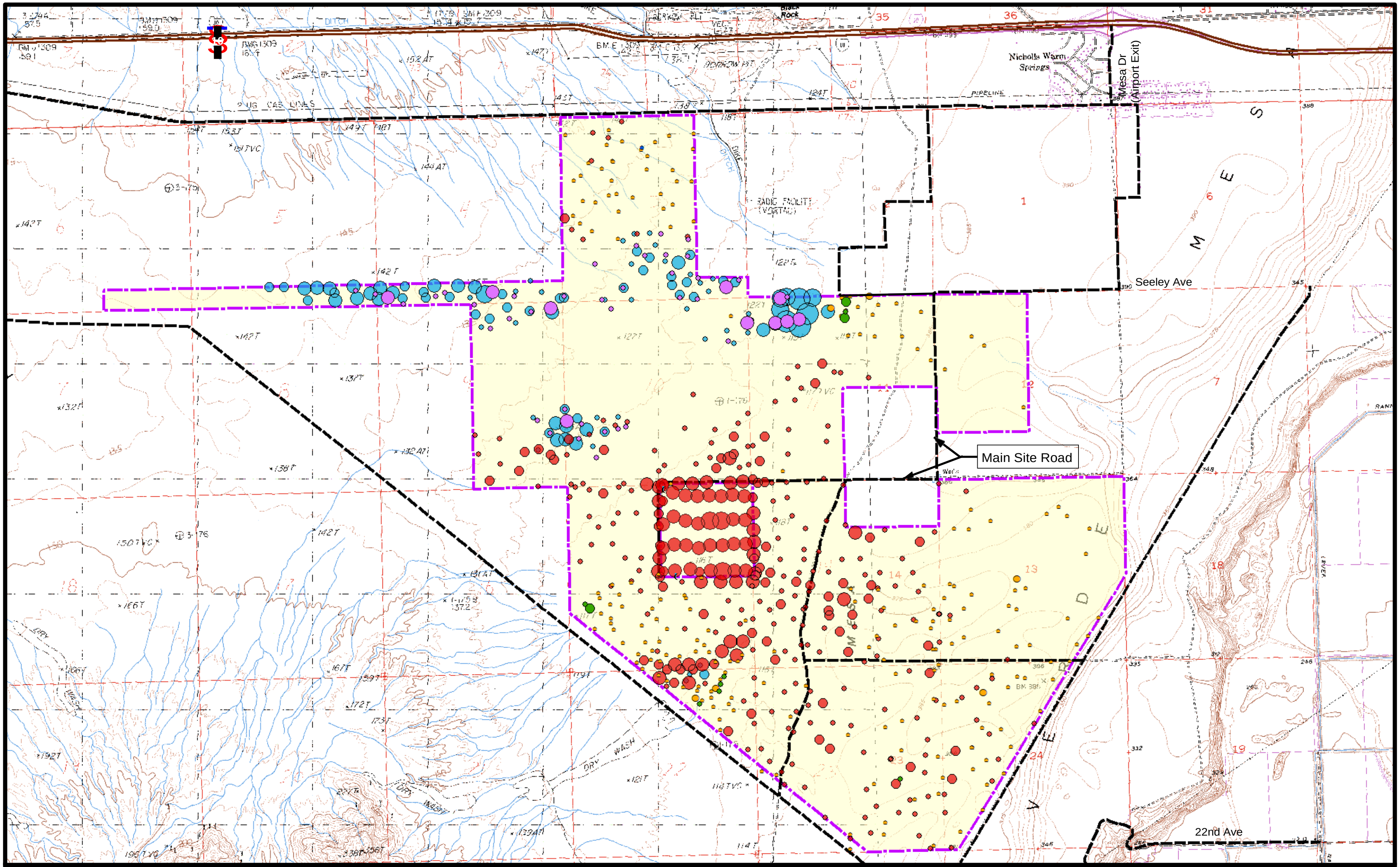
DESERT QUARTZITE SOLAR PROJECT
DESERT QUARTZITE, LLC

Figure 1

Private Land Spring 2015 Rare Plant Survey

#300 P:\GIS\Ironwood\Shared\Projects\Projects\Quartzite\ArcGIS project files\Plants_Jojoba.mxd 4/30/2015

P:\GIS\IronwoodShared\Projects\Projects\QuartziteArcGIS project files\Plants_Combined_20150430.mxd


Mesa Dr
(Airport Exit)
Nicholls Warm Springs
Seeley Ave
Main Site Road
22nd Ave
MESA
VERDE
MESA

Species

- ● Harwood's Eriastrum
- ● Ribbed Cryptantha
- ● Adam's Prostrate Spurge
- ● Desert Devil's Claw
- ● Harwood's Milkvetch
- ● Utah Vine Milkweed

Plant Density

- ○ 1 - 10
- 10 -100
- ○ 100 - 1,000
- ○ 1,000 - 5,000
- ○ 5,000 - 12,200

- ▬ ▬ Site Access Roads
- ▨ Desert Quartzite Site Boundary

Note:
Dot size does not represent Area of Occurrence

0 500 1,000
Meters

DESERT QUARTZITE SOLAR PROJECT
DESERT QUARTZITE, LLC

Figure 2

Combined Rare Plants Map

1.4 STUDY AREA

For the purpose of this report, the Study Area is defined by the area of private land subjected to biological resource assessment including vegetation community mapping, soils mapping, and habitat assessments for special status species. The Study Area is a historical jojoba farm that is a square 160-acre parcel situated within diffuse creosote bush scrub (Photograph 1). Presumably it was constructed in the late 1970s to early 1980s, and abandoned within 10 years thereafter. The entire site was either chained or bulldozed, and is surrounded on all sides by bulldozed berms about 4 to 5 ft. high. Soil is soft decomposed granitic sand with occasional patches of gravel and larger cobbles. There is a good access road around the inner perimeter of the berms on all four sides.

Photograph 1: View of Jojoba Farm from top of southern berm, looking north

Rows of jojoba (*Simmondsia chinensis*) were planted in a north-south orientation throughout the site and spaced about 4 meters (m) apart. These rows are slightly raised to cover the buried three-fourths inch perforated irrigation pipe running their entire length. There is a wellhead and some debris remaining at the northeast corner entrance to the site.

Thousands of jojoba were planted across the site, and about one third are currently surviving today without any maintenance. However, the health of the existing plants is diminished; most are dying-back from their center outwards but a few are still flowering and fruiting.

Since abandonment, native vegetation seems to be recovering slowly. Sparse creosote bush (*Larrea tridentata)* can be seen throughout the site and on the surrounding berms. This is probably re-growth from old root crowns, but some smaller new plants have taken hold. The only other common native perennials appearing occasionally are white bursage (*Ambrosia dumosa)* and brittlebrush (*Encelia farinosa).* Native annual plants recolonizing the site include desert pincushion (*Chaenactis stevioides),* brown-eyed primrose *(Chylismia claviformis),* narrowed-leaved popcorn flower *(Cryptantha angustifolia),* chuckwalla combseed *(Pectocarya heterocarpa),* Harwood's milkvetch *(Astragalus insularis* var. *harwoodii),* dwarf white milkvetch *(A. didymocarpus),* stigose bird's-foot trefoil *(Acmispon strigosus),* and hairy desert sunflower (*Gerea canescens).*

Non-native annual weeds are not particularly abundant except for common Mediterranean grass (*Schismus barbatus)* (widespread), and occasional Sahara mustard (*Brassica tournefortii).*

2.0 METHODS

2.1 SURVEY TIMING

This survey was conducted during the optimal season for positive identification of all target plants, as well as justifiable on-site conditions for finding target plants.

A cursory site check was performed by Michael Honer on February 24, 2015. Many common annuals and one target plant were observed leafing-out at that time. It was decided that survey timing should be in mid-March to catch most of the target plants in optimal identifiable condition. During the survey of March 10-12, the soil was still quite moist at a depth of about 3 inches.

Reference population checks were performed for the three special status species with the highest probability of encounter during the survey: *Astragalus insularis* var. *harwoodii*, *Cryptantha costata*, and *Eriastrum harwoodii*. All three of these plants were relocated off-site from populations found during the spring 2013 surveys, and observed in flowering and/or fruiting condition on March 10, 2015.

Although most of California remains in a state of extreme historical drought, actual rainfall on the Quartzite project area from fall 2014 through spring 2015 was only slightly below average (Table 1).

Table 1: Blythe Rainfall: October 2014-March 2015

Station ID	Location	OCT 2014	NOV 2014	DEC 2014	JAN 2015	FEB 2015	MAR 2015
BLH	Blythe	0.03	0	0.78	0.57	0.04	1.02

Notes:

Precipitation in inches
Source: National Weather Service California Nevada River Forecast Center Lower Colorado Region;
Station: Blythe, http://www.cnrfc.noaa.gov/monthly_precip.php

2.2 SURVEYOR QUALIFICATIONS

Three surveyors, Michael Honer, Brian Sandstrom, and Kelsi Black, performed this survey. All had all participated in the fall 2012 and spring 2013 Quartzite rare plant surveys, and are experienced in identification of all the target plants, as well as extensive knowledge of western Sonoran desert plants.

2.3 SURVEY INTENSITY

This survey provided 100 percent coverage of the entire jojoba farm site, including the surrounding berms. Transects were walked slowly along the jojoba rows in North-South and South-North directions, at a spacing of less than 10 m between surveyors. This was appropriate spacing for detecting any special status plants, no matter how small or cryptic.

3.0 RESULTS

3.1 FLORISTIC SUMMARY

Forty-one (41) species of vascular plants were recorded on the jojoba farm site during this survey (Appendix 1). Plant germination across the site was generally very patchy. Most annuals were observed within the row interspace swales where water would collect, but long stretches of the farm yielded only barren sand. Occasional perennial species were seen, but the majority of vegetation was annual (Photograph 2).

Photograph 2: Typical annual plant distribution seen on interspace swales

3.2 SPECIAL STATUS PLANTS FOUND

3.2.1 Astragalus insularis var. *harwoodii*

CNPS RPR 4 (Plants of Limited Distribution - A Watch List) Approximately 12,658 individuals

Astragalus insularis var. *harwoodii* was distributed widely across the entire jojoba farm site, including the peripheral berms (Figure 1). There was no particular pattern of distribution; these plants could be found against the irrigation berms or within the interspaces. When found, they were usually in patches of 2 to 30 individuals, most often accompanied by other flowering native annuals.

This distribution of *Astragalus* on the jojoba farm mirrors our observations from the spring 2013 surveys. Populations of this plant tend to concentrate against hills, berms, and other obstructions that interrupt the smooth laminar flow of the prevailing winds. Most likely, the puffy swollen fruits get swept-along by wind and dropped whenever there is an obstacle such as a berm.

The jojoba farm is a regular grid of shallow mounds and berms, providing excellent micro-breaks in the flow of wind. Thus there are many opportunities for *Astragalus* seedpods to drop and accumulate anywhere within the farm, leading to the large numbers of individuals counted during this survey.

The linear distribution of A. insularis var. hardwoodii. waypoints as depicted on Figure 2 is an artifact of the mapping protocol. Actual distribution of this plant was patchy, and evenly dispersed across the whole farm with no evident pattern visually observed.

3.2.2 Cryptantha costata

CNPS RPR 4: 2 individuals

Only two individuals of *Cryptantha costata* were found during this survey. Both of these appear to be waifs and it is unlikely that they will promote establishment of larger populations on the jojoba farm. This occurrence is insignificant when compared to the approximately 56,000 individuals found on deeper sandy areas of the solar site and T-line in spring 2013.

3.2.3 Other Target Plants

No other target plants were found during this survey. Ironwood looked carefully for any occurrences of *Eriastrum harwoodii* (CNPS RPR 1B.2), but none were found. This plant is restricted to deeper sand dunes around the NW corner of the site and along the T-line. Appropriate habitat within the jojoba farm was not present.

The only other target plants potentially surviving on the jojoba farm could be *Proboscidea altheifolia* (RPR 4.3) and *Euphobria abramsiana* (RPR 2B.2), but both of these plants usually leaf and flower in the fall after summer monsoons. Neither of these plants have particularly high status ranking (CNPS 2015), and any additional discoveries of these would be relatively insignificant in light of widely scattered documentation from the fall 2012 plant surveys.

4.0 REFERENCES

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California Native Plant Society

2015 Rare Plant Program. 2015. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society, Sacramento, CA. Website *http://www.rareplants.cnps.org* [accessed 21 March 2015].

APPENDIX 1: QUARTZITE PRIVATE LAND PLANT LIST: March 2015

QUARTZITE PRIVATE LAND PLANT LIST **March 2015**	
Scientific name	**Abundance**
Abronia villosa	scarce
Acmispon strigosus	occasional
Allionia incarnata	scarce
Ambrosia dumosa	scarce
Aristida adscensionis	scarce
Astragalus didymocarpus	scarce
Astragalus insularis* var. *harwoodii	abundant
Brassica tournefortii	occasional
Calicoseris wrightii	scarce
Chaenactis carpholclinia	scarce
Chaenactis stevioides	occasional
Chorizanthe rigida	scarce
Chylismia claviformis	occasional
Cryptantha angustifolia	common
Cryptantha costata	scarce
Cryptantha maritima	occasional
Dithyrea californica	scarce
Encelia farinosa	scarce
Eremalche rotundifolia	scarce
Eriogonum tricopes	scarce
Erodium texanum	scarce
Gerea canescens	occasional
Hesperocallis undulata	scarce
Hilaria rigida	scarce
Larrea tridentata	occasional
Lepidium lasiocarpum	occasional
Mentzelia longiloba	scarce
Oenothera deltoides	scarce
Palafoxia arida	occasional

QUARTZITE PRIVATE LAND PLANT LIST **March 2015**	
Pectocarya heterocarpa	common
Pectocarya platycarpa	occasional
Phacelia ambigua	scarce
Plantago ovata	occasional
Prosopis glandulosa	scarce
Rafinesquia neomexicana	scarce
Schismus barbatus	abundant
Simmonsdia chinensis	common
Sonchus oleraceus	scarce
Stephanomeria exigua	scarce
Streptanthella longirostris	occasional
Tiquilia plicata	occasional

APPENDIX G QUARTZITE PRIVATE LANDS PRELIM. BIOLOGICAL ASSESSMENT

Draft

Preliminary Biological Reconnaissance Assessment
Desert Quartzite Solar Project
Private Land Study Area
Riverside County, California

Prepared for:

Desert Quartzite, LLC
135 Main Street, 6th Floor
San Francisco, CA 94105

Prepared by:

Ironwood Consulting, Inc.
1040 Nevada Street, Suite 301
Redlands, CA 92374

December 2014

TABLE OF CONTENTS

SUMMARY ... 1

1.0 INTRODUCTION ... 1
  1.1 SITE LOCATION ... 1
  1.2 PROPOSED PROJECT ... 1
  1.3 STUDY AREA ... 1

2.0 METHODS ... 5
  2.1 LITERATURE SEARCH ... 5
  2.2 PRELIMINARY MAPPING ... 5
  2.3 PRELIMINARY SURVEY ... 6

3.0 RESULTS ... 7
  3.1 GENERAL ... 7
  3.2 SOILS ... 7
  3.3 VEGETATION COMMUNIES ... 7
  3.4 WILDLIFE COMMUNITIES ... 7
  3.5 SPECIAL STATUS SPECIES ... 9
    3.5.1 Special Status Plant Species ... 10
    3.5.2 Special Status Wildlife Species ... 15
  3.6 SENSITIVE HABITATS ... 22

4.0 CONCLUSIONS AND RECOMMENDATIONS ... 24
  4.1 SPECIAL STATUS SPECIES ... 24
  4.2 FOCUSED STUDIES ... 24

5.0 REFERENCES ... 26

LIST OF FIGURES

Figure 1 Regional Setting ... 3
Figure 2 Study Area ... 4
Figure 3 Soils Type and CNDDB Occurrences ... 8

LIST OF TABLES

Table 1 Weather Conditions during Surveys ... 7
Table 2 Potential for Occurrence Definitions ... 10
Table 3 Special Status Plant Species ... 11
Table 4 Special Status Wildlife Species ... 15

LIST OF APPENDICES

Appendix A Site Photos

SUMMARY

The Desert Quartzite Solar Project Private Land (Project) Study Area is primarily fallow jojoba farmland that currently supports Sonoran Creosote Bush Scrub.

One federal- and state-listed (threatened) species is likely to inhabit the Study Area, the desert tortoise. Several other special status plant and wildlife species may also occur within the Study Area. Focused surveys are recommended for:

- Desert tortoise;
- Mojave fringe-toed lizard;
- burrowing owl;
- Other special status wildlife species (pallid San Diego pocket mouse, prairie falcon, mountain lion, loggerhead shrike, Colorado Valley woodrat, burro deer, vermillion flycatcher, American badger, desert kit fox, and LeConte’s thrasher); and
- Special status plant species (desert unicorn-plant, Harwood’s milkvetch, Emory's crucifixion-thorn, Abrams' spurge, Las Animas colubrine, foxtail cactus, glandular ditaxis, and Wiggins' cholla).

1.0 INTRODUCTION

1.1 SITE LOCATION

The Desert Quartzite Solar Project Private Land (Project) site is located on privately owned fallow farmland in unincorporated eastern Riverside County, California (Figure 1). The 160-acre private parcel is surrounded by the proposed Desert Quartzite Solar Project which is on lands managed by the Bureau of Land Management (BLM). This 160-acre parcel was originally excluded from the biological surveys that took place in 2008 and 2012 on the surrounding BLM lands. The Project Study Area (as defined in Section 1.3) is situated south of Interstate 10, approximately ten miles west of the City of Blythe. Elevations range from 370 feet (113 meters) above mean sea level (amsl) in the center of the site to over 410 feet (125 meters) amsl on the berm that surrounds the private land. The site is found on the Roosevelt mine and Ripley U.S. Geological Survey 7.5 minute quadrangles. The Project Study Area is located on the Palo Verde Mesa. The site is not located within any Desert Wildlife Management Area (DWMA) or Critical Habitat Unit (CHU).

1.2 PROPOSED PROJECT

The Project components are described in general terms below and are referring to the entire Desert Quartzite Solar Project including the Private Land Study Area (Figure 2). The entire Desert Quartzite Solar Project would include the Solar Facility (where the electrical power will be generated) and a 220-kilovolt (kV) transmission line (gen-tie Line) and the private lands being evaluated in this document. The Solar Facility would consist of several main components, all located within the Desert Quartzite Solar Project security fencing and permanent desert tortoise fencing:

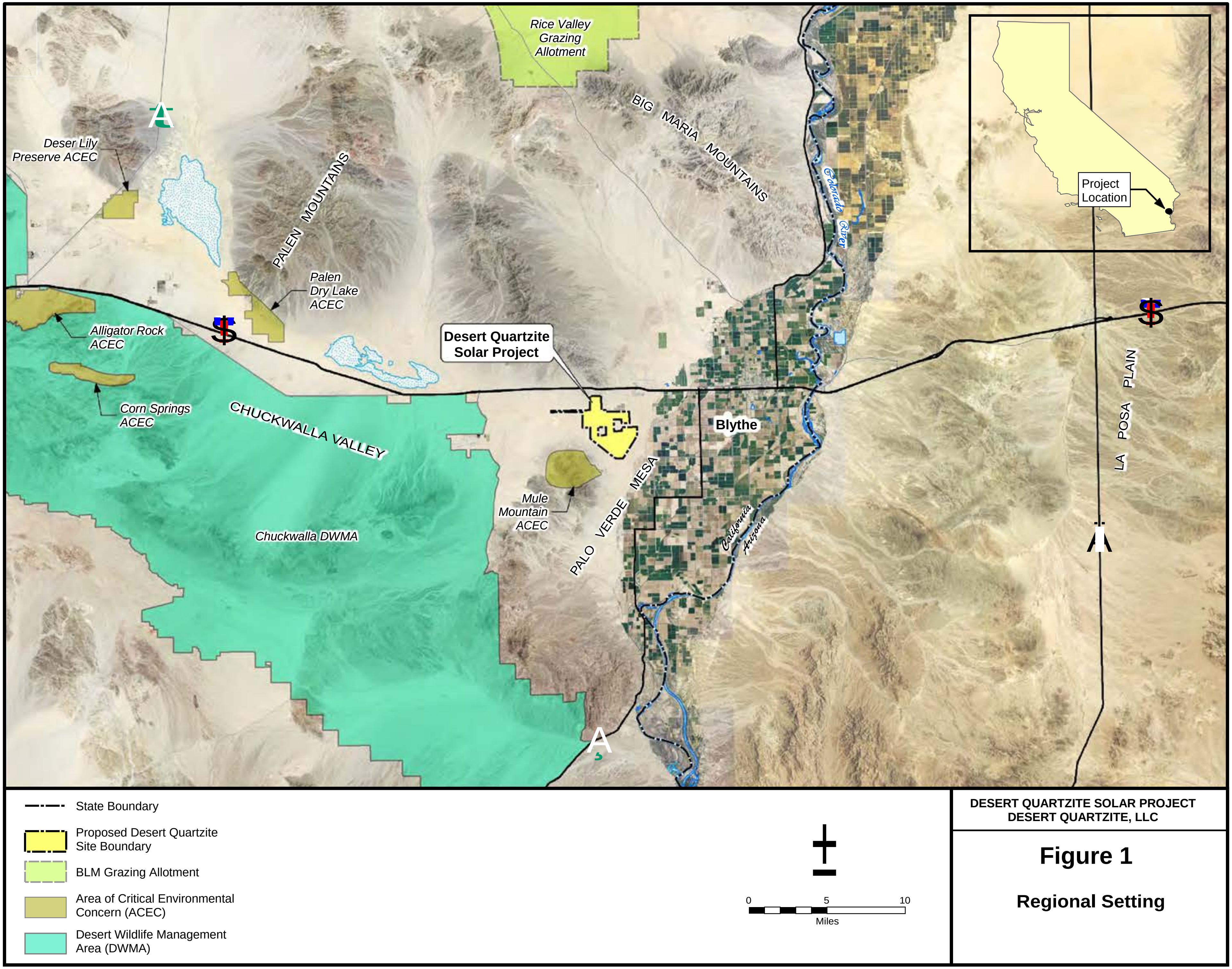
- Main Generation Area - PV arrays, combining switchgear, overhead lines, and access corridors;
- Operations and Maintenance (O&M) Facility;
- On-site substation; and
- Site Security, Fencing, and Lighting.

The Desert Quartzite Solar Project would interconnect with the regional transmission system via a 220-kV single-circuit gen-tie Line that would exit the western portion of the Solar Farm site and follow a 160-foot-wide transmission right of way (ROW) to the planned Southern California Edison (SCE) Colorado River Substation located approximately one mile west of the proposed Quartzite Solar site western boundary.

1.3 STUDY AREA

For the purpose of this report, the Study Area is defined by the area of private land subjected to biological resource assessment including vegetation community mapping, soils mapping, and habitat assessments for special status species. The Study Area is approximately 160 acres in size and is surrounded by and is a part of the proposed, Desert Quartzite Solar Project and gen-tie line corridor (Figure 2).

P:\GIS\Ironwood\Desert_Quartzite\Region.mxd

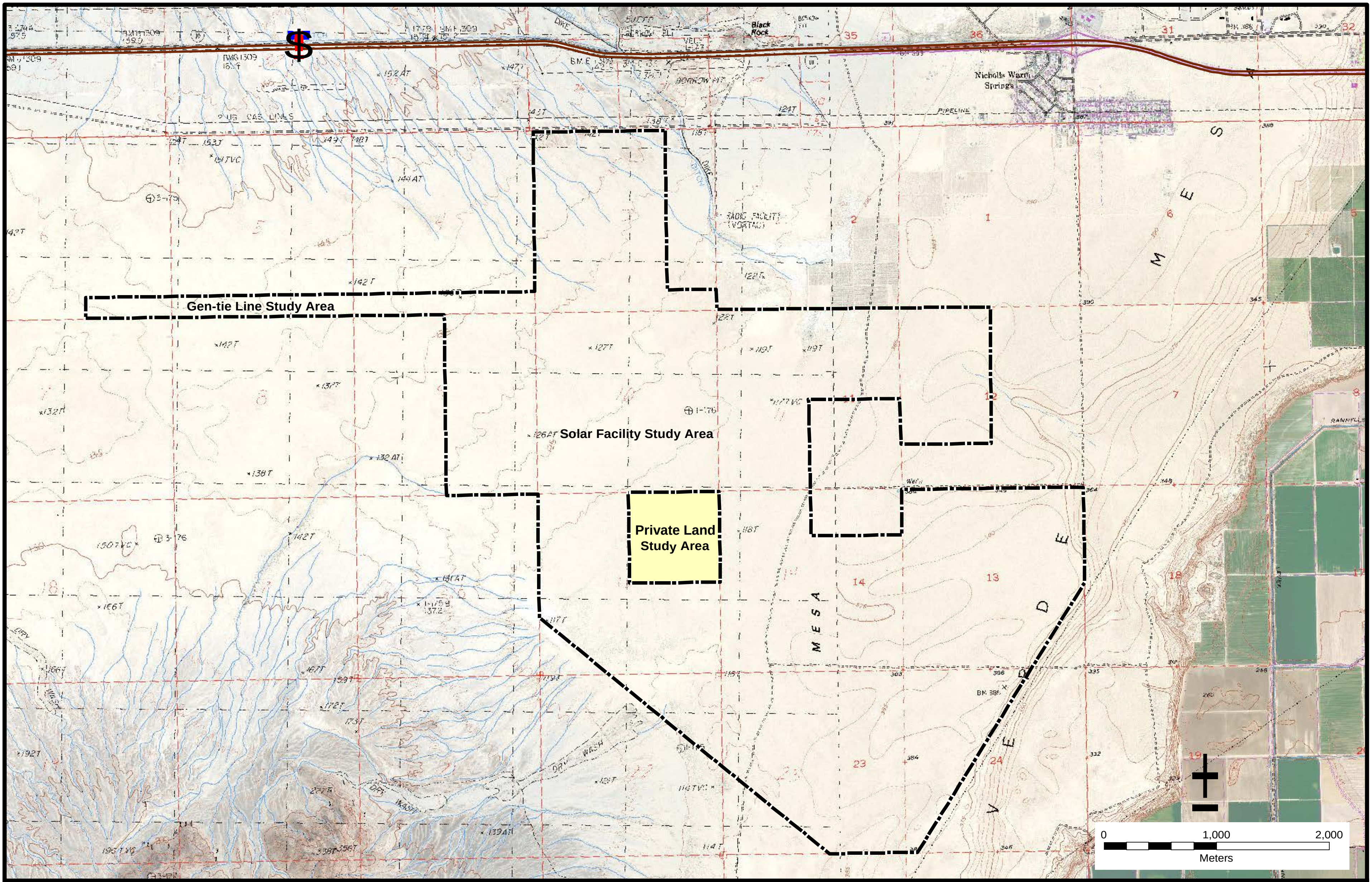

Rice Valley Grazing Allotment
BIG MARIA MOUNTAINS
Deser Lily Preserve ACEC
PALEN MOUNTAINS
Colorado River
Project Location
Palen Dry Lake ACEC
Alligator Rock ACEC
Desert Quartzite Solar Project
Corn Springs ACEC
CHUCKWALLA VALLEY
Blythe
Mule Mountain ACEC
PALO VERDE MESA
LA POSA PLAIN
Chuckwalla DWMA
California
Arizona
State Boundary
Proposed Desert Quartzite Site Boundary
BLM Grazing Allotment
Area of Critical Environmental Concern (ACEC)
Desert Wildlife Management Area (DWMA)
0
5
10
Miles

DESERT QUARTZITE SOLAR PROJECT
DESERT QUARTZITE, LLC

Figure 1

Regional Setting

#213 P:\GIS\Ironwood\Shared\Projects\Projects\Quartzite\ArcGIS project files\Study Area_20141118.mxd 11/18/2014


Gen-tie Line Study Area
Solar Facility Study Area
Private Land Study Area
Nicholls Warm Springs
MESA
MESA VERDE
0
1,000
2,000
Meters

▭ Desert Quartzite Site Boundary

🟨 Private Land Study Area

DESERT QUARTZITE SOLAR PROJECT
DESERT QUARTZITE, LLC

Figure 2

Study Area

2.0 METHODS

2.1 LITERATURE SEARCH

Prior to conducting the preliminary survey, a biological resources literature search was performed. This included researching information from regional documents such as the Northern and Eastern Colorado Coordinated Management Plan and Final Environmental Impact Statement (NECO, BLM 2002) and the Biological Opinion that addresses NECO (USFWS 2005). A search of the California Department of Fish and Wildlife's (CDFW) *California Natural Diversity Data Base* (CNDDB) was conducted to determine special status species that have been documented in the project region.

It should be noted that although this parcel is on private land and not necessarily under BLM jurisdiction, all BLM protocols are being followed so that the surveys with this parcel are consistent with the rest of the Quartzite Solar Project.

Using this information and observations from the survey, a list of special status plant and wildlife species that have the potential to occur at the site was generated. For the purposes of this assessment, special status species are defined as plants or wildlife that:

- Have been designated as either rare, threatened, or endangered by CDFW or the U.S. Fish and Wildlife Service (USFWS), and are protected under either the California or Federal Endangered Species Act (ESA);
- Are candidate species or species proposed for listing under these same acts; or
- Are covered species under NECO and the Study Area is located within the species' range per maps in NECO Appendix A [3-5, 3-6(a-f), and 3-7(a-d)].

2.2 PRELIMINARY MAPPING

A large-scale aerial photograph of the Private Land Study Area was created and used to preliminarily map vegetation communities, soil substrates, and other areas of interest during the survey. Such areas included those that appeared to have unique plant assemblages or areas of interest under NECO. The preliminary mapping effort allowed surveyors to focus on areas most likely to support special status species and habitats, while characterizing each type of vegetation community and soil substrate. Soil data was initially obtained from the Natural Resources Conservation Service (NRCS) Web Soil Survey and incorporated into Geographic Information Systems (GIS). The Private Land Study Area was most recently used as farmland, so there was an expectation that soil substrates may differ from what the NRCS Web Soil Survey suggested.

2.3 PRELIMINARY SURVEY

A survey was conducted on November 3-4, 2014 by Audrey Johnson and Ryan Layden, biologists of Ironwood Consulting, Inc. Ten meter line transect surveys were conducted across the entire site. The area surrounding the Study Area was previously surveyed for the larger proposed project therefore no buffer area was surveyed around the Study Area. The following information was collected during the survey:

- Preliminary characterization of plant communities;
- Preliminary mapping of surface soil substrates; and
- Preliminary assessment of special status species potential for occurrence.

Focused surveys for special status species were not conducted during the preliminary survey.

3.0 RESULTS

3.1 GENERAL

Weather conditions during the survey are shown on Table 1.

Table 1 Weather Conditions during Surveys

Date	Temperature (°F)	Cloud Cover	Wind Speed (mph)
11/3/2014	71-85	0%	10-15
11/4/2014	64-82	0%	25-30

The Private site has no discernable slope but has a general southeast-facing aspect. There is a 3-10 ft high berm that surrounds the entire Study Area (Appendix A; Photo 1). Human-induced land disturbances appear to be associated with agricultural practices, linear utilities construction, and trash dumping. Appendix A presents photos of the Study Area taken during the survey.

3.2 SOILS

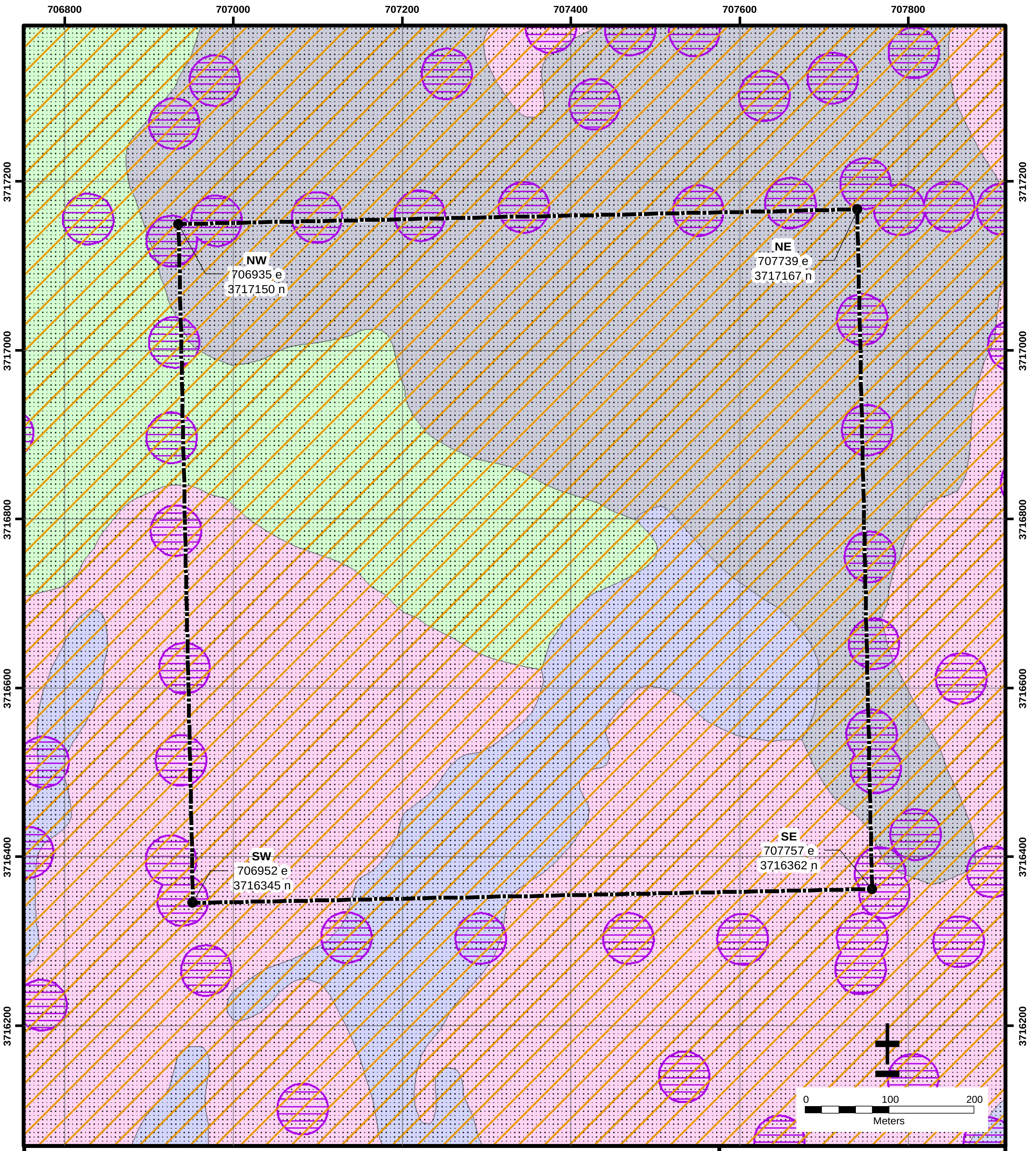
Soils within the Study Area are dominated by gravely sands with small localized patches of finer sand (Appendix A; Photo 5). The Natural Resources Conservation Service (NRCS) Web Survey contained soil type data for the Study Area (Figure 3) but this site, being previously farmed, had very little variation in soil type across the site.

3.3 VEGETATION COMMUNIES

The Study Area supports two vegetation communities: previously farmed Jojoba farmland and Sonoran Creosote Bush Scrub [Holland 1986; analogous to Creosote Bush-White Bursage Series (Sawyer and Keeler-Wolf 1995)]. The majority of the vegetation coverage on the Study Area is jojoba and the rest is Sonoran Creosote Bush Scrub (SCBS). The SCBS on-site is dominated by creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*). Most of the on-site vegetation is growing in rows and follows the previous layout of the jojoba farm (See Appendix A; photo 2). Few plants grow outside of these set rows of jojoba and creosote.

3.4 WILDLIFE COMMUNITIES

Wildlife species inhabiting the Project Study Area are expected to be typical of those species found in surrounding undisturbed areas in the region. During the preliminary surveys canid and burrowing owl sign was found. Seven canid burrows (one with burrowing owl sign) and two groups of canid scat were recorded (Appendix A; Photo 4).


706800
707000
707200
707400
707600
707800
3717200
3717000
3716800
3716600
3716400
3716200
NW
706935 e
3717150 n
NE
707739 e
3717167 n
SW
706952 e
3716345 n
SE
707757 e
3716362 n
0
100
200
Meters
NRCS Soil Types
🟩 Aco sandy loam
🟦 Orita fine sand
🟪 Orita gravelly loamy sand
⬜ Rositas fine sand, 0-2% slopes
CNDDB Occurrence
▨ California leaf-nosed bat
▤ Harwood's milk-vetch
░ cave myotis
▭ Proposed Desert Quartzite Site Boundary

Note:
Coordinates in UTM, WGS84, meters.

DESERT QUARTZITE SOLAR PROJECT
DESERT QUARTZITE, LLC

Figure 3

Soil Types and CNBBD Occurrences in Private Land Study Area

#192 P:\GIS\Ironwood\Shared\Projects\Projects\Quartzite\ArcGIS project files\160_Area.mxd 10/28/2014

Species associated with water are unlikely to inhabit the Study Area due to the lack of suitable aquatic habitat. Reptiles that are likely to inhabit the Study Area include desert tortoise (*Gopherus agassizii* – discussed further in Section 3.5.2), Mojave fringe-toed lizard (*Uma scoparia* – discussed further in Section 3.5.2), desert iguana (*Dipsosaurus dorsalis*), zebra-tailed lizard (*Callisaurus draconoides*), long-nosed leopard lizard (*Gambelia wislizenii*), side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), coachwhip (*Masticophis flagellum*), gopher snake (*Pituophis melanoleucus*), and Mojave rattlesnake (*Crotalus scutulatus*). Bird species may include burrowing owl, (*Athene cinicularia),* turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), California quail (*Callipepla californica*), mourning dove (*Zenaida macroura*), greater roadrunner (*Geococcyx californianus*), horned lark (*Eremophila alpestris*), common raven (*Corvus corax*), ash-throated flycatcher (*Myiarchus cinerascens*), black-throated sparrow (*Amphispiza bilineata*), and white-crowned sparrow (*Zonotrichia leucophrys*). Mammals likely to inhabit the Study Area include white-tailed antelope ground squirrel (*Ammospermophilus leucurus*), pocket mouse (*Perognathus* sp.), deer mouse (*Peromyscus maniculatus*), kangaroo rat (*Dipodomys* sp.), coyote (*Canis latrans*), black-tailed jackrabbit (*Lepus californicus*), desert kit fox (*Vulpes macrotis*), American badger (*Taxidea taxis*) and desert cottontail (*Sylvilagus audubonii*).

3.5 SPECIAL STATUS SPECIES

Eighty-one special status species (twenty-two plants and fifty-nine animals) have been documented in the vicinity (approximately 5 miles) of the Study Area and/or are species covered in NECO. Species covered in NECO having specific ranges or habitat requirements not found on or adjacent to the Study Area are considered to be absent and not discussed in this report. The potential for occurrence for each plant or wildlife species was assessed and defined using the following criteria listed in Table 2.

Table 2 Potential for Occurrence Definitions

Potential for Occurrence	Definition
Present	Species was observed within the boundaries of the Study Area at the time of this survey, or a survey within the past two years.
High	Both a historical record exists of the species within the boundaries of the Study Area or its immediate vicinity (approximately 5 miles) **and** the environmental conditions (including soil and elevation factors) associated with the species are found at the Study Area.
Moderate	Either a historical record exists of the species within the immediate vicinity of the Study Area (approximately 5 miles) **or** the environmental conditions (including vegetation, soil and elevation factors) associated with species are found at the Study Area.
Low	No records exist of the species occurring within the Study Area or its immediate vicinity (approximately 5 miles) **and/or** the environmental conditions (including vegetation, soil type and elevation factors) associated with species presence are marginal on the Study Area.
Absent	Species was not observed during focused surveys conducted at an appropriate time, **or** the species is restricted to specific habitats or geographical locations not found on or adjacent to the Study Area.

3.5.1 Special Status Plant Species

No federal- or state-listed (endangered or threatened) plant species have been recorded near the Study Area. Twenty-two special status plant species have been recorded in the vicinity of the Study Area (CNDDB 2014) and/or are NECO-covered species with range maps that encompass the Study Area (BLM 2002). All of these species are presented in Table 3, along with their status, flowering period, and potential to occur. Each species with a moderate or greater potential for occurrence is discussed in detail below.

Table 3 Special Status Plant Species

Scientific Name **Common Name**	**Status**		**Flowering Period**	**Potential for Occurrence**
Acleisanthes longiflora Angel trumpets	Federal: State: CRPR: NECO:	None none 2B.3 covered	May	Absent: no suitable habitat on-site (rocky carbonate canyon bottoms).
Astragalus insularis var. *harwoodii* Harwood’s milkvetch	Federal: State: CRPR: NECO:	none none 2B.3 covered	Jan - May	Moderate
Astragalus lentiginosus var. borreganus Borrego milkvetch	Federal: State: CRPR: NECO:	none none 4.3 covered	Feb - May	Low
Astragalus sabulonum gravel milkvetch	Federal: State: CRPR NECO:	None None 2B.2 not covered	Feb-July	Moderate
Carnegiea gigantean saguaro	Federal: State: CRPR NECO:	None None 2B.2 covered	May-June	Low
Castela emoryi Emory's crucifixion-thorn	Federal: State: CRPR: NECO:	none none 2B.2 covered	Apr - Jul	Moderate
Chamaesyce abramsiana Abrams' spurge	Federal: State: CNPS: NECO:	none none 2B.2 not covered	Sep – Nov	High
Colubrina californica Las Animas colubrina	Federal: State: CNPS: NECO:	none none 2B.3 not covered	Apr - Jun	Moderate
Coryphantha alversonii foxtail cactus	Federal: State: CNPS: NECO:	none none 4.3 covered	Apr - Jun	Moderate
Cryptantha costata ribbed cryptantha	Federal: State: CRPR: NECO:	None None 4.3 not covered	Jan-May	High
Cryptantha holoptera Winged cryptantha	Federal: State: CRPR: NECO:	None None 4.3 covered	Mar-April	Moderate
Ditaxis claryana glandular ditaxis	Federal: State: CNPS: NECO:	none none 2B.2 covered	Oct - Mar	Moderate
Eriastrum harwoodii Harwood’s eriastrum	Federal: State: CRPR: NECO:	None None 1B.2 not covered	Mar-May	High

Scientific Name **Common Name**	**Status**		**Flowering Period**	**Potential for Occurrence**
Funustrum utahense Utah vine milkweed	Federal: State: CRPR: NECO:	None None 4.2 not covered	Apr-Sep	High
Hymenoxys odorata Bitter hymenoxys	Federal: State: CRPR: NECO:	None None 2B.1 not covered	Feb-Aug	Absent: no suitable habitat on site (moist river margins and benches)
Imperata brevifolia California satintail	Federal: State: CRPR: NECO:	None None 2B.1 not covered	Sep-May	Absent: no suitable habitat on site (moist river plains & canal margins)
Mentzelia puberula Darlington's blazing star	Federal: State: CRPR: NECO:	None None 2B.2 not covered	Mar-May	Absent: no potential habitat present on site (rocky limestone and granite slopes)
Opuntia wigginsii Wiggins' cholla	Federal: State: CNPS: NECO:	none none 3.3 covered	Mar-June	Moderate
Panicum hirticaule ssp. hirticaule roughstalk witchgrass	Federal: State: CNPS: NECO:	None None 2B.1 not covered	Aug-Dec	Moderate
Penstemon pseudospectabilis ssp. pseudospectabilis desert beardtongue	Federal: State: CNPS: NECO	None None 2B.2 not covered	Mar-May	Moderate
Proboscidea althaefolia desert unicorn-plant	Federal: State: CNPS: NECO:	none none 4.3 covered	May - Aug	High
Teucrium cubense ssp. depressum Dwarf germrander	Federal: State: CNPS: NECO:	None None 2B.2 not covered	Mar-Nov	Low

California Rare Plant Ranking (CRPR) designations:
1A: Presumed extirpated in California and either rare or extinct elsewhere.
1B: Rare and Endangered in California and elsewhere.
2A: Presumed extirpated in California, but more common elsewhere.
2B: Rare or Endangered in California, but more common elsewhere.
3: Plants for which we need more information-Review list
4: Plants of limited distribution-Watch list.

Threat Code Extensions:
.1: Seriously threatened in California
.2: Moderately threatened in California
.3: Not very endangered in California
Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) designations
Covered: Species is listed as covered in NECO
Not covered: Species is not listed as covered in NECO
Other sources: CNDDB search for Roosevelt Mine, Ripley, McCoy Wash, McCoy Peak, Blythe, Blythe NE, Thumb Peak, Mule Wash and Palo Verde 7.5 minute USGS quadrangles

Astragalus insularis var. *harwoodii* (Harwood's milkvetch) is a CNPS List 2.2 annual herb belonging to the Fabaceae family. It is historically known to occur in desert dunes and Mojavean and Sonoran desert scrub at elevations ranging from 0 to 2,300 feet (0 to 710 meters) amsl. These environmental conditions occur on-site and Harwood's milkvetch was detected during the 2013 rare plant surveys performed for the BLM land portion of the Desert Quartzite Solar Project. For this reason, this species has a high potential to occur on-site.

Astragalus sabulonum (gravel milkvetch) is a CRPR list 2B.2 annual herb belonging to the Fabaceae family. It is historically known to occur in desert dunes, Mojavean and Sonoran desert scrub usually in sandy soils at elevations ranging from 0 to 656 feet (0-200 meters) amsl. These environmental conditions occur on-site. The CNDDB lists an occurrence in the Roosevelt Mine quad, however, gravel milkvetch was not detected during the 2013 rare plant surveys for the BLM land portion of the DQSP. For these reasons, this species has a moderate potential to occur.

Castela emoryi (crucifixion thorn) is a CNPS List 2.3 perennial deciduous shrub belonging to the Simaroubaceae (quassia) family. It is historically known to occur in Mojavean desert scrub, playas, and gravelly Sonoran desert scrubs at elevations ranging from 300 to 2,200 feet (90 to 670 meters) amsl. These environmental conditions occur within the Study Area and the nearest record of crucifixion thorn is greater than 5 miles from the Study Area. For these reasons, this species has a moderate potential to occur.

Chamaesyce abramsiana (Abrams' spurge) is a CNPS List 2.2 annual herb belonging to the Euphorbiaceae (spurge) family. It is historically known to occur in Mojavean desert scrub, playas, and sandy Sonoran desert scrubs at elevations ranging from sea level to 3,000 feet (0 to 915 meters) amsl. These environmental conditions occur within the Study Area Abrams' spurge was detected during the 2013 rare plant surveys for the DQSP. For these reasons, this species has a high potential to occur.

Colubrina californica (Las Animas colubrine) is a CNPS List 2.3 perennial deciduous shrub belonging to the Rhamnaceae (Buckthorn) family. It is historically known to occur in both Mojavean and Sonoran desert scrub at elevations ranging from 0 to 3,200 feet (0 to 1,000 meters) amsl. These environmental conditions occur within the Study Area and the nearest record of Las Animas colubrine is greater than 5 miles from the Study Area. For these reasons, this species has a moderate potential to occur.

Coryphantha alversonii (foxtail cactus) is a CNPS List 4.3 stem succulent belonging to the Cactaceae (cactus) family. It is historically known to occur in Mojavean desert scrub and sandy or rocky (usually granitic) Sonoran desert scrub at elevations ranging from 246 to 5,000 feet (75 to 1525 meters) amsl. These environmental conditions occur within the Study Area and the nearest record of foxtail cactus is greater than 5 miles from the Study Area. For these reasons, this species has a moderate potential to occur.

*Cryptantha costata (*ribbed cryptantha) is a CRPR list 4.3 annual herb belonging to the Boraginaceae family. It is historically known to occur in desert dunes, Mojavean and Sonoran desert scrub in sandy soils at elevations ranging from 0 to 1,640 feet (0-500 meters) amsl. Ribbed cryptantha was detected during rare plant surveys performed for the BLM land portion of the Desert Quartzite Solar Project. For these reason, this species has a high potential to occur on-site.

Cryptantha holoptera (winged cryptantha) is CRPR list 4.3 annual herb belonging to the Boraginaceae family. It is historically known to occur in Mojavean and Sonoran desert scrub at elevations ranging from 330 to 5,544 feet (100-1690 meters) amsl. These environmental conditions occur on-site but winged cryptantha was not detected during rare plant surveys performed for the BLM land portion of the DQSP. For this reason, this plant has a moderate potential to occur on-site.

Ditaxis claryana (glandular ditaxis) is a CNPS List 2.2 perennial herb belonging to the Euphorbiaceae (spurge) family. It is historically known to occur in Mojavean desert scrub and sandy Sonoran desert scrub at elevations ranging from 0 to 1,500 feet (0 to 465 meters) amsl. These environmental conditions occur within the Study Area and the nearest record of glandular ditaxis is greater than 5 miles from the Study Area. For these reasons, this species has a moderate potential to occur.

*Eriastrum harwoodii (*Harwood's eriastrum) is a CRPR list 1B.2 annual herb belonging to the Polemoniaceae family. It is historically known to occur in desert dunes, at elevations ranging from 410 to 3,000 feet (125-915 meters) amsl. Harwood's eriastrum was detected during rare plant surveys performed for the BLM land portion of the DQSP. For this reason, this plant has a moderate potential to occur on-site.

Funustrum utahense (Utah vine milkweed) is a CRPR list 4.2 perrenial herb belonging to the Apocynaceae family. It is historically known to occur in Mojavean and Sonoran desert scrub in sandy or gravelly soils, at elevations ranging from 330 to 4,708 feet (100-1,436 meters) amsl. These environmental conditions occur on-site and one occurrence of Utah vine milkweed was detected during rare plant surveys performed for the BLM land portion of the DQSP near the northern most border. For this reason, this plant has a high potential to occur on-site.

Opuntia wigginsii (Wiggins' cholla) is a CNPS List 3.3 stem succulent belonging to the Cactaceae (cactus) family. It is historically known to occur in sandy Sonoran desert scrub at elevations ranging from 98 to 2,900 feet (30 to 885 meters) amsl. These environmental conditions occur within the Study Area and the nearest record of Wiggins' cholla is greater than 5 miles from the Study Area. For these reasons, this species has a moderate potential to occur.

Panicum hirticaule ssp. hirticaule (roughstalk witch grass) is a CNPS List 2B.1 annual herb belonging to the Poaceae family. It is historically known to occur in desert dunes, Joshua tree woodland, Mojavean and Sonoran desert scrub at elevations ranging from 148 to 4,314 feet (45 to 1,315 meters) amsl. These environmental conditions occur within the Study Area and there is a record of roughstalk witch grass in the Roosevelt Mine Quadrangle. For these reasons, this species has a moderate potential to occur.

3.5.2 Special Status Wildlife Species

The federal and state listed desert tortoise is the only listed species that has historically been found near the Project site. Fifty-eight additional special status wildlife species have been recorded in the vicinity of the Study Area (CNDDB 2014) and/or are mentioned in NECO with range maps that encompass the Study Area (BLM 2002). All of these species are presented on Table 4, along with their status and potential to occur within the Study Area. Each species with a moderate or greater potential for occurrence is discussed in detail below.

Table 4 Special Status Wildlife Species

Scientific Name **Common Name**	**Status**		**Potential for Occurrence**
Gopherus agassizii desert tortoise	Federal: State: NECO:	threatened threatened covered	Moderate
Incilius alvarius Sonoran desert toad	Federal: State: NECO:	None SSC Not covered	Low
Coccyzus americanus occidentalis western yellow-billed cuckoo	Federal: State: NECO:	candidate endangered not covered	Absent
Melanerpes uropygialis Gila woodpecker	Federal: State: NECO:	none endangered covered	Absent
Antrozous pallidus pallid bat (roosting)	Federal: State: NECO:	none SSC covered	Low
Ardea alba *Great egret*	Federal: State: NECO:	none none not covered	Low

Scientific Name **Common Name**	**Status**		**Potential for Occurrence**
Ardea herodias *Great blue heron*	Federal: State: NECO:	none none not covered	Low
Aquila chysaetos Golden eagle	Federal: State: NECO:	none FP; WL covered	Low
Athene cunicularia burrowing owl	Federal: State: NECO:	none SSC covered	Present
Chaetodipus fallax pallidus pallid San Diego pocket mouse	Federal: State: NECO:	none SSC not covered	Moderate
Colaptes chrysoides gilded flicker	Federal: State: NECO:	none endangered not covered	Low
Corynorhinus townsendii Townsend's big-eared bat (roosting)	Federal: State: NECO:	none SSC covered	Low
Setophaga petechia yellow warbler	Federal: State: NECO:	none SSC covered	Low
Empidonax traillii willow flycatcher	Federal: State: NECO:	none endangered covered	Low
Empidonax traillii extimus southwestern willow flycatcher	Federal: State: NECO:	endangered endangered covered	Low
Eumops perotis californicus western mastiff bat (roosting)	Federal: State: NECO:	none SSC covered	Low
Falco columbarius merlin	Federal: State: NECO:	none WL none	Moderate
Falco mexicanus prairie falcon	Federal: State: NECO:	none SSC covered	Moderate
Felis concolor mountain lion (foraging)	Federal: State: NECO:	none none covered	Moderate
Icteria virens Yellow-breasted chat	Federal: State: NECO:	none SSC not covered	Moderate
Ixobrychus exilis least bittern	Federal: State: NECO:	none SSC not covered	Low
Lanius ludovicianus loggerhead shrike	Federal: State: NECO:	none SSC not covered	Moderate
Lasiurus cinereus hoary bat (roosting)	Federal: State: NECO:	none none covered	Moderate
Macrotus californicus California leaf-nosed bat (roosting)	Federal: State: NECO:	none SSC covered	Moderate
Melozone aberti Abert's towhee	Federal: State: NECO:	none none covered	Low

Scientific Name **Common Name**	**Status**		**Potential for Occurrence**
Myiarchus tyrannulus	Federal:	none	Low
Brown-crested flycatcher	State:	WL	
	NECO	covered	
Myotis velifer	Federal:	none	Low
cave myotis (roosting)	State:	SSC	
	NECO:	covered	
Myotis occultus	Federal:	none	Low
occult little brown bat, Arizona myotis (roosting)	State:	SSC	
	NECO:	covered	
Nycticorax nycticorax	Federal:	none	Low
Black-crowned night heron	State:	none	
	NECO:	not covered	
Nyctinomops femorosacca	Federal:	none	Low
pocketed free tail bat (roosting)	State:	none	
	NECO:	covered	
Neotoma albigula venusta	Federal:	none	Moderate
Colorado Valley woodrat	State:	none	
	NECO:	covered	
Odocoileus hemionus eremicus	Federal:	none	Moderate
burro deer	State:	none	
	NECO:	covered	
Ovis Canadensis nelsoni	Federal:	none	Low
Nelson’s bighorn sheep	State:	none	
	NECO:	covered	
Oreothlypis luciae	Federal:	none	Low
Lucy’s warbler	State:	SSC	
	NECO:	not covered	
Pelecanus erythrorhynchos	Federal:	none	Low
American white pelican	State:	SSC	
	NECO:	not covered	
Piranga flava	Federal:	none	Low
Hepatic tanager	State:	WL	
	NECO:	not covered	
Piranga rubra	Federal:	none	Low
Summer tanager	State:	SSC	
	NECO:	not covered	
Poloiptila melanura	Federal:	none	High
Black-tailed gnatcatcher	State:	none	
	NECO:	not covered	
Pyrocephalus rubinus	Federal:	none	High
vermillion flycatcher	State:	SSC	
	NECO:	covered	
Rallus longirostris yumanensis	Federal:	endangered	Low
Yuma clapper rail	State:	threatened	
	NECO:	not covered	
Sauromalus ater	Federal:	none	Low
chuckwalla	State:	none	
	NECO:	covered	
Scaphiopus couchii	Federal:	none	Low
Couch’s spadefoot toad	State:	SSC	
	NECO:	covered	
Setophaga petechial sonorana	Federal:	none	Low
Sonoran yellow warbler	State:	SSC	
	NECO:	covered	
Sigmodon arizonae plenus	Federal:	none	Low
Colorado River cotton rat	State:	SSC	
	NECO:	not covered	

Scientific Name **Common Name**	**Status**		**Potential for Occurrence**
Spizella breweri *Brewer's sparrow*	Federal: State: NECO:	none none not covered	Low
Spizella passerine *Chipping sparrow*	Federal: State: NECO:	none none not covered	Low
Taxidea taxus American badger	Federal: State: NECO:	none SSC not covered	Moderate
Vulpes macrotis desert kit fox	Federal: State: NECO:	none covered not covered	High
Toxostoma crissale Crissal thrasher	Federal: State: NECO:	none SSC covered	Low
Toxostoma lecontei LeConte's thrasher	Federal: State: NECO:	none SSC covered	Moderate
Uma notata Colorado Desert fringe-toed lizard	Federal: State: NECO:	none SSC covered	Low
Uma scoparia Mojave fringe-toed lizard	Federal: State: NECO:	none SSC covered	High
Xanthocephalus xanthocephalus *yellow-headed blackbird*	Federal: State: NECO:	none SSC not covered	Low
Charadrius montanus mountain plover	Federal: State: NECO:	candidate SSC covered	Absent
Micrathene whitneyi elf owl	Federal: State: NECO:	none endangered covered	Low
Vireo bellii arizonae Arizona bell's vireo	Federal: State: NECO:	none endangered not covered	Low
Sigmodon hispidus eremicus Yuma hispid cotton rat	Federal: State: NECO:	none SSC not covered	Low
Lasiurus xanthinus western yellow bat	Federal: State: NECO:	none SSC not covered	Moderate
Myotis yumanensis Yuma myotis	Federal: State: NECO:	none SSC not covered	Moderate

California Department of Fish and Wildlife (CDFW/State) designation:

FP: Fully Protected: This classification was the State of California's initial effort to identify and provide additional protection to those animals that were rare or faced possible extinction. Lists were created for fish, amphibians and reptiles, birds and mammals. Most of the species on these lists have subsequently been listed under the state and/or federal endangered species acts.

SSC: Species of Special Concern - extirpated from the State, or in its primary seasonal or breeding role; federal-listed, but not state-listed, threatened or endangered; meets the state definition of threatened or endangered but has not formally been listed; experiencing, or formerly experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for State threatened or endangered status; has naturally small populations exhibiting high susceptibility to risk from any factor(s), which could lead to declines that would qualify it for State threatened or endangered status

WL: Watch List: The Department of Fish and Wildlife maintains a list consisting of taxa that were previously designated as "Species of Special Concern" but no longer merit that status, or which do not yet meet SSC criteria, but for which there is concern and a need for additional information to clarify status

Scientific Name **Common Name**	**Status**	**Potential for Occurrence**

Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) designations
Covered: Species is listed as covered in NECO
Not covered: Species is not listed as covered in NECO
Other sources: CNDDB and CNPSEI for Roosevelt Mine, Ripley, McCoy Wash, McCoy Peak, McCoy Spring, Hopkins Well, Wiley Well, Thumb Peak, and Palo Verde 7.5 minute USGS quadrangles

Gopherus agassizii (desert tortoise) is a federal and state-listed threatened species, and is one of the species of primary focus in NECO. This species occurs in desert scrub, desert wash and Joshua tree habitats with appropriate soils for burrowing, and prefers areas of creosote scrub with abundant annual wildflowers. Desert tortoises have been found in areas surrounding the site, not on-site, but the environment on-site is fallow jojoba farmland, therefore it is only moderately likely that this species inhabits the BLM portion of the site at low densities.

Athene cunicularia (western burrowing owl) is a SSC and NECO-covered species and is protected by the federal Migratory Bird Treaty Act. A burrow complex containing a pellet and feather was present on-site at UTM Zone 11 E707492/N3716604 (see Appendix A, Photo 4) during the preliminary survey. No individual owls were observed. This species is considered to be present on the site.

Ten bat species *Antrozous pallidus* (pallid bat), *Corynorhinus townsendii* (Townsend's big-eared bat), *Eumops perotis californicus* (western mastiff bat), *Lasiurus cinereus* (hoary bat), *Lasiurus xanthinus* (western yellow bat), *Macrotus californicus* (California leaf-nosed bat), *Myotis velifer* (Cave myotis), *Myotis occultus* (Occult little brown bat or Arizona myotis), *Myotis yumanensis* (Yuma myotis) and *Nyctinomops femorosacca* (pocketed free tail bat) are California Species of Special Concern (SSC) species that inhabit desert scrub and woodland habitats often containing rocky areas, caves, mines, and buildings for roosting. Pallid bats roost in small rocks on the ground. The Study Area does not support suitable roosting habitat for this species; however, suitable habitat occurs within the rocky foothills of the Mule Mountains located less than one mile to the southwest. Desert dry wash (microphyll) woodland areas have been documented as important habitat to several bat species (Brown 2010). Hoary bats will roost in palo verde trees and ironwoods. During the warmer months, California leaf-nosed bats night roost in ironwood trees between foraging bouts. Desert dry wash woodland vegetation attracts foraging bats due to increased insect concentration. This is especially true for California leaf-nosed bats and pallid bats (both State Species of Special Concern) that feed on large arthropods which they glean off of the foliage. Desert Dry Wash Woodland (112 acres) was identified nearby the Study Area on the BLM lands portion of the proposed Desert Quartzite Solar Project. Bat surveys were conducted in the Spring of 2013 for the BLM lands portion of the proposed Desert Quartzite Solar Project and included the Study Area. Based on habitat characteristics and location of previous records, California leaf-nosed bats and hoary bats have a moderate potential to roost and forage within the Study Area. The other bat species are not expected to roost and have a low potential for foraging within the Study Area. The method used to perform the focused bat surveys for the DQSP covered this location.

Chaetodipus fallax pallidus (pallid San Diego pocket mouse) is a SSC typically found in open, sandy areas. This species is nocturnal, emerging from burrows at night to forage. Diet typically consists of seeds and may also include smaller portions of green vegetation and insects. Habitat for this species occurs on the site and the nearest record is located 9.5 miles southwest of the site. For these reasons, the pallid San Diego pocket mouse has a moderate potential to occur on the site.

*Falco columbarius (*merlin) is a CDFW Watch List species that can be found in woodland, farmland and nearby rivers. This species may utilize the Study Area for foraging or nest near the site. Although there is no nesting habitat present on-site there is a moderate potential for this species to forage at the site.

Falco mexicanus (prairie falcon) is a SSC and NECO-covered species that nests on cliffs in rocky areas. This species may forage at the site, but is unlikely to nest on or near the site. Nest sites of prairie falcon are typically found on cliffs and are legally protected. Although no nesting habitat is present, there is a moderate potential for this species to forage at the site.

Felis concolor (mountain lion) is a NECO-covered species that is known to inhabit the low mountains and use the desert dry wash woodlands in the Project vicinity as movement corridors. Appropriate movement corridor habitat for this species is found on the BLM lands at the proposed Desert Quartzite Solar Project site. Although no documented records of this species were found during the literature review, it has a moderate potential to utilize the nearby site for foraging or movement.

Icteria virens (yellow-breasted chat) is a CDFW SSC that can be found in abandoned farmland and low bushy shrubs. This species may utilize the Study Area for foraging or nest on the site during summer or migration therefore there is a moderate potential for this species to exist at the site.

Lanius ludovicianus (loggerhead shrike) is a SSC bird species. It is a year-round resident in parts of the Southern California desert. As a predatory bird its diet consists of insects, amphibians, small reptiles, small mammals, and birds. Habitat for this species occurs on the site and the nearest record is greater than 5 miles from the site. For these reasons, the loggerhead shrike has a moderate potential to occur on the site.

Neotoma albigula venusta (Colorado Valley woodrat) is a NECO-covered species that inhabits low-lying desert areas and is closely associated with beavertail cactus (*Opuntia* sp.) and mesquite (*Prosopis* sp.). Because the site supports appropriate habitat for this species and records of the species are found approximately ten miles from the site, this species has been assigned a moderate potential to occur on the site.

Odocoileus hemionus eremicus (burro deer) is a NECO-covered species that is known to inhabit desert dry wash woodlands in the project vicinity and likely also uses these areas as movement corridors. Appropriate habitat for this species is found at the nearby DQSP site in the large washes that support these habitats. Although no records of this species are found for the site, it has a moderate potential to utilize the surrounding area for foraging or movement.

Polioptila melanura (black-tailed gnatcatcher) is listed on CDFW's Special Animals List (tracked by CNDDB) and can be found in arid deserts year round. This non-migratory species may utilize the Study Area for foraging or breeding therefore there is a high potential for this species to exist on the site.

Pyrocephalus rubinus (vermillion flycatcher) is a SSC and NECO-covered bird species. It typically occurs in desert scrub, cultivated lands, and riparian woodlands. Its diet consists mainly of insects. During nesting, it generally inhabits desert riparian areas next to irrigated fields, irrigation ditches, pastures, other open areas. It can be found nesting in cottonwood, willow, mesquite, and other large desert riparian trees. Habitat for this species occurs on the surrounding DQSP site within the desert dry wash woodland and the nearest record is less than 5 miles east of the site. For these reasons, the Vermillion flycatcher has a high potential to occur on the site.

Taxidea taxus (American badger) is a SSC species that may occur throughout the Californian desert region. It requires friable soils for building burrows and sufficient rodent population. Habitat for this species occurs on the Study Area and the nearest record is greater than 5 miles south of the Study Area. For these reasons, the American badger has a moderate potential to occur on the Study Area.

Vulpes macrotis (desert kit fox) is protected by the California Code of Regulations (Title 14, CCR: §460) and Fish and Wildlife Commission Section 4000 as a fur-bearing mammal. Desert kit foxes are fossorial mammals that occur in arid open areas, shrub grassland, and desert ecosystems. Desert kit fox typically consume small rodents, primarily kangaroo rats, rabbits, lizards, insects, and in some cases immature desert tortoises. Dens typically support multiple entrances, but desert kit fox may utilize single burrows for temporary shelter. During the preliminary survey multiple burrows were recorded on-site and have the potential to provide shelter for desert kit fox. Also, desert kit fox have been recorded as occupying the surrounding BLM lands on the larger Desert Quartzite Solar Farm footprint, therefore this species has a high potential to occur on the site.

Toxostoma lecontei (Le Conte's thrasher) is a SSC species, covered under NECO. This species breeds in desert areas that support cactus, Mojave yucca (*Yucca schidigera*), Joshua trees (*Yucca brevifolia*), and large thorny shrubs such as Lycium species. Habitat for this species occurs on the Study Area, however no records were found near the Study Area. For these reasons, the Le Conte's thrasher has a moderate potential to occur on the Study Area.

Uma scoparia (Mojave fringe-toed lizard) is a SSC and NECO-covered reptile species. This species is typically restricted to aeolian (wind-blown) sand dune habitat, including adjacent sandy washes and stabilized dunes. Recent records of this species occur adjacent to the Study Area (CNDDB 2014). Based on existing records of this species nearby and likelihood of suitable aeolian sand deposits, there is a moderate potential for this species to occur within the Private Land Study Area.

3.6 SENSITIVE HABITATS

Sensitive habitats mentioned in this report include:

- Areas of Critical Environmental Concern (ACECs), Desert Wildlife Management Areas (DWMAs), BLM wilderness areas, or other special designations by the BLM;
- Plant communities rare or declining and of concern to agencies or local jurisdictions;
- Wildlife movement corridors; and
- Wetlands or other potentially jurisdictional waters.

The Mule Mountain ACEC is located less than one mile west of the Private Land Study Area. The Chuckwalla DWMA for desert tortoise is located approximately twenty miles west of the Study Area. The Burro Habitat Management Area (HMA) is located approximately five miles south of the Study Area.

The surrounding BLM lands portion of the proposed Desert Quartzite Solar Project contain two main wash systems: one originating in the northwest from the McCoy Mountains and the other originating in the southwest from the Mule Mountains. These washes are not contiguous with navigable, interstate, or relatively permanent waters; therefore, they do not appear to be subject to the jurisdiction of the U.S. Army

Corps of Engineers (USACE) or Regional Water Quality Control Board (RWQCB). Neither drainage currently or has historically crossed the Study Area.

4.0 CONCLUSIONS AND RECOMMENDATIONS

This section summarizes those biological resources within the Study Area for which further surveys or permitting may be required, and recommendations for meeting the requirements for these resources.

4.1 SPECIAL STATUS SPECIES

One threatened species, desert tortoise, has a moderate potential to exist within the Study Area. One special status wildlife species, burrowing owl, was determined to be present within the Study Area. Fourteen special status animals (pallid San Diego pocket mouse, merlin, prairie falcon, mountain lion, yellow-breasted chat, loggerhead shrike, Colorado Valley woodrat, burro deer, black-tailed gnatcatcher, vermillion flycatcher, American badger, kit fox, LeConte’s thrasher, and Mojave fringe-toed lizard) have a moderate or high potential to inhabit the Desert Quartzite Private Land Study Area along with ten additional bat species.

Fifteen special status plants (Harwood’s milkvetch, gravel milkvetch Emory's crucifixion-thorn, Abrams' spurge, Las Animas colubrine, foxtail cactus, ribbed cryptantha, winged cryptantha, glandular ditaxis, Harwood’s eriastrum, Utah vine milkweed, Wiggins' cholla, roughstalk witchgrass, desert beardtongue, desert unicorn plant) have a moderate or high potential to inhabit the Study Area.

4.2 FOCUSED STUDIES

Additional focused surveys are recommended for the Desert Quartzite Private Land Project and discussed individually below. It is recommended that all other special status species be searched for and recorded during these focused surveys.

Desert Tortoise

It is recommended that focused surveys for desert tortoise be conducted according to the USFWS 2010 protocol. These surveys would focus on determining the relative abundance and distribution of desert tortoise within the Study Area. However, if the impacts to this Study Area is considered with the larger project, then this Study Area may not require a protocol survey, since presence of desert tortoise is known on the BLM portion of Quartzite Project. The Private Study Land Area should be part of all pre-construction surveys required for the Quartzite project.

Western Burrowing Owl

It is recommended that surveys for the presence of western burrowing owls be performed. Survey should follow the California Department of Fish and Wildlife Staff Report of Burrowing Owl Mitigation date

March 7, 2012. However, if the impacts to this Study Area is considered with the larger project, then this Study Area may not require a separate survey, since presence of burrowing owl is known on this site and the BLM portion of the Quartzite Project. The Private Study Land Area should be part of all pre-construction surveys required for the Quartzite project.

Mojave Fringe-toed Lizard

A formal survey protocol has not been established for Mojave fringe-toed lizard; however, because it is a SSC and NECO-covered species, it is recommended that surveys be performed. Survey methods should be developed through coordination with CDFW.

Special Status Plant Surveys

Focused surveys for special status plant species are recommended. The survey should follow the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009), *Survey Protocols Required for NEPA/ESA Compliance for BLM Special Status Plant Species* (BLM 2009), and *Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants* (USFWS 2000).

Other Special Status Wildlife Surveys

The thirteen remaining special status wildlife species (pallid San Diego pocket mouse, merlin, prairie falcon, mountain lion, yellow-breasted chat, loggerhead shrike, Colorado Valley woodrat, burro deer, black-tailed gnatcatcher, vermillion flycatcher, American badger, kit fox, and LeConte’s thrasher) with potential to occur may require separate surveys or they be combined with the surveys required for the BLM portion of the Quartzite Solar Project.

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2000 Guidelines for Conducting and Reporting Botanical Inventories for Federally Listed, Proposed and Candidate Plants.

Appendix A

Site Photos

Photo 1 – Berm surrounding Private Land Study Area.

Photo 2 –Fallow jojoba farmland with Sonoran creosote bush scrub

Photo 3 – Representative rows of jojoba and Sonoran creosote bush scrub with gravelly sand.

Photo 4 – Burrow utilized by burrowing owl.

Photo 5 – Representative jojoba and Sonoran creosote bush scrub with fine sand.

Photo 6 – Trash dumping on the Private Land Study Area.

ENVIRONMENTAL & STATISTICAL CONSULTANTS

415 West 17th Street, Suite 200, Cheyenne, W Y 82001 Phone:
307-634-1756 ◆ www.west-inc.com ◆ Fax: 307-637-6981

MEMORANDUM

DATE: June 29, 2017

TO: Roy Skinner, Desert Quartzite, LLC

FROM: Kurt Flaig, WEST, Inc.

RE: *Eriastrum harwoodii* Survey Results for the Desert Quartzite Solar Project, Riverside County, CA

Desert Quartzite, LLC (Desert Quartzite) is currently considering a site for potential solar energy development in eastern Riverside County, California, referred to as the Desert Quartzite Solar Project (Project; Figure 1). The Project site occurs primarily on lands managed and administered by the Bureau of Land Management (BLM). Western EcoSystems Technology, Inc. (WEST) was contracted by Desert Quartzite to conduct a species-specific survey for Harwood's eriastrum (*Eriastrum hardwoodii*). This memorandum describes the methods and results of the survey.

Site Description

The Project site is located south of Interstate 10, approximately ten miles west of the City of Blythe (Figure 1). The site occurs on the Ripley and Roosevelt Mine U.S. Geological Survey 7.5 minute quadrangles. Three natural vegetation communities were documented in the Project site by Ironwood Consulting Inc. (Ironwood 2016), including Sonoran Desert scrub, sand dunes, and dry desert wash woodland. Sonoran Desert scrub, dominated by creosote bush (*Larrea tridentata*) and burro bush (*Ambrosia dumosa*), occupies the majority of the site (98%; Ironwood 2016).

Plant Species Information

Harwood's eriastrum is an annual herb that flowers from March through June. It is a BLM sensitive species with a State Rank of 2 (Imperiled in California) and a California Native Plant society (CNPS) Rank of 1B.2 (Rare, threatened, or endangered in California and elsewhere). Harwood's eriastrum is a California endemic that typically occurs in desert sand dunes at elevations between 125 to 915 meters (410 to 3,000 feet; CNPS 2017). It is known from three California counties including Riverside, San Bernardino, and San Diego (CNPS 2017).

Methods

Prior to the May 2017 survey for Harwood's eriastrum conducted by WEST, surveys for the eriastrum (and five additional special status plant species) had been conducted by Ironwood within the Desert Quartzite Project area in March 2013 and 2015. Ironwood detected multiple occurrences of Harwood's eriastrum within two general locations within the Project area, both of which occurred in stabilized sand dune vegetation communities (Figure 2). While 2013 and 2015 overall represented slightly above average rainfall years (4.11 inches and 3.96 inches, respectively) for the Blythe area, localized winter rainfall from December 2016 through the end of February 2017 (3.94 inches) alone exceeded the average annual rainfall (3.82 inches) for the area (Weather Underground 2017, U.S. Climate Data 2017). As a result of the much higher than average rainfall during the 2016/2017 winter, the BLM requested that an additional species-specific survey for Harwood's eriastrum be conducted within the Project site in the spring of 2017. Per BLM request, the spring 2017 survey area did not include areas containing previously documented occurrences of the eriastrum and did not include stabilized sand dune communities previously mapped and surveyed by Ironwood (Figure 2). Additionally, the BLM specified that the 2017 survey only be conducted in suitable habitat for Harwood's eriastrum found elsewhere in the Project site.

In response to the requirements defined above, the methods used by WEST for the survey during May 2017 involved a two-tiered approach, in which the two surveyors walked transects at approximately 60 m spacing to detect suitable habitat for Harwood's eriastrum, and, if suitable habitat was encountered, the surveyors narrowed the survey spacing to a width of less than 10 m to detect any occurring plants. Suitable habitat was defined as any sand dune, regardless of size, depth, and species composition. Prior to commencing the May 2017 survey, the two surveyors visited known occurrences of Harwood's eriastrum (detected by Ironwood in 2013 and 2015) in several locations within the Project site to become more familiar with the species and its current phenology, to assess suitable habitat within the Project site, and to observe associate species and their current phenologies.

The survey was conducted from May 9-14, 2017 by Kurt Flaig and Gregory Johnson (see qualifications in Appendix A). The lead botanist (Kurt Flaig) has conducted numerous rare plant surveys in the deserts of California and has a working knowledge of the genus *Eriastrum* based on surveys in the Mojave Desert in California. Survey timing occurred towards the latter part of the known flowering period for the eriastrum (March through June), but the region had experienced a wetter than average winter/spring and numerous Harwood's eriastrum individuals were observed in flower on site at the time of the survey. Furthermore, the BLM requested and approved that the surveys be conducted during this time.

Results

Observations of Sand Dune Habitat in Previously-documented Harwood eriastrum Occurrences

Populations of Harwood's eriastrum in the Project site documented by Ironwood in March 2013 and 2015 occur in sand dune vegetation communities. WEST surveyors visited several of these occurrences prior to commencing the May 2017 survey and were able to observe over 100 individuals of the eriastrum. A majority of these individuals had senesced but a small percentage was still flowering at the time of the survey. The stabilized and partially stabilized sand dunes upon which the Ironwood occurrences were found are large in size, forming dune complexes comprising tens of acres. The dominant species was the perennial bunchgrass big galleta grass (*Hilaria rigida*), for which the herbaceous alliance found on the dunes is named (*Pleuraphis* [*Hilaria*] *rigida* Herbaceous Alliance [Sawyer et al. 2009]). Commonly occurring species included creosote bush (*Larrea tridentata*), desert sand verbena (*Abronia villosa*), many-flowered mentzelia (*Mentzelia longiloba*), desert lantern (*Oenothera deltoides*), desert wire lettuce (*Stephanomeria pauciflora*), and desert lily (*Hesperocallis undulata*). Russian thistle (*Salsola tragus*), an invasive annual herb, was also common at these occurrences. The majority of desert sand verbena, many-flowered mentzelia, and desert wire lettuce individuals observed within the sand dunes during the survey were still flowering.

WEST surveyors found sand dune habitat meeting the description above in only three locations within the Project site (Figure 2). No *Eriastrum harwoodii* was observed at any of these locations. All three of the sites occurred immediately adjacent to large tracts of land that had been cleared (i.e., graded) within the last eight years based on review of Google Earth Pro imagery. As such, it appears that the observed sand dunes have formed more recently from wind-deposited sand and dust particles from the adjacent clearings and that Harwood's eriastrum has not had a sufficient time opportunity to become established. WEST surveyors observed and surveyed numerous small patches of accumulated sand. Typically these areas did not support Harwood's eriastrum associate species and were not mapped as potential habitat (although they were surveyed).

Harwood's eriastrum found during the May 2017 Survey

WEST surveyors detected *Eriastrum harwoodii* in two locations within the Project site that were not identified during the 2013 and 2015 Ironwood surveys (Figure 2), with a total of seventy-four individuals found. One individual was encountered at a location in the central portion of the Project site (Figure 2). It was situated in a small sand deposit (approximately 1.9 m^2 [20 ft^2] in area) on the downwind side of a creosote bush, within a sparsely-vegetated Sonoran Desert scrub vegetation community. Although they comprised very low vegetative cover, dominant associate species included creosote bush, desert Indianwheat (*Plantago ovata*), common Mediterranean grass (*Schismus barbatus*), and desert sunflower (*Geraea canescens*). With the exception of creosote bush, none of the associate species observed at the known occurrences within the Project site were found at this location. The lone individual of *Eriastrum harwoodii* detected at this occurrence was located approximately 0.8 km (0.5 mile) south and east of two large sand dune complexes with known occurrences of the species (Figure 2). Although the site didn't appear to represent quality suitable habitat for the species, it is possible that some seed, blown in from the large occurrences located nearby, had managed to germinate in the small sand drift. The two surveyors observed hundreds of such drifts throughout the Project site with no eriastrum present.

The second occurrence of *Eriastrum harwoodii* detected within the Project site was located in the northwest portion of the site, near the west end of the transmission line corridor and existing substation (Figure 2). The area contained previously documented occurrences of the eriastrum and, as such, did not require surveying in 2017 per the methods established with the BLM. WEST surveyors entered the area to observe previously mapped plants and encountered additional plants at a distance far enough (110 m [360 ft]) from previously mapped occurrences to warrant additional mapping. Thus, WEST surveyed the area as suitable habitat for the eriastrum (i.e., large sand dune complexes). Surveyors documented 73 individuals of the erisatrum in this area, all of which occurred on sand dunes (Figure 2). Associate species composition was similar to that found in the other previously documented occurrences observed by WEST on site with the addition of Indianwheat and narrow leaved cryptantha (*Cryptantha* *angustifolia*), which were both common. All Harwood's eriastrum individuals observed at this occurrence had senesced, but some dried corollas were still apparent.

Photographs of the two Harwood's eriastrum occurrences documented by WEST and of Harwood's eriastrum individuals observed in flower and post-flowering within the Desert Quartzite Project site are provided (Photographs 1-4).

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Sawyer, J.O., T. Keeler-Wolf, and J.M. Evans. 2009. A Manual of California Vegetation, second edition. California Native Plant Society. Sacramento, California.

Weather Underground. 2017. Weather History for Blythe, CA. Website http://www.wunderground.com [accessed on 07 June 2017).

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Attachments:
Figure 1. Desert Quartzite Solar Project site location map
Figure 2. Desert Quartzite rare plant survey report results figure.
Photograph 1. Harwood's eriastrum occurrence in the central portion of the Project site.
Photograph 2. Harwood's eriastrum occurrence in the northwest portion of the Project site.
Photograph 3. Harwood's eriastrum in flower.
Photograph 4. Harwood's eriastrum post-anthesis.
Appendix A. Surveyor qualifications.

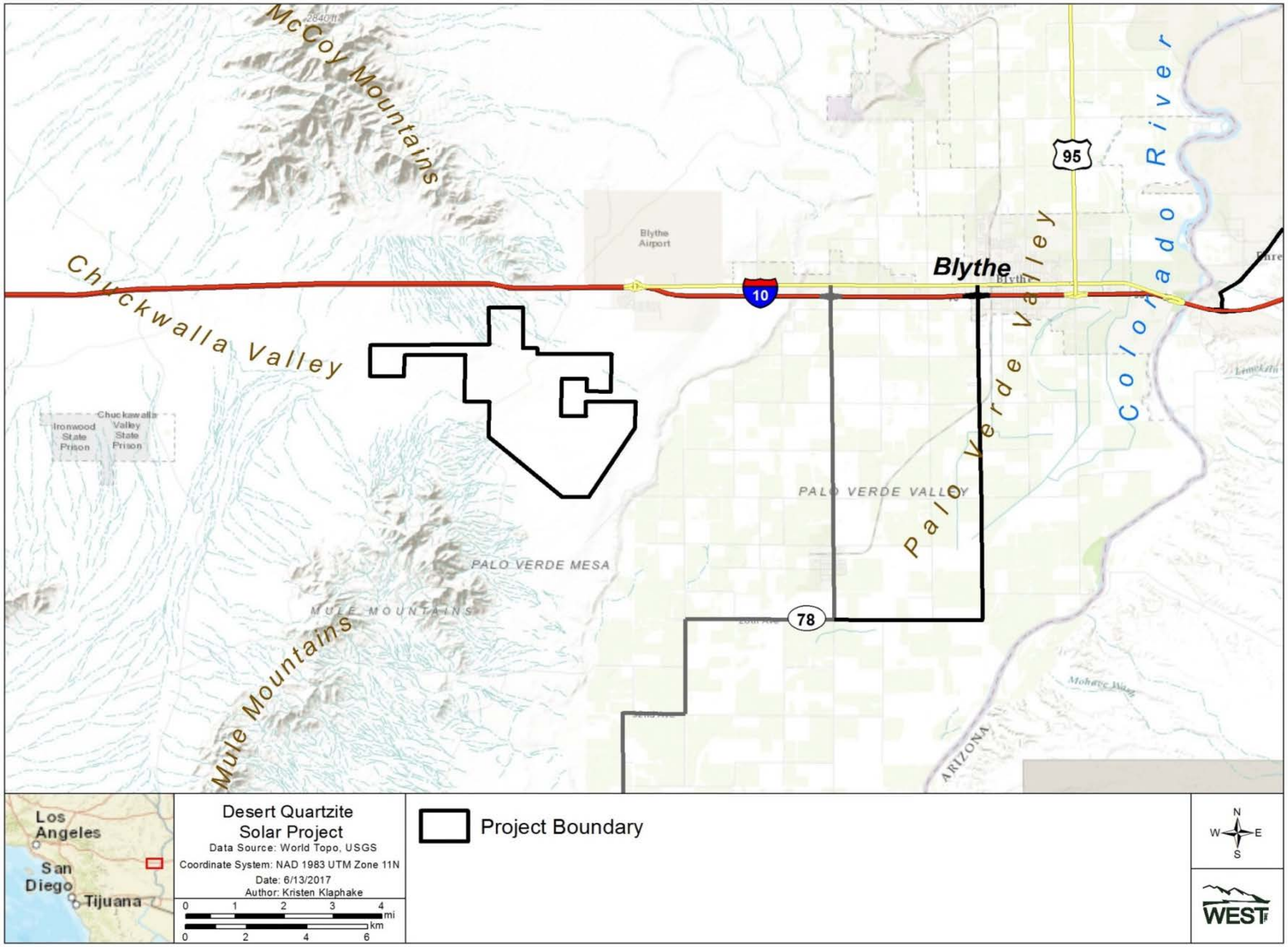

McCoy Mountains
Chuckwalla Valley
Blythe Airport
Blythe
10
95
Colorado River
Palo Verde Valley
PALO VERDE VALLEY
PALO VERDE MESA
MULE MOUNTAINS
Mule Mountains
78
Ironwood State Prison
Chuckawalla Valley State Prison
ARIZONA
Los Angeles
San Diego
Tijuana
Desert Quartzite Solar Project
Data Source: World Topo, USGS
Coordinate System: NAD 1983 UTM Zone 11N
Date: 6/13/2017
Author: Kristen Klaphake
0 1 2 3 4 mi
0 2 4 6 km
Project Boundary
N
W
E
S
WEST

Figure 1. Desert Quartzite Solar Project site location map.

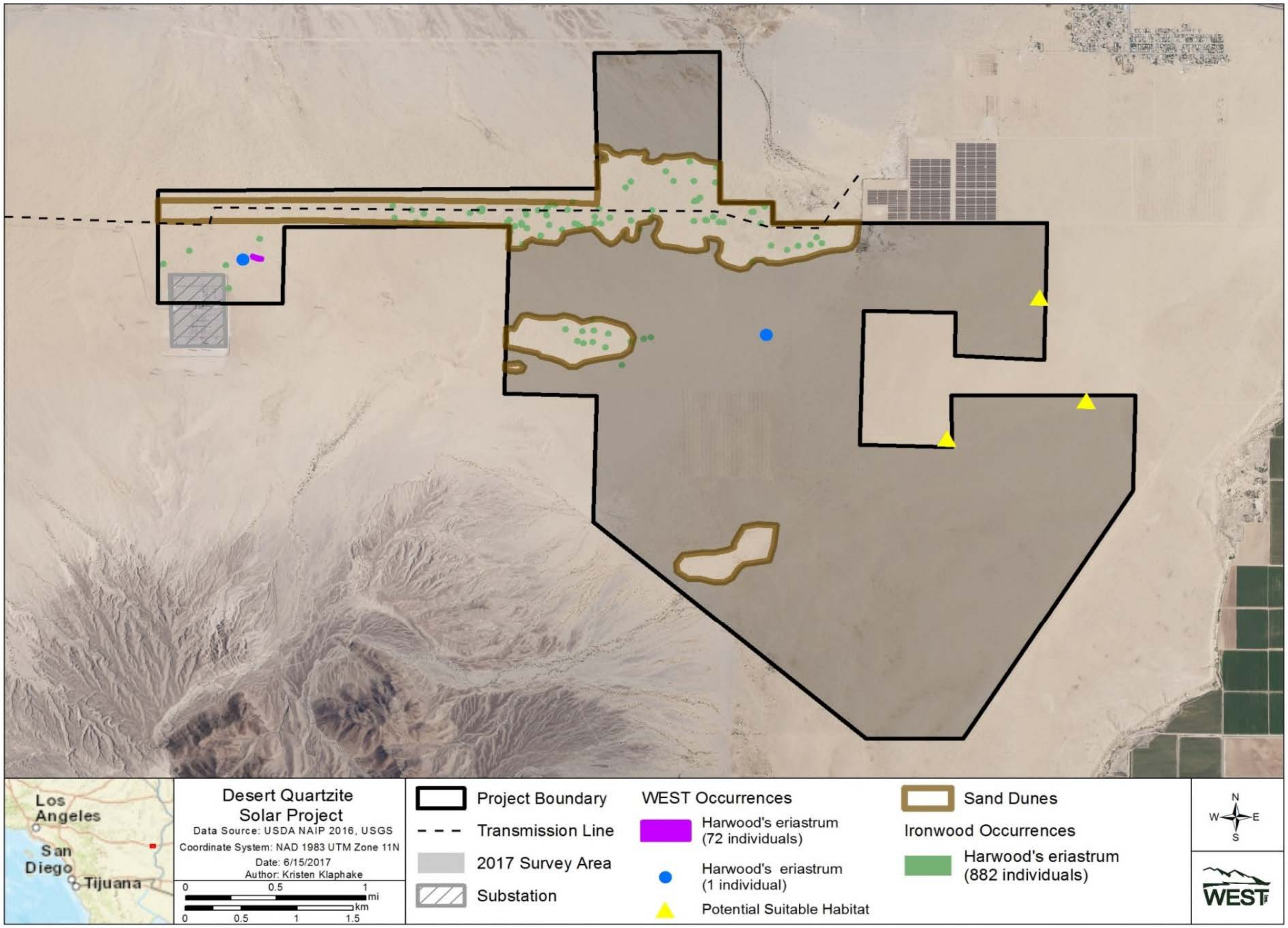
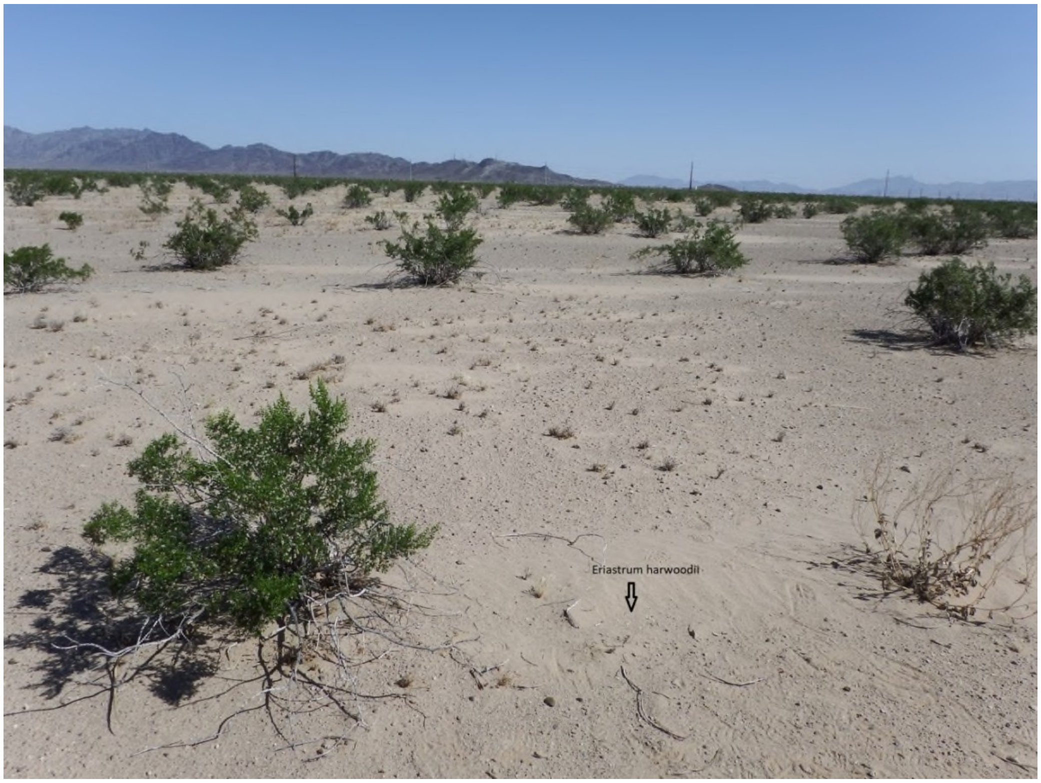
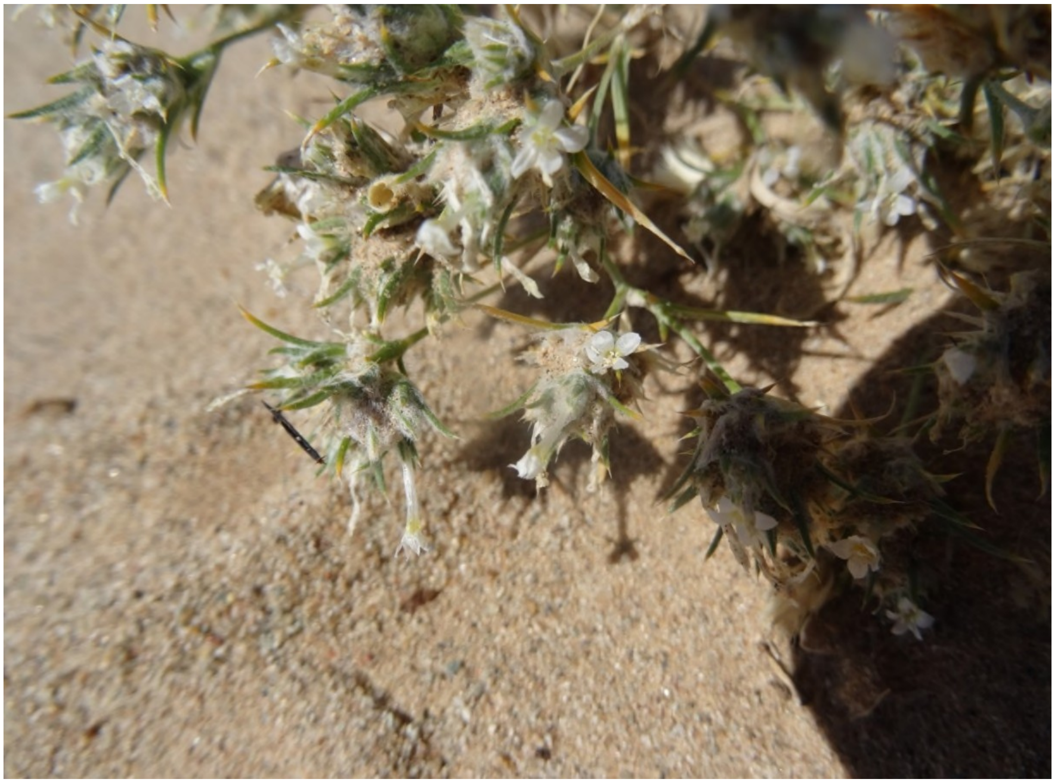

Los Angeles
San Diego
Tijuana
Desert Quartzite Solar Project
Data Source: USDA NAIP 2016, USGS
Coordinate System: NAD 1983 UTM Zone 11N
Date: 6/15/2017
Author: Kristen Klaphake
0 0.5 1 mi
0 0.5 1 1.5 km
Project Boundary
Transmission Line
2017 Survey Area
Substation
WEST Occurrences
Harwood's eriastrum (72 individuals)
Harwood's eriastrum (1 individual)
Potential Suitable Habitat
Sand Dunes
Ironwood Occurrences
Harwood's eriastrum (882 individuals)
N
W
E
S
WEST

Figure 2. Desert Quartzite *Eriastrum harwoodii* occurrences documented by WEST (2017) and Ironwood (2013 and 2015).

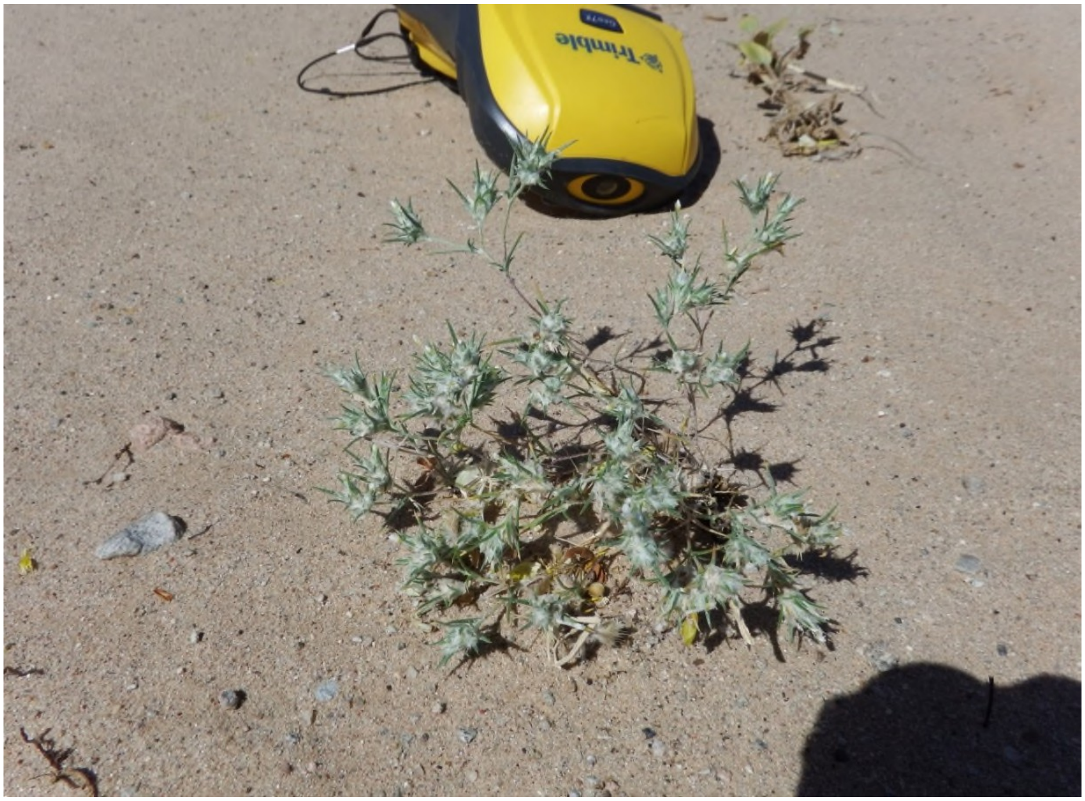


Photograph 1: Harwood's eriastrum occurrence (one individual) in small sand drift adjacent to creosote bush.

Photograph 2: Harwood's eriastrum occurrence (73 individuals) near substation and transmission line corridor; photograph shows sand dune habitat.



Photograph 3: Harwood's eriastrum in flower; photograph taken at occurrence mapped by Ironwood.



Photograph 4: Harwood's eriastrum post-anthesis; photograph taken at occurrence mapped by Ironwood.

Appendix A. Surveyor Qualifications

Kurt F. Flaig, *Plant Ecologist*

PROFESSIONAL EXPERIENCE

2004-Present	*Plant Ecologist,* Western EcoSystems Technology, Inc., Cheyenne, Wyoming
2001-2003	*Plant Ecologist,* H.T. Harvey & Associates, San Jose, California
2000-2001	*Range Technician,* Colorado State Cooperative Extension Program and Division of Wildlife, Weston, Colorado
2000-2001	*Natural Resource Technician,* Center for Ecological Management of Military Lands, Fort Collins Colorado
1999-2000	*Biological Science Technician,* U.S. Forest Service, Canyon Lakes District, Fort Collins, Colorado
1998-1999	*Range Technician,* Colorado State Cooperative Extension Program, Fort Collins, Colorado and Y-Cross Ranch, Horse Creek, Wyoming
1996-1999	*Graduate Research Assistant,* Department of Rangeland Ecosystem Science, Fort Collins, Colorado and Fort Richardson, Alaska

SPECIALTY AREAS

Rare Plants: Kurt has been conducting rare plant assessments and surveys for county, state, BLM, and USFS sensitive species, and ESA listed species since 2001. This experience includes evaluating project impacts to rare plant species and communities, and designing and implementing mitigation measures to address such impacts. Kurt has detected numerous occurrences of special-status plant species, including federally threatened and endangered species, in the western U.S. This experience includes locating occurrences in Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, New Mexico, North Dakota, South Dakota, Utah, Washington, and Wyoming.

Wetlands: Kurt has 15 years of experience in conducting wetland delineations throughout the western U.S. He has prepared and assisted clients in preparing USACE Section 404 permits, California Department of Fish and Game Streambed Alteration Agreements, and in complying with various states' waters regulatory requirements. Kurt has designed wetland mitigation sites and conducted extensive mitigation monitoring. He also has formal training and considerable experience in conducting wetland functional assessments.

Vegetation Classification, Mapping and Monitoring: Kurt has extensive experience in the classification and mapping of vegetation in a variety of community and ecosystem types throughout the western U.S. This includes detailed descriptions of habitats and identification of component flora. Kurt has over 15 years of experience in conducting vegetation monitoring in systems ranging from shortgrass and coastal prairies to mixed coniferous forest and coastal salt marsh. This experience includes baseline studies and short- and long-term monitoring studies for projects involving range inventories, grassland restoration, wetland/riparian restoration and mitigation, and soil erosion analysis. Kurt is proficient in the utilization of numerous sampling methods.

Technical Report Preparation: Kurt is an accomplished technical writer and editor. He provides expertise in the preparation of various NEPA related documents, including Environmental Impacts Statements, Biological Assessments, Biological Evaluations, and Habitat Conservation Plans, and has authored numerous technical reports and documents.

ADDITIONAL TRAINING & CERTIFICATION

WAFWA Lesser Prairie Chicken Vegetation Monitoring Training, 2014

Wyoming Reclamation and Restoration Center Workshop, 2012

Functional Assessment of Colorado Wetlands (FACWet) Methodology Training, 2009

Biological Assessment/Biological Evaluation Preparation Training, 2008, USFS

Advanced Hydric Soils Course, 2005, Wetland Training Institute (CA)

Wetland Delineation Course, 2003, Wetland Training Institute (CA)

California Native Plant Society Rapid Assessment Course for Vegetation Mapping, 2001

EIR/EIS Preparation and Review, 2001, University of California Davis Extension

Wetland Regulations, 2001, University of California Davis Extension

EDUCATION

M.S.
Colorado State University
Fort Collins, Colorado
1999
Range Ecology

B.S.
Colorado State University
Fort Collins, Colorado
1995
Natural Resource Management

B.A.
Florida Atlantic University
Boca Raton, Florida
1989
Political Science

SCIENTIFIC ORGANIZATION MEMBERSHIPS

California Native Plant Society

Colorado Native Plant Society

Wyoming Native Plant Society

Society of Wetland Scientists

RELATIVE PROJECT EXPERIENCE*

Alta Infill / Pinyon Pines Post-construction Restoration Monitoring (2015, 2016) – Kern County, California
Conducted two consecutive years of reclamation vegetation monitoring in which all plant species encountered were identified and percent cover estimates were provided.

Wildflower Green Renewable Energy Project (2010, 2011) – Los Angeles County, California
Conducted rare plant surveys for the following species: round-leaved filaree, golden goodmania, Coulter's goldfields, Pierson's morning glory, Barstow woolly sunflower, and pale-yellow layia. Identified, mapped, and described vegetation communities within the project area. Identified potential jurisdictional wetlands and other waters of the U.S., and CDFG jurisdictional streams.

Rising Tree Wind Energy Project (2010, 2011) – Kern County, California
Conducted rare plant surveys for the following species: alkali mariposa-lily, white pygmy-poppy, Mojave spineflower, white-bracted spineflower, desert cymopterus, Bakersfield cactus, Barstow woolly sunflower, Red Rock poppy, short-joint beavertail, and golden goodmania.

Mojave Solar Energy Project (2010) – Kern County, California
Conducted rare plant surveys for the following species: alkali mariposa-lily, white pygmy-poppy, Mojave spineflower, white-bracted spineflower, desert cymopterus, Barstow woolly sunflower, Red Rock poppy, short-joint beavertail, and golden goodmania. Identified potential jurisdictional wetlands and other waters of the U.S., and CDFG jurisdictional streams.

Buckeye Solar Resource Project (2010) – Maricopa County, Arizona
Conducted a native plants and noxious weed inventory using a systematic sampling design. Identified potential jurisdictional wetlands and other waters of the U.S.

Sidewinder Wind Energy Project (2008) – San Bernardino County, California
Conducted rare plant surveys for the following species: Lane Mountain milkvetch, desert cymopterus, Barstow woolly sunflower, Mojave monkeyflower, short-joint beavertail. Identified potential jurisdictional wetlands and other waters of the U.S., and CDFG jurisdictional streams.

White Hills Wind Energy Project (2008) – Mohave County, Arizona
Conducted rare plant species surveys for the following species: Las Vegas bearpoppy, clustered barrel cactus, silverleaf sunray, and Navajo bridge cactus. Designed and conducted a systematic sampling method to inventory salvage restricted, protected native plant species within the project area. Identified potential jurisdictional wetlands and other waters of the U.S.

PPM Dry Lake Wind Energy Project (2006) – Navajo County, Arizona
Conducted rare plant species surveys for the following species: roundleaf errazurizia, paper-spined cactus, and Peebles Navajo cactus. Identified potential jurisdictional wetlands and other waters of the U.S.

Hoover's woolly-star (Eriastrum hooveri) Survey (2003) – Los Angeles County and Kern County, California
Collected extent and distribution data for Hoover's woolly-star at various locations in the Antelope Valley in support of its proposed delisting as a Federal-threatened species by the USFWS (for H.T. Harvey & Associates).

***In addition to the regional projects identified above, Kurt has conducted numerous other rare plant surveys throughout the western U.S., including surveys in Colorado, Idaho, Kansas, Montana, Nebraska, New Mexico, North Dakota, South Dakota, Utah, Washington, and Wyoming.**

Gregory D. Johnson, *Research Biologist*

Professional Experience

1991-Present	Research Biologist, Western EcoSystems Technology, Inc., Cheyenne, Wyoming
1987-1991	*Study Director/Project Manager*, Wildlife International, Easton, Maryland
1985-1987	*Research Assistant,* University of Wyoming, Laramie, Wyoming
1984-1986	*Teaching Assistant,* University of Wyoming, Laramie, Wyoming
1984	*Wildlife Technician,* U.S. Forest Service, Laramie, Wyoming
1983	*Wildlife Technician,* University of Wyoming, Laramie, Wyoming

Professional Summary

Greg Johnson has been an Ecologist and Project Manager for WEST since 1991. He received a B.S. degree in Wildlife Conservation and Management and a M.S. degree in Zoology and Physiology from the University of Wyoming. He has over 30 years of consulting experience in wildlife and ecological studies. He is a Certified Wildlife Biologist through The Wildlife Society, a Professional Wetland Scientist through the Society of Wetland Scientists, and a certified Senior Ecologist through the Ecological Society of America. His specialty areas include wildlife research with an emphasis on contaminants and wind power development; endangered species; wetland delineation, mitigation, and functional value assessment; and vegetation sampling. He is the author/coauthor of 49 professional journal articles, book chapters or peer reviewed proceedings papers and is an author/coauthor of 61 presentations at scientific meetings.

Relevant Work Experience

Mr. Johnson has extensive experience sampling vegetation. He prepared a weed management plan and collected quantitative data on weed cover to establish baseline conditions prior to implementing the plan for a reservoir project in CO. He collected transect data on willows and alders along 7.5 miles of stream south of Rawlins, WY to establish baseline conditions of woody riparian habitats used for mitigation purposes. He has collected quantitative plot and transect data on over 60 created and restored wetlands. In 1995 and 1996, he monitored success of reclamation of the 41-mile Wasatch Sour Gas Gathering System pipeline on the Utah/Wyoming border through quantifying vegetation species composition and % cover. He has identified wetland plants on over 100 project sites while conducting wetland delineations. In the summer of 1984, he collected quantitative vegetation data on an elk winter range in southern WY. In the summers of 1979-82, he was employed by the USDA Agricultural Research Service, where he collected extensive vegetation data on reclaimed mined lands in southeast WY. He has mapped vegetation, described vegetation types, and prepared the vegetation portion of numerous EIS's, EA's, and BA's. He has also conducted numerous searches for rare and sensitive plant species prior to construction activities in Wyoming, Idaho, Colorado, Oregon, Washington and California.

He has been certified as a Professional Wetland Scientist (PWS) by the Society of Wetland Scientists since 1997. He is formally trained in wetland delineations, wetland construction and restoration, and wetland plant identification. He has 23 years of wetland experience and has delineated over 5,000 acres of wetland using the Corps of Engineers 1987 manual on over 100 project sites. He was selected by the Corps of Engineers to peer review the Great Plains Region and Western Mountains, Valleys and Coast Region regional supplements to the 1987 Corps of Engineers wetland delineation manual. He has selected numerous wetland mitigation sites and assisted engineers with designs of created wetlands for mitigation purposes. He has quantitatively assessed the functions and values of

EDUCATION

M.S.
University of Wyoming
Laramie, Wyoming
1987
Zoology and Physiology

B.S.
University of Wyoming
Laramie, Wyoming
1983
Wildlife Conservation and Management

CERTIFICATIONS

Certified Senior Ecologist,
Ecological Society of America

Certified Wildlife Biologist,
The Wildlife Society

Professional Wetland Scientist,
Society of Wetland Scientists

impacted wetlands as well as wetlands created for mitigation purposes to ensure that proposed wetland mitigation plans will result in created wetlands that completely replace the functions and values of impacted wetlands. He has also monitored the success of over 75 created wetlands using quantitative line transect and plot methods to measure vegetative composition and success.

Rare Plant Survey Experience:

2017 Proposed Quartzsite Solar Energy Project, Riverside County, California.
Species: Harwood's eriastrum (*Eriastrum harwoodii*)

2014 U.S. Highway 14 reconstruction project, Sheridan County, Wyoming.
Species: 59 species of U.S. Forest Service and Wyoming Natural Diversity database sensitive species.

2013 Highway 130 roadside hazard tree clearing project, Carbon County, Wyoming.
Species: 53 species of U.S. Forest Service sensitive species.

2013 Confidential Pipeline, Laramie and Platte Counties,Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*) and Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*)

2012 Cheyenne Prairie Generating Station Pipeline, Laramie County, Wyoming
Species: Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*)

2006 Wyoming State Highway 150 Reconstruction Project, Campbell County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*)

2006 Lance Creek East Highway Reconstruction Project, Niobrara County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*)

2005 Entrega Gas Pipeline Project, Carbon County, Wyoming
Species: Nelson's milkvetch (*Astragalus nelsonianus*), Gibben's penstemon (*Penstemon gibbensii*)

2004 Reuter-Hess Reservoir Project, Parker, Colorado
Species: Carrionflower (*Smilax lasioneura*) and American black currant (*Ribes americanum*). Located over 40 currant and over 300 carrionflower plants for transplant from the reservoir site.

2004 Entrega Gas Pipeline Project, Rio Blanco and Moffat Counties, Colorado
Species: debris milkvetch (*Astragalus detritalis*), narrow-stem gilia (*Gilia stenothysra*), Rollins cryptanth (*Oreocarya rollinsii*)

2004 City of Cheyenne Belvoir Ranch Landfill and Access Road, Laramie County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*) and Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*)

2004 Bear Creek Bridge replacement project, Goshen County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*) and Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*)

2004 Happy Jack Road Reconstruction Project, Laramie County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*) and Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*)

2004 Basin - Greybull Highway Reconstruction Project, Bighorn County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*)

2004 Farson-Lander Highway Reconstruction Project, Sweetwater County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*)

2003 Casper East I-25 Reconstruction Project, Natrona County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*)

2003 Evanston South Highway Reconstruction Project, Uinta County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*)

2003 Henry's Fork Bridge replacement Project, Uinta County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*)

2003 Wild Horse Wind Development Project, Kittitas County, Washington.
Species: Tall agoseris (*Agoseris elata*), Pasque flower (*Anemone nuttalliana*), Palouse milk-vetch (*Astragalus arrectus*), Columbia milk-vetch (*Astragalus columbianus*), Pauper milk-vetch (*Astragalus misellus* var. *pauper*), Dwarf evening-primrose (*Camissonia pygmaea*), Naked-stemmed evening primrose (*Camissonia scapoidea*), Bristle-flowered collomia (*Collomia macrocalyx*), Golden corydalis (*Corydalis aurea*), Beaked cryptantha (*Cryptantha rostellata*), Shining flatsedge (*Cyperus bipartitus*), Wenatchee larkspur (*Delphinium viridescens*), White eatonella (*Eatonella nivea*), Basalt daisy (*Erigeron basalticus*), Piper's daisy (*Erigeron piperianus*), Sagebrush stickseed (*Hackelia hispida* var. *disjuncta*), Longsepal globemallow (*Iliamna longisepala*), Hoover's desert-parsley (*Lomatium tuberosum*), Suksdorf's monkey-flower (*Mimulus suksdorfii*), Coyote tobacco (*Nicotiana attenuata*), Cespitose evening-primrose (*Oenothera cespitosa* ssp.*cespitosa*), Hedgehog cactus (*Pediocactus simpsonii* var. *robustior*), Brewer's cliff-brake (*Pellaea breweri*), Fuzzytongue penstemon (*Penstemon eriantherus* var.*whitedii*), Least phacelia (*Phacelia minutissima*), Sticky goldenweed (*Pyrrocoma hirta* var. *sonchifolia*), Seely's silene (*Silene seelyi*), Ute ladies'-tresses (*Spiranthes diluvialis*), and Hoover's tauschia (*Tauschia hooveri*).

2002 Crystal Canyon Pipeline Project, Laramie County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*) and Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*)

2002 Harriman Road Interchange, Interstate 80, Laramie County, Wyoming
Species: Ute Ladies Tresses (*Spiranthes diluvialis*) and Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*)

2002 Dubois - Moran Junction Highway Reconstruction project, Fremont County, Wyo.
Species: Pink agoseris (*Agoseris lackschewitzii*), Teton wire-lettuce (*Stephanoneria fluminea*).

2001 Unnamed tributary to Lone Tree Creek, Albany County, Wyoming, Prestridge Stock Reservoir Project
Species: Ute Ladies Tresses (*Spiranthes diluvialis*) and Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*)

2001 South Fork of Crow Creek, Laramie County, Wyoming, City of Cheyenne Diversion Dam Rehabilitation Project
Species: Ute Ladies Tresses (*Spiranthes diluvialis*) and Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*)

2001 City of Cheyenne water line crossing of the South Fork of Crow Creek
Species: Ute Ladies Tresses (*Spiranthes diluvialis*) and Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*)

2000 & 2001 Seminoe Dam Road improvement project, Carbon County, Wyo.
Species: blowout penstemon (*Penstemon haydenii*)

2000 22 abandoned bentonite mines, Crook and Weston counties, Wyo.
Species: water-thread pondweed (*Potamogeton diversifolius*), slender bulrush (*Scirpus heterochaetus*), matted broom-spurge (*Euphorbia serpens*), spring forget-me-not (*Myosotis verna*), small-flowered flame-flower (*Talinum parviflorum*), prairie three-awn (*Aristida oligantha*), roundleaf water-hyssop (*Bacopa rotundifolia*), Texas spreading loeflingia (*Loeflingia squarrosa* var. *texana*)

2000 Sand mining operation, BP Amoco Soda Lake Remediation site, Casper, Wyo.
Species: blowout penstemon (*Penstemon haydenii*)

1999 Snow Sail project, Teton County, Wyoming
Species: Soft aster (*Aster mollis*), Boreal draba (*Draba borealis*), Narrowleaf goldenweed *(Haplopappus macronema* var. *linearis)*, Payson's bladderpod *(Lesquerella paysonii)*

1999 Haul Road construction project, Hanna, Wyoming

Species: bun milk-vetch (*Astragalus simplicifolius*), bedstraw milkweed (*Asclepias subverticillata*)

1998 Sinks Canyon Highway Reconstruction Project, Fremont County, Wyo.
Species: Fremont bladderpod (*Lesquerella fremontii*), Beaver Rim phlox (*Phlox pungens*), Rocky Mountain twinpod (*Physaria saximontana* var *saximontana*), Barneby's clover (*Trifolium barnebyi*)

1998 Dubois - Moran Junction Highway Reconstruction project, Fremont County, Wyo.
Species: Wyoming Tansymustard *(Descurainia torulosa)*, Sweet-flowered Rock Jasmine *(Androsace chamaejasme)*, Upward-lobe Moonwort *(Botrychium ascendens)*, Seaside Sedge (*Carex incurviformis*), Narrowleaf Goldenweed (*Haplopappus macronema*)

1997 Proposed campground site, Bighorn National Forest, Wyo.
Species: limestone columbine *(Aquilegia jonsii)*, northern arnica *(Arnica lonchophylla)*, soft aster *(Aster mollis)*, balsamroot *(Balsamorhiza X tomentosa)*, moonwort *(Botrychium lunaria)*, livid sedge *(Carex livida)*, northern single-spike sedge *(Carex scirpoidea)*, conimitella *(Conimetella williamsii)*, Williams waterparsnip *(Cymopterus williamsii)*, yellow ladyslipper *(Cypripedium calceolus)*, mountain ladyslipper *(Cypripedium montanum)*, giant helleborine *(Epipactis gigantea)*, rough fescue *(Festuca hallii)*, broad-leaved twayblade *(Listera convallaroides)*, marsh muhly *(Muhlenbergia glomerata)*, Kotzebue's grass of parnassus *(Parnasia kotzebuei)*, mountain lousewort *(Pedicularis pulchella)*, Cary beardtongue *(Penstemon caryii)*, Pacific bluegrass *(Poa gracillima)*, greenland primrose *(Primula egaliksensis)*, nagoonberry *(Rubus acaulis)*, Hapeman's saxifrage *(Sullivantea hapmanii)*

1997 Three abandoned uranium mines, Gas Hills in Fremont County, Wyo.
Species: cedar rim thistle (*Cirsium aridum*), contracted Indian ricegrass (*Oryzopsis contracta*), Payson beardtongue (*Penstemon paysoniorum*), bun milk-vetch (*Astragalus simplicifolius*), Nelson's milkvetch (*Astragalus nelsonianus* a.k.a. *Astragalus pectinatus* var. *platyphyllus*)

1995 Five abandoned uranium mines, Gas Hills in Fremont County, Wyo.
Species: cedar rim thistle (*Cirsium aridum*), contracted Indian ricegrass (*Oryzopsis contracta*), Beaver Rim phlox (*Phlox pungens*), meadow pussytoes (*Antennaria arcuata*), Payson beardtongue (*Penstemon paysoniorum*), wild yellowcress (*Rorippa truncata*), Brandegee's Jacob's-ladder (*Polemonium brandegei*), swamp willow-herb (*Epilobium palustre* var *palustre*), bun milk-vetch (*Astragalus simplicifolius*), Nelson's milkvetch (*Astragalus nelsonianus* a.k.a. *Astragalus pectinatus* var. *platyphyllus*)

1995 One abandoned bentonite mine, Crook County, Wyo.
Species: Texas spreading loeflingia (*Loeflingia squarrosa* var. *texana*)

1995 Proposed Tribal Casino, Klamath Basin, Oregon

Species: Applegate's milk-vetch (*Astragalus applegatei*), Pumice grape-fern (*Botrychium pumicola*), long-bearded mariposa-lily (*Calochortus longebarbatus* var. *longebarbatus*), pygmy monkeyflower (*Mimulus pygmaeus*), red-root yampah (*Perideridia erythrorhiza*), Columbia cress (*Rorippa columbiae*)

1995 Two proposed reservoir sites, Park County, Wyo.
Species: sand dropseed (*Sporobolus cryptandrus*), persistant sepal yellowcress (*Rorippa calycina*)

1994 Five abandoned coal mine sites near Hanna, Wyo.
Species: bun milk-vetch (*Astragalus simplicifolius*), bedstraw milkweed (*Asclepias subverticillata*

APPENDIX N

IDENTIFICATION AND DELINEATION OF AREAS POTENTIALLY SUBJECT TO JURISDICTION UNDER THE CALIFORNIA DEPARYTMENT OF FISH AND WILDLIFE LAKE AND STREAMBED ALTERATION PROGRAM

Identification and Delineation of Areas Potentially Subject to Jurisdiction under the California Department of Fish and Wildlife Lake and Streambed Alteration Program Desert Quartzite Solar Farm Project Blythe, Riverside County, California

Prepared for

Desert Quartzite, LLC
135 Main Street, 6th Floor
San Francisco, California 94105

Prepared by

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS
828 Mission Avenue
San Rafael, California 94901

March 2017

TABLE OF CONTENTS

LIST OF TABLES .... **II**

LIST OF APPENDICES .... **II**

1.0 INTRODUCTION **1**

- **1.1** Purpose and Scope of Work 1
- **1.2** General Site Description 1
- **1.3** Contact Information 1
- **1.4** Environmental Setting 1
  - *1.4.1 Topography* *1*
  - *1.4.2 Land Use* *1*
  - *1.4.3 Geology* *2*
  - *1.4.4 Soils* *3*
  - *1.4.5 Vegetation* *3*
  - *1.4.6 Climate* *4*
  - *1.4.7 Hydrology* *4*
  - *1.4.8 FEMA Flood Zone* *5*
- **1.5** Disclaimer 5

2.0 REGULATORY FRAMEWORK **6**

- **2.1** CDFW Lake and Streambed Alteration Program 6

3.0 DELINEATION METHOD **7**

- **3.1** Objective and Study Approach 7
- **3.2** Preliminary Investigations 7
- **3.3** Detailed Field Investigations 7
- **3.4** Rainfall (WETS) Analysis 9
- **3.5** Mapping 9

4.0 TECHNICAL FINDINGS **11**

- **4.1** Uplands 11
  - *4.1.1 Sand Sheet Deposits* *11*
  - *4.1.2 Alluvial Fan Deposits* *12*
- **4.2** Watercourses Identified 12
  - *4.2.1 Active Watercourses* *12*
  - *4.2.2 Dormant Watercourses* *13*
  - *4.2.3 Abandoned Watercourses* *13*
  - *4.2.4 Relict Watercourses* *15*

5.0 AREAS POTENTIALLY SUBJECT TO CDFW JURISDICTION **16**

6.0 REFERENCES **18**

List of Tables

Table 1	Average Monthly Temperatures, Blythe, CA
Table 2	Geomorphic Indicators of Upland and Active Fluvial Watercourses
Table 3	Summary of Observed Physical Indicators of Fluvial Inactivity associated with Abandoned Water Courses Within the Study Area
Table 4	Summary of Linear Distance and Acreage of Fluvial Watercourse Found Within the Study Area Potentially Subject to CDFW Jurisdiction
Table 5	Summary Linear Distance and Acreage of Watercourses Found Not to be Jurisdictional

List of Appendices

Appendix A	**Figures**
Figure 1	Regional Location Map
Figure 2	USGS Topographic Map of the Study Area
Figure 3	Vegetation Map of the Study Area
Figure 4	USGS NHD HUC 8 Watershed Mapping
Figure 5	USGS NHD HUC 12 Watershed Mapping
Figure 6	USGS NHD Mapping with Mapped Surface Water Flows Within and Adjacent to the Study Area
Figure 7	Stream Channel and Floodplain Watercourses Potentially Subject to CDFW Jurisdiction
Figure 8	Mapping Showing Where Off-Site Surface Water Flows Directed Toward the Study Area Have Been Cut-Off by Natural and by Constructed Surface Features
Appendix B	**NRCS Custom Soil Report**
Appendix C	**WETS Analysis**
Appendix D	**Field Data**
Appendix E1	**Representative Onsite Photographs**
Appendix E2	**Photopoint Location Map**
Appendix F	**Computations for Delineated Areas**

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1.0 INTRODUCTION

1.1 Purpose and Scope of Work

At the request of Desert Quartzite, LLC, a wholly owned subsidiary of First Solar Development, Inc. (First Solar), Huffman-Broadway Group, Inc. (HBG) investigated the potential presence of areas subject to California Department of Fish and Wildlife (CDFW) jurisdiction under the Department's Lake and Streambed Alteration Agreement Program (California Fish and Game Code (FGC) Sections 1600-1616). The investigation covered a contiguous Study Area (Study Area) in eastern Riverside County, California, where a proposed new photovoltaic solar power generation facility (Solar Farm) would be located.

1.2 General Site Description

The Study Area is an approximately 4,954.6-acre area in the Colorado Desert Section of the Sonoran Desert in an unincorporated part of Riverside County, California. The city of Blythe is about 6.5 miles to the east (Appendix A, Figure 1). The Study Area is approximately 0.46 mile south of Interstate I-10, and is northeast of the Mule Mountains, east of Milpitas Wash Road, and west of Palo Verde Valley and the Lower Colorado River (Appendix A, Figures 1 and 2). Approximate latitude and longitude coordinates for the center of the Study Area are 33.569620 / 114.760883 W.

1.3 Contact Information

Project Contact	*Wetland and Biological Consultant*
First Solar Development, LLC 135 Main Street, 6th Floor San Francisco, California 94105 Contact: Roy Skinner 415.531.6909 (cell) • 415.935.2500 (office) Email: Roy.Skinner@FirstSolar.com	**Huffman-Broadway Group, Inc.** 828 Mission Avenue San Rafael, California 94901 Contact*:* Terry Huffman, PhD 415.385.1045 (cell) • 415.925.2002 (office) Email: thuffman@h-bgroup.com

1.4 Environmental Setting

1.4.1 Topography

The Study Area is within portions of the Roosevelt Mine (1983) and Ripley (1952, rev.1975) USGS 7.5-minute quadrangles (Appendix A, Figure 2). The majority of the Study Area has relatively flat desert terrain. Elevations are shown in meters on the western approximately two-thirds of the map and in feet for the eastern third of the map. Elevations range from approximately 325 to 475 feet high (99.0 to 145.0 meters) above mean sea level.

1.4.2 Land Use

The Study Area is on largely vacant, undeveloped land within the Palo Verde Mesa in eastern Riverside County. Small areas of formerly cultivated lands also occur within the Study Area (Appendix A, Figure 7, Sheets 5, 6, 11, 12, and 13).

1.4.3 Geology

The site is in the east-northeastern Colorado Desert Geomorphic Province. The San Andreas Fault defines the southwestern boundary of the eastern Colorado Desert while the San Bernardino Mountains form a less-defined boundary to the north. Review of U.S. Department of Agriculture National Agriculture Imagery Program (NAIP) 2012 aerial imagery (Appendix A, Figure 7), onsite terrain reconnaissance survey photographs (Appendix E), and the NRCS Custom Soil Resources Report in Appendix B indicates that the area consists of active younger sediments within alluvial fan remnant and sand sheet landforms. The active younger sediments are of Holocene age and consist of fine to coarse sand interbedded with clay, silt, and gravel. Topography in these areas tends to be consistent, relatively flat with 0 to 2 percent slopes with shallow stream channels generally less than 0.5-foot-deep interspersed through upland areas consisting of fan remnants. Unless surface flows are cut off by natural processes (i.e., sand sheet) or by anthropogenic disturbance or influence (i.e., flow diversion or detention) shallow channels within the younger sediments exhibit frequent channel avulsion and lateral migration during high stormwater runoff periods.

Review of NAIP2012 aerial imagery (Appendix A, Figure 7), the Appendix B NRCS Custom Soil Resources Report (Appendix B), and survey photographs taken during onsite terrain reconnaissance (Appendix E) indicate that two significant geologic environments occur within the Study Area:

- Active younger sediments with no evidence of desert pavement
- Eolian sand sheets

Active Younger Sediments

The active younger sediments are of Holocene age and consist of fine to coarse sand interbedded with clay, silt and gravel. There is no evidence of desert pavement. Topography in these areas tends to be consistent. Stream channel and floodplain watercourses occur within these upland areas.

Eolian Sand Sheets

Aeolian sand sheets were described as follows by WorleyParsons (2010):

> Sand sheets (or plains) are flat or gently undulatory broad floors of tabular windblown sand deposits derived from accumulating sand ripple migration. The tabular deposits generally range in thickness from a few centimeters to a few meters. Some sand sheets, as in the southwestern U.S., are local deposits that extend only a few square kilometers in and around dune fields, where they are exposed on interdune floors and form the aprons or trailing margins of dune fields and along sand migration corridors. Sand sheet deposits are composed of gently inclined or nearly horizontal layers, each less than about a centimeter thick, of coarse silt and very fine to medium sand separated by layers, one grain thick, of coarse sand and granules. Unlike dune sand, the unconsolidated sand and granules are closely packed and firm under foot. The surface is protected by a wind abrasion lag, one grain thick, of the coarsest particles that can be shifted by the wind, ranging from coarse sand to pea-size gravel. In any one place, however, the sizes of the lag particles are remarkably uniform, and the lag may be so closely packed that it forms a miniature desert pavement. In the Chuckwalla Valley, the wind abrasion lag often contains small gravel that may have been derived from burrowing animals moving coarser grained alluvial

> deposits containing gravel to the surface in the past ([*citation*]). The existence of a wind abrasion lag containing gravel from underlying alluvial units suggests that the surface is a minimum of a few thousand years old in order to provide sufficient time for burrowing animals to mix the near surface units over a relatively large area. Sand sheets in themselves indicate little about wind direction regimes, but the particle size of sand and gravel lag on ripple surfaces seems dependent on the strength of the winds in any given locality. Inactive sand sheet deposits near and at the surface however do provide evidence of past wind sand migration corridors.

Stream channel and floodplain watercourses are not found within these upland areas.

1.4.4 Soils

Appendix B is an NRCS custom soil resources report for the Study Area. According to NRCS, the Study Area is within the Colorado Desert Area and Palo Verde Area NRCS soils mapping units. No soils data have been collected for the Colorado Desert Area, California (CA803), in the western 499.4 acres of the Study Area (USDA NRCS 2017). Although soils have not been mapped in this area, onsite observation of surface conditions and interpretation of aerial imagery and NRCS soils mapping for the Palo Verde Area portion indicate that the soils found in this unmapped area are the same as or similar to Palo Verde Area soils described below.

Seven soil types have been mapped within the Palo Verde Area, California (CA681), portion of the Study Area (4,455.3 acres [89%]) (USDA NRCS 2015). The soils and their parent materials and landforms are summarized below:

Soil type	**Parent Material / Landform**
Aco gravelly loamy sand (Ac)	Mixed alluvium / alluvial fan remnants landform
Aco sandy loam (Af)	Mixed alluvium / alluvial fan remnants landform
Orita fine sand (Oc)	Mixed alluvium / alluvial fan remnants landform
Orita gravelly fine sandy loam (Or)	Mixed alluvium / alluvial fan remnants landform
Rositas fine sand, 0 to 2 percent slopes (RoA)	Eolian sands / sand sheets landform
Rositas fine sand, 2 to 9 percent slopes (RoB)	Eolian sands / sand sheets landform
Rositas gravelly loamy sand, 0 to 2% slopes (RsA	Eolian sands over mixed alluvium parent material / sand sheets on stream terraces landform

The parent material / landform of more than 86% of these soils is mixed alluvium / alluvial fan remnants; the parent material / landform of about 14% of the soils is Eolian sands /sand sheets. Depth to water for all soils is greater than 80 inches. The NRCS soils report indicates that the four alluvial fan remnant soils (Ac, Af, Oc, Or) are well-drained and the three Rositas soils (RoA, RoB, and RsA) are "somewhat excessively drained."

1.4.5 Vegetation

The Study Area vegetation was mapped as part of a study conducted by the 2013 has been mapped as part of the by Menke, et al. (2013) as part of their vegetation map development in support of the Desert Renewable Energy Conservation Plan funded by the California Department of Fish and Wildlife's Renewable Energy Program and the California Energy

Commission (Appendix A, Figure 3). Dominant plant associations mapped within the Study Area included:

1. Paloverde (*Parkinsonia florida*) - Desert Ironwood (*Olneya tesota*)
2. Creosote Bush (*Larrea tridentata*)
3. Creosote Bush - Burro Bush (*Ambrosia dumosa*)
4. Big Galleta (*Pleuraphis rigida*) vegetation alliance

1.4.6 Climate

The Study Area has a desert climate with very hot, dry summers and mild winters based on review of WETS data (USDA Field Office Climate Data, http://agacis.rcc-acis.org/06065/wets/results) (Appendix C). HBG obtained climate data for the Blythe, California, AP WETS Station (CA158). This WETS station is on Hobsonway Road within approximately 2 miles of the Study Area (Appendix A, Figure 1). Average monthly temperatures (° F) for the period of record (1971 – 2000) are presented in Table 1:

Table 1. Average Monthly Temperatures, Blythe, CA

Month/ Temperature (°F)	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Average	54.2	58.9	63.9	71.0	78.9	88.4	93.7	92.5	86.0	74.0	61.1	53.5
Average Daily Maximum	66.6	72.0	77.6	85.7	93.9	104.1	107.2	105.4	99.6	88.0	74.7	66.0
Average Daily Minimum	41.7	45.7	50.2	56.2	63.9	72.6	80.2	79.5	72.4	60.0	47.4	40.9

The downloaded WETS Precipitation Data Summary Table in Appendix C presents average monthly precipitation at the Blythe AP WETS Station for the period of record (1971 – 2000); the range of precipitation for the period of record considered to be normal (30 % chance precipitation will be < or > average). Average annual precipitation is 4.02 inches. Highest rainfall months with average precipitation ranging from 0.32 to 0.66 inches are December – March and July – September.

1.4.7 Hydrology

The Study Area primarily lies within the Imperial Reservoir 8-digit Hydrologic Unit Code (HUC) watershed, HUC 15030104, more specifically in the HUC 12 Cinnabar Wash-Palo Verde Valley (HUC 150301040804) watershed. The western tip of the Study Area, however, is in the South Mojave 8-digit HUC watershed (HUC 18100100), specifically in the Wileys Well 12-digit watershed (HUC 181001005201). See Appendix A, Figures 3 and 4. Figure 5 shows National Hydrography Dataset (NHD) flowlines and flow directions for the Study Area and its vicinity overlain on a Microsoft March 2011 aerial photograph. Most flow onto the Study Area is from the north-northwest, crossing the northernmost portion of the site (Appendix A, Figure 6).

Surface and channel flooding can occur within the Study Area any time of year; however, many years can pass between surface flow events. General winter and summer storms generate low amounts of precipitation that typically infiltrates the ground where it falls, with little or no surface flow generated. If flow does occur, it typically runs within small, localized areas before it infiltrates the soil. Flooding because of high intensity thunderstorms typically lasts only a few hours at most and typically occurs in localized areas.

1.4.8 FEMA Flood Zone

The Federal Emergency Management Agency (FEMA) has not conducted a flood hazard analysis of the Study Area; no FEMA flood zone designation exists.

1.5 Disclaimer

Huffman-Broadway Group, Inc., has conducted a thorough historical review and site investigation and made a good-faith effort herein to thoroughly describe and document the presence of potential factors that the CDFW may consider in determining jurisdiction under the Lake and Streambed Alteration Program; however, Desert Quartzite, LLC, reserves the right to challenge or seek revision to any areas over which the CDFW may assert jurisdiction.

2.0 REGULATORY FRAMEWORK

2.1 CDFW Lake and Streambed Alteration Program

Fish and Game Code (FGC) Section 1602 requires any person, state or local governmental agency, or public utility subject to FGC 1600 thru 1616 to notify CDFW of any proposed activity that may substantially divert or obstruct a river, stream, or lake. Section 1602(a) specifically provides that:

> An entity may not substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake unless all of the following occur:
>
> (1) The department receives written notification regarding the activity in the manner prescribed by the department. . .

The program developed by CDFW to implement this notification process is generally referred to as the Lake and Streambed Alteration Agreement Program. CDFW's regulations implementing the FGC (Title 14 California Code of Regulations or 14 CCR) define the relevant rivers, streams and lakes over which the agency has jurisdiction to constitute "all rivers, streams, lakes, and streambeds in the State of California, including all rivers, streams and streambeds which have intermittent flows of water." 14 CCR § 720. The regulations further define the terms "stream" and "lake" as follows:

> 14 CCR § 1.72. Stream (Includes Creeks and Rivers).
>
> A stream is a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation.
>
> 14 CCR § 1.56. Lake.
>
> Includes natural lakes or man-made reservoirs.

3.0 DELINEATION METHOD

3.1 Objective and Study Approach

The objective of this investigation was to identify and map areas within the Study Area potentially subject to jurisdiction under CDFW's Lake and Streambed Alteration Agreement Program (CDFW Jurisdiction). The approach taken by this study was to identify and map, using field indicators, the geographic extent of any areas meeting the definition of lake or stream as previously described in Section 2.0.

3.2 Preliminary Investigations

Preliminary investigations consisted of identifying landforms within the Study Area (Appendix A, Figure 2) where lakes or watercourses (stream channel and floodplain watercourses) may potentially occur. The investigations included reviewing the resource materials listed below and conducting an onsite terrain reconnaissance during March 2014.

1. USGS topographic mapping (Appendix A, Figure 2);
2. Vegetation mapping (Appendix A, Figure 3);
3. USGS National Hydrography Dataset (NHD) HUC 8 and HUC 12 mapping (Appendix A, Figures 4 and 5);
4. USGS NHD high-resolution mapping with flow arrows (Appendix A, Figure 6);
5. USDA NAIP 2012 aerial imagery (Appendix A, Figure 7); and
6. NRCS Custom Soil Resources Report (Appendix B).

For this jurisdictional delineation, the land surface was subdivided into the categories of uplands and fluvial watercourses. At this stage of the investigation, due to the lack of field indicator data for analysis, no determination was made regarding whether stream channels and floodplain watercourses observed were either hydrologically active, dormant, abandoned, or relict. These landform geomorphic features are summarized as follows:

Uplands	Fluvial Watercourses
Sand sheet deposits	Stream Channel
Fan Terraces	Floodplain

3.3 Detailed Field Investigations

Detailed field investigations to determine the presence or absence of stream channel and floodplain watercourses were conducted on foot within the Study Area during May 2014 thru November 2016 (Appendix A, Figure 2). Using NAIP 2012 aerial imagery as a base map the Study Area was divided into 0.3-mile grid squares using ESRI ArcGIS software. Each grid square was investigated first visually through photointerpretation then observed onsite by walking linear transects across each grid square. Transects were spaced between approximately 500 to 1000 feet apart. Follow-up photointerpretation of each grid was also conducted following field data collection. Field data collected along each transect included: (1) the presence or absence of geomorphic indicators of uplands and fluvial watercourses; (2) combined average width of channels and abutting floodplain watercourse to the extent of identifiable fluvial indicators; and (3) representative onsite photographs. Field data regarding the presence or absence of upland and fluvial areas were recorded on a field data form developed for this study (Appendix D). Field data collection locations or sample points were memorialized as point features using a hand-held, Trimble XT global positioning system (GPS) unit with sub-meter accuracy after geoprocessing. Data for stream channels encountered along the transect was collected walking both 100 feet above and 100 feet below each watercourse sample point. For channels, less than 200 feet the entire length of the channel was visually inspected for indicators.

The CDFW 1994 publication *A Field Guide to Lake and Streambed Alteration Agreements, Sections 1600-1607 California Fish and Game Code* was used for general guidance, however this publication lacks sufficient specificity for identifying fluvial watercourses in the field. The types of field indicators examined for in the field were similar to those used by the Corps of Engineers (Lichvar and McCooley 2008) to define ordinary high water marks, except they were adapted and used to define the geographical extent of fluvial watercourses. Field indicators of uplands and fluvial watercourses as described by Brady and Vyverberg (2013) were also used. Table 2 provides a list of these indicators.

Table 2. Geomorphic Indicators of Upland and Active Fluvial Watercourses

Upland	Fluvially Active Alluvial Fan Surface	
ϒ Av Horizon	ϒ Bars: mud, sand & gravel	ϒ Ripples
ϒ Biotic Soil Crust	ϒ Beach ridges	ϒ Scour
ϒ Biotubation	ϒ Bifurcated flow	ϒ Secondary channels
ϒ Caliche: coatings, layers, rubble	ϒ Biotic crusts	ϒ Secondary channel bypassing obstruction
ϒ Carbonate etching	ϒ Drainage swales	ϒ Sediment sheets
ϒ Clast / rock weathering	ϒ Crusts: carbonate, salt, & soda	ϒ Sand filled channels
ϒ Coppice dunes: active & relict	ϒ Cut banks	ϒ Scour holes downstream of obstructions
ϒ Deflated surfaces	ϒ Desiccation Mud: cracks, curls / drapes	ϒ Sediment plastering
ϒ Desert pavement	ϒ Drift: organic	ϒ Sediment ramps
ϒ Over-turned rock	ϒ Exposed roots below intact soil layer	ϒ Sediment sorting
ϒ Relict bar & swale	ϒ Flow or streaming lineations	ϒ Sediment tails
ϒ Relict channel	ϒ Headcuts	ϒ Springs
ϒ Rock fracture in place	ϒ Imbricated gravel	ϒ Staining of rocks
ϒ Rock varnish	ϒ Knick Points	ϒ Stepped-bed morphology in gravel
ϒ Rock weathering	ϒ Levee Ridges: sand & gravel	ϒ Substrate staining
ϒ Rubified rock undersides	ϒ Observed inundation: flooding, ponding, or	ϒ Vegetation - channel alignment

Table 2. Geomorphic Indicators of Upland and Active Fluvial Watercourses

Upland	Fluvially Active Alluvial Fan Surface	
	substrate saturation	
ϒ Soil development	ϒ Out of channel flow	ϒ Water-cut benches
ϒ Surface rounding of landform	ϒ Overturned rocks	ϒ Water level marks
ϒ Woody debris in place	ϒ Rills	ϒ Wrack: woody

* Adapted from: *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual* (Lichvar and McColley 2008); and *Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants* (Brady and Vyverberg, 2013).

Documentation of the presence of stream channel and floodplain watercourses as opposed to upland fan terraces using field indicators provided a technical basis for: (1) determining the presence or absence of fluvial watercourses and (2) determining if the watercourse is active, dormant, abandoned, or relict.

3.4 Rainfall (WETS) Analysis

A WETS analysis was conducted to assess whether rainfall periods during the period of study fall within the normal range of precipitation based on long-term records collected at the nearest appropriate NWS cooperative weather station. Climate data for the nearby Blythe WETS Station (No. CA158) were obtained from the Western Regional Climate Center Cooperative Observer Program (Appendix A, Figure 1; Appendix C). The rainfall analysis followed the Technical Standard for Water-Table Monitoring of Potential Wetland Sites (Corps 2005), by which the Corps determines what is a normal, below normal and above normal rainfall month for any given year of record. The purpose of this analysis was to aid in establishing whether surface hydrology indicators observed onsite were likely the result of the amount of rainfall received during the period of study. This was accomplished by comparing recorded precipitation data collected prior to HBG's May 2014 to November 2016 on-site investigations with WETS historical average monthly rainfall data (averaged for the years 1971 to 2000) (Appendix A, Figure 1; Appendix C).

3.5 Mapping

Once field data collection was completed, recorded GPS data were incorporated into a Geographic Information System (GIS) and georeferenced in overlay fashion onto a USGS topographic base map and 2012 NAIP aerial imagery. This imagery was orthorectified to the 1:25,000 USGS topographic base following national mapping standards. The GIS located field data sampling points were used to assist in the identification and heads-up digitization of the location and geographic extent of all stream channel and floodplain watercourses within the Study Area. Indicator data collected in the field was analyzed to determine if the mapped watercourses were active, dormant, abandoned, or relict. Discreet stream channels and their abutting out of bank flow areas were mapped as line features and larger floodplain watercourses were mapped as polygon features. Area calculations for channels was based on average width data taken in the field (which included the active channel and abutting watercourse to the geographical extent of identifiable fluvial indicators) and the mapped channel length.

4.0 TECHNICAL FINDINGS

The Study Area was found to consist of sand sheet and alluvial fan upland landforms shaped by eolian and fluvial geomorphological processes. Fluvial stream channels and floodplain watercourses were found within the upland fan landform. No lake landform was found within the Study Area. The following is a summary of the types of watercourses found.

Upland Landforms	Stream / Floodplain Watercourses Found Within Sand Sheet and Alluvial Fan Landforms
Sand sheet deposits	None
Alluvial fan surfaces	• ***Active***. Hydrologically active watercourse. • ***Dormant.*** A watercourse isolated from its principal water source by natural causes or human constructed features such as roads, but that retains its potential for hydrologic reactivation and stream / watercourse function. • ***Abandoned.*** A watercourse along which water flow demonstrably no longer occurs; for example, a channel isolated from its water source through faulting or stream capture, or by human constructed features such as levees, incised roadways, surface flow diversions. The presence of physical indicators of fluvial inactivity is necessary to demonstrate abandonment, and the cause of the abandonment (such as a levee or road berm) should be identified. With time and the absence of flow, an abandoned channel will become a relict landform. • ***Relict.*** Surface water flow demonstrably no longer occurs as demonstrated by the presence of physical indicators of antiquity which demonstrate that the channel is a relict landform.

The following sections describe the field indicators found within the Study Area that are indicative of stream channel and associated floodplain watercourse. As seen in the WETS Precipitation Data Summary in Appendix C, the months between December to March and July to September for the years 2014, 2015, and 2016 all had monthly average precipitation exceeding 0.4 of an inch. Observations of organic drift (organic flotsam) and desiccation mud cracks / curls associated with various active stream channels and floodplain watercourses situated along the northern, southern, eastern, and western boundaries of the site during 2014, 2015, and 2016 on-site investigations provide evidence that the amount of rainfall received within the Study Area prior to onsite indicator observations was enough to generate surface water flow or ponding conditions throughout the entire site. This information aided in determining if a watercourse was active or dormant versus abandoned or relict.

4.1 Uplands

4.1.1 Sand Sheet Deposits

Sand sheet deposits and coppice dunes were found at various locations within the Study Area. These areas consist of fine sands within 22 inches of the soil surface. No indicators of a stream channel or floodplain watercourse were found. The Appendix B NRCS Custom Soils Report shows the approximate location of these areas which are mapped as various Rositas Soil Types (RoA, RoB, and RsA). Dominant vegetation where vegetation was present was creosote bush and / or big galleta.

4.1.2 Alluvial Fan Deposits

Mixed alluvium deposits were found on remnant fan terraces over much of the Study Area. Both stream channel or floodplain watercourse were found within these upland areas. Coppice dunes were also found within many of these areas. The Appendix B NRCS Custom Soils Report shows the approximate location of these remnant fan areas which are mapped as Aco and Orita Soil Types (Ac, Af, Oc, and Or). Geomorphic upland field indicators found included deflated surfaces, coppice dunes, no flow or ponding indicators, and surface rounding of landform. Dominant vegetation was creosote bush.

4.2 Watercourses Identified

4.2.1 Active Watercourses

Active channels and out of channel flows were found on remnant fan terraces along the northern, southern, western, and eastern boundaries of the Study Area. The channels found along the northern boundary form part of the terminus of the Pallowalla Wash distributary stream system. This active stream system is captured by sand sheets and ends abruptly within the norther margin of the Study Area (Appendix A, Figure 7, Sheets 4 and 5 (FP1 & FP3)). Fine grained sediment deposited within the channels and abutting out of channel flow areas (floodplain) produced visible signatures that were observable using USDA NAIP 2012 aerial imagery. Dominant vegetation within the natural and excavated portions of the Pallowalla Wash channel (RR# 107, R54a, R54b, and R54c) was paloverde and creosote bush within the area around channel RR# 105.

Two active stream channels occur on the southeastern boundary of the Study Area (Appendix A, Figure 7, Sheets 13 and 17). Each of these channels direct surface water flows to hydrologically isolated playa lakes east of the Study Area. The source of water is from direct precipitation and overland surface flow from fan remnant areas to the west. Dominant vegetation within the area around the channels was creosote bush. Geomorphic fluvial field indicators found associated with the active channels included drift (organic), flow or streaming lineations. Review of aerial imagery provided indication of the channel and abutting floodplain in that areas with recent fine grained sediment deposits had a visible signature.

Sizeable watercourse floodplains were found at the end of the active channels along the northern Study Area boundary (Appendix A, Figure 7, Sheets 4 and 5, Watercourse #s FP1 and FP3). Here water flows spill from the terminus end of the channels and form surface water overflow areas against sand sheet areas within the floodplain. Dominant vegetation found within Watercourse # FP1 at the end of the Pallowalla Wash included creosote bush, big galleta, and paloverde. Creosote bush also dominated the area within Watercourse # FP3. Desiccation mud cracks and curls was the principal geomorphic fluvial field indicator found within each of these floodplain watercourses. Fine grained sediment deposited within the watercourse floodplain produced visible signatures that were observable using USDA NAIP 2012 aerial imagery.

An active watercourse was also found along the southwestern boundary of the Study Area (Appendix A, Figure 7, Sheet 10, Watercourse # FP2). At this location surface water from the

Mule Mountain distributary channel system is slowed down by a deeply incised dirt roadway to the west of the Study Area boundary and then abruptly stopped in a localized area by sand sheets resulting in the formation of a forming localized floodplain overflow area which episodically ponds. Desiccation mud cracks and curls was the principal geomorphic fluvial field indicator found. Fine grained sediment deposited within the watercourse floodplain produced visible signatures that were observable using USDA NAIP 2012 aerial imagery. Where vegetation was present creosote bush dominated the area within Watercourse.

4.2.2 Dormant Watercourses

Many channels were found which were hydrologically inactive, but have the potential for hydrologic reactivation and stream function (Appendix A, Figure 7, Sheets 5 and 10). Older flow or streaming lineations partially covered with sand were present within the channels, but organic drift material as found in the above described active channels was absent. Dominant vegetation within these dormant watercourse areas was creosote bush

4.2.3 Abandoned Watercourses

Abandoned channels were found throughout the Study Area (Appendix A, Figure 7, Sheets 1 - 6, 9, - 11, and 15, 16 - 17). Each of these channels was found to be hydrologically isolated or cut off from its principal up-slope or overland surface water flow source by either natural causes (sand sheet) and / or anthropogenic disturbance and / or influence to include: roads; earthen berms; and detention channels. In contrast to active and dormant channels, there was no evidence of flow to or from the abandoned channels due to interruption by natural and / or anthropogenic surface features. Field indicators of surface flow was typically not present or, if present, surface water flow would only be over a short distance within the channel before infiltrating into the soil.

Figure 8 of Appendix A provides mapping showing where off-site surface water flows directed toward the Study Area have been cut-off by natural and / or by human constructed features to include:

1. Natural Features (Appendix A, Figure 8; Appendix B):
    a. sheet sands and dune soils which intercept surface water flows along the north, east, south, southwest, and west perimeter of the Study Area.
2. Human Constructed Feature s (Appendix A, Figure 8):
    a. flood control features established along the north side of I-10 which direct surface water flows across the alluvial fan remnant directly to the Pallowalla Wash;
    b. gravel pits on the Southside of I-10 which trap surface flows;
    c. graded dirt roadways and pipeline routes which run perpendicular across the alluvial fan north of the Study Area and intercept surface water flows either capturing them within the roadway or redirecting them to larger channels;
    d. a graded roadway and sand sheets / dune soils which run along the southwestern and eastern borders of the Study Area;
    e. Dirt Roadways through the central and northeastern portion of the Study Area; and
    f. Cultivated lands within the central part of the Study Area.

Review of USDA NAIP 2012 aerial imagery found that although the abandoned channels had a visible channel signature they lacked strong visible signatures of an abutting floodplain which is typical of active and dormant channels and floodplain watercourses. This is believed to be because of the lack of fine grained sediment within the floodplain watercourse after flow was cut off and weathering has occurred due to eolian process and/or direct precipitation events without surface / out of bank flow. Dominant vegetation within the area around the channels was creosote bush.

The following table summarizes how each of the abandoned channels has become hydrologically or cut off from its principal water source.

Table 3. Summary of Observed Physical Indicators of Fluvial Inactivity Associated with Abandoned Water Courses Within the Study Area

Watercourse ID	Description of Hydrologic Disconnection	Physical Indicators of (fluvial inactivity)
RR1, RR2, & RR3	Small localized erosional features (rill erosion) associated with dirt access road through plowed farm field. Storm water flow contained within localized land feature. Plowed soils intercept surface water flow (Attachment A, Figure 7, Sheet 5).	Hydrologically isolated; no evidence of flow to or from the channels. Field indicators of surface flow found only to be over a short distance within the channel before infiltrating into the soil.
RR7 & RR8	Small localized erosional features (rill erosion) located on margins of graded dirt access road. Storm water flow contained within localized land feature. Roadway intercepts / cuts flow off. Roadway is actively maintained (Attachment A, Figure 7, Sheet 15).	Hydrologically isolated; no evidence of flow to or from the channels. Field indicators of surface flow found only to be over a short distance within the channel before infiltrating into the soil.
RR9, RR10, RR11, RR12, RR13, RR14, RR15, RR16, RR17, RR18, RR22, RR23, & RR40	Small localized erosional features (rill erosion) located on margins of an abandoned graded dirt access road. Storm water flow contained within localized land feature. Roadway intercepts / cuts surface water flow off (Attachment A, Figure 7, Sheet 11).	Hydrologically isolated; no evidence of flow to or from the channels. Field indicators of surface flow found only to be over a short distance within the channel before infiltrating into the soil.
RR6	Excavated ditch adjacent to abandoned cropland no longer irrigated from well-water source; Without irrigation, no excess irrigation runoff to ditch adjacent to constructed berm (Attachment A, Figure 7, Sheet 11).	Hydrologically isolated; no evidence of flow to or from the channel. No field indicators of flow found.
RR19, RR20a-f, RR21a-b, RR24a-e, RR25a-e, RR26, RR27a-b, RR28a-b, RR29, RR30a-b, RR31, RR32, RR33, RR34a-c, RR35, & RR36	Small localized erosional features (rill erosion) located on margins of an abandoned graded earthen levee surrounding a former irrigated cropland. Features result of levee construction (Attachment A, Figure 7, Sheet 11).	Hydrologically isolated; no evidence of flow to or from the channels. Field indicators of surface flow found only to be over a short distance within the channel before infiltrating into the soil.
RR37, RR38a, RR38b, & RR39	Storm water flow contained within localized land feature. Surface water flow cut-off upgradient by deeply incised dirt roadway maintained by periodic road grading; Roadway captures upslope surface water flows where they are absorbed into the soil. Roadway cut exposed underlying	Hydrologically isolated; no evidence of flow to or from the channels. Field indicators of surface flow found only to be over

Table 3. Summary of Observed Physical Indicators of Fluvial Inactivity Associated with Abandoned Water Courses Within the Study Area

Watercourse ID	Description of Hydrologic Disconnection	Physical Indicators of (fluvial inactivity)
	sand sheets / dune soils covered by alluvial fan deposits (see Appendix A, Figure 7, Sheets 10 & 15 and Figure 8). Hydrologically isolated with no flow to or from channels observed. Roadway is actively maintained.	a short distance within the channel before infiltrating into the soil.
RR47b, RR69, RR70, RR73, RR83, & RR85	Upgradient surface water flow cut-off from the west and northwest by sand sheet movement (see Appendix A, Figure 7, Sheet 10; and Figure 8).	Hydrologically isolated; no evidence of flow to or from the channels. Field indicators of surface flow found only to be over a short distance within the channel before infiltrating into the soil.
RR90, RR91, RR92, RR93, RR94, RR95, RR96, RR97, RR98, RR99, RR 100, RR101, & RR 102,	Upgradient surface water flow cut-off by sand sheet movement and dune soils. Hydrologically isolated with no flow to or from channels observed (see Appendix A, Figure 8). (see Appendix A, Figure 7, Sheets 16 and 17; and Figure 8).	Hydrologically isolated; no evidence of flow to or from the channels. Field indicators of surface flow found only to be over a short distance within the channel before infiltrating into the soil.
RR77 & RR80	Surface water flows from Pallowalla Wash/ channel diverted by earthen dike and intercepted by detention channel to protect solar farm project located to the northwest (see Appendix A, Figure 7, Sheet 6; and Figure 8).	Hydrologically isolated; no evidence of flow to or from the channels. Field indicators of surface flow found only to be over a short distance within the channel before infiltrating into the soil.
RR66, RR67, RR68, RR81, & RR82, RR106	Sand sheet formation between discharge point and historical stream channels prevents surface water from reaching channels (see Appendix A, Figure 7, Sheets 2, 3, 5, & 6; and Figure 8).	Hydrologically isolated; no evidence of flow to or from the channels. Field indicators of surface flow found only to be over a short distance within the channel before infiltrating into the soil.
RR42 – RR47a, RR48 - RR58, RR60, RR71, RR72, RR74 – RR76, RR84, RR86 - RR88, RR103, & RR104	Sand sheet formation and movement combined with maintained incised dirt roadway cuts-off surface water flow to historical stream channels preventing surface water from reaching channels (see Appendix A, Figure 7, Sheets 9 & 10; and Figure 8).	Hydrologically isolated; no evidence of flow to or from the channels. Field indicators of surface flow found only to be over a short distance within the channel before infiltrating into the soil.

4.2.4 Relict Watercourses

No relict channels were identified within Study Area as sand sheet appeared to mask episodic field indicators where these types of channels were likely to occur. There is some visual evidence based on vegetation alignment as seen on the of USDA NAIP 2012 aerial imagery along the western margin of Sheets 2 and 10 of Appendix A Figure 7 that there are potentially underlying relict channels. Dominant vegetation within the area around these likely relict channels was creosote bush.

5.0 AREAS POTENTIALLY SUBJECT TO CDFW JURISDICTION

This section presents the findings of this delineation with respect to the identification and geographic extent of areas found that could potentially be regulated by the CDFW under the 1600 Lake and Streambed Alteration Agreement Program.

No lakes were found within the Study Area, but areas were found that meet the Title 14 CCR Section 1.72 definition of a stream. These watercourses are potentially subject to jurisdiction under the CDFW's Lake and Streambed Alteration Agreement Program (FGC Sections 1600-1616). This finding is based on the presence of observed physical evidence that water had moved across the land surface within the confines of a streambed or where water had overflowed the confines of the streambed prior to infiltrating into the soils. Fluvially active and dormant watercourses were considered as potentially subject to CDFW jurisdiction. Fluvial channels hydrologically isolated or cut off from upgradient stream channel or floodplain watercourses were not considered to be potentially subject to CDFW jurisdiction. These types of watercourses were considered abandoned or relict based on field indicator data and review of aerial imagery.

Table 4 provides a summary of potential CDFW jurisdictional acreage within the Study Area. Potential jurisdictional acreage for individual delineated stream and floodplain watercourses was calculated using the total linear distance of the channel multiplied by the average width. As described in Section 3.0, above channel width was measured from where indicators of fluvial process were found within the watercourse either within the channel or to the extent surface water flow indicators (i.e., fine sediment deposition) was evident outside the channel bank. Potential jurisdictional acreage for floodplain watercourses was measured using an area calculation based on the perimeter of the watercourse ponding indicators (i.e., desiccation cracks) identified in the field. Appendix A, Figure 7 provides mapping stream / watercourse areas potentially subject to CDFW jurisdiction as well as hydrologically cut-off abandoned watercourses not considered to be jurisdictional. Table 5 provides a summary of watercourses not considered to be jurisdictional. Relict stream course features were not mapped given the difficulty in identification as the landform features were obscured by moving sand sheets. Appendix F provides computations for delineated areas shown in Appendix A, Figure 7.

Table 4. Summary of Linear Distance and Acreage of Fluvial Watercourse Found Within the Study Area Potentially Subject to CDFW Jurisdiction

Jurisdictional Watercourse	**Linear Distance**	**Acres**
• Active Channel	5,744	0.13
• Dormant Channel (retains its potential for hydrologic reactivation and stream function)	6,778	0.16
Active Watercourse (floodplain)	NA	66.98
Total	**12,522**	**67.27**

Table 5. Summary Linear Distance and Acreage of Watercourses Found Not to be Jurisdictional		
Non-Jurisdictional Watercourse	**Linear Distance**	**Acres**
• Abandoned Channel	45,189	1.04
Total	**45,189**	**1.04**

6.0 REFERENCES

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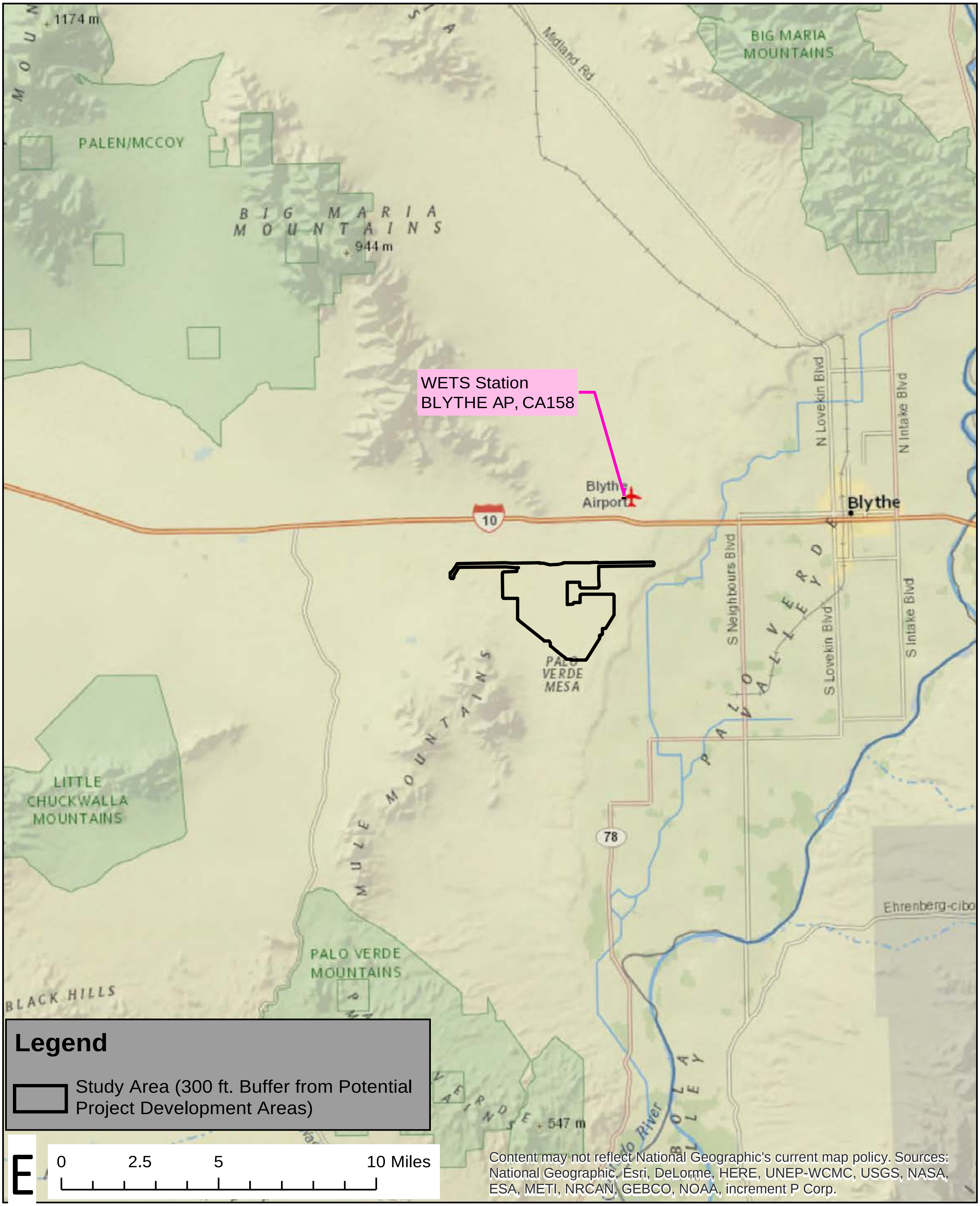
Appendix A

Figures

Figure 1	Regional Location Map
Figure 2	USGS Topographic Map of the Study Area
Figure 3	Vegetation Map of the Study Area
Figure 4	USGS NHD HUC 8 Watershed Mapping
Figure 5	USGS NHD HUC 12 Watershed Mapping
Figure 6	USGS NHD Mapping with Mapped Surface Water Flows Within and Adjacent to The Study Area
Figure 7	Stream Channel and Watercourses Potentially Subject to CDFW Jurisdiction
Figure 8	Mapping Showing Where Off-Site Surface Water Flows Directed Toward the Study Area Have Been Cut-Off by Natural and by Constructed Surface Features

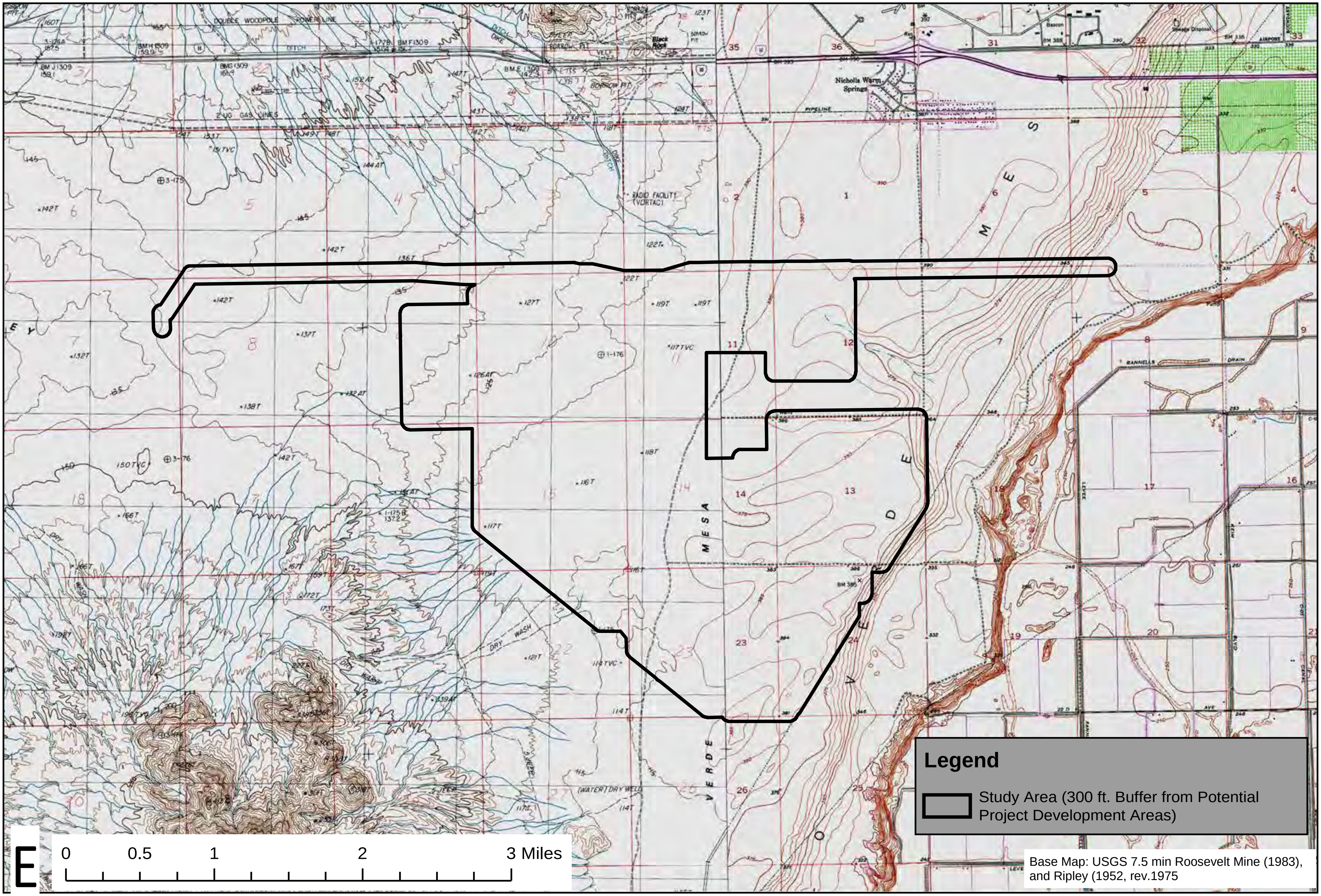

1174 m
BIG MARIA MOUNTAINS
Midland Rd
PALEN/MCCOY
BIG MARIA MOUNTAINS
944 m
WETS Station
BLYTHE AP, CA158
N Lovekin Blvd
N Intake Blvd
Blythe Airport
10
Blythe
S Neighbours Blvd
S Lovekin Blvd
S Intake Blvd
PALO VERDE VALLEY
PALO VERDE MESA
MULE MOUNTAINS
LITTLE CHUCKWALLA MOUNTAINS
78
Ehrenberg-cibo
PALO VERDE MOUNTAINS
BLACK HILLS
547 m
Colorado River
Legend
Study Area (300 ft. Buffer from Potential Project Development Areas)
E
0
2.5
5
10 Miles

Content may not reflect National Geographic's current map policy. Sources: National Geographic, Esri, DeLorme, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Figure 1. Regional Location Map

Desert Quartzite LLC Solar Farm Project,
Town of Blythe, Riverside County, California

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

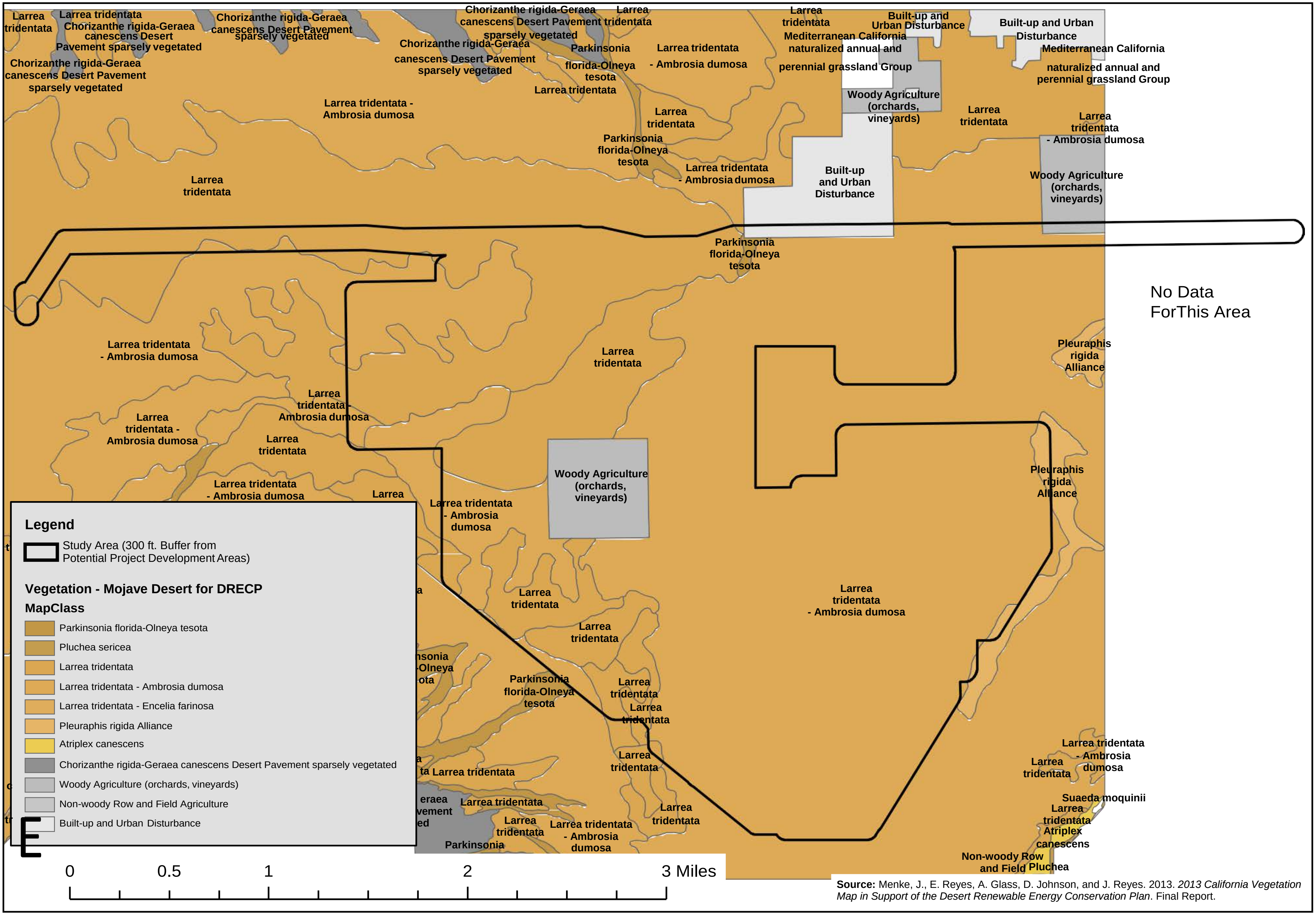

Legend
Study Area (300 ft. Buffer from Potential Project Development Areas)
0
0.5
1
2
3 Miles
DOUBLE WOODPOLE
POWER LINE
2 UG GAS LINES
PIPELINE
Nicholls Warm Springs
Black Rock
RADIO FACILITY (VORTAC)
MESA
VERDE
DRY WASH
RANNELLS
DRAIN
(WATER) DRY WELL

Base Map: USGS 7.5 min Roosevelt Mine (1983), and Ripley (1952, rev.1975

Figure 2. USGS Topographic Map of the Study Area

Desert Quartzite LLC Solar Farm Project,
Town of Blythe, Riverside County, California

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

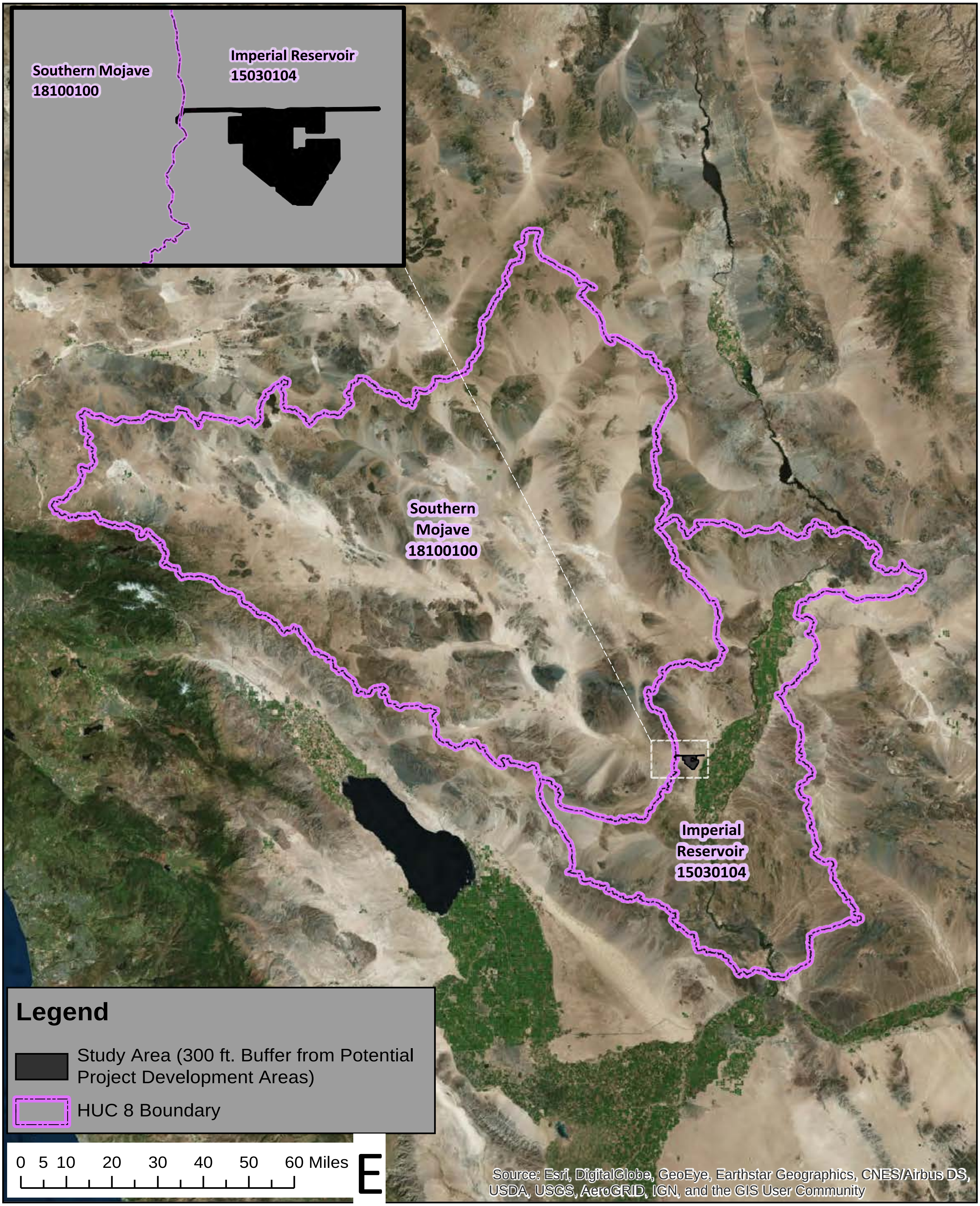

Larrea tridentata
Chorizanthe rigida-Geraea canescens Desert Pavement sparsely vegetated
Larrea tridentata - Ambrosia dumosa
Parkinsonia florida-Olneya tesota
Built-up and Urban Disturbance
Mediterranean California naturalized annual and perennial grassland Group
Woody Agriculture (orchards, vineyards)
No Data ForThis Area
Pleuraphis rigida Alliance
Suaeda moquinii
Atriplex canescens
Non-woody Row and Field Pluchea
Legend
Study Area (300 ft. Buffer from Potential Project Development Areas)
Vegetation - Mojave Desert for DRECP
MapClass
Parkinsonia florida-Olneya tesota
Pluchea sericea
Larrea tridentata
Larrea tridentata - Ambrosia dumosa
Larrea tridentata - Encelia farinosa
Pleuraphis rigida Alliance
Atriplex canescens
Chorizanthe rigida-Geraea canescens Desert Pavement sparsely vegetated
Woody Agriculture (orchards, vineyards)
Non-woody Row and Field Agriculture
Built-up and Urban Disturbance
0
0.5
1
2
3 Miles

Source: Menke, J., E. Reyes, A. Glass, D. Johnson, and J. Reyes. 2013. *2013 California Vegetation Map in Support of the Desert Renewable Energy Conservation Plan*. Final Report.

Figure 3. Vegetation Map of the Study Area

Desert Quartzite LLC Solar Farm Project,
Town of Blythe, Riverside County, California

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

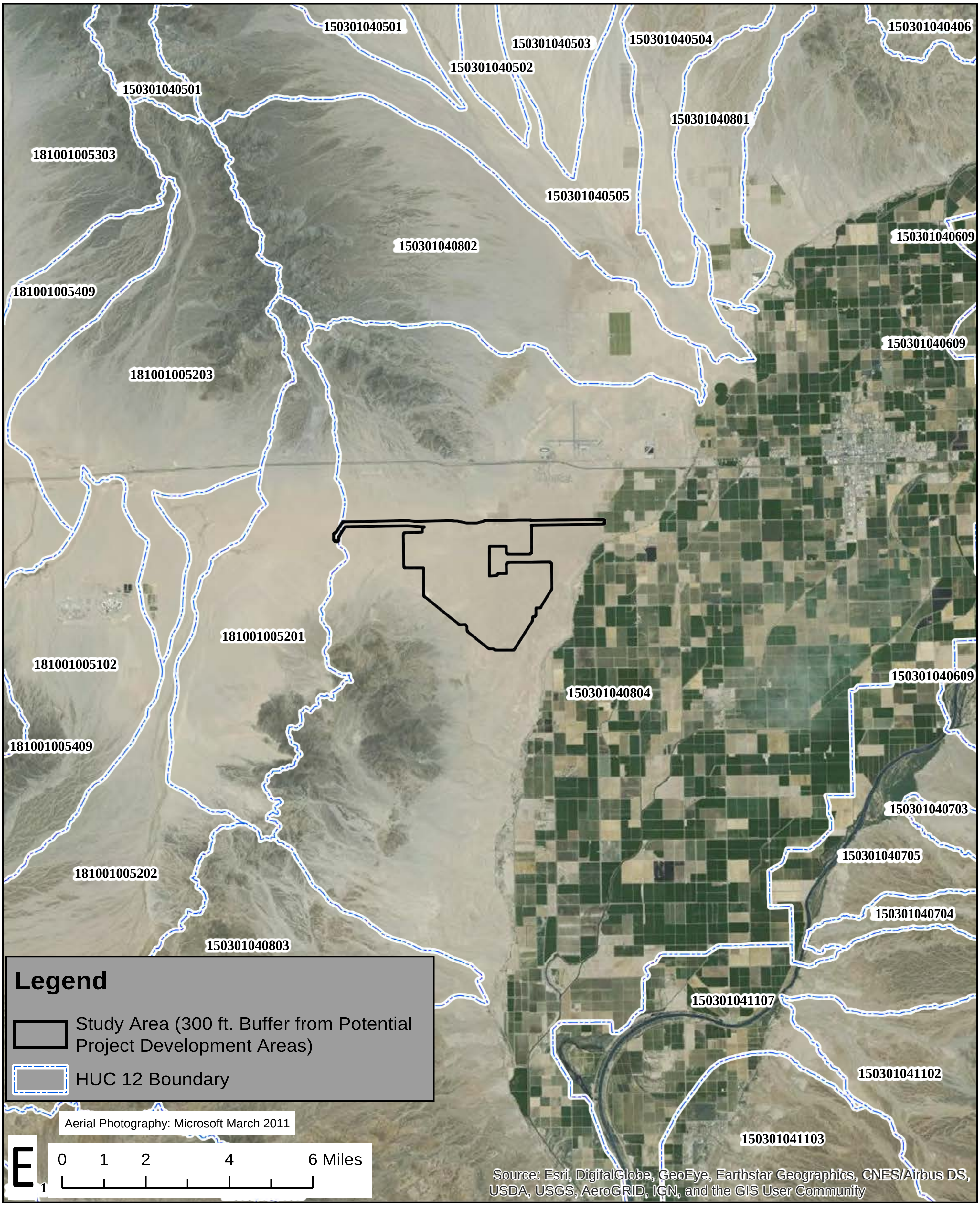

Southern Mojave
18100100
Imperial Reservoir
15030104
Southern
Mojave
18100100
Imperial
Reservoir
15030104
Legend
Study Area (300 ft. Buffer from Potential Project Development Areas)
HUC 8 Boundary
0 5 10 20 30 40 50 60 Miles
E

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 4. USGS NHD HUC 8 Watershed Mapping

Desert Quartzite LLC Solar Farm Project,
Town of Blythe, Riverside County, California

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS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150301040406
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150301040802
181001005409
150301040609
181001005203
181001005201
181001005102
150301040609
150301040804
181001005409
150301040703
150301040705
181001005202
150301040704
150301040803
150301041107
150301041102
150301041103
Legend
Study Area (300 ft. Buffer from Potential Project Development Areas)
HUC 12 Boundary
0 1 2 4 6 Miles

Aerial Photography: Microsoft March 2011

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 5. USGS NHD HUC 12 Watershed Mapping

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Desert Quartzite LLC Solar Farm Project,
Town of Blythe, Riverside County, California

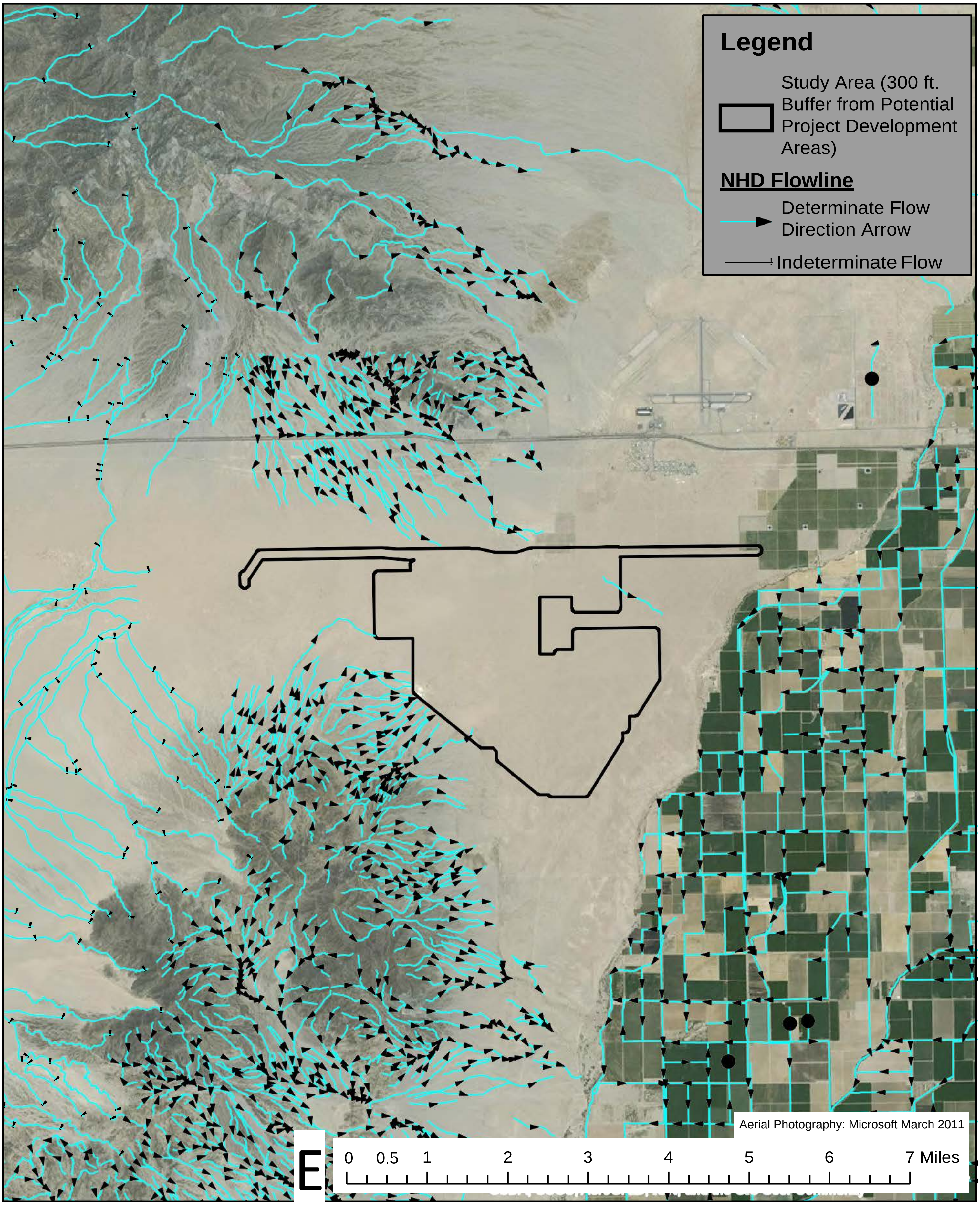
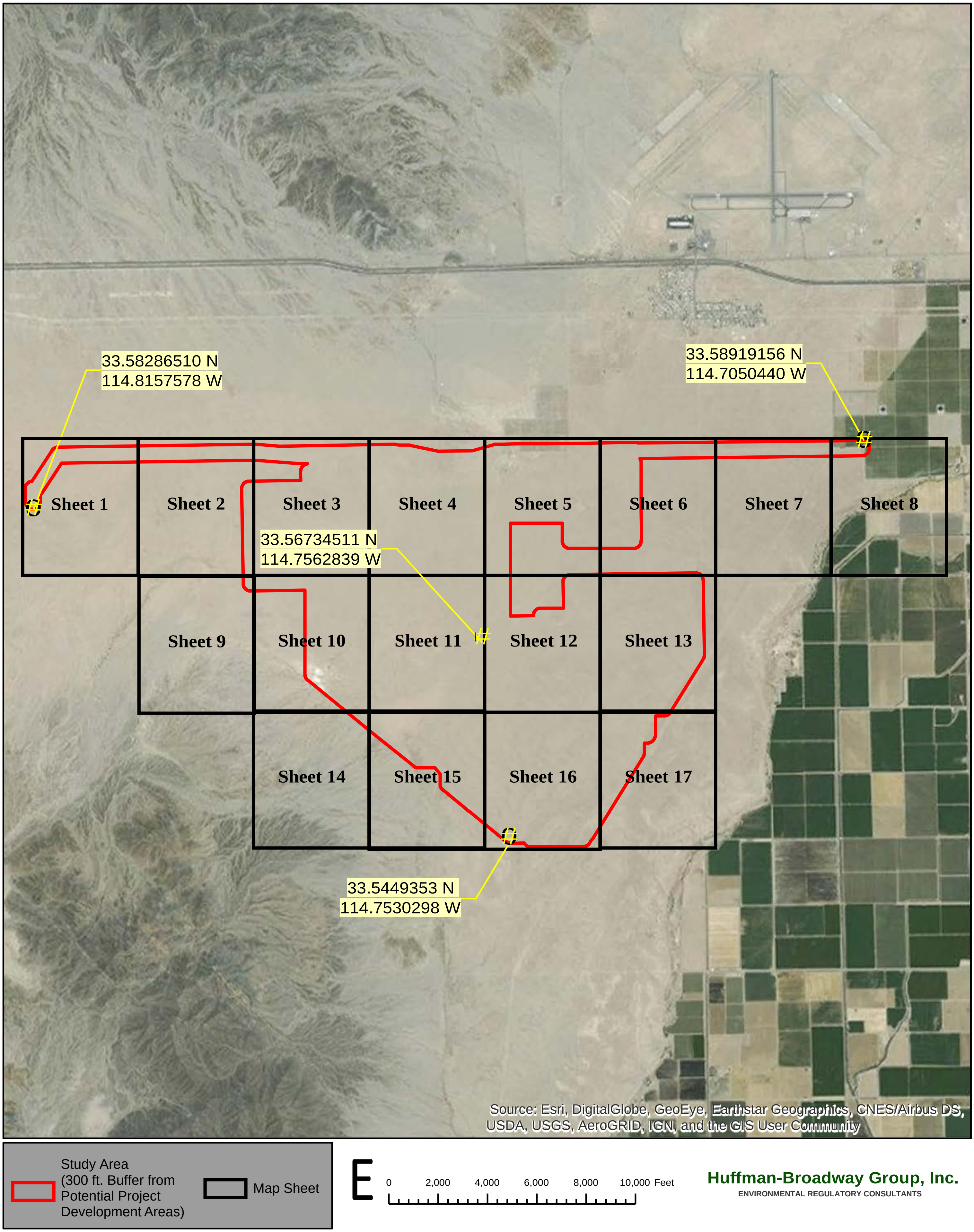

Legend
Study Area (300 ft. Buffer from Potential Project Development Areas)
NHD Flowline
Determinate Flow Direction Arrow
Indeterminate Flow
Aerial Photography: Microsoft March 2011
E
0 0.5 1 2 3 4 5 6 7 Miles

Figure 6. USGS NHD Mapping with Mapped Surface Water Flows Within and Adjacent to the Study Area

Desert Quartzite LLC Solar Farm Project,
Town of Blythe, Riverside County, California

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

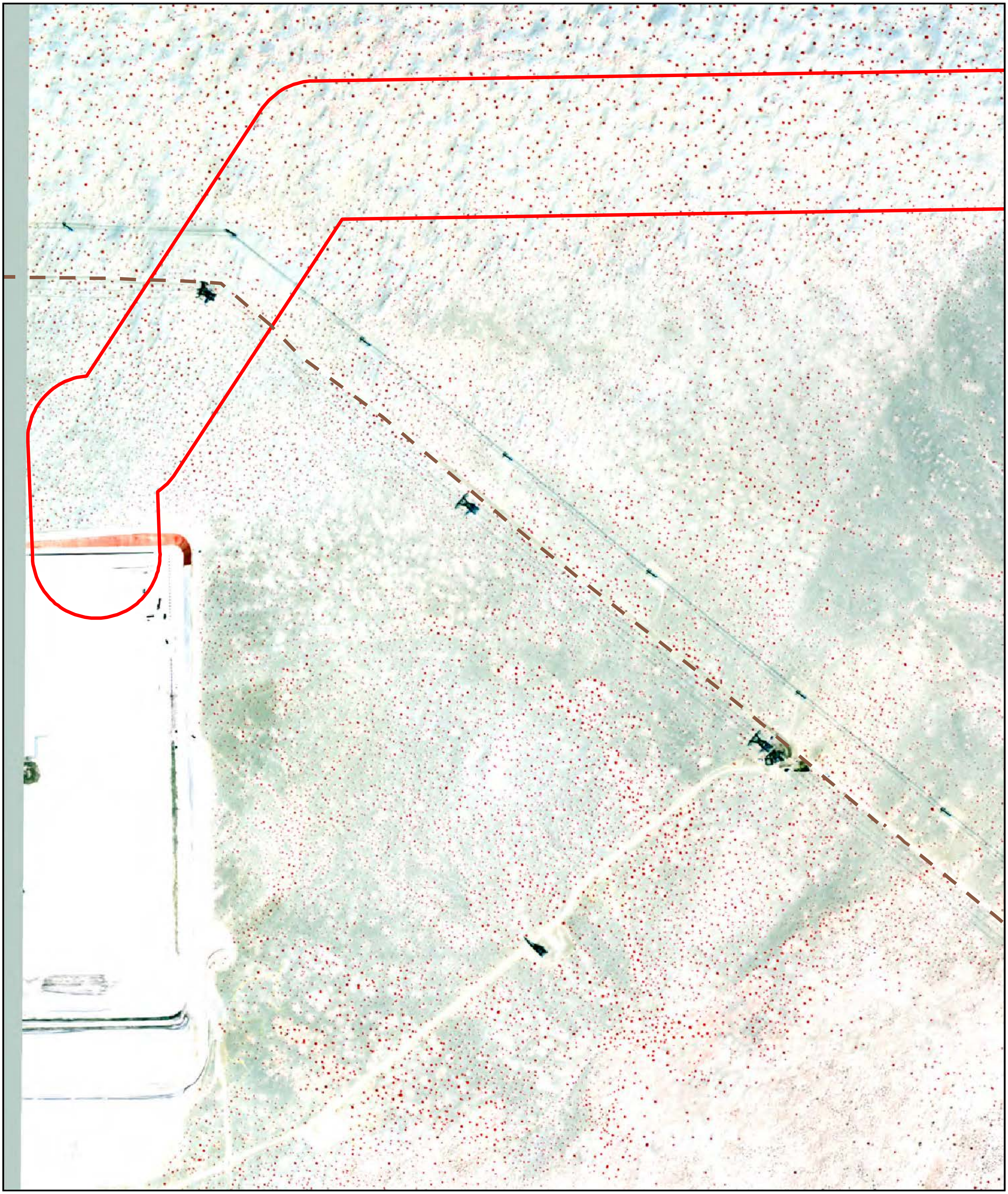

33.58286510 N
114.8157578 W
33.58919156 N
114.7050440 W
33.56734511 N
114.7562839 W
33.5449353 N
114.7530298 W
Sheet 1
Sheet 2
Sheet 3
Sheet 4
Sheet 5
Sheet 6
Sheet 7
Sheet 8
Sheet 9
Sheet 10
Sheet 11
Sheet 12
Sheet 13
Sheet 14
Sheet 15
Sheet 16
Sheet 17
Study Area (300 ft. Buffer from Potential Project Development Areas)
Map Sheet
E
0
2,000
4,000
6,000
8,000
10,000
Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Index Map

Desert Quartzite LLC Solar Farm Project,
Town of Blythe, Riverside County, California



Aerial Photography: NAIP 2012

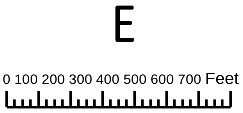

E
0 100 200 300 400 500 600 700 Feet

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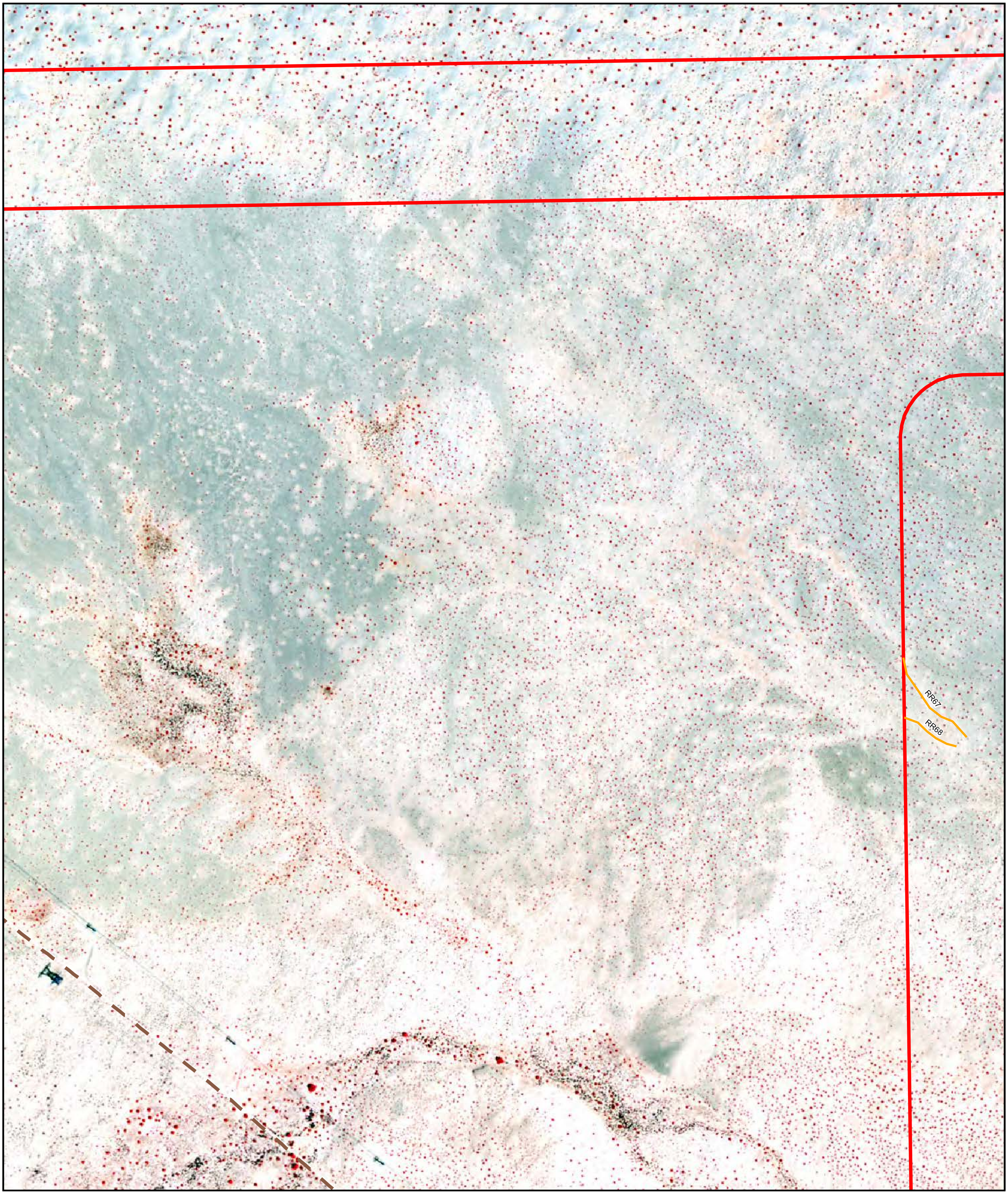
Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Sheet 1
Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California



Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
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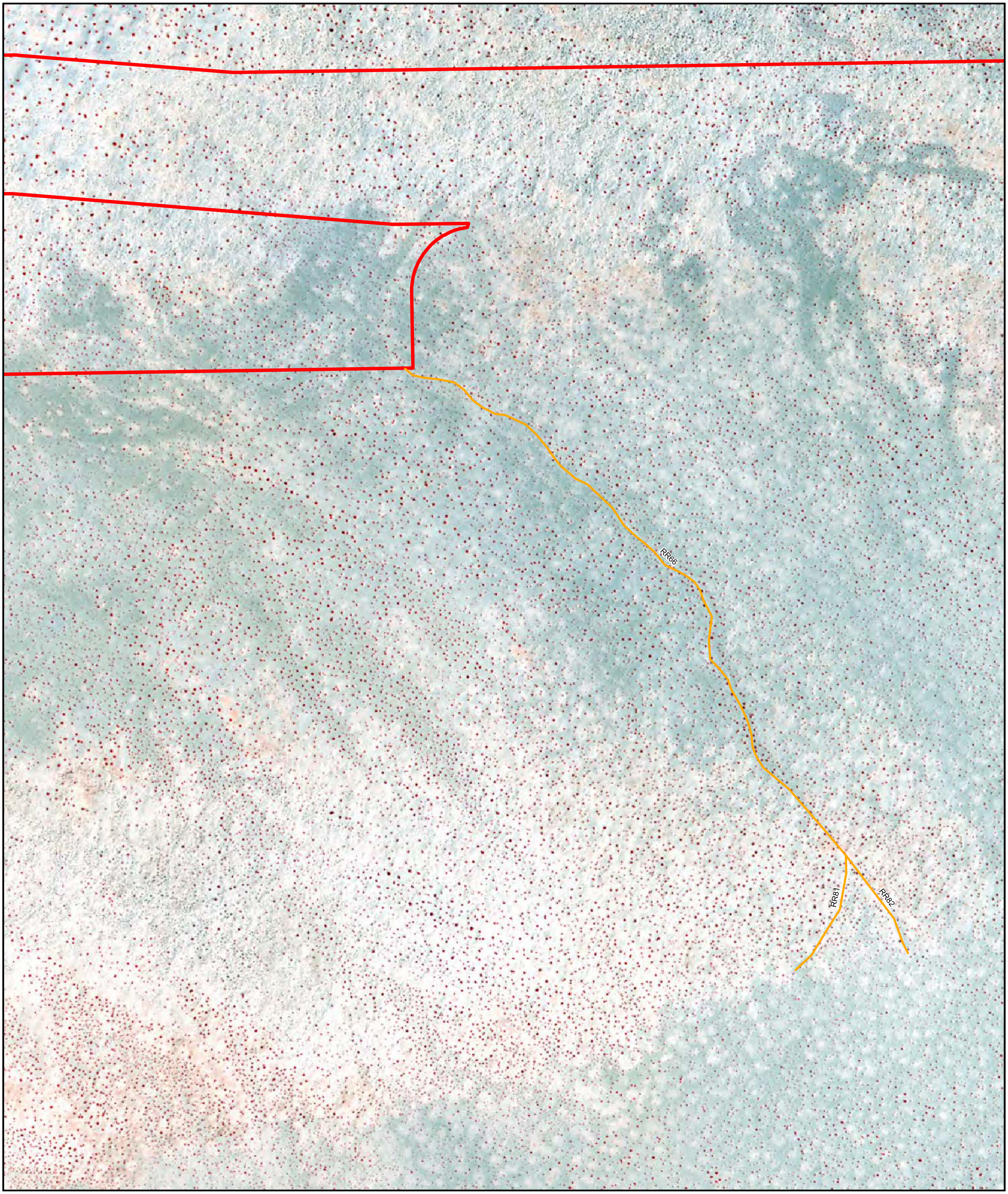
0 100 200 300 400 500 600 700 Feet

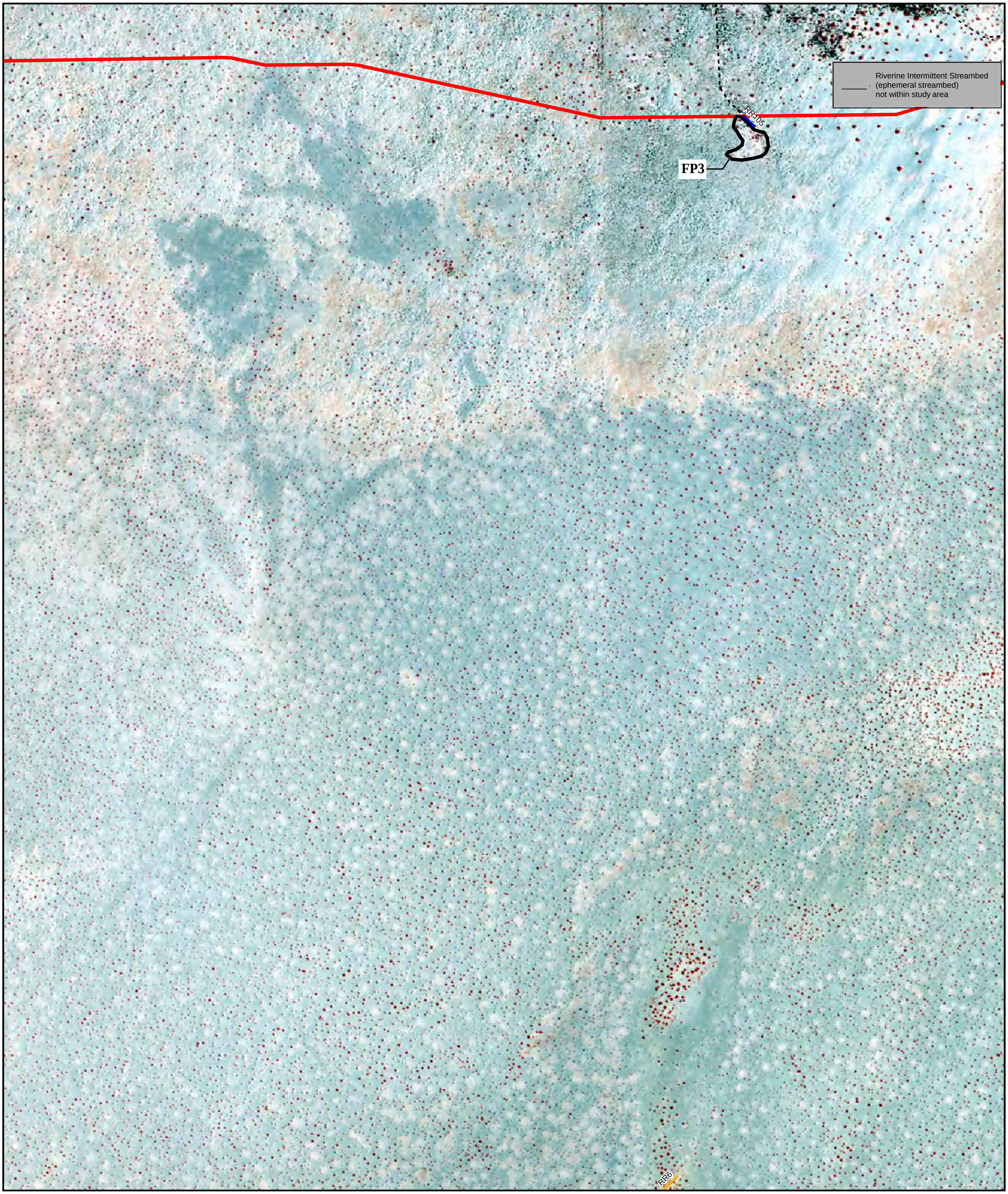
Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Sheet 2
Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California


RR66
RR81
RR82
E
0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Sheet 3
Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California


Riverine Intermittent Streambed (ephemeral streambed) not within study area
RR105
FP3
RR6

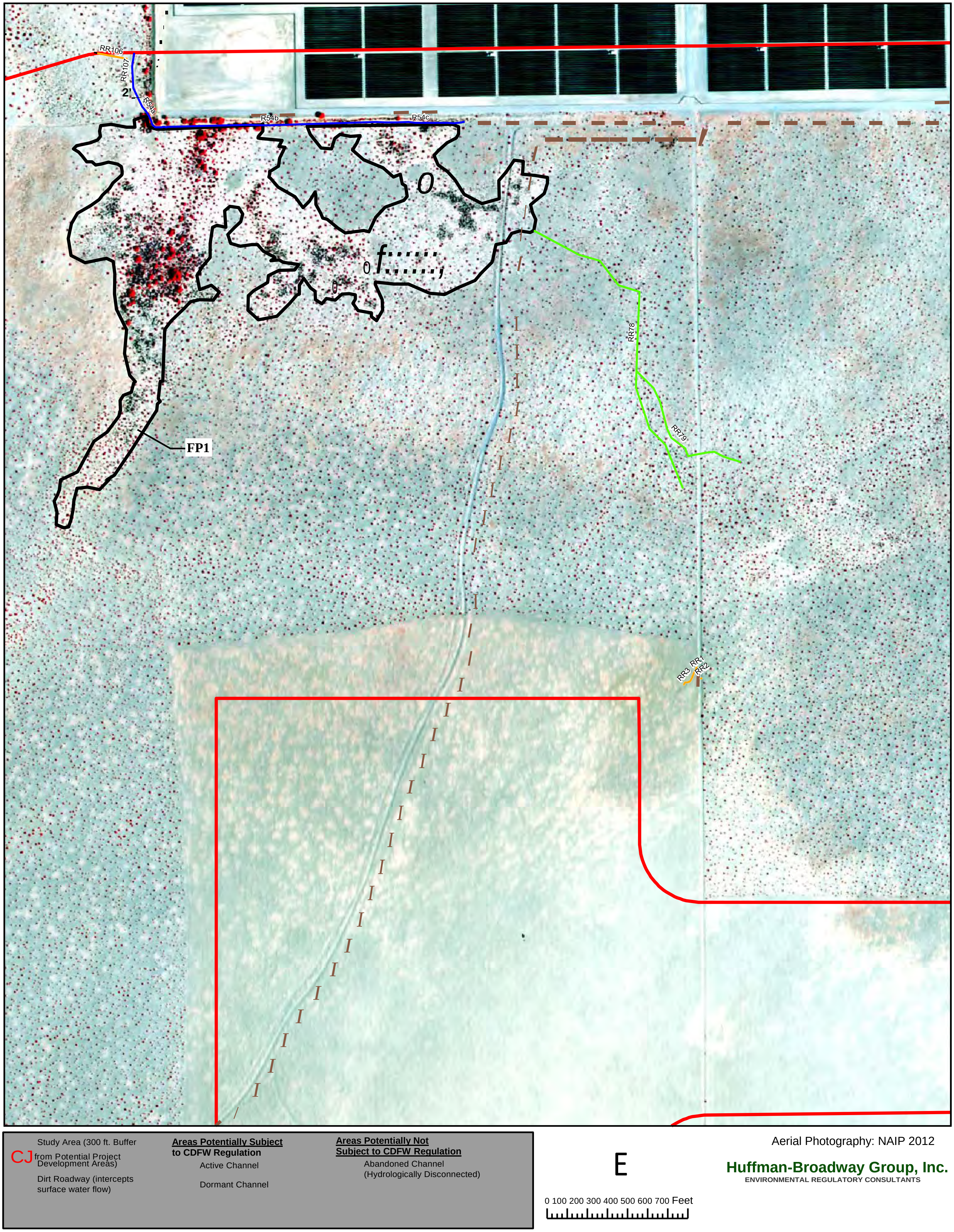
E

0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

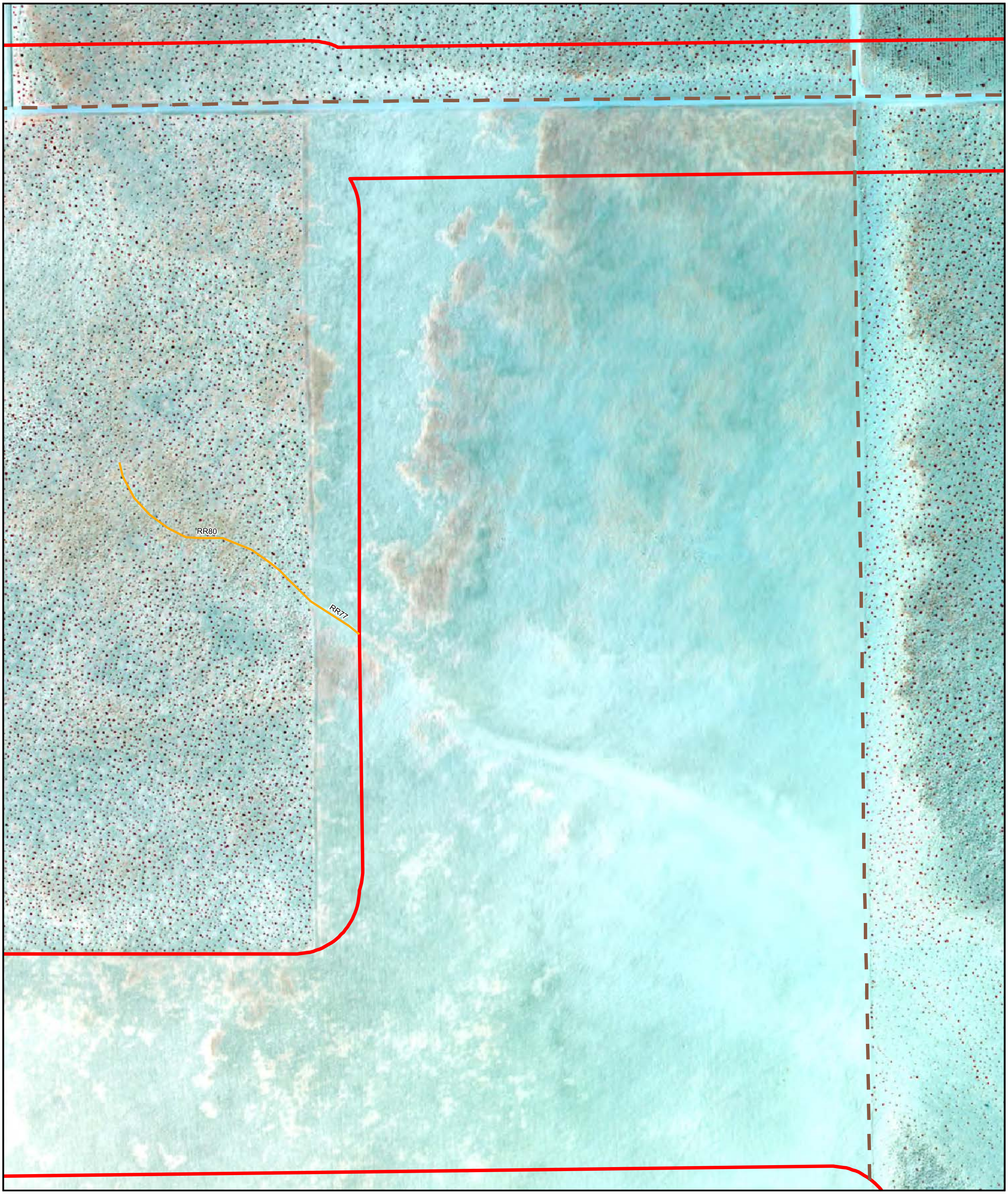
Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Sheet 4
Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California


RR106
RR107
2
R54a
R54b
R54c
FP1
RR78
RR79
RR3
RR1
RR2
CJ
Study Area (300 ft. Buffer from Potential Project Development Areas)
Dirt Roadway (intercepts surface water flow)
Areas Potentially Subject to CDFW Regulation
Active Channel
Dormant Channel
Areas Potentially Not Subject to CDFW Regulation
Abandoned Channel (Hydrologically Disconnected)
E
0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Sheet 5
Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California


RR80
RR77

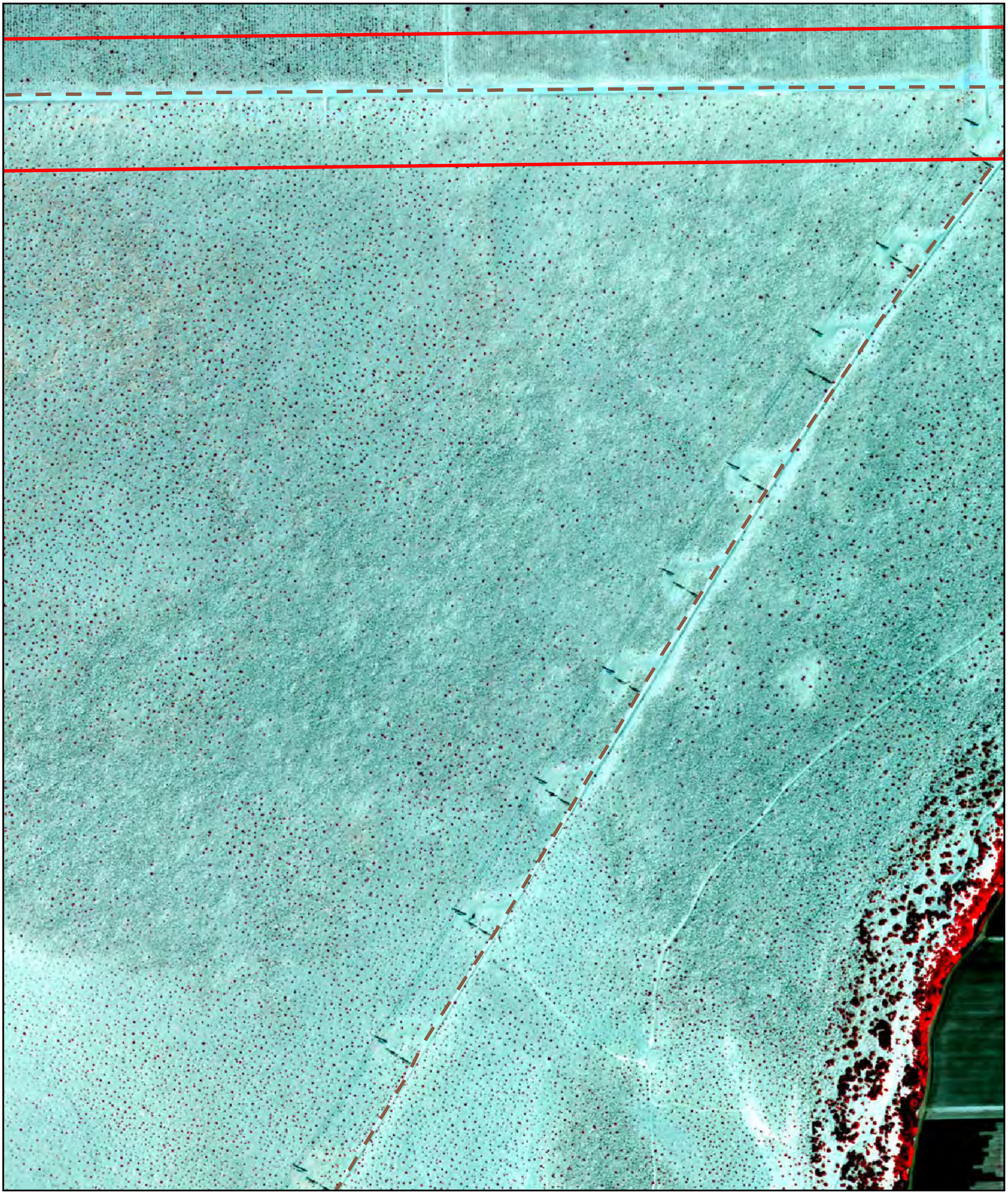
Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

E
0 100 200 300 400 500 600 700 Feet

Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Sheet 6

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California

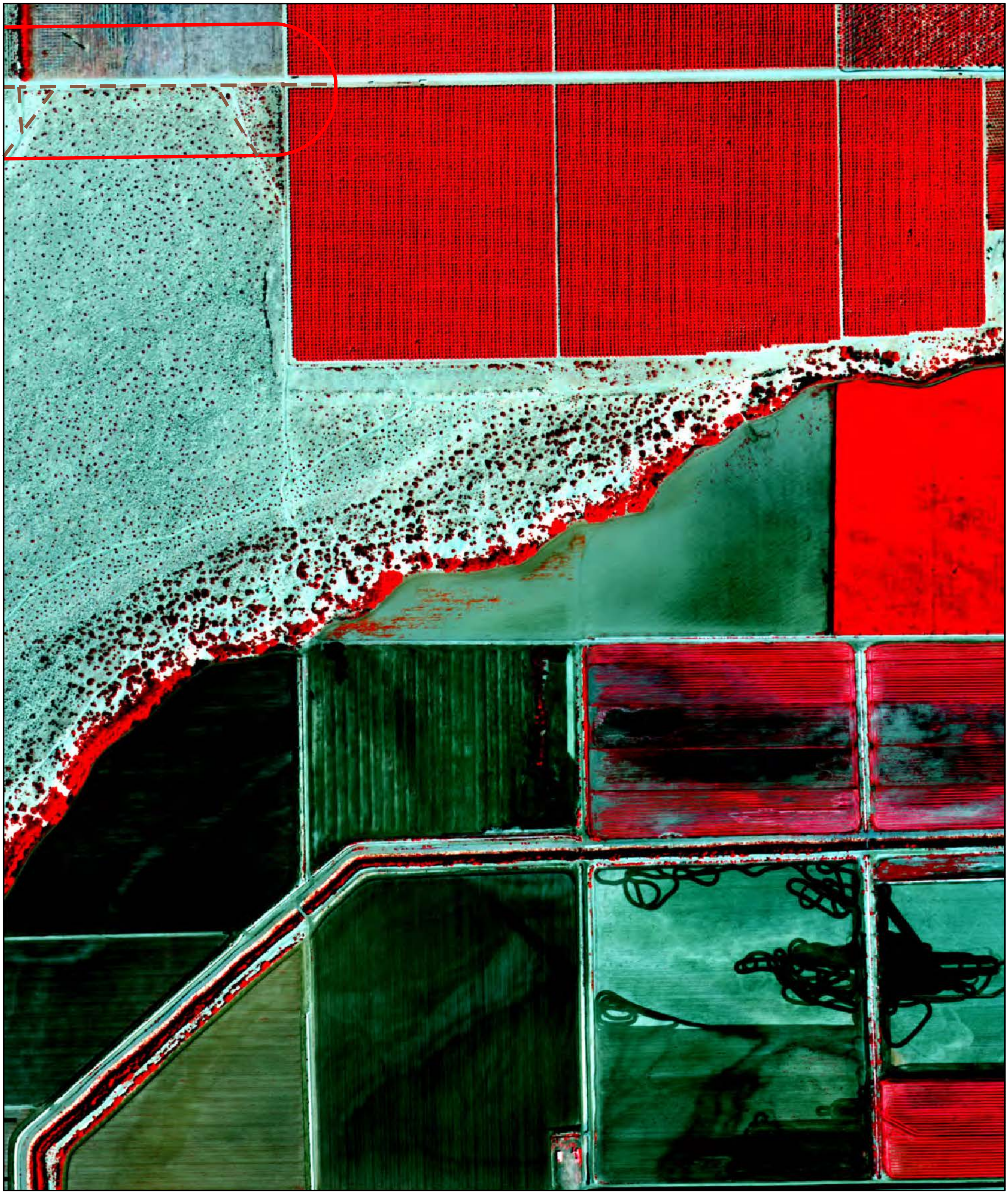


Aerial Photography: NAIP 2012

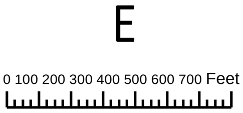
Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

E
0 100 200 300 400 500 600 700 Feet

Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Sheet 7
Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California

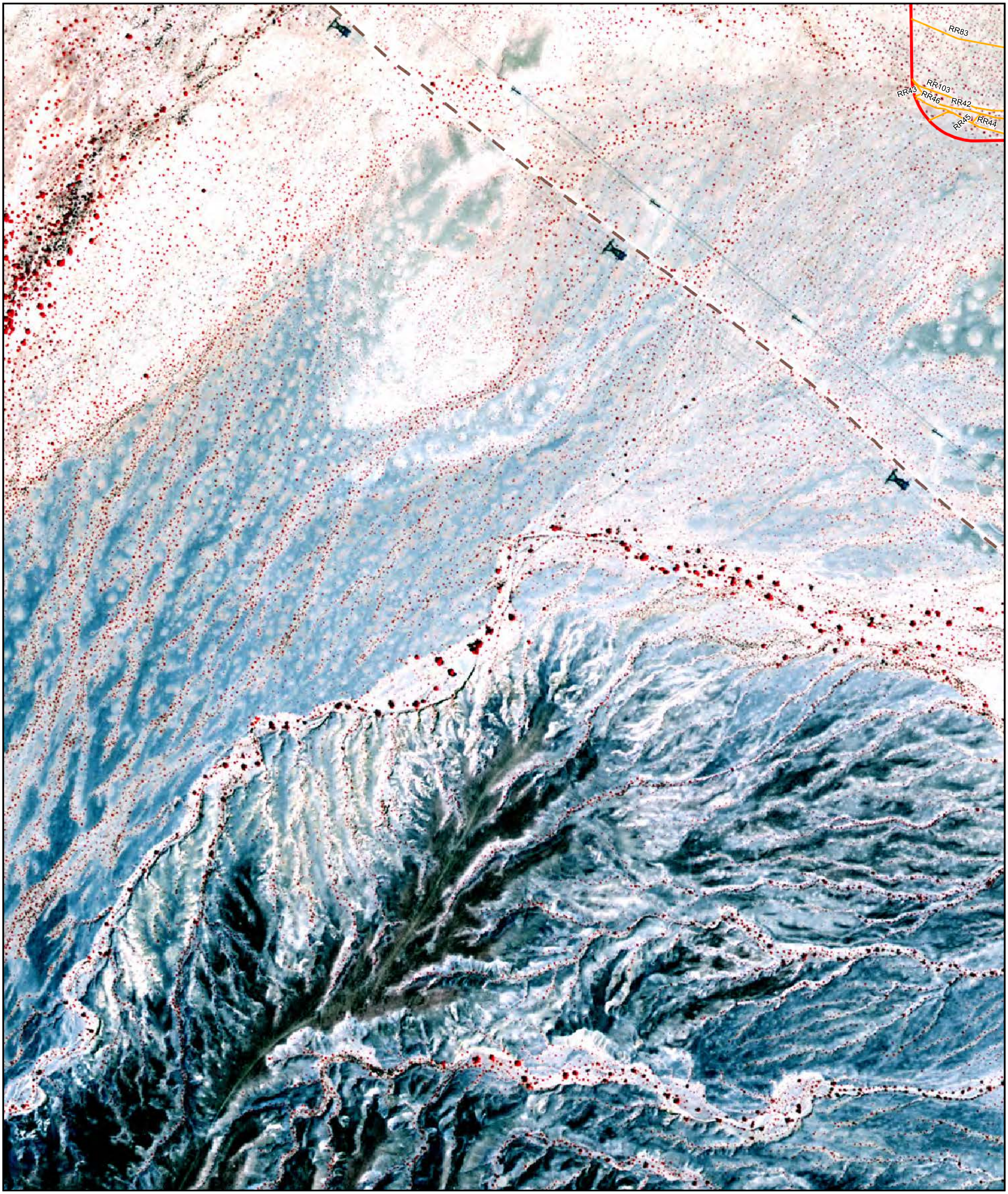


Aerial Photography: NAIP 2012


E
0 100 200 300 400 500 600 700 Feet

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Sheet 8
Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California


RR83
RR103
RR43
RR46
RR42
RR45
RR44

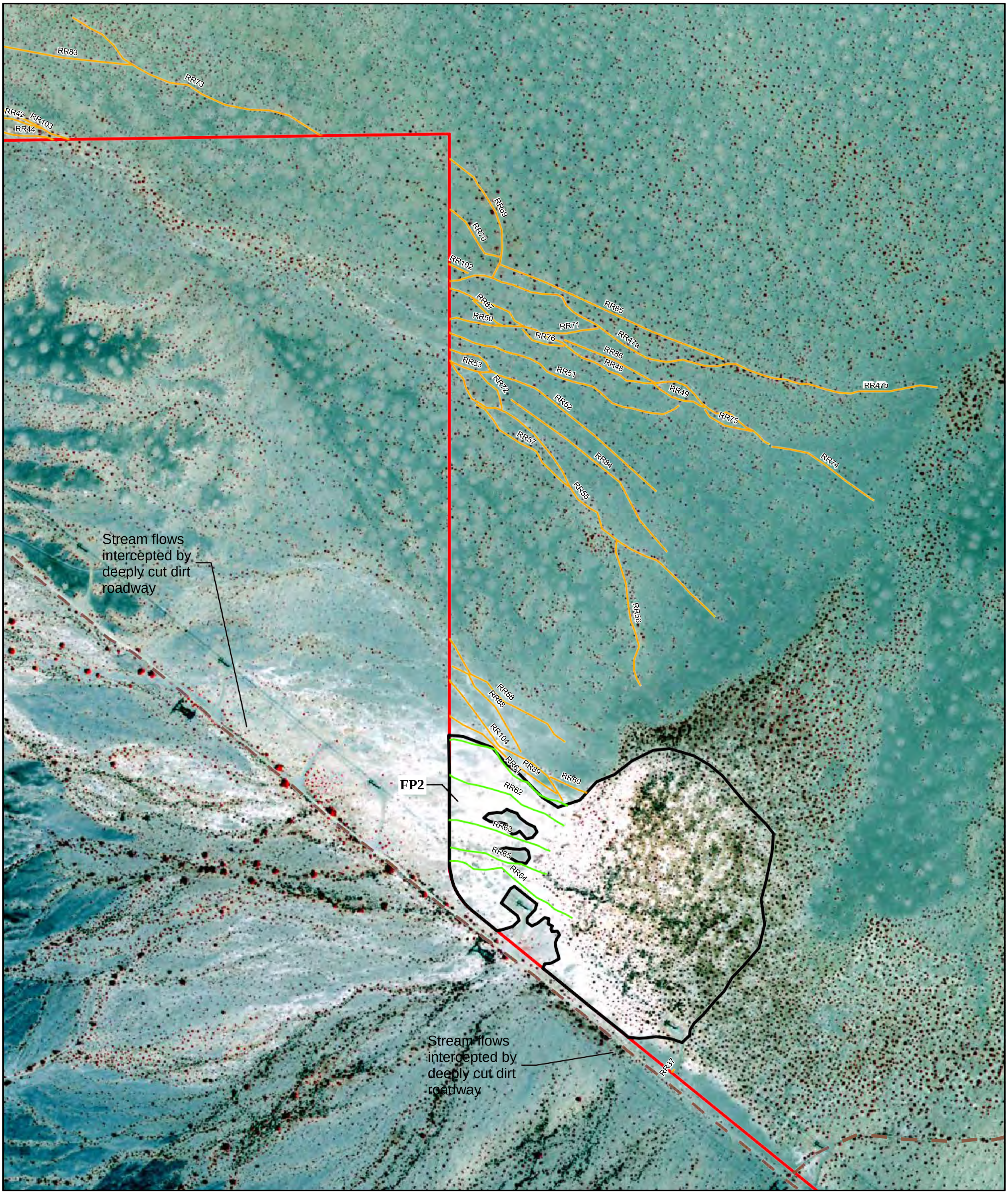
E

0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Sheet 9
Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California


RR83
RR73
RR42
RR103
RR44
RR69
RR70
RR102
RR85
RR87
RR50
RR71
RR76
RR47a
RR86
RR48
RR53
RR51
RR72
RR49
RR47b
RR52
RR75
RR57
RR84
RR74
RR55
Stream flows intercepted by deeply cut dirt roadway
RR56
RR58
RR88
RR104
RR61
RR89
RR60
FP2
RR62
RR63
RR65
RR64
Stream flows intercepted by deeply cut dirt roadway
RR37

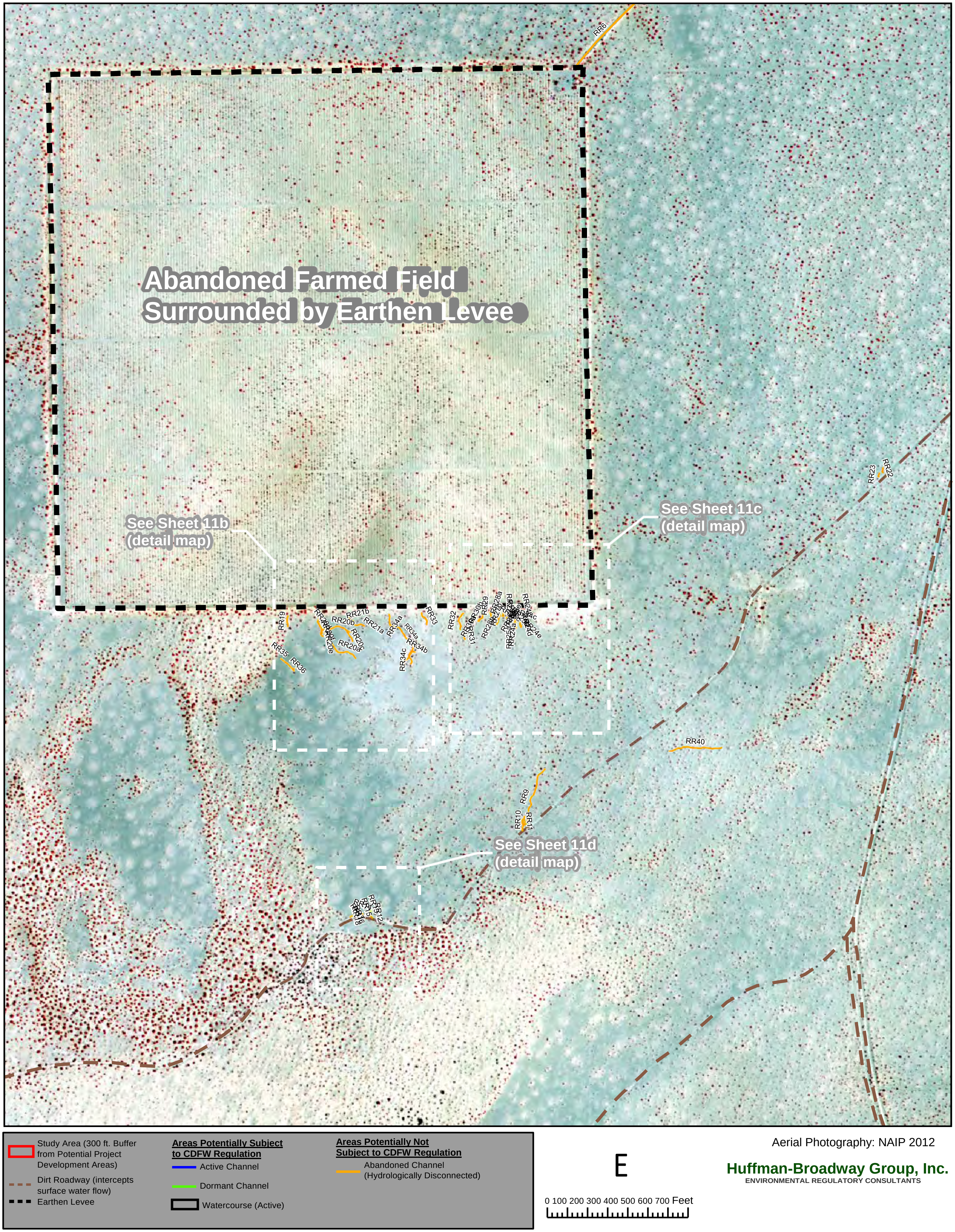
E

0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Sheet 10
Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California


RR6
Abandoned Farmed Field
Surrounded by Earthen Levee
RR23
RR22
See Sheet 11b
(detail map)
See Sheet 11c
(detail map)
RR19
RR20b
RR21b
RR21a
RR20c
RR20a
RR20e
RR35
RR36
RR34a
RR34b
RR34c
RR33
RR32
RR30b
RR29
RR28a
RR28b
RR31
RR24c
RR24d
RR24e
RR24a
RR40
RR9
RR10
RR11
See Sheet 11d
(detail map)
RR12
RR15
RR16
RR18
Study Area (300 ft. Buffer from Potential Project Development Areas)
Dirt Roadway (intercepts surface water flow)
Earthen Levee
Areas Potentially Subject to CDFW Regulation
Active Channel
Dormant Channel
Watercourse (Active)
Areas Potentially Not Subject to CDFW Regulation
Abandoned Channel (Hydrologically Disconnected)
E
0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Sheet 11
Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California

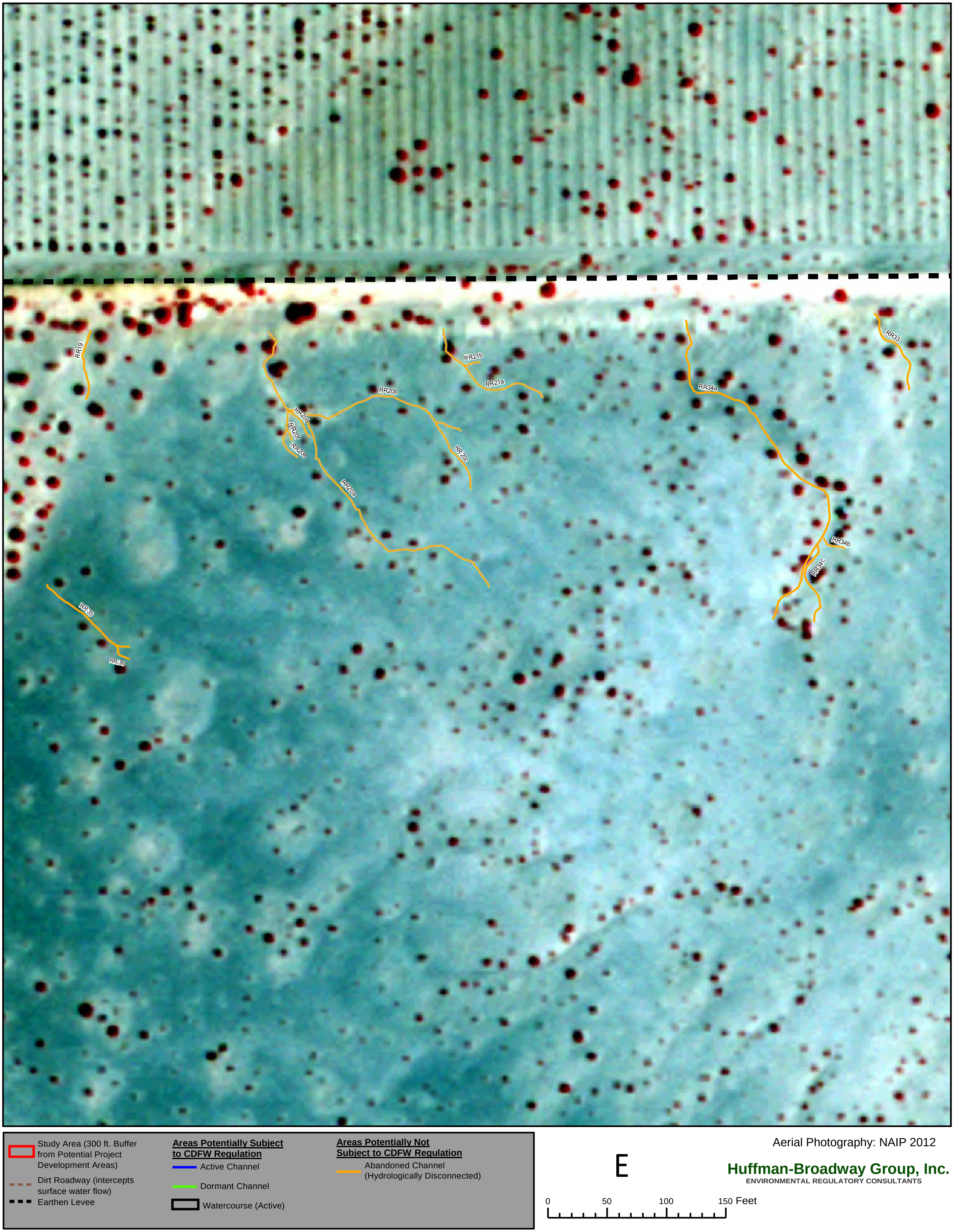
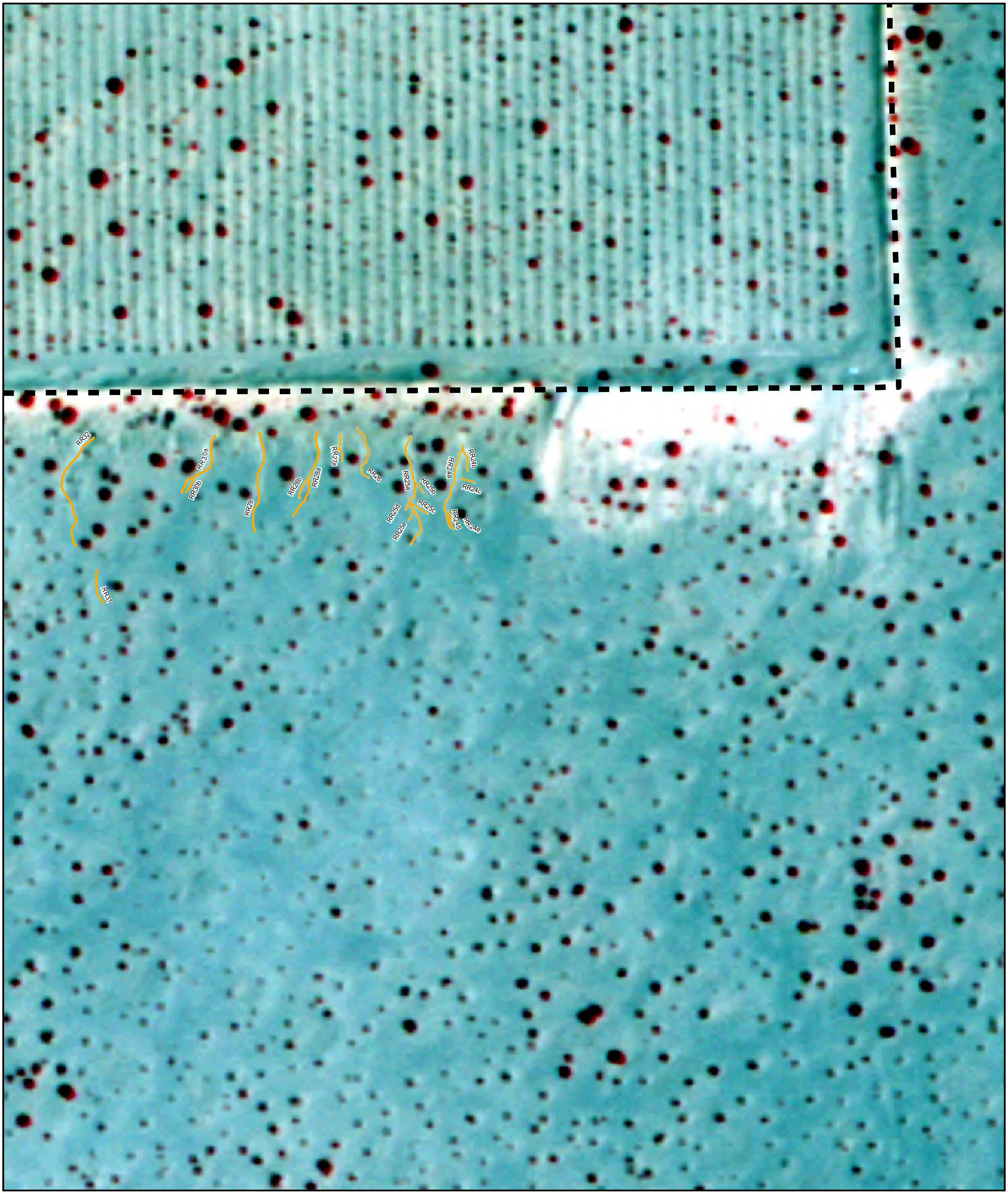

RR19
RR21b
RR21a
RR20b
RR20d
RR20f
RR20e
RR20c
RR20a
RR33
RR34a
RR34b
RR34c
RR35
RR36
Study Area (300 ft. Buffer from Potential Project Development Areas)
Dirt Roadway (intercepts surface water flow)
Earthen Levee
Areas Potentially Subject to CDFW Regulation
Active Channel
Dormant Channel
Watercourse (Active)
Areas Potentially Not Subject to CDFW Regulation
Abandoned Channel (Hydrologically Disconnected)
Aerial Photography: NAIP 2012
E
0
50
100
150 Feet
Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Sheet 11b

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California


RR32
RR30a
RR30b
RR29
RR28b
RR28a
RR27a
RR26
RR25a
RR25b
RR25c
RR25d
RR25e
RR24a
RR24b
RR24c
RR24d
RR24e
RR31

🟥 Study Area (300 ft. Buffer from Potential Project Development Areas)

Dirt Roadway (intercepts surface water flow)

Earthen Levee

Areas Potentially Subject to CDFW Regulation

Active Channel

Dormant Channel

▭ Watercourse (Active)

Areas Potentially Not Subject to CDFW Regulation

Abandoned Channel (Hydrologically Disconnected)

E

0 50 100 150 Feet

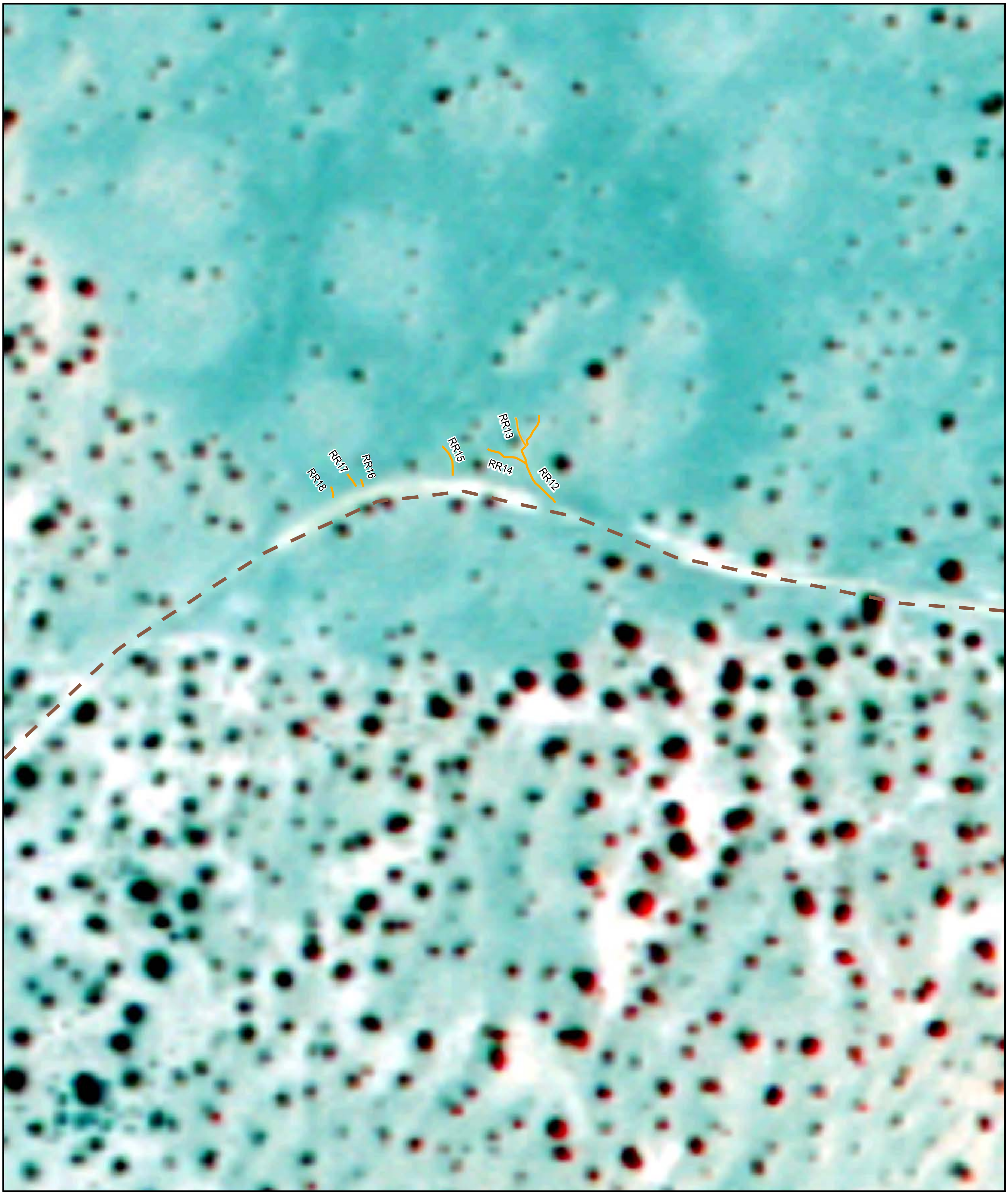
Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.

ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Sheet 11c

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California



🟥 Study Area (300 ft. Buffer from Potential Project Development Areas)

Dirt Roadway (intercepts surface water flow)

Earthen Levee

Areas Potentially Subject to CDFW Regulation

Active Channel

Dormant Channel

▭ Watercourse (Active)

Areas Potentially Not Subject to CDFW Regulation

Abandoned Channel (Hydrologically Disconnected)

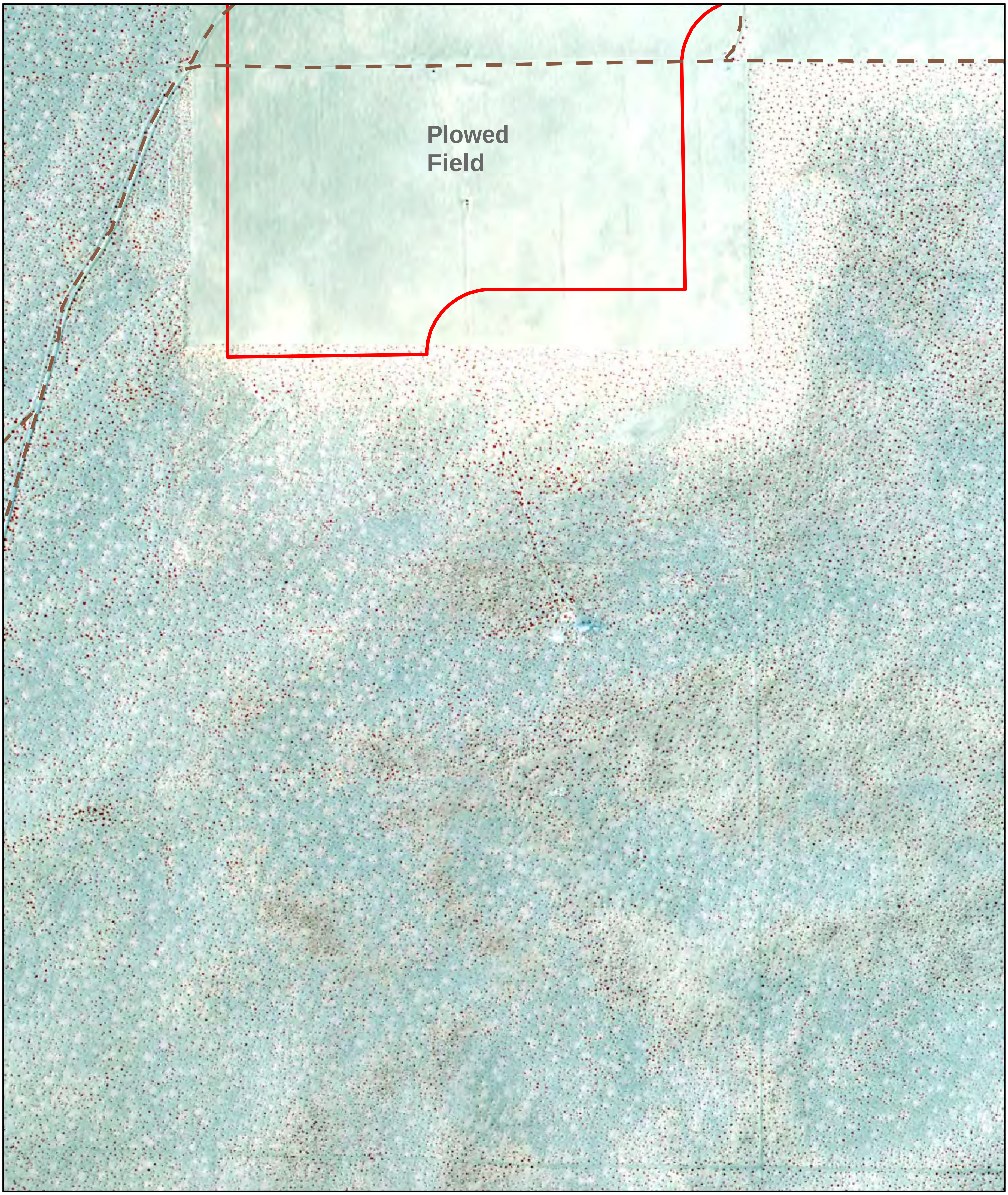
E

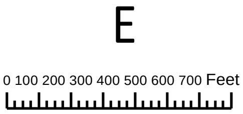
0 25 50 75 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Sheet 11d
Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California

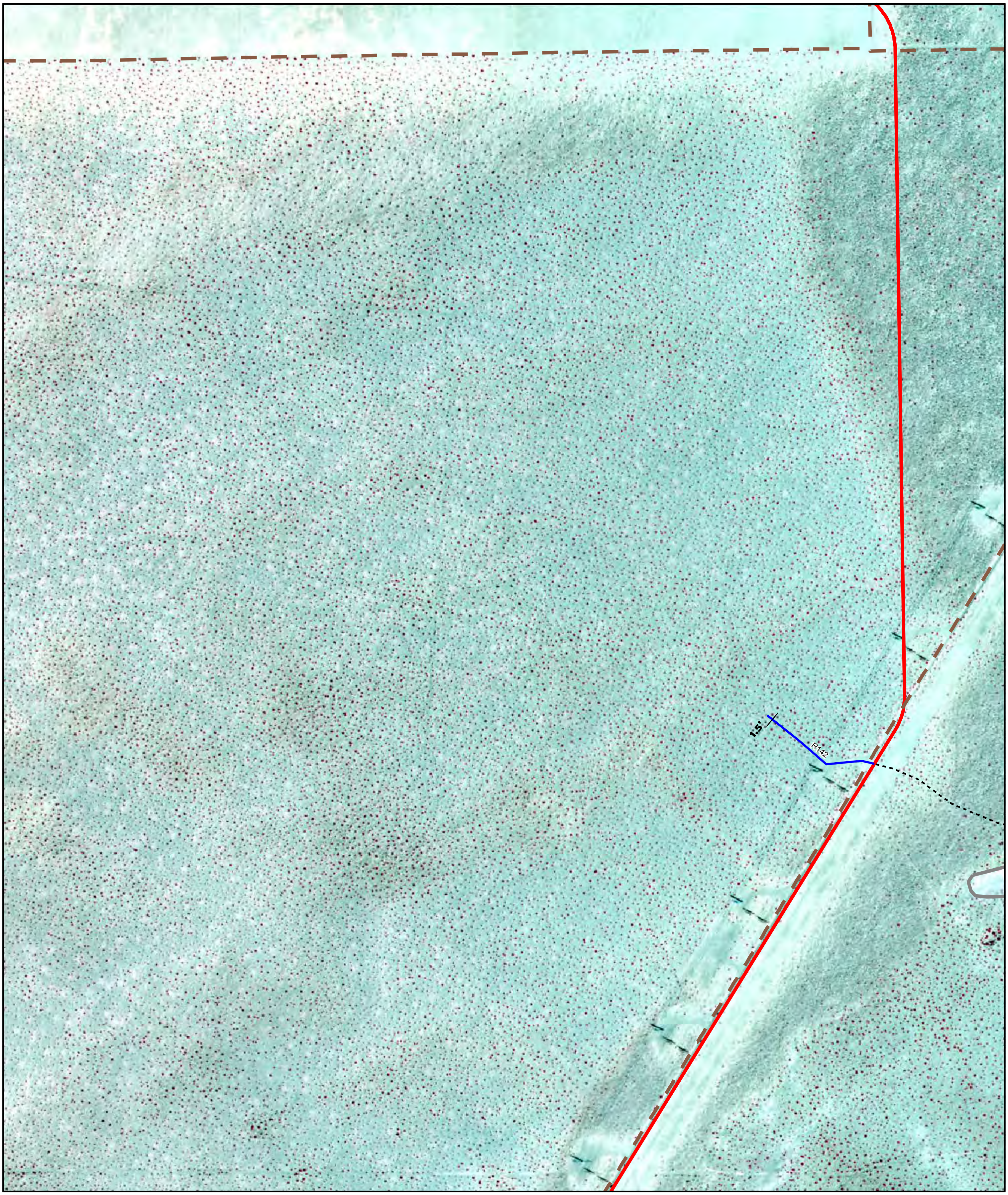

Plowed Field


E
0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Sheet 12
Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California



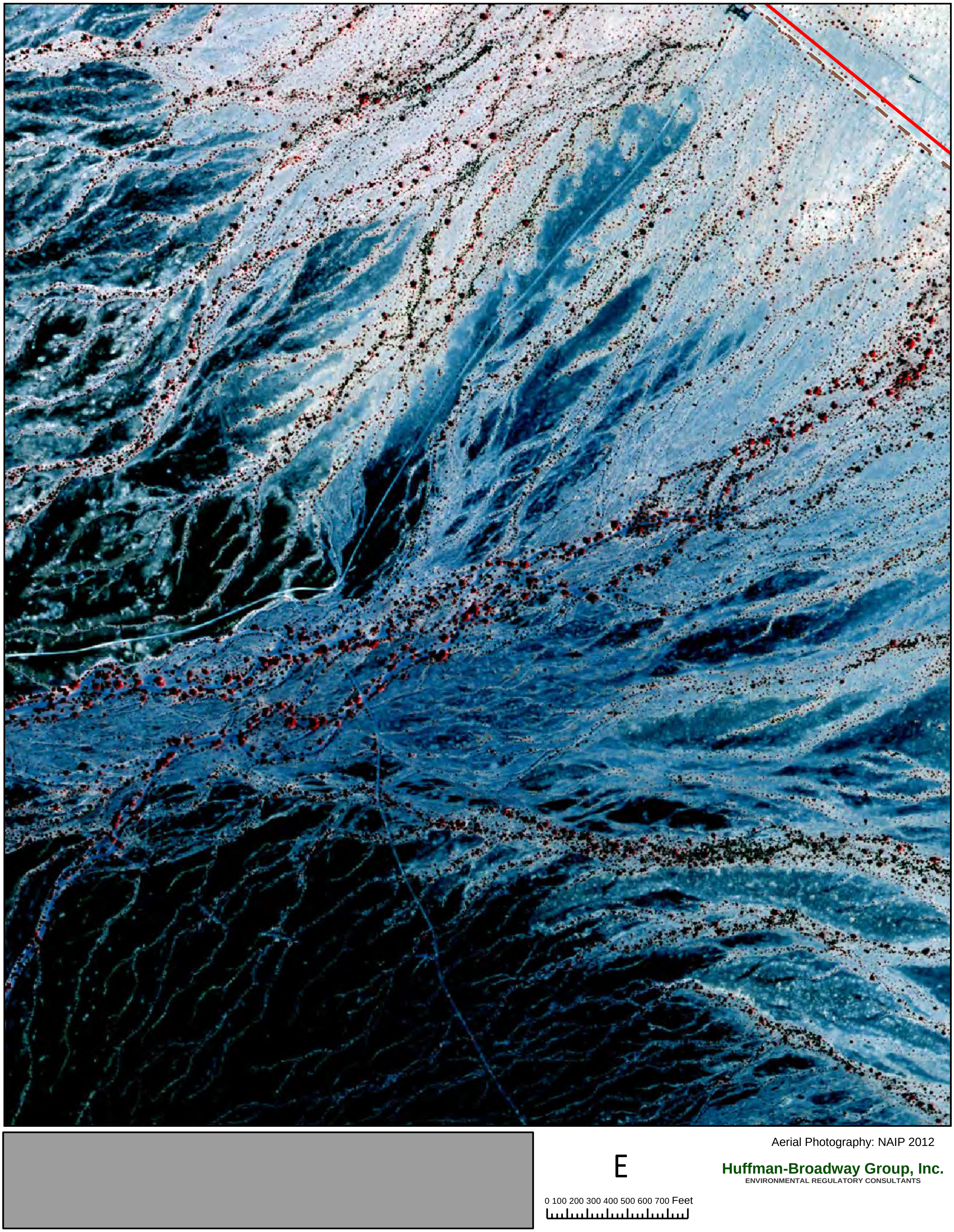
Aerial Photography: NAIP 2012

E

0 100 200 300 400 500 600 700 Feet

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

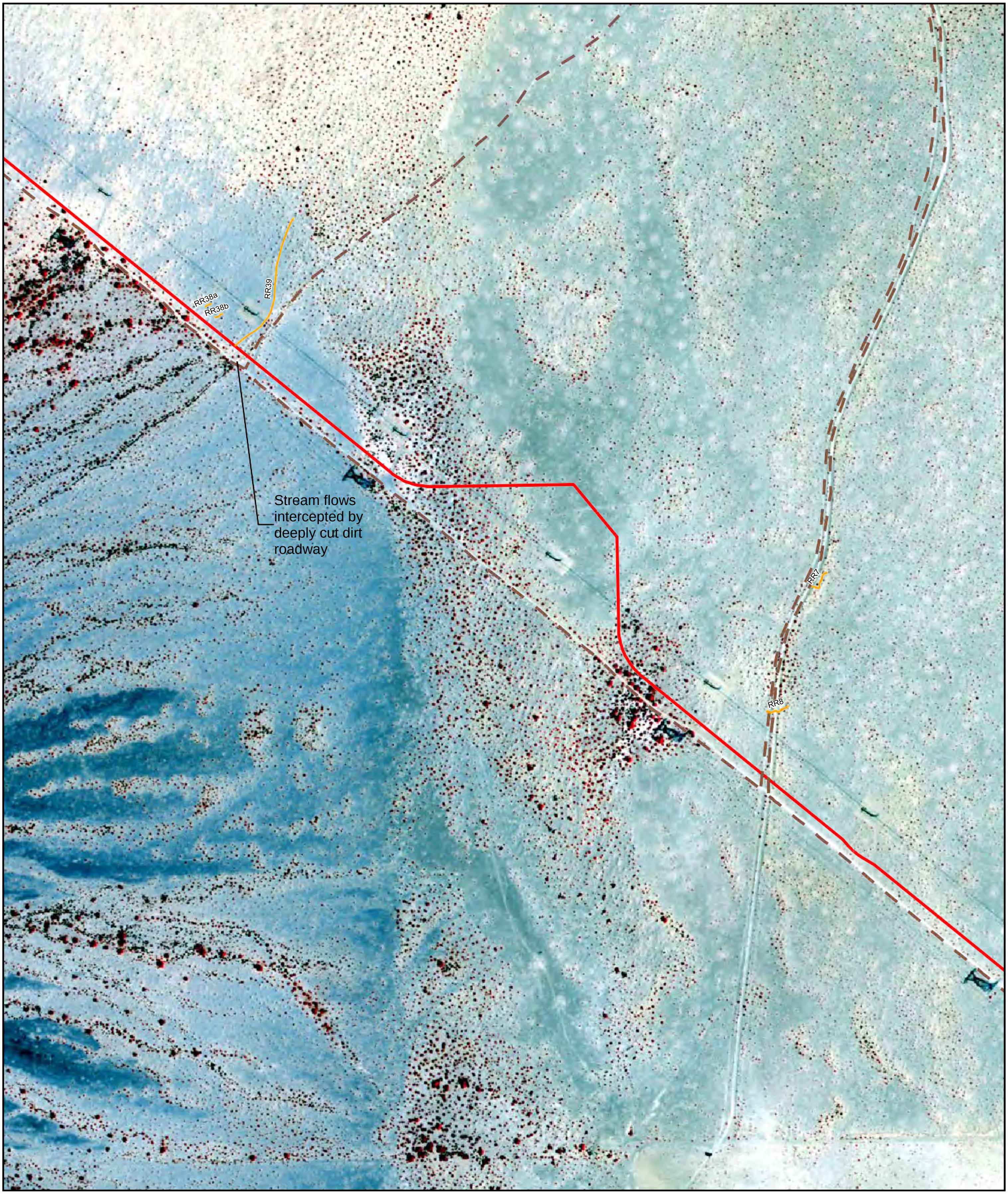
Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Sheet 13
Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California


E
0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Sheet 14
Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California


RR38a
RR38b
RR39
Stream flows intercepted by deeply cut dirt roadway
RR7
RR8

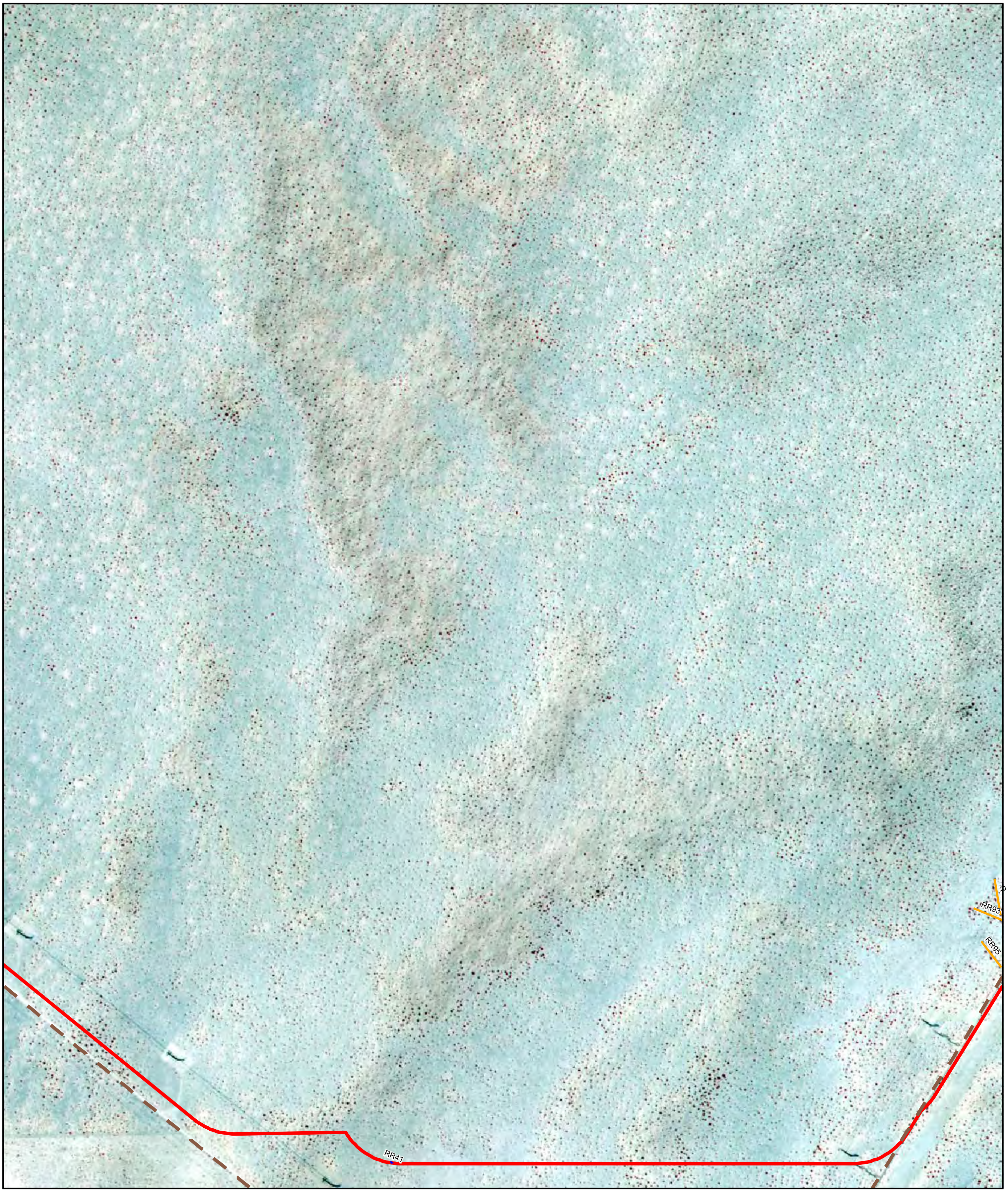
Aerial Photography: NAIP 2012

E

0 100 200 300 400 500 600 700 Feet

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Sheet 15
Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California



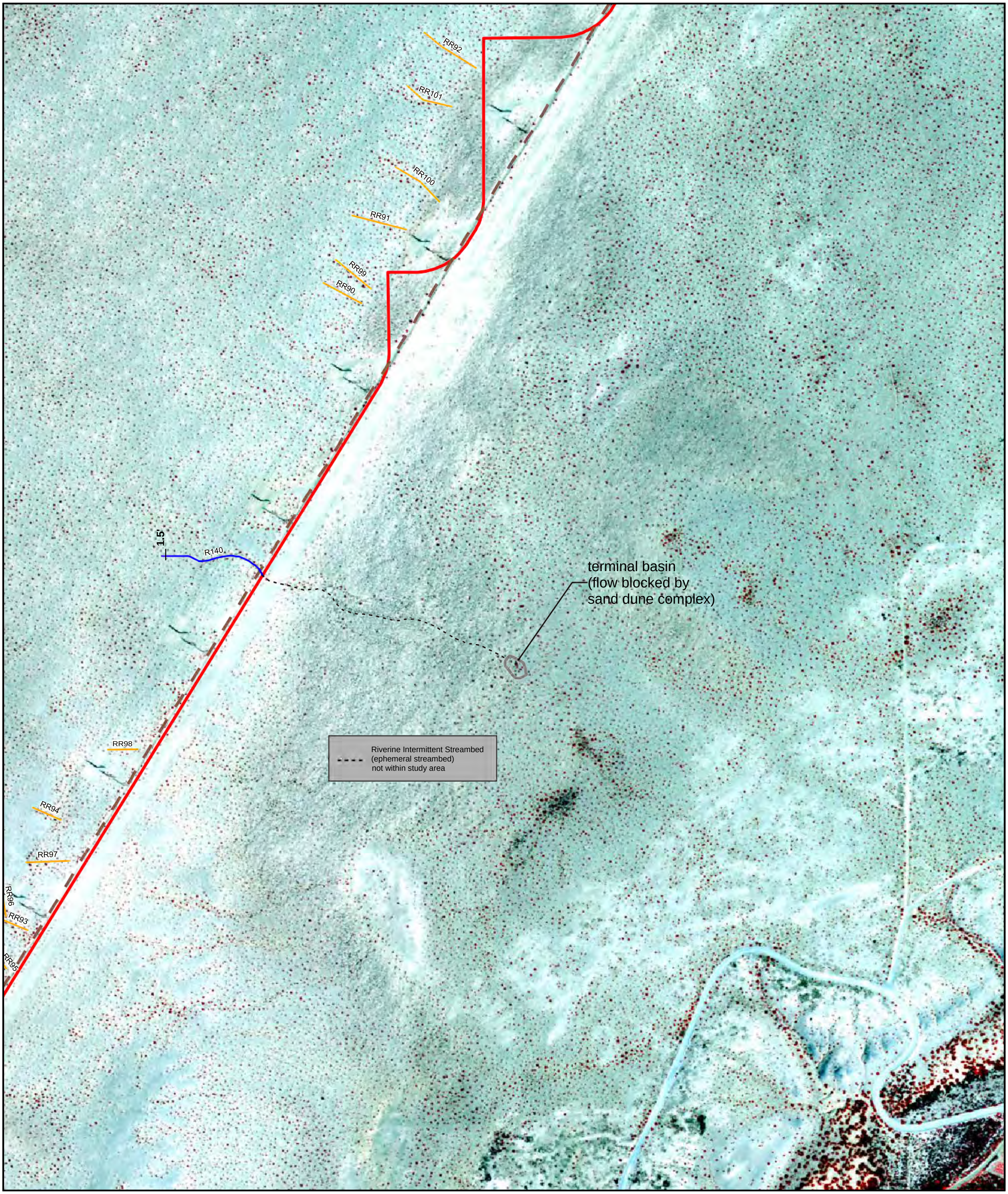
E

0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Sheet 16
Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California


RR92
RR101
RR100
RR91
RR99
RR90
1.5'
R140
terminal basin
(flow blocked by
sand dune complex)
Riverine Intermittent Streambed
(ephemeral streambed)
not within study area
RR98
RR94
RR97
RR96
RR93
RR95

Aerial Photography: NAIP 2012

E

0 100 200 300 400 500 600 700 Feet

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Figure 7. Stream Channels and Watercourses Potentially Subject to CDFW Jurisdiction, Sheet 17
Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California

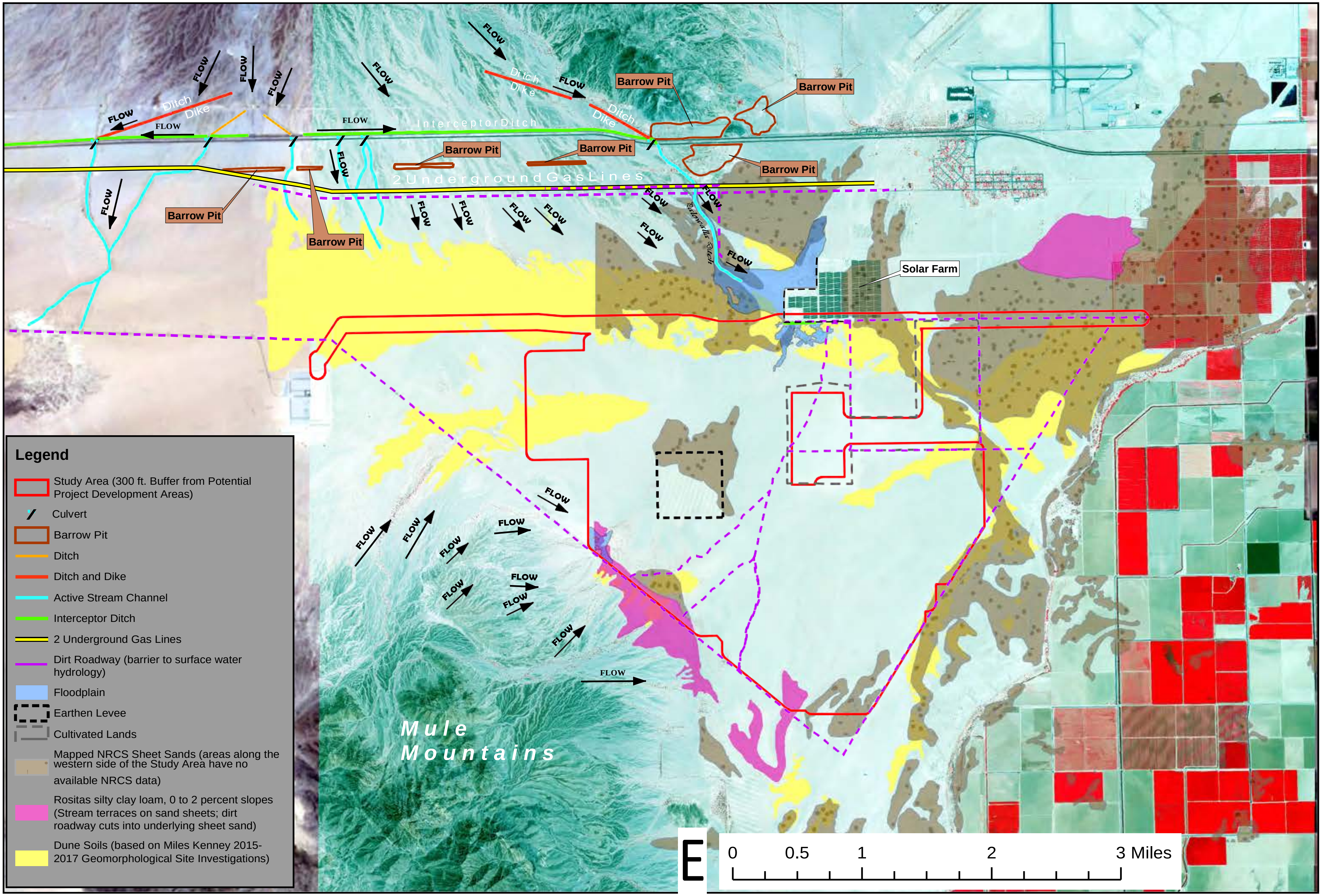

FLOW
Ditch
Dike
Ditch
Dike
Ditch
Dike
Interceptor Ditch
Barrow Pit
Barrow Pit
Barrow Pit
Barrow Pit
Barrow Pit
Barrow Pit
Barrow Pit
2 Underground Gas Lines
Solar Farm
Mule Mountains
Legend
Study Area (300 ft. Buffer from Potential Project Development Areas)
Culvert
Barrow Pit
Ditch
Ditch and Dike
Active Stream Channel
Interceptor Ditch
2 Underground Gas Lines
Dirt Roadway (barrier to surface water hydrology)
Floodplain
Earthen Levee
Cultivated Lands
Mapped NRCS Sheet Sands (areas along the western side of the Study Area have no available NRCS data)
Rositas silty clay loam, 0 to 2 percent slopes (Stream terraces on sand sheets; dirt roadway cuts into underlying sheet sand)
Dune Soils (based on Miles Kenney 2015-2017 Geomorphological Site Investigations)
E
0
0.5
1
2
3 Miles

Figure 8. Mapping Showing Where Off-Site Surface Water Flows Directed Toward the Study Area Have Been Cut-Off by Natural and by Constructed Surface Features

Desert Quartzite LLC Solar Farm Project,
Town of Blythe, Riverside County, California

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix B

NRCS Custom Soil Report

United States
Department of
Agriculture

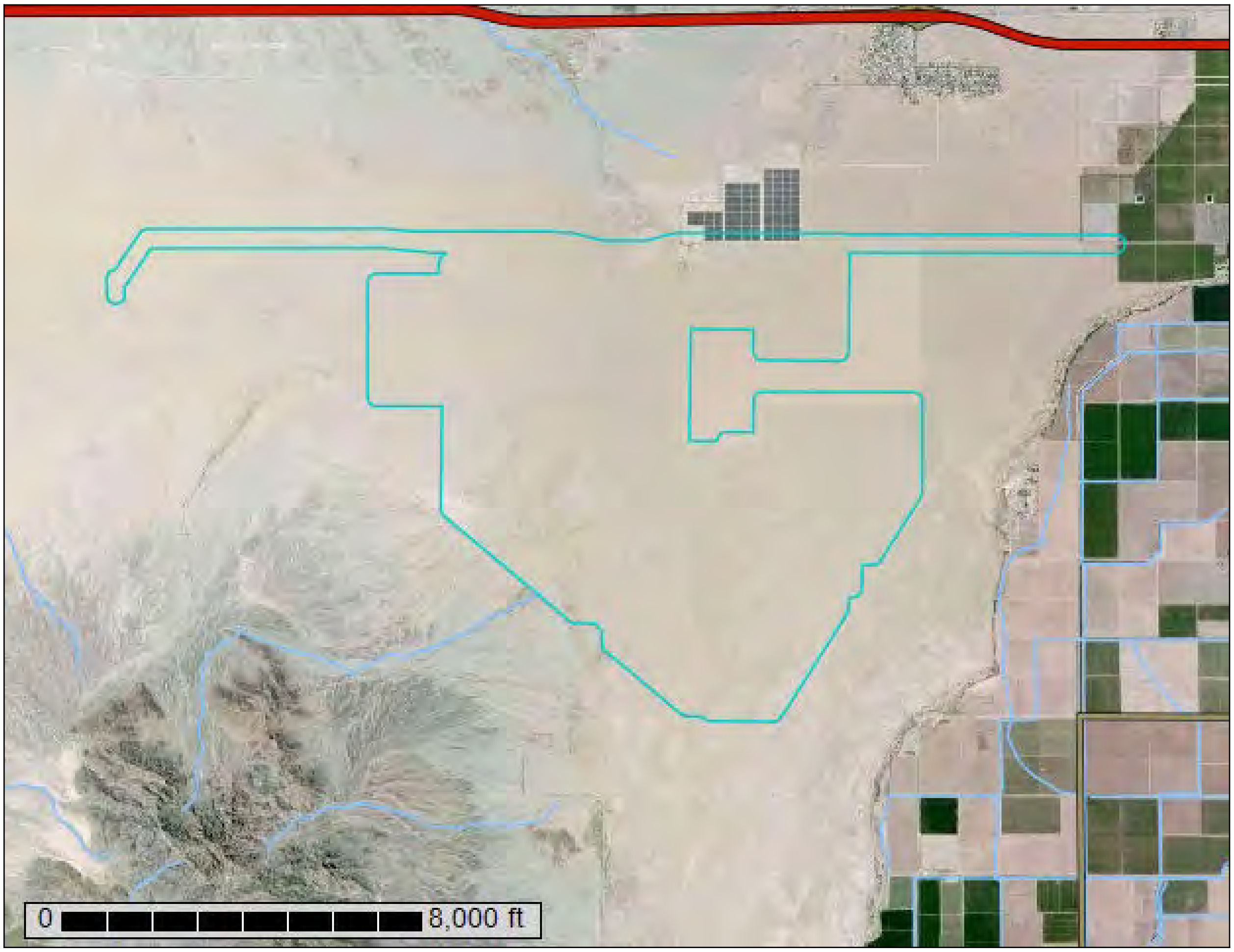
NRCS

Natural
Resources
Conservation
Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Colorado Desert Area, California, and Palo Verde Area, California

FS Desert Quartzite



March 23, 2017

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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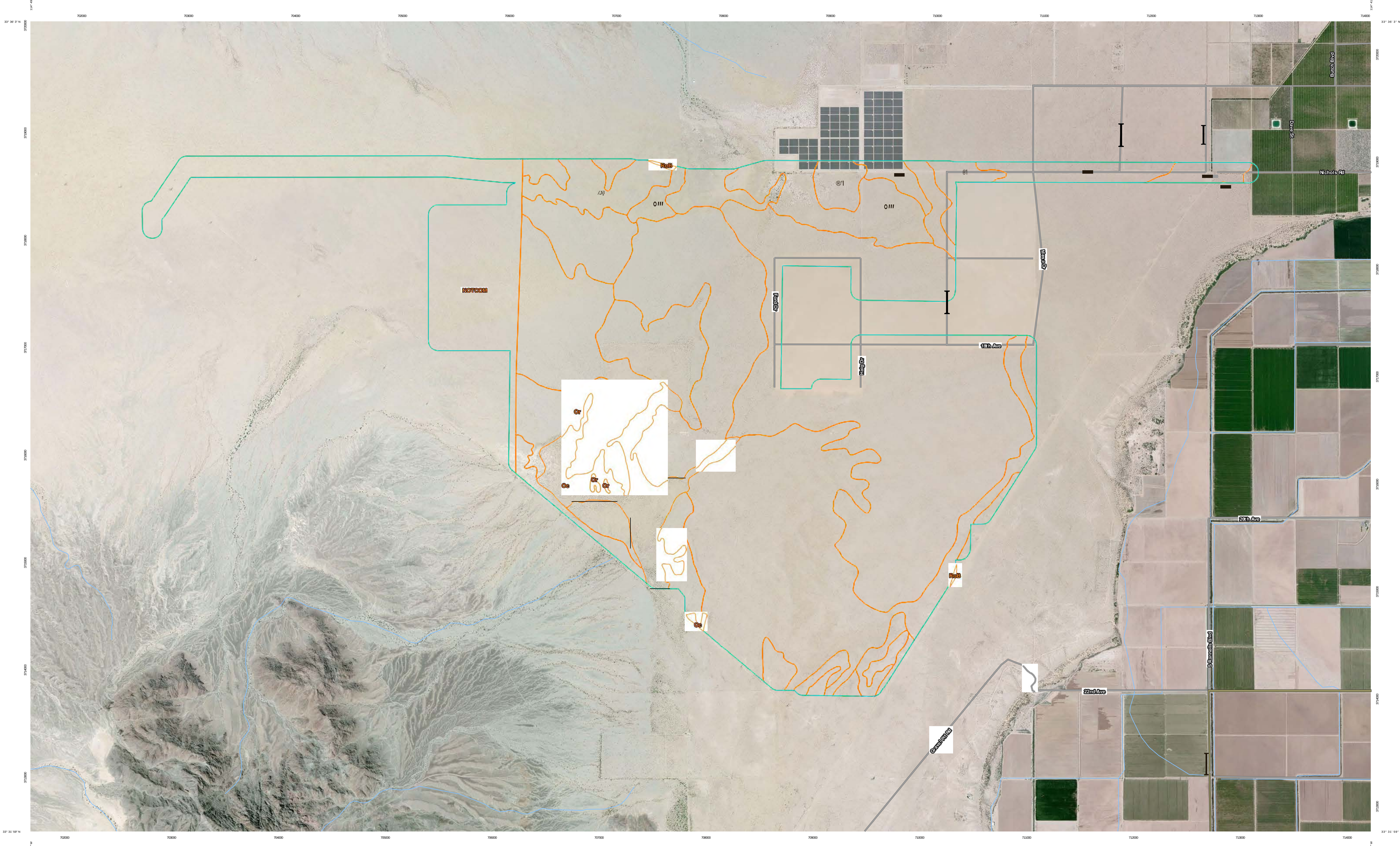
Contents

Preface 2
Soil Map 5
  Soil Map 6
  Legend 7
  Map Unit Legend 9
  Map Unit Descriptions 9
    Colorado Desert Area, California 12
      NOTCOM—No Digital Data Available 12
    Palo Verde Area, California 13
      Ac—Aco gravelly loamy sand 13
      Af—Aco sandy loam 14
      Ce—Carrizo gravelly sand 15
      Oc—Orita fine sand 16
      Or—Orita gravelly fine sandy loam 17
      RoA—Rositas fine sand, 0 to 2 percent slopes 19
      RoB—Rositas fine sand, 2 to 9 percent slopes 20
      RsA—Rositas gravelly loamy sand, 0 to 2 percent slopes 21
References 23

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map


114° 49' 41" W
114° 41' 35" W
33° 36' 3" N
33° 31' 59" N
702000
703000
704000
705000
706000
707000
708000
709000
710000
711000
712000
713000
714000
3720000
3719000
3718000
3717000
3716000
3715000
3714000
3713000
RaB
NOTCOM
Cr
Cc
Butch Blvd
Dave St
Nichols Rd
Mesa Dr
Ford Dr
Haig Dr
18th Ave
20th Ave
22nd Ave
S Rannells Blvd
Gravel Pit Rd

Map Scale: 1:15,600 if printed on D landscape (34" x 22") sheet.

N

0 200 400 800 1200 Meters

0 500 1000 2000 3000 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- □ Area of Interest (AOI)

Soils
- □ Soil Map Unit Polygons
- 〰 Soil Map Unit Lines
- ■ Soil Map Unit Points

Special Point Features
- ⊙ Blowout
- ☒ Borrow Pit
- ✱ Clay Spot
- ◇ Closed Depression
- ✕ Gravel Pit
- ∴ Gravelly Spot
- ◎ Landfill
- Λ Lava Flow
- ψ Marsh or swamp
- ⚒ Mine or Quarry
- ◎ Miscellaneous Water
- ◎ Perennial Water
- ∨ Rock Outcrop
- + Saline Spot
- ⁘ Sandy Spot
- ⊜ Severely Eroded Spot
- ◇ Sinkhole
- ⊳ Slide or Slip
- ⊘ Sodic Spot
- ≡ Spoil Area
- ◊ Stony Spot
- ∞ Very Stony Spot
- ψ Wet Spot
- △ Other
- ⋯ Special Line Features

Water Features
- 〰 Streams and Canals

Transportation
- ┼┼┼ Rails
- 〰 Interstate Highways
- 〰 US Routes
- 〰 Major Roads
- 〰 Local Roads

Background
- ▨ Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Colorado Desert Area, California
Survey Area Data: Version 5, Sep 13, 2016

Soil Survey Area: Palo Verde Area, California
Survey Area Data: Version 7, Sep 12, 2016

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 13, 2011—Apr 17, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Colorado Desert Area, California (CA803)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
NOTCOM	No Digital Data Available	499.4	10.0%
Subtotals for Soil Survey Area		**499.4**	**10.0%**
Totals for Area of Interest		**4,971.7**	**100.0%**

Palo Verde Area, California (CA681)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Ac	Aco gravelly loamy sand	1,093.4	22.0%
Af	Aco sandy loam	1,584.4	31.9%
Ce	Carrizo gravelly sand	0.0	0.0%
Oc	Orita fine sand	434.6	8.7%
Or	Orita gravelly fine sandy loam	730.6	14.7%
RoA	Rositas fine sand, 0 to 2 percent slopes	322.5	6.5%
RoB	Rositas fine sand, 2 to 9 percent slopes	241.2	4.9%
RsA	Rositas gravelly loamy sand, 0 to 2 percent slopes	65.6	1.3%
Subtotals for Soil Survey Area		**4,472.4**	**90.0%**
Totals for Area of Interest		**4,971.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Colorado Desert Area, California

NOTCOM—No Digital Data Available

Map Unit Composition

Notcom: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Notcom

Properties and qualities

Palo Verde Area, California

Ac—Aco gravelly loamy sand

Map Unit Setting

National map unit symbol: hkwq
Elevation: 300 to 700 feet
Mean annual precipitation: 4 inches
Mean annual air temperature: 72 degrees F
Frost-free period: 290 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Aco and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aco

Setting

Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 3 inches: gravelly loamy sand
H2 - 3 to 18 inches: coarse sandy loam
H3 - 18 to 46 inches: sandy loam
H4 - 46 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Rositas, gravelly loamy sand

Percent of map unit: 8 percent
Hydric soil rating: No

Aco, sandy loam

Percent of map unit: 7 percent
Hydric soil rating: No

Af—Aco sandy loam

Map Unit Setting

National map unit symbol: hkwr
Elevation: 300 to 700 feet
Frost-free period: 290 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Aco and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Aco

Setting

Landform: Fan remnants
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 3 inches: sandy loam
H2 - 3 to 18 inches: coarse sandy loam
H3 - 18 to 46 inches: sandy loam
H4 - 46 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent

Salinity, maximum in profile: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.3 inches)

Interpretive groups
Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Rositas, fine sand
Percent of map unit: 8 percent
Hydric soil rating: No

Aco, gravelly loamy sand
Percent of map unit: 7 percent
Hydric soil rating: No

Ce—Carrizo gravelly sand

Map Unit Setting
National map unit symbol: hkwt
Elevation: 300 to 450 feet
Mean annual precipitation: 2 to 8 inches
Mean annual air temperature: 72 degrees F
Frost-free period: 290 to 310 days
Farmland classification: Not prime farmland

Map Unit Composition
Carrizo and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Carrizo

Setting
Landform: Arroyos
Landform position (two-dimensional): Toeslope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Mixed sandy and gravelly alluvium

Typical profile
H1 - 0 to 37 inches: gravelly sand
H2 - 37 to 47 inches: very cobbly sandy loam
H3 - 47 to 60 inches: very cobbly sandy loam

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches

Natural drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 1 percent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 8s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Chuckawala

Percent of map unit: 5 percent
Hydric soil rating: No

Rositas

Percent of map unit: 5 percent
Hydric soil rating: No

Badland

Percent of map unit: 5 percent
Hydric soil rating: No

Oc—Orita fine sand

Map Unit Setting

National map unit symbol: hkxb
Elevation: 370 to 500 feet
Mean annual precipitation: 4 inches
Mean annual air temperature: 72 degrees F
Frost-free period: 290 days
Farmland classification: Prime farmland if irrigated and reclaimed of excess salts and sodium

Map Unit Composition

Orita and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orita

Setting

Landform: Fan remnants
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 12 inches: fine sand
H2 - 12 to 22 inches: fine sandy loam
H3 - 22 to 68 inches: gravelly clay loam
H4 - 68 to 80 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 6 percent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Available water storage in profile: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Orita, gravelly fine sandy loam

Percent of map unit: 8 percent
Hydric soil rating: No

Carrizo, gravelly sand

Percent of map unit: 7 percent
Hydric soil rating: No

Or—Orita gravelly fine sandy loam

Map Unit Setting

National map unit symbol: hkxd

Elevation: 370 to 500 feet
Mean annual precipitation: 4 inches
Mean annual air temperature: 72 degrees F
Frost-free period: 290 days
Farmland classification: Prime farmland if irrigated and reclaimed of excess salts and sodium

Map Unit Composition

Orita and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Orita

Setting

Landform: Fan remnants
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

H1 - 0 to 4 inches: Error
H2 - 4 to 10 inches: gravelly fine sandy loam
H3 - 10 to 22 inches: gravelly sand
H4 - 22 to 68 inches: gravelly fine sandy loam
H5 - 68 to 80 inches: gravelly clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 6 percent
Salinity, maximum in profile: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Aco, gravelly loamy sand

Percent of map unit: 5 percent
Hydric soil rating: No

Carrizo, gravelly sand

Percent of map unit: 5 percent
Hydric soil rating: No

Orita, gravelly fine sandy loam

Percent of map unit: 5 percent
Hydric soil rating: No

RoA—Rositas fine sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hkxj
Elevation: 220 to 500 feet
Mean annual precipitation: 2 to 4 inches
Mean annual air temperature: 72 degrees F
Frost-free period: 290 to 310 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Rositas and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rositas

Setting

Landform: Sand sheets
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian sands

Typical profile

H1 - 0 to 3 inches: loamy fine sand
H2 - 3 to 60 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)

Available water storage in profile: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Gilman, valley location

Percent of map unit: 3 percent
Hydric soil rating: No

Indio

Percent of map unit: 3 percent
Hydric soil rating: No

Gilman

Percent of map unit: 3 percent
Hydric soil rating: No

Aco

Percent of map unit: 3 percent
Hydric soil rating: No

Carrizo

Percent of map unit: 3 percent
Hydric soil rating: No

RoB—Rositas fine sand, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: hkxk
Elevation: 220 to 500 feet
Mean annual precipitation: 2 to 4 inches
Mean annual air temperature: 72 degrees F
Frost-free period: 290 to 310 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Rositas and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rositas

Setting

Landform: Sand sheets
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Riser
Down-slope shape: Convex

Across-slope shape: Convex
Parent material: Eolian sands

Typical profile

H1 - 0 to 3 inches: fine sand
H2 - 3 to 72 inches: fine sand

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Unnamed, low dunes

Percent of map unit: 8 percent
Hydric soil rating: No

Unnamed, gravelly surface pavement

Percent of map unit: 7 percent
Hydric soil rating: No

RsA—Rositas gravelly loamy sand, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hkxm
Elevation: 220 to 500 feet
Mean annual precipitation: 3 inches
Mean annual air temperature: 72 degrees F
Frost-free period: 290 to 310 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Rositas and similar soils: 85 percent
Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rositas

Setting

Landform: Sand sheets on stream terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian sands over mixed alluvium

Typical profile

H1 - 0 to 10 inches: gravelly loamy sand
H2 - 10 to 72 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Unnamed, steeper slopes

Percent of map unit: 8 percent
Hydric soil rating: No

Aco

Percent of map unit: 7 percent
Hydric soil rating: No

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Appendix C

WETS Analysis

WETS Precipitation Data Summary

Month / Year	Total Precipitation (inches)	Average Precipitation*	30 % Chance Precipitation Will Be < or > Values Below*	Is Precipitation within Normal Range?
January 2013	0.77	0.46	0.03 – 0.51	> Normal
February 2013	0.01	0.55	0.04 – 0.61	< Normal
March 2013	0.03	0.45	0.03 – 0.52	Normal
April 2013	0.00	0.14	0.00 – 0.09	Normal
May 2013	0.00	0.03	0.00 – 0.03	Normal
June 2013	0.00	0.01	NA	Normal
July 2013	0.54	0.32	0.00 – 0.33	> Normal
August 2013	0.66	0.66	0.07 – 0.80	Normal
September 2013	0.57	0.50	0.00 – 0.50	> Normal
October 2013	0.01	0.23	0.00 – 0.19	Normal
November 2013	0.74	0.19	0.00 – 0.16	> Normal
December 2013	0.01	0.48	0.01 – 0.47	Normal
January 2014	0.00	0.46	0.03 – 0.51	< Normal
February 2014	0.07	0.55	0.04 – 0.61	Normal
March 2014	0.04	0.45	0.03 – 0.52	Normal
April 2014	0.00	0.14	0.00 – 0.09	Normal
May 2014	0.01	0.03	0.00 – 0.03	Normal
June 2014	0.00	0.01	NA	Normal
July 2014	0.00	0.32	0.00 – 0.33	Normal
August 2014	0.58	0.66	0.07 – 0.80	Normal
September 2014	0.11	0.50	0.00 – 0.50	Normal
October 2014	0.03	0.23	0.00 – 0.19	Normal
November 2014	0.00	0.19	0.00 – 0.16	Normal
December 2014	0.78	0.48	0.01 – 0.47	> Normal
January 2015	0.57	0.46	0.03 – 0.51	> Normal
February 2015	0.04	0.55	0.04 – 0.61	Normal
March 2015	1.02	0.45	0.03 – 0.52	> Normal
April 2015	0.00	0.14	0.00 -0.09	Normal
May 2015	0.35	0.03	0.00 – 0.03	> Normal
June 2015	0.04	0.01	NA	NA
July 2015	0.23	0.32	0.00 – 0.33	Normal
August 2015	0.00	0.66	0.07 – 0.80	< Normal
September 2015	0.04	0.50	0.00 – 0.50	Normal
October 2015	0.84	0.23	0.00 – 0.19	> Normal
November 2015	0.05	0.19	0.00 – 0.16	Normal
December 2015	0.00	0.48	0.01 – 0.47	< Normal
January 2016	0.56	0.46	0.03 – 0.51	> Normal
February 2016	0.00	0.55	0.04 – 0.61	< Normal
March 2016	0.00	0.45	0.03 – 0.52	< Normal
April 2016	0.14	0.14	0.00 – 0.09	> Normal
May 2016	0.00	0.03	0.00 – 0.03	Normal
June 2016	0.03	0.01	NA	Normal
July 2016	0.24	0.32	0.00 – 0.33	Normal
August 2016	0.14	0.66	0.07 – 0.80	Normal
September 2016	0.13	0.50	0.00 – 0.50	Normal
October 2016	0.14	0.23	0.00 – 0.19	Normal
November 2016 (to 11/14/2016)	0.00	0.19	0.00 – 0.16	Normal

* Data from WETS Station Blythe AP, CA158, reporting years 1970 – 2000.

```
WETS Station : BLYTHE AP, CA158                Creation Date: 10/09/2014
Latitude:  3337      Longitude:  11443        Elevation:  00395
State FIPS/County(FIPS):  06065     County Name: Riverside
Start yr. - 1971   End yr. - 2000
----------------------------------------------------------------------|
          |       Temperature      |          Precipitation              |
          |       (Degrees F.)     |             (Inches)                |
          |----------------------|-------------------------------------|
          |       |       |       |         |   30% chance     |avg |      |
          |       |       |       |         |    will have     |# of| avg  |
          |-------|-------|-------|         |-----------------|days| total|
  Month   |  avg  |  avg  |  avg  |   avg   | less     | more     |w/.1| snow |
          | daily | daily |       |         | than     | than     |  or| fall |
          |  max  |  min  |       |         |          |          |more|      |
----------------------------------------------------------------------|
January   |  66.6 |  41.7 |  54.2 |   0.46 |   0.03 |   0.51 |  1 |  0.0 |
February  |  72.0 |  45.7 |  58.9 |   0.55 |   0.04 |   0.61 |  1 |  0.0 |
March     |  77.6 |  50.2 |  63.9 |   0.45 |   0.03 |   0.52 |  1 |  0.0 |
April     |  85.7 |  56.2 |  71.0 |   0.14 |   0.00 |   0.09 |  1 |  0.0 |
May       |  93.9 |  63.9 |  78.9 |   0.03 |   0.00 |   0.03 |  0 |  0.0 |
June      | 104.1 |  72.6 |  88.4 |   0.01 |     NA |     NA |  0 |  0.0 |
July      | 107.2 |  80.2 |  93.7 |   0.32 |   0.00 |   0.33 |  1 |  0.0 |
August    | 105.4 |  79.5 |  92.5 |   0.66 |   0.07 |   0.80 |  1 |  0.0 |
September |  99.6 |  72.4 |  86.0 |   0.50 |   0.00 |   0.50 |  1 |  0.0 |
October   |  88.0 |  60.0 |  74.0 |   0.23 |   0.00 |   0.19 |  0 |  0.0 |
November  |  74.7 |  47.4 |  61.1 |   0.19 |   0.00 |   0.16 |  0 |  0.0 |
December  |  66.0 |  40.9 |  53.5 |   0.48 |   0.01 |   0.47 |  1 |  0.0 |
----------|-------|-------|-------|--------|--------|--------|----|------|
----------|-------|-------|-------|--------|--------|--------|----|------|
  Annual  | ----- | ----- | ----- | ------ |   2.87 |   4.74 | -- | ---- |
----------|-------|-------|-------|--------|--------|--------|----|------|
  Average |  86.7 |  59.2 |  73.0 | ------ | ------ | ------ | -- | ---- |
----------|-------|-------|-------|--------|--------|--------|----|------|
  Average | ----- | ----- | ----- |   4.02 | ------ | ------ |  9 |  0.0 |
----------|-------|-------|-------|--------|--------|--------|----|------|
----------------------------------------------------------------------|

GROWING SEASON DATES

---------------------------------------------------------------------------
                     |                   Temperature
---------------------|-----------------------------------------------------
      Probability    | 24 F or higher  | 28 F or higher  | 32 F or higher
---------------------|-----------------|-----------------|-----------------
                     |            Beginning and Ending Dates
                     |              Growing Season Length
                     |
       50 percent *  |                 |                 |
                     |                 |                 |
                     |                 |                 |
       70 percent *  |                 |                 |
                     |                 |                 |
                     |                 |                 |
---------------------------------------------------------------------------

 * Percent chance of the growing season occurring between the Beginning
   and Ending dates.

total  1948-2014  prcp
```

```
Station : CA158, BLYTHE AP
-------   Unit = inches

yr  jan   feb   mar   apr   may   jun   jul   aug   sep   oct   nov   dec  annl
------- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- ----- -----
48                                     0.05  0.90  0.49  1.33  0.00  0.24  3.01
49 2.48  0.00  0.01  0.02  0.00  0.00  0.00  0.18  0.00  0.23  0.00  0.07  2.99
50 0.00  0.05  0.00  0.00  0.00  0.00  0.24  0.00  0.02  0.00  0.00  0.00  0.31
51 0.54  0.00  0.00  0.73  0.07  0.00  0.19  5.92  0.00  0.41  0.69  0.13  8.68
52 0.40  0.18  0.59  0.65  0.00  0.91  0.25  0.05  0.10  0.00  0.33  1.42  4.88
53 0.00  0.10  0.10  0.00  0.00  0.00  0.07  0.06  0.00  0.00  0.00  0.26  0.59
54 0.70  0.00  0.76  0.01  0.00  0.00  0.14  0.46  0.20  0.16  0.00  0.00  2.43
55 1.05  0.00  0.00  0.02  0.00  0.00  0.04  1.14  0.00  0.00  0.01  0.00  2.26
56 0.00  0.07  0.00  0.00  0.00  0.00  1.03  0.00  0.01  0.00  0.00  0.00  1.11
57 0.97  0.03  0.00  0.13  0.00  0.00  0.32  0.48  0.00  1.53  0.05  0.13  3.64
58 0.12  1.35  0.60  0.25  0.02  0.00  0.02  0.57  0.01  0.09  0.03  0.00  3.06
59 0.07  0.36  0.00  0.00  0.00  0.01  0.07  1.30  0.07  0.38  0.00  1.95  4.21
60 0.42  0.17  0.21  0.03  0.00  0.00  0.12  0.09  1.03  0.02  0.25  0.00  2.34
61 0.13  0.00  0.00  0.00  0.00  0.00  0.04  0.50  0.00  0.00  0.12  0.75  1.54
62 0.79  0.26  0.09  0.00  0.00  0.00  0.02  0.48  0.00  0.00  0.00  0.57  2.21
63 0.55  0.23  0.20  0.00  0.00  0.00  0.00  1.05  1.03  1.17  0.41  0.00  4.64
64 0.00  0.22  0.33  0.08  0.00  0.00  0.08  0.00  0.00  0.00  0.30  0.12  1.13
65 0.14  0.09  0.23  3.00  0.01  0.00  0.00  0.35  0.00  0.00  0.81  1.44  6.07
66 1.08  0.02  0.15  0.03  0.00  0.00  0.61  0.13  0.18  1.09  0.02  0.19  3.50
67 0.26  0.00  0.22  0.00  0.00  0.00  0.00  1.16  1.04  0.00  0.70  0.87  4.25
68 0.00  0.12  0.25  0.06  0.00  0.00  0.38  0.05  0.00  0.32  0.03  0.11  1.32
69 1.00  0.01  0.03  0.00  0.00  0.00  1.05  0.17  0.60  0.17  0.47  0.05  3.55
70 0.11  0.66  1.11  0.01  0.00  0.00  0.00  0.73  0.00  0.00  0.00  0.03  2.65
71 0.00  0.00  0.00  0.05  0.00  0.00  0.01  1.07  0.97  0.06  0.00  0.08  2.24
72 0.00  0.00  0.00  0.00  0.00  0.10  0.21  0.30  0.01  1.89  0.38  0.03  2.92
73 0.07  0.96  1.12  0.00  0.00  0.00  0.00  0.38  0.00  0.00  0.05  0.00  2.58
74 0.71  0.00  0.19  0.00  0.00  0.00  0.12  0.11  0.00  0.89  0.00  0.70  2.72
75 0.05  0.11  0.07  0.32  0.00  0.00  0.76  0.00  0.56  0.00  0.01  0.04  1.92
76 0.00  1.78  0.00  0.91  0.00  0.00  0.14  0.00  2.14  0.05  0.02  0.18  5.22
77 0.16  0.01  0.12  0.01  0.09  0.01  0.17  1.10  0.70  0.06  0.00  0.40  2.83
78 1.73  1.07  0.22  0.10  0.04  0.00  0.06  0.99  0.00  1.42  0.43  0.89  6.95
79 1.44  0.06  0.81  0.00  0.12  0.00  0.36  2.09  0.52  0.06  0.00  0.18  5.64
80 0.84  1.57  0.65  0.24  0.00  0.00  0.10  0.72  0.18  0.03  0.00  0.02  4.35
81 0.05  0.19  1.01  0.00  0.07  0.04  0.00  1.77  0.03              0.00  3.16
82 0.13  0.26  0.87  0.00  0.12  0.00  0.49  1.25  0.51  0.00  0.28  1.26  5.17
83 0.13  0.37  1.75  0.00  0.00  0.00  0.00  2.07  0.88  0.00  0.03  0.73  5.96
84 0.06  0.00  0.00  0.00  0.02  0.00  2.44  0.11  0.00  0.00  0.10  3.33  6.06
85 0.27  0.29  0.03  0.06  0.00  0.00  0.00  0.00  1.61  0.90  1.84  0.07  5.07
86 0.07  0.40  0.19  0.02  0.00  0.00  0.11  0.05  0.90  0.50  0.69  0.75  3.68
87 0.00  0.03  0.00  0.05  0.00  0.03  1.40  0.00  0.01  0.42  0.71 M0.68  3.33
88 0.42  0.61  0.02  0.98  0.00  0.00  0.00  0.83  0.00  0.07  0.00  0.00  2.93
89 1.08  0.00  0.06  0.00  0.00  0.00  0.32  0.15  0.01  0.00  0.00  0.00  1.62
90 0.14  0.01  0.21  0.00  0.02  0.00  0.22  1.47  0.13  0.06  0.00        2.26
91       0.76  1.24  0.00  0.00  0.00  0.01  0.28  1.52  0.14  0.04  0.31  4.30
92 0.78  1.59  2.15  0.28  0.03  0.00  0.00  1.93  0.00  0.20  0.00  2.20  9.16
93 2.33  2.19  0.17  0.00  0.00  0.00  0.00  0.00  0.00  0.05  0.87  0.01  5.62
94 0.01  0.29  0.68  0.02  0.12  0.00  0.69  0.14  0.00  0.00  0.06  1.23  3.24
95 2.29  0.32  0.49  0.09        0.00  0.05  1.37  0.08  0.00  0.00  0.00  4.69
96 0.10  0.27  0.09  0.00  0.22  0.00  0.00  0.00  0.85  0.01  0.04  0.01  1.59
97 0.47  0.00  0.00  0.06  0.00  0.00  0.61  0.03  2.05  0.01  0.03  1.06  4.32
98 0.28  3.03  1.29  0.01  0.01  0.00  0.05  0.47  0.52  0.04  0.16  0.21  6.07
99 0.00  0.34  0.00  1.00  0.04  0.00  1.20  0.00  0.74  0.00  0.00  0.00  3.32
 0 0.00  0.08  0.38  0.00  0.00  0.01  0.00  1.03  0.00  0.00 M0.00  0.00  1.50
 1 0.81  0.67  1.55  0.01  0.00  0.00  0.00 M0.00  0.00  0.00  0.11  0.03  3.18
 2 0.00  0.00  0.04  0.00  0.00  0.00  0.00  0.00  0.75  0.04  0.03  0.00  0.86
 3 0.11  1.08  0.28  0.08  0.00  0.00  0.06  0.00  0.07  0.00  0.33  0.00  2.01
 4 0.02  0.57  0.81  0.06  0.00  0.00  0.00  0.02  0.12  1.02  0.31  0.57  3.50
 5 1.55  2.83  0.21  0.00  0.00  0.00  0.00  1.35  0.00  0.85  0.00  0.00  6.79
 6 0.00  0.00  0.25  0.00  0.00  0.20  0.15  1.46  1.44  0.04  0.00  0.00  3.54
 7 0.16  0.07  0.53  0.00  0.00  0.00  0.00  0.00  0.06  0.00  1.11  0.00  1.93
 8 0.77  0.02  0.00  0.00  0.18  0.00  0.27  0.15  0.06  0.00  0.24  0.65  2.34
 9 0.02  0.43  0.00  0.00  0.03  0.01  0.07  0.02  0.03  0.00  0.00  0.85  1.46
10 2.12  0.90  0.67  0.01  0.00  0.00  0.00  0.03  0.00  0.26  0.00  0.54  4.53
11 0.00  1.17  0.06  0.00  0.00  0.00  1.64  0.00  0.08  0.12  0.29  0.60  3.96
12 0.00  0.01  0.19  0.14  0.00  0.00  1.88  1.05  0.07  0.27  0.00  0.86  4.47
13 0.77  0.01  0.03  0.00  0.00  0.00  0.54  0.66  0.57  0.02  0.74  0.01  3.35
14 0.00  0.07  0.04  0.00  0.01  0.00 M0.00  0.49  0.11 M0.02              0.74
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Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For January 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	56	32	44	66	41	53	-9	82	1981	24	1976	0.00	0.0	0	21	0
2	61	37	49	66	41	54	-5	80	1981	27	2015	0.00	0.0	0	16	0
3	63	39	51	66	41	54	-3	78	1997	21	1974	0.00	0.0	0	14	0
4	61	33	47	66	41	54	-7	80	1981	23	1950	0.00	0.0	0	18	0
5	62	29	46	66	41	54	-8	79	1981	22	1972	0.00	0.0	0	19	0
6	63	37	50	66	42	54	-4	80	1962	25	1950	0.00	0.0	0	15	0
7	66	39	53	67	42	54	-1	85	1962	24	1971	0.00	0.0	0	12	0
8	74	43	59	67	42	54	5	84	1962	20	1971	0.00	0.0	0	6	0
9	72	45	59	67	42	54	5	80	1962	25	1971	0.00	0.0	0	6	0
10	63	46	55	67	42	54	1	80	1962	26	1971	0.00	0.0	0	10	0
11	54	33	44	67	42	55	-11	80	1986	27	1950	0.00	0.0	0	21	0
12	53	35	44	67	42	55	-11	79	1983	26	1962	0.00	0.0	0	21	0
13	52	25	39	67	42	55	-16	78	1996	25	2013	0.00	0.0	0	26	0
14	48	32	40	68	42	55	-15	80	1983	25	2007	0.00	0.0	0	25	0
15	54	34	44	68	42	55	-11	78	2014*	28	1987	0.00	0.0	0	21	0
16	63	38	51	68	42	55	-4	83	1976	29	1964	0.00	0.0	0	14	0
17	69	38	54	68	42	55	-1	82	2011*	25	2007	0.00	0.0	0	11	0
18	70	41	56	68	43	55	1	85	1971	30	2002	0.00	0.0	0	9	0
19	71	40	56	68	43	55	1	84	1971	29	1990	0.00	0.0	0	9	0
20	73	39	56	68	43	55	1	83	1971	30	2008	0.00	0.0	0	9	0
21	75	41	58	68	43	56	2	80	2009	30	1973	0.00	0.0	0	7	0
22	76	40	58	69	43	56	2	79	1994	31	1987	0.00	0.0	0	7	0
23	73	45	59	69	43	56	3	82	1950	30	1972	0.00	0.0	0	6	0
24	71	56	64	69	43	56	8	82	1951	29	1996	0.00	0.0	0	1	0
25	71	57	64	69	43	56	8	89	1951	31	1972	0.32	0.0	0	1	0
26	64	57	61	69	43	56	5	81	2003	30	2002	0.45	0.0	0	4	0
27	70	51	61	69	43	56	5	79	2003	29	1972	0.00	0.0	0	4	0
28	60	44	52	69	43	56	-4	80	2014*	29	1972	0.00	0.0	0	13	0
29	63	41	52	69	43	56	-4	81	1953	30	1975	0.00	0.0	0	13	0
30	66	40	53	70	43	56	-3	83	2003	26	1949	0.00	0.0	0	12	0
31	70	43	57	70	44	57	0	86	2003	30	1972	0.00	0.0	0	8	0

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For February 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	73	41	57	70	44	57	0	84	2003	28	2002	0.00	0.0	0	8	0
2	75	49	62	70	44	57	5	85	1963	31	1951	0.00	0.0	0	3	0
3	74	56	65	70	44	57	8	84	1963	23	1972	0.00	0.0	0	0	0
4	76	50	63	70	44	57	6	84	1963	26	2011	0.00	0.0	0	2	0
5	75	48	62	70	44	57	5	87	1983	33	1956	0.00	0.0	0	3	0
6	74	51	63	70	44	57	6	88	1963	30	1989	0.00	0.0	0	2	0
7	74	45	60	71	44	57	3	89	1996	31	1989	0.00	0.0	0	5	0
8	65	48	57	71	44	58	-1	88	1963	35	2002	0.00	0.0	0	8	0
9	62	42	52	71	45	58	-6	86	1996	30	1949	0.00	0.0	0	13	0
10	62	37	50	71	45	58	-8	87	1951	32	1986	0.00	0.0	0	15	0
11	62	44	53	71	45	58	-5	90	1957	33	1986	0.00	0.0	0	12	0
12	62	37	50	71	45	58	-8	85	1971	29	1965	0.00	0.0	0	15	0
13	70	36	53	72	45	58	-5	90	1957	31	1972	0.00	0.0	0	12	0
14	77	40	59	72	45	59	0	87	2015	31	1966	0.00	0.0	0	6	0
15	77	51	64	72	46	59	5	86	2014*	26	1990	0.00	0.0	0	1	0
16	79	46	63	72	46	59	4	87	1981	22	1990	0.00	0.0	0	2	0
17	77	41	59	72	46	59	0	88	1981	31	1956	0.00	0.0	0	6	0
18	75	42	59	73	46	59	0	93	1981	35	1967	0.00	0.0	0	6	0
19	67	45	56	73	46	60	-4	90	1981	31	1956	0.00	0.0	0	9	0
20	57	41	49	73	47	60	-11	86	1981	32	1990	0.01	0.0	0	16	0
21	62	35	49	73	47	60	-11	92	1977	32	1953	0.00	0.0	0	16	0
22	65	36	51	73	47	60	-9	88	1982	32	1955	0.00	0.0	0	14	0
23	72	36	54	74	47	60	-6	87	2002	31	1953	0.00	0.0	0	11	0
24	65	44	55	74	47	61	-6	90	1986	34	1996	0.00	0.0	0	10	0
25	67	42	55	74	48	61	-6	93	1986	32	1960	0.00	0.0	0	10	0
26	70	36	53	74	48	61	-8	92	1986	35	1977	0.00	0.0	0	12	0
27	69	48	59	75	48	61	-2	93	1986	30	1996	0.00	0.0	0	6	0
28	76	45	61	75	48	61	0	93	1986	31	1962	0.00	0.0	0	4	0

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locati ons Add to My Locati ons

Units: English | Metric

Table Graph Details

Actual Conditions For March 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	81	48	65	75	48	62	3	90	1986	34	1962	0.00	0.0	0	0	0
2	84	47	66	75	48	62	4	89	2009*	36	1997	0.00	0.0	0	0	1
3	82	51	67	76	49	62	5	90	1986	31	1971	0.00	0.0	0	0	2
4	80	52	66	76	49	62	4	88	1986	31	2002	0.00	0.0	0	0	1
5	80	49	65	76	49	63	2	91	1986	33	2002	0.00	0.0	0	0	0
6	81	51	66	76	49	63	3	92	1986	36	1977	0.00	0.0	0	0	1
7	75	48	62	77	49	63	-1	90	1960	37	1982	0.00	0.0	0	3	0
8	66	52	59	77	49	63	-4	91	1957	35	1969	0.03	0.0	0	6	0
9	71	47	59	77	50	63	-4	92	2004	34	1964	0.00	0.0	0	6	0
10	75	48	62	77	50	64	-2	95	1997	41	2010*	0.00	0.0	0	3	0
11	81	47	64	78	50	64	0	93	1997	38	1969	0.00	0.0	0	1	0
12	87	47	67	78	50	64	3	92	2007*	37	1990	0.00	0.0	0	0	2
13	91	51	71	78	50	64	7	95	2007	30	1956	0.00	0.0	0	0	6
14	95	54	75	78	50	64	11	95	2013	38	1952	0.00	0.0	0	0	10
15	93	55	74	79	50	64	10	94	2004	34	1977	0.00	0.0	0	0	9
16	95	59	77	79	51	65	12	98	2007	36	1963	0.00	0.0	0	0	12
17	90	56	73	79	51	65	8	99	2007	36	2002	0.00	0.0	0	0	8
18	87	56	72	79	51	65	7	94	1997	37	1979	0.00	0.0	0	0	7
19	89	57	73	79	51	65	8	96	1997	39	1977	0.00	0.0	0	0	8
20	88	56	72	80	51	65	7	99	2004	41	2012	0.00	0.0	0	0	7
21	87	63	75	80	51	66	9	100	2004	40	1987	0.00	0.0	0	0	10
22	86	59	73	80	51	66	7	98	2004	39	2006*	0.00	0.0	0	0	8
23	76	58	67	80	51	66	1	95	1956	43	2011*	0.00	0.0	0	0	2
24	81	48	65	81	51	66	-1	95	1956	37	1995	0.00	0.0	0	0	0
25	85	47	66	81	52	66	0	96	1981	41	1964	0.00	0.0	0	0	1
26	90	57	74	81	52	66	8	96	1988	40	1995	0.00	0.0	0	0	9
27	89	58	74	81	52	67	7	100	1986	36	1975	0.00	0.0	0	0	9
28	86	55	71	82	52	67	4	95	1986	40	1972	0.00	0.0	0	0	6
29	88	57	73	82	52	67	6	95	1971	37	1972	0.00	0.0	0	0	8
30	91	68	80	82	52	67	13	100	1971	38	1998	0.00	0.0	0	0	15
31	89	58	74	82	53	67	7	100	2011	38	1972	0.00	0.0	0	0	9

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locati ons Add to My Locati ons

Units: English | Metric

Table Graph Details

Actual Conditions For April 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year:_Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	83	53	68	83	53	68	0	99	2011*	44	2010*	0.00	0.0	0	0	3
2	87	58	73	83	53	68	5	98	1966	40	1975	0.00	0.0	0	0	8
3	92	57	75	83	53	68	7	101	1961	40	1975	0.00	0.0	0	0	10
4	92	59	76	83	53	68	8	106	1961	41	1977	0.00	0.0	0	0	11
5	90	59	75	84	53	69	6	100	1989	42	1983	0.00	0.0	0	0	10
6	91	58	75	84	54	69	6	103	1989	43	2006	0.00	0.0	0	0	10
7	89	63	76	84	54	69	7	105	1989	44	1964	0.00	0.0	0	0	11
8	78	64	71	84	54	69	2	107	1989	42	1999	0.00	0.0	0	0	6
9	79	58	69	85	54	70	-1	102	1989	42	2011	0.00	0.0	0	0	4
10	82	59	71	85	55	70	1	101	1960	38	1975	0.00	0.0	0	0	6
11	91	49	70	85	55	70	0	99	2014*	44	2001	0.00	0.0	0	0	5
12	90	56	73	86	55	70	3	100	1990	44	1967	0.00	0.0	0	0	8
13	95	59	77	86	55	71	6	103	1985	40	1983	0.00	0.0	0	0	12
14	90	61	76	86	56	71	5	104	2002	46	1983	0.00	0.0	0	0	11
15	83	59	71	86	56	71	0	104	1962	46	2012	0.00	0.0	0	0	6
16	76	54	65	87	56	71	-6	104	1984	41	2009	0.00	0.0	0	0	0
17	76	56	66	87	57	72	-6	103	1987	44	1976	0.00	0.0	0	0	1
18	77	56	67	87	57	72	-5	104	1954	41	1963	0.00	0.0	0	0	2
19	85	51	68	88	57	72	-4	106	1980	44	1968	0.00	0.0	0	0	3
20	93	53	73	88	58	73	0	103	1980	46	1995	0.00	0.0	0	0	8
21	96	56	76	88	58	73	3	105	2012	42	1967	0.00	0.0	0	0	11
22	97	62	80	89	58	73	7	106	2012	41	1970	0.00	0.0	0	0	15
23	90	63	77	89	58	74	3	106	1949	44	2010*	0.00	0.0	0	0	12
24	92	56	74	89	59	74	0	105	1996	46	1964	0.00	0.0	0	0	9
25	88	60	74	89	59	74	0	102	1987	46	1989	0.00	0.0	0	0	9
26	93	60	77	90	59	75	2	106	1996	48	1971	0.00	0.0	0	0	12
27	99	61	80	90	60	75	5	106	1987	45	1963	0.00	0.0	0	0	15
28	102	65	84	90	60	75	9	106	1992	44	1970	0.00	0.0	0	0	19
29	106	67	87	91	60	76	11	107	1992	45	1984	0.00	0.0	0	0	22
30	102	69	86	91	61	76	10	105	1992	46	1967	0.00	0.0	0	0	21

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locati ons Add to My Locati ons

Units: English | Metric

Table Graph Details

Actual Conditions For May 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	96	67	82	91	61	76	6	105	1985	49	1990	0.00	0.0	0	0	17
2	91	68	80	92	61	76	4	105	1966	48	1967	0.00	0.0	0	0	15
3	95	61	78	92	62	77	1	103	2014*	50	1991	0.00	0.0	0	0	13
4	98	61	80	92	62	77	3	105	2004	49	1999	0.00	0.0	0	0	15
5	88	66	77	93	62	77	0	105	1997	45	1964	0.00	0.0	0	0	12
6	84	62	73	93	62	78	-5	108	1987	47	1988	0.00	0.0	0	0	8
7	81	60	71	93	63	78	-7	108	1989	46	1988	0.00	0.0	0	0	6
8	84	55	70	93	63	78	-8	109	2001	49	1964	0.00	0.0	0	0	5
9	89	59	74	94	63	79	-5	108	2001	50	1982	0.00	0.0	0	0	9
10	96	66	81	94	64	79	2	109	1960	48	1977	0.00	0.0	0	0	16
11	100	67	84	94	64	79	5	113	1960	50	1982	0.00	0.0	0	0	19
12	103	69	86	95	64	79	7	112	1996	50	1980	0.00	0.0	0	0	21
13	106	69	88	95	64	80	8	108	1996	50	1962	0.00	0.0	0	0	23
14	107	74	91	95	64	80	11	107	2013*	50	1998	0.00	0.0	0	0	26
15	101	63	82	96	65	80	2	107	2012*	53	1962	0.00	0.0	0	0	17
16	102	68	85	96	65	80	5	109	1997	52	1953	0.00	0.0	0	0	20
17	95	67	81	96	65	81	0	110	1997	53	1977	0.00	0.0	0	0	16
18	95	62	79	96	65	81	-2	110	1970	54	1977	0.00	0.0	0	0	14
19	99	66	83	97	66	81	2	113	2008	49	2011	0.00	0.0	0	0	18
20	96	72	84	97	66	81	3	111	2008	51	1949	0.00	0.0	0	0	19
21	101	65	83	97	66	82	1	110	2005	47	1975	0.00	0.0	0	0	18
22	103	71	87	98	66	82	5	113	2000	45	1971	0.00	0.0	0	0	22
23	96	65	81	98	66	82	-1	110	2001	50	1971	0.00	0.0	0	0	16
24	96	61	79	98	67	82	-3	112	2001	51	2010	0.00	0.0	0	0	14
25	97	65	81	99	67	83	-2	113	1951	51	1980	0.00	0.0	0	0	16
26	97	65	81	99	67	83	-2	112	1974	52	1996	0.00	0.0	0	0	16
27	95	68	82	99	67	83	-1	114	1951	50	1962	0.00	0.0	0	0	17
28	97	68	83	99	67	83	0	114	1983	52	1971	0.00	0.0	0	0	18
29	102	73	88	100	68	84	4	114	2000	43	1971	0.00	0.0	0	0	23
30	99	73	86	100	68	84	2	113	1984	56	1988	0.00	0.0	0	0	21
31	101	74	88	100	68	84	4	112	2012*	55	1991	0.00	0.0	0	0	23

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For June 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	109	74	92	101	68	84	8	114	2012	46	1980	0.00	0.0	0	0	27
2	109	74	92	101	68	85	7	112	1960	56	1983	0.00	0.0	0	0	27
3	104	73	89	101	69	85	4	113	1996	55	1971	0.00	0.0	0	0	24
4	104	73	89	102	69	85	4	114	1996	56	1998	0.00	0.0	0	0	24
5	107	72	90	102	69	85	5	116	1957	55	1999	0.00	0.0	0	0	25
6	112	74	93	102	69	86	7	114	2002	59	1993	0.00	0.0	0	0	28
7	114	77	96	102	70	86	10	117	1985	52	1993	0.00	0.0	0	0	31
8	108	84	96	103	70	86	10	118	1955	58	1998	0.00	0.0	0	0	31
9	107	73	90	103	70	87	3	118	1955	57	1995	0.00	0.0	0	0	25
10	110	73	92	103	70	87	5	116	1994	60	1969	0.00	0.0	0	0	27
11	106	77	92	104	71	87	5	114	1956	56	1976	0.00	0.0	0	0	27
12	108	77	93	104	71	87	6	116	1956	62	1998	0.00	0.0	0	0	28
13	108	77	93	104	71	88	5	115	1979	56	1998	0.00	0.0	0	0	28
14	106	78	92	104	72	88	4	117	1966	59	1997	0.00	0.0	0	0	27
15	107	77	92	105	72	88	4	117	2000	54	1962	0.00	0.0	0	0	27
16	107	74	91	105	72	89	2	116	1971	58	1990	0.00	0.0	0	0	26
17	108	73	91	105	73	89	2	116	1981	57	1995	0.00	0.0	0	0	26
18	108	74	91	106	73	89	2	118	1981	60	1995	0.00	0.0	0	0	26
19	104	73	89	106	73	90	-1	117	1961	61	1975	0.00	0.0	0	0	24
20	105	73	89	106	74	90	-1	118	1981	58	1975	0.00	0.0	0	0	24
21	106	74	90	106	74	90	0	116	2008*	64	1975	0.00	0.0	0	0	25
22	107	72	90	106	74	90	0	119	1960	65	2010*	0.00	0.0	0	0	25
23	105	76	91	107	75	91	0	118	1961	63	1998	0.00	0.0	0	0	26
24	102	74	88	107	75	91	-3	118	1994	63	1998	0.00	0.0	0	0	23
25	103	72	88	107	75	91	-3	122	1970	66	1991	0.00	0.0	0	0	23
26	107	79	93	107	76	92	1	122	1990	61	1965	0.00	0.0	0	0	28
27	110	78	94	107	76	92	2	121	1973	62	1996	0.00	0.0	0	0	29
28	120	83	102	108	76	92	10	123	1994	67	1991	0.00	0.0	0	0	37
29	119	90	105	108	77	92	13	121	1994	67	1997	0.00	0.0	0	0	40
30	115	86	101	108	77	92	9	119	1972	68	1997	0.00	0.0	0	0	36

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locati ons Add to My Locati ons

Units: English | Metric

Table Graph Details

Actual Conditions For July 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year:_Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	115	90	103	108	77	93	10	118	1972	62	1982	0.00	0.0	0	0	38
2	112	87	100	108	78	93	7	119	2001	66	1995	0.00	0.0	0	0	35
3	116	89	103	108	78	93	10	119	1985	67	1979	0.00	0.0	0	0	38
4	110	86	98	108	78	93	5	121	1989	67	1956	0.00	0.0	0	0	33
5	104	86	95	108	79	93	2	118	1981	69	1987	0.00	0.0	0	0	30
6	109	82	96	108	79	94	2	117	1965	67	1994	0.00	0.0	0	0	31
7	114	85	100	108	79	94	6	117	1985	70	2005	0.00	0.0	0	0	35
8	115	86	101	109	79	94	7	119	1985	73	1949	0.00	0.0	0	0	36
9	107	86	97	109	80	94	3	118	1958	70	1987	0.00	0.0	0	0	32
10	103	83	93	109	80	94	-1	118	1973	72	1986	0.00	0.0	0	0	28
11	95	75	85	109	80	94	-9	118	1958	69	1974	0.21	0.0	0	0	20
12	104	78	91	109	80	94	-3	118	1985	71	2000	0.00	0.0	0	0	26
13	108	82	95	109	80	94	1	119	2005	66	1962	0.00	0.0	0	0	30
14	111	86	99	109	81	95	4	118	2003	73	2011*	0.00	0.0	0	0	34
15	113	87	100	109	81	95	5	117	2006*	71	2001	0.00	0.0	0	0	35
16	110	86	98	108	81	95	3	119	1960	69	1993	0.00	0.0	0	0	33
17	109	81	95	108	81	95	0	121	2005	64	1983	0.00	0.0	0	0	30
18	112	83	98	108	81	95	3	118	2005	67	1987	0.00	0.0	0	0	33
19	103	87	95	108	81	95	0	119	1961	62	1987	0.00	0.0	0	0	30
20	99	77	88	108	81	95	-7	118	1978	70	1993	0.09	0.0	0	0	23
21	89	76	83	108	81	95	-12	118	2006	69	1973	0.24	0.0	0	0	18
22	100	78	89	108	81	95	-6	120	2006	69	1995	0.00	0.0	0	0	24
23	103	82	93	108	81	95	-2	117	1981	69	1987	0.00	0.0	0	0	28
24	108	85	97	108	81	95	2	117	1980	73	1995	0.00	0.0	0	0	32
25	100	87	94	108	82	95	-1	117	2000	71	1993	0.00	0.0	0	0	29
26	104	87	96	108	82	95	1	118	1995	71	1986	0.00	0.0	0	0	31
27	109	87	98	108	82	95	3	120	1998	72	1993	0.00	0.0	0	0	33
28	110	84	97	108	82	95	2	123	1995	68	1987	0.00	0.0	0	0	32
29	108	76	92	108	82	95	-3	116	1972	64	1987	0.00	0.0	0	0	27
30	108	81	95	108	82	95	0	117	1995	73	1948	0.00	0.0	0	0	30
31	111	80	96	108	81	95	1	120	1972	72	2001	0.00	0.0	0	0	31

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For August 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	111	84	98	108	81	95	3	120	1972	70	1959	0.00	0.0	0	0	33
2	107	77	92	108	81	94	-2	118	1995	70	1976	0.00	0.0	0	0	27
3	108	76	92	107	81	94	-2	118	1998	68	1976	0.00	0.0	0	0	27
4	108	78	93	107	81	94	-1	118	1969	67	1976	0.00	0.0	0	0	28
5	103	78	91	107	81	94	-3	118	2000	70	1976	0.00	0.0	0	0	26
6	106	84	95	107	81	94	1	118	1995	66	1976	0.00	0.0	0	0	30
7	107	80	94	107	81	94	0	117	1980	68	1988	0.00	0.0	0	0	29
8	108	74	91	107	81	94	-3	119	1980	69	1999	0.00	0.0	0	0	26
9	107	73	90	107	81	94	-4	115	1995	68	2009	0.00	0.0	0	0	25
10	104	73	89	107	81	94	-5	116	2003	67	1949	0.00	0.0	0	0	24
11	105	72	89	107	81	94	-5	116	1962	70	1999	0.00	0.0	0	0	24
12	108	71	90	107	81	94	-4	116	1962	69	1949	0.00	0.0	0	0	25
13	107	74	91	107	81	94	-3	119	1960	66	1993	0.00	0.0	0	0	26
14	109	76	93	107	81	94	-1	117	1962	65	1968	0.00	0.0	0	0	28
15	111	86	99	107	80	94	5	115	1962	64	1993	0.00	0.0	0	0	34
16	114	85	100	107	80	94	6	116	1992	67	1980	0.00	0.0	0	0	35
17	113	85	99	107	80	94	5	116	1992	67	1980	0.00	0.0	0	0	34
18	110	88	99	107	80	93	6	115	1992	64	1976	0.00	0.0	0	0	34
19	108	88	98	107	80	93	5	114	1973	66	1976	0.00	0.0	0	0	33
20	112	83	98	107	80	93	5	113	1992	68	1980	0.00	0.0	0	0	33
21	110	85	98	107	80	93	5	116	1969	69	2014	0.00	0.0	0	0	33
22	105	81	93	107	79	93	0	116	1972	68	2014*	0.02	0.0	0	0	28
23	105	81	93	107	79	93	0	116	2011*	64	1968	0.00	0.0	0	0	28
24	100	76	88	106	79	93	-5	119	1985	66	1968	0.30	0.0	0	0	23
25	86	77	82	106	79	93	-11	115	1985	68	1973	0.02	0.0	0	0	17
26	93	72	83	106	79	93	-10	115	2011	66	1951	0.27	0.0	0	0	18
27	101	78	90	106	79	92	-2	115	2005	67	1973	0.00	0.0	0	0	25
28	106	83	95	106	78	92	3	118	1998	65	1973	0.00	0.0	0	0	30
29	99	83	91	106	78	92	-1	118	1948	66	1975	0.05	0.0	0	0	26
30	98	81	90	106	78	92	-2	116	1998	62	1957	0.00	0.0	0	0	25
31	103	83	93	106	78	92	1	119	1950	62	1992	0.00	0.0	0	0	28

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locati ons Add to My Locati ons

Units: English | Metric

Table Graph Details

Actual Conditions For September 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	105	83	94	105	78	91	3	121	1950	64	1966	0.00	0.0	0	0	29
2	108	80	94	105	77	91	3	118	1948	64	2000	0.01	0.0	0	0	29
3	106	78	92	105	77	91	1	118	1948	65	1964	0.00	0.0	0	0	27
4	100	81	91	105	77	91	0	115	1948	61	1985	0.12	0.0	0	0	26
5	109	78	94	105	76	91	3	113	1955	59	1976	0.00	0.0	0	0	29
6	109	79	94	104	76	90	4	114	1955	66	1992	0.01	0.0	0	0	29
7	95	78	87	104	76	90	-3	112	1994	60	1985	0.00	0.0	0	0	22
8	97	76	87	104	75	90	-3	116	1979	65	2010	0.25	0.0	0	0	22
9	100	75	88	104	75	89	-1	114	1993	62	1961	0.18	0.0	0	0	23
10	89	74	82	103	75	89	-7	114	1990	63	2005	0.00	0.0	0	0	17
11	96	73	85	103	74	89	-4	115	1990	61	1985	0.00	0.0	0	0	20
12	100	77	89	103	74	88	1	113	1971	59	1985	0.00	0.0	0	0	24
13	103	77	90	102	74	88	2	112	1971	58	1985	0.00	0.0	0	0	25
14	106	76	91	102	73	88	3	113	1971	60	2005	0.00	0.0	0	0	26
15	108	78	93	102	73	87	6	113	2000	61	2005	0.00	0.0	0	0	28
16	108	79	94	101	73	87	7	110	1962	61	1970	0.00	0.0	0	0	29
17	109	79	94	101	72	87	7	112	1962	61	1977	0.00	0.0	0	0	29
18	101	75	88	101	72	86	2	111	1980	57	1985	0.00	0.0	0	0	23
19	102	68	85	100	71	86	-1	113	1962	56	1985	0.00	0.0	0	0	20
20	103	68	86	100	71	85	1	108	1962	53	1971	0.00	0.0	0	0	21
21	102	73	88	99	70	85	3	108	2009*	59	1986	0.00	0.0	0	0	23
22	89	69	79	99	70	84	-5	110	1966	55	1988	0.00	0.0	0	0	14
23	96	66	81	99	70	84	-3	111	1966	56	2007	0.00	0.0	0	0	16
24	99	63	81	98	69	84	-3	109	2002	54	1986	0.00	0.0	0	0	16
25	98	70	84	98	69	83	1	110	1963	59	1993	0.00	0.0	0	0	19
26	86	64	75	97	68	83	-8	110	2010	53	1971	0.00	0.0	0	0	10
27	86	61	74	97	68	82	-8	110	2010	54	1971	0.00	0.0	0	0	9
28	91	60	76	96	67	82	-6	108	2009	55	1982	0.00	0.0	0	0	11
29	94	56	75	96	67	81	-6	110	1980	56	2013	0.00	0.0	0	0	10
30	96	59	78	96	66	81	-3	109	1980	51	2005	0.00	0.0	0	0	13

M = Missing

Actual Conditions For October 2013

Choose another month / year: Month ▼ Year ▼ GO

Reports from: BLYTHE, CA [BLH]

Choose another location: Postal Code or City GO

(Lat: 33.62 Lon:-114.72)

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	95	62	79	95	66	81	-2	111	1980	53	1971	0.00	0.0	0	0	14
2	94	63	79	95	66	80	-1	111	1980	52	1971	0.00	0.0	0	0	14
3	92	67	80	94	65	80	0	107	1987	49	2002	0.00	0.0	0	0	15
4	85	67	76	94	65	79	-3	107	1987	53	2002	0.00	0.0	0	0	11
5	85	65	75	93	64	79	-4	108	1987	52	2009	0.00	0.0	0	0	10
6	91	58	75	93	64	78	-3	110	1987	49	2009	0.00	0.0	0	0	10
7	89	56	73	93	63	78	-5	108	1987	49	2009	0.00	0.0	0	0	8
8	93	56	75	92	63	78	-3	106	1996	51	2011	0.00	0.0	0	0	10
9	76	59	68	92	63	77	-9	106	1996	46	1949	0.00	0.0	0	0	3
10	75	54	65	91	62	77	-12	107	1991	48	1949	0.01	0.0	0	0	0
11	82	50	66	91	62	76	-10	105	1965	M	M	0.00	0.0	0	0	1
12	84	53	69	91	61	76	-7	105	1999	50	2000	0.00	0.0	0	0	4
13	86	54	70	90	61	76	-6	106	1950	47	1969	0.00	0.0	0	0	5
14	85	60	73	90	61	75	-2	103	1961	50	1994	0.00	0.0	0	0	8
15	86	55	71	89	60	75	-4	103	1950	52	1986	0.00	0.0	0	0	6
16	83	59	71	89	60	74	-3	102	1958	49	1980	0.00	0.0	0	0	6
17	84	50	67	89	59	74	-7	M	M	46	1994	0.00	0.0	0	0	2
18	89	52	71	88	59	74	-3	104	2003	41	1971	0.00	0.0	0	0	6
19	89	51	70	88	59	73	-3	104	2003	41	1971	0.00	0.0	0	0	5
20	89	53	71	87	58	73	-2	103	2003	42	1949	0.00	0.0	0	0	6
21	91	52	72	87	58	73	-1	104	2003	44	1949	0.00	0.0	0	0	7
22	92	53	73	87	58	72	1	104	2003	44	1996	0.00	0.0	0	0	8
23	91	57	74	86	57	72	2	101	2003	39	1996	0.00	0.0	0	0	9
24	89	56	73	86	57	71	2	102	1959	42	1996	0.00	0.0	0	0	8
25	89	54	72	86	57	71	1	98	1965	44	1975	0.00	0.0	0	0	7
26	93	56	75	85	56	71	4	98	1965	41	1971	0.00	0.0	0	0	10
27	91	56	74	85	56	70	4	M	M	45	1971	0.00	0.0	0	0	9
28	79	61	70	84	55	70	0	98	1965	44	1996	0.00	0.0	0	0	5
29	73	50	62	84	55	69	-7	97	1965	33	1971	0.00	0.0	0	3	0
30	75	51	63	84	55	69	-6	95	1966	27	1971	0.00	0.0	0	2	0
31	78	46	62	83	54	69	-7	97	1966	29	1971	0.00	0.0	0	3	0

M = Missing

Actual Conditions For November 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	81	49	65	83	54	68	-3	95	1997	42	1972	0.00	0.0	0	0	0
2	82	49	66	82	53	68	-2	93	1997	38	1971	0.00	0.0	0	0	1
3	83	50	67	82	53	67	0	M	M	40	1979	0.00	0.0	0	0	2
4	78	47	63	81	53	67	-4	M	M	38	1956	0.00	0.0	0	2	0
5	73	52	63	81	52	67	-4	94	1980	43	1994	0.00	0.0	0	2	0
6	77	46	62	80	52	66	-4	94	1988	M	M	0.00	0.0	0	3	0
7	84	50	67	80	52	66	1	M	M	41	1993	0.00	0.0	0	0	2
8	83	46	65	80	51	65	0	92	1991	M	M	0.00	0.0	0	0	0
9	82	49	66	79	51	65	1	89	1995	41	2000	0.00	0.0	0	0	1
10	84	49	67	79	50	64	3	89	1980	M	M	0.00	0.0	0	0	2
11	88	52	70	78	50	64	6	M	M	36	1950	0.00	0.0	0	0	5
12	90	55	73	78	49	64	9	91	1999	32	1950	0.00	0.0	0	0	8
13	88	62	75	77	49	63	12	93	1999	35	1985	0.00	0.0	0	0	10
14	83	52	68	77	49	63	5	91	1999	32	2000	0.00	0.0	0	0	3
15	85	57	71	76	48	62	9	90	1999	39	1994	0.00	0.0	0	0	6
16	74	48	61	76	48	62	-1	88	1995	35	2000	0.00	0.0	0	4	0
17	73	47	60	75	47	61	-1	89	1995	35	1958	0.00	0.0	0	5	0
18	78	50	64	75	47	61	3	M	M	34	1958	0.00	0.0	0	1	0
19	75	49	62	74	47	60	2	M	M	35	1958	0.00	0.0	0	3	0
20	75	53	64	74	46	60	4	87	2006	27	1994	0.00	0.0	0	1	0
21	72	53	63	73	46	60	3	87	1950	33	1994	0.19	0.0	0	2	0
22	58	50	54	73	45	59	-5	88	1950	35	1992	0.52	0.0	0	11	0
23	59	50	55	72	45	59	-4	86	1949	M	M	0.03	0.0	0	10	0
24	64	49	57	72	45	58	-1	87	1995	34	1971	0.00	0.0	0	8	0
25	69	46	58	71	44	58	0	87	1950	32	1952	0.00	0.0	0	7	0
26	71	47	59	71	44	58	1	87	1995	M	M	0.00	0.0	0	6	0
27	71	51	61	71	44	57	4	86	1954	M	M	0.00	0.0	0	4	0
28	71	46	59	70	43	57	2	83	1949	30	1994	0.00	0.0	0	6	0
29	72	46	59	70	43	56	3	83	1953	33	1976	0.00	0.0	0	6	0
30	73	49	61	69	43	56	5	M	M	32	1975	0.00	0.0	0	4	0

M = Missing

Actual Conditions For December 2013

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	74	49	62	69	43	56	6	M	M	33	1952	0.00	0.0	0	3	0
2	68	44	56	69	42	55	1	82	1959	30	1991	0.00	0.0	0	9	0
3	78	45	62	68	42	55	7	83	1958	32	1991	0.00	0.0	0	3	0
4	64	44	54	68	42	55	-1	M	M	M	M	0.00	0.0	0	11	0
5	56	37	47	68	42	55	-8	80	1962	M	M	0.00	0.0	0	18	0
6	57	33	45	67	41	54	-9	81	1966	32	1972	0.00	0.0	0	20	0
7	63	35	49	67	41	54	-5	79	1995	M	M	0.00	0.0	0	16	0
8	55	39	47	67	41	54	-7	78	1996	29	1978	0.00	0.0	0	18	0
9	52	34	43	66	41	54	-11	80	1962	26	1978	0.00	0.0	0	22	0
10	56	32	44	66	41	54	-10	82	1950	25	1971	0.00	0.0	0	21	0
11	62	34	48	66	41	53	-5	81	1958	31	1994	0.00	0.0	0	17	0
12	71	42	57	66	41	53	4	M	M	24	1971	0.00	0.0	0	8	0
13	67	43	55	66	40	53	2	80	1995	30	1985	0.00	0.0	0	10	0
14	69	45	57	66	40	53	4	78	1952	29	2001	0.00	0.0	0	8	0
15	71	43	57	65	40	53	4	81	1977	24	1971	0.00	0.0	0	8	0
16	76	47	62	65	40	53	9	85	1980	26	2005	0.00	0.0	0	3	0
17	72	47	60	65	40	53	7	82	1998	29	2005	0.00	0.0	0	5	0
18	70	49	60	65	40	53	7	77	1950	30	1968	0.00	0.0	0	5	0
19	68	51	60	65	40	53	7	76	1999	25	1968	0.00	0.0	0	5	0
20	67	47	57	65	40	53	4	79	1950	29	2006*	0.01	0.0	0	8	0
21	67	41	54	65	40	53	1	76	1950	29	1968	0.00	0.0	0	11	0
22	67	38	53	65	40	53	0	77	1955	24	1968	0.00	0.0	0	12	0
23	69	43	56	65	40	53	3	82	1955	27	1968	0.00	0.0	0	9	0
24	73	44	59	65	40	53	6	81	2005	30	1968	0.00	0.0	0	6	0
25	73	50	62	65	41	53	9	77	1980	30	1953	0.00	0.0	0	3	0
26	72	42	57	65	41	53	4	79	1980	30	2002	0.00	0.0	0	8	0
27	71	39	55	65	41	53	2	80	1980	25	1987	0.00	0.0	0	10	0
28	64	39	52	65	41	53	-1	80	1980	27	1988	0.00	0.0	0	13	0
29	69	40	55	65	41	53	2	87	1980	28	2003	0.00	0.0	0	10	0
30	67	37	52	66	41	53	-1	83	1980	27	1988	0.00	0.0	0	13	0
31	68	34	51	66	41	53	-2	79	1980	26	1988	0.00	0.0	0	14	0

M = Missing

Actual Conditions For January 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	70	35	53	66	41	53	0	82	1981	24	1976	0.00	0.0	0	12	0
2	73	41	57	66	41	54	3	80	1981	28	1979	0.00	0.0	0	8	0
3	71	39	55	66	41	54	1	78	1997	21	1974	0.00	0.0	0	10	0
4	69	43	56	66	41	54	2	80	1981	23	1950	0.00	0.0	0	9	0
5	69	49	59	66	41	54	5	79	1981	22	1972	0.00	0.0	0	6	0
6	67	40	54	66	42	54	0	80	1962	25	1950	0.00	0.0	0	11	0
7	65	37	51	67	42	54	-3	85	1962	24	1971	0.00	0.0	0	14	0
8	67	38	53	67	42	54	-1	84	1962	20	1971	0.00	0.0	0	12	0
9	68	38	53	67	42	54	-1	80	1962	25	1971	0.00	0.0	0	12	0
10	69	39	54	67	42	54	0	80	1962	26	1971	0.00	0.0	0	11	0
11	71	40	56	67	42	55	1	80	1986	27	1950	0.00	0.0	0	9	0
12	75	44	60	67	42	55	5	79	1983	26	1962	0.00	0.0	0	5	0
13	74	48	61	67	42	55	6	78	1996	M	M	0.00	0.0	0	4	0
14	78	49	64	68	42	55	9	80	1983	M	M	0.00	0.0	0	1	0
15	78	48	63	68	42	55	8	M	M	28	1987	0.00	0.0	0	2	0
16	80	47	64	68	42	55	9	83	1976	29	1964	0.00	0.0	0	1	0
17	79	46	63	68	42	55	8	M	M	M	M	0.00	0.0	0	2	0
18	75	44	60	68	43	55	5	85	1971	30	2002	0.00	0.0	0	5	0
19	71	41	56	68	43	55	1	84	1971	29	1990	0.00	0.0	0	9	0
20	74	38	56	68	43	55	1	83	1971	M	M	0.00	0.0	0	9	0
21	78	43	61	68	43	56	5	M	M	30	1973	0.00	0.0	0	4	0
22	76	48	62	69	43	56	6	79	1994	31	1987	0.00	0.0	0	3	0
23	75	41	58	69	43	56	2	82	1950	30	1972	0.00	0.0	0	7	0
24	72	51	62	69	43	56	6	82	1951	29	1996	0.00	0.0	0	3	0
25	76	52	64	69	43	56	8	89	1951	31	1972	0.00	0.0	0	1	0
26	75	46	61	69	43	56	5	81	2003	30	2002	0.00	0.0	0	4	0
27	78	53	66	69	43	56	10	79	2003	29	1972	0.00	0.0	0	0	1
28	80	44	62	69	43	56	6	M	M	29	1972	0.00	0.0	0	3	0
29	78	47	63	69	43	56	7	81	1953	30	1975	0.00	0.0	0	2	0
30	82	53	68	70	43	56	12	83	2003	26	1949	0.00	0.0	0	0	3
31	71	54	63	70	44	57	6	86	2003	30	1972	0.00	0.0	0	2	0

M = Missing

Actual Conditions For February 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	64	43	54	70	44	57	-3	84	2003	28	2002	0.00	0.0	0	11	0
2	62	37	50	70	44	57	-7	85	1963	31	1951	0.00	0.0	0	15	0
3	65	44	55	70	44	57	-2	84	1963	23	1972	0.00	0.0	0	10	0
4	64	39	52	70	44	57	-5	84	1963	M	M	0.00	0.0	0	13	0
5	68	49	59	70	44	57	2	87	1983	33	1956	0.00	0.0	0	6	0
6	70	46	58	70	44	57	1	88	1963	30	1989	0.00	0.0	0	7	0
7	70	45	58	71	44	57	1	89	1996	31	1989	0.00	0.0	0	7	0
8	74	47	61	71	44	58	3	88	1963	35	2002	0.00	0.0	0	4	0
9	80	46	63	71	45	58	5	86	1996	30	1949	0.00	0.0	0	2	0
10	82	50	66	71	45	58	8	87	1951	32	1986	0.00	0.0	0	0	1
11	80	56	68	71	45	58	10	90	1957	33	1986	0.00	0.0	0	0	3
12	81	49	65	71	45	58	7	85	1971	29	1965	0.00	0.0	0	0	0
13	82	47	65	72	45	58	7	90	1957	31	1972	0.00	0.0	0	0	0
14	84	46	65	72	45	59	6	86	1957	31	1966	0.00	0.0	0	0	0
15	86	47	67	72	46	59	8	M	M	26	1990	0.00	0.0	0	0	2
16	81	53	67	72	46	59	8	87	1981	22	1990	0.00	0.0	0	0	2
17	85	46	66	72	46	59	7	88	1981	31	1956	0.00	0.0	0	0	1
18	84	50	67	73	46	59	8	93	1981	35	1967	0.00	0.0	0	0	2
19	84	50	67	73	46	60	7	90	1981	31	1956	0.00	0.0	0	0	2
20	77	54	66	73	47	60	6	86	1981	32	1990	0.00	0.0	0	0	1
21	77	51	64	73	47	60	4	92	1977	32	1953	0.00	0.0	0	1	0
22	77	45	61	73	47	60	1	88	1982	32	1955	0.00	0.0	0	4	0
23	82	46	64	74	47	60	4	87	2002	31	1953	0.00	0.0	0	1	0
24	81	47	64	74	47	61	3	90	1986	34	1996	0.00	0.0	0	1	0
25	79	48	64	74	48	61	3	93	1986	32	1960	0.00	0.0	0	1	0
26	80	50	65	74	48	61	4	92	1986	35	1977	0.00	0.0	0	0	0
27	82	52	67	75	48	61	6	93	1986	30	1996	0.00	0.0	0	0	2
28	82	61	72	75	48	61	11	93	1986	31	1962	0.07	0.0	0	0	7

M = Missing

Actual Conditions For March 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO
Choose another location: Postal Code or City GO
Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	70	54	62	75	48	62	0	90	1986	34	1962	0.04	0.0	0	3	0
2	71	45	58	75	48	62	-4	M	M	36	1997	0.00	0.0	0	7	0
3	77	48	63	76	49	62	1	90	1986	31	1971	0.00	0.0	0	2	0
4	80	56	68	76	49	62	6	88	1986	31	2002	0.00	0.0	0	0	3
5	83	55	69	76	49	63	6	91	1986	33	2002	0.00	0.0	0	0	4
6	86	59	73	76	49	63	10	92	1986	36	1977	0.00	0.0	0	0	8
7	84	58	71	77	49	63	8	90	1960	37	1982	0.00	0.0	0	0	6
8	82	62	72	77	49	63	9	91	1957	35	1969	0.00	0.0	0	0	7
9	83	55	69	77	50	63	6	92	2004	34	1964	0.00	0.0	0	0	4
10	86	47	67	77	50	64	3	95	1997	M	M	0.00	0.0	0	0	2
11	79	54	67	78	50	64	3	93	1997	38	1969	0.00	0.0	0	0	2
12	79	53	66	78	50	64	2	M	M	37	1990	0.00	0.0	0	0	1
13	81	52	67	78	50	64	3	M	M	30	1956	0.00	0.0	0	0	2
14	86	55	71	78	50	64	7	M	M	38	1952	0.00	0.0	0	0	6
15	88	55	72	79	50	64	8	94	2004	34	1977	0.00	0.0	0	0	7
16	86	59	73	79	51	65	8	M	M	36	1963	0.00	0.0	0	0	8
17	93	51	72	79	51	65	7	M	M	36	2002	0.00	0.0	0	0	7
18	77	56	67	79	51	65	2	94	1997	37	1979	0.00	0.0	0	0	2
19	81	50	66	79	51	65	1	96	1997	39	1977	0.00	0.0	0	0	1
20	81	46	64	80	51	65	-1	99	2004	M	M	0.00	0.0	0	1	0
21	86	47	67	80	51	66	1	100	2004	40	1987	0.00	0.0	0	0	2
22	84	52	68	80	51	66	2	98	2004	39	2006*	0.00	0.0	0	0	3
23	86	53	70	80	51	66	4	95	1956	M	M	0.00	0.0	0	0	5
24	91	54	73	81	51	66	7	95	1956	37	1995	0.00	0.0	0	0	8
25	91	54	73	81	52	66	7	96	1981	41	1964	0.00	0.0	0	0	8
26	79	59	69	81	52	66	3	96	1988	40	1995	0.00	0.0	0	0	4
27	76	49	63	81	52	67	-4	100	1986	36	1975	0.00	0.0	0	2	0
28	82	50	66	82	52	67	-1	95	1986	40	1972	0.00	0.0	0	0	1
29	88	51	70	82	52	67	3	95	1971	37	1972	0.00	0.0	0	0	5
30	83	60	72	82	52	67	5	100	1971	38	1998	0.00	0.0	0	0	7
31	84	52	68	82	53	67	1	M	M	38	1972	0.00	0.0	0	0	3

M = Missing

Actual Conditions For April 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	77	54	66	83	53	68	-2	M	M	M	M	0.00	0.0	0	0	1
2	71	50	61	83	53	68	-7	98	1966	40	1975	0.00	0.0	0	4	0
3	76	48	62	83	53	68	-6	101	1961	40	1975	0.00	0.0	0	3	0
4	81	46	64	83	53	68	-4	106	1961	41	1977	0.00	0.0	0	1	0
5	79	51	65	84	53	69	-4	100	1989	42	1983	0.00	0.0	0	0	0
6	86	58	72	84	54	69	3	103	1989	43	2006	0.00	0.0	0	0	7
7	90	53	72	84	54	69	3	105	1989	44	1964	0.00	0.0	0	0	7
8	95	56	76	84	54	69	7	107	1989	42	1999	0.00	0.0	0	0	11
9	98	59	79	85	54	70	9	102	1989	M	M	0.00	0.0	0	0	14
10	99	62	81	85	55	70	11	101	1960	38	1975	0.00	0.0	0	0	16
11	99	67	83	85	55	70	13	M	M	44	2001	0.00	0.0	0	0	18
12	91	58	75	86	55	70	5	100	1990	44	1967	0.00	0.0	0	0	10
13	92	58	75	86	55	71	4	103	1985	40	1983	0.00	0.0	0	0	10
14	87	63	75	86	56	71	4	104	2002	46	1983	0.00	0.0	0	0	10
15	91	54	73	86	56	71	2	104	1962	M	M	0.00	0.0	0	0	8
16	95	61	78	87	56	71	7	104	1984	M	M	0.00	0.0	0	0	13
17	92	60	76	87	57	72	4	103	1987	44	1976	0.00	0.0	0	0	11
18	85	65	75	87	57	72	3	104	1954	41	1963	0.00	0.0	0	0	10
19	89	66	78	88	57	72	6	106	1980	44	1968	0.00	0.0	0	0	13
20	94	67	81	88	58	73	8	103	1980	46	1995	0.00	0.0	0	0	16
21	99	65	82	88	58	73	9	M	M	42	1967	0.00	0.0	0	0	17
22	93	65	79	89	58	73	6	M	M	41	1970	0.00	0.0	0	0	14
23	88	58	73	89	58	74	-1	106	1949	M	M	0.00	0.0	0	0	8
24	91	58	75	89	59	74	1	105	1996	46	1964	0.00	0.0	0	0	10
25	91	65	78	89	59	74	4	102	1987	46	1989	0.00	0.0	0	0	13
26	77	58	68	90	59	75	-7	106	1996	48	1971	0.00	0.0	0	0	3
27	83	50	67	90	60	75	-8	106	1987	45	1963	0.00	0.0	0	0	2
28	90	56	73	90	60	75	-2	106	1992	44	1970	0.00	0.0	0	0	8
29	87	70	79	91	60	76	3	107	1992	45	1984	0.00	0.0	0	0	14
30	88	68	78	91	61	76	2	105	1992	46	1967	0.00	0.0	0	0	13

M = Missing

Choose another month / year:_Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Actual Conditions For May 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	93	66	80	91	61	76	4	105	1985	49	1990	0.00	0.0	0	0	15
2	99	60	80	92	61	76	4	105	1966	48	1967	0.00	0.0	0	0	15
3	103	63	83	92	62	77	6	M	M	50	1991	0.00	0.0	0	0	18
4	103	66	85	92	62	77	8	105	2004	49	1999	0.00	0.0	0	0	20
5	98	65	82	93	62	77	5	105	1997	45	1964	0.00	0.0	0	0	17
6	80	61	71	93	62	78	-7	108	1987	47	1988	0.00	0.0	0	0	6
7	84	52	68	93	63	78	-10	108	1989	46	1988	0.00	0.0	0	0	3
8	87	57	72	93	63	78	-6	109	2001	49	1964	0.00	0.0	0	0	7
9	93	61	77	94	63	79	-2	108	2001	50	1982	0.00	0.0	0	0	12
10	94	63	79	94	64	79	0	109	1960	48	1977	0.00	0.0	0	0	14
11	83	65	74	94	64	79	-5	113	1960	50	1982	0.00	0.0	0	0	9
12	91	60	76	95	64	79	-3	112	1996	50	1980	0.00	0.0	0	0	11
13	92	70	81	95	64	80	1	108	1996	50	1962	0.00	0.0	0	0	16
14	95	69	82	95	64	80	2	M	M	50	1998	0.00	0.0	0	0	17
15	101	62	82	96	65	80	2	M	M	53	1962	0.00	0.0	0	0	17
16	106	66	86	96	65	80	6	109	1997	52	1953	0.00	0.0	0	0	21
17	107	70	89	96	65	81	8	110	1997	53	1977	0.00	0.0	0	0	24
18	104	71	88	96	65	81	7	110	1970	54	1977	0.00	0.0	0	0	23
19	98	69	84	97	66	81	3	M	M	M	M	0.00	0.0	0	0	19
20	89	63	76	97	66	81	-5	M	M	51	1949	0.00	0.0	0	0	11
21	86	54	70	97	66	82	-12	110	2005	47	1975	0.00	0.0	0	0	5
22	88	63	76	98	66	82	-6	113	2000	45	1971	0.00	0.0	0	0	11
23	91	67	79	98	66	82	-3	110	2001	50	1971	0.01	0.0	0	0	14
24	94	63	79	98	67	82	-3	112	2001	M	M	0.00	0.0	0	0	14
25	100	68	84	99	67	83	1	113	1951	51	1980	0.00	0.0	0	0	19
26	106	73	90	99	67	83	7	112	1974	52	1996	0.00	0.0	0	0	25
27	107	74	91	99	67	83	8	114	1951	50	1962	0.00	0.0	0	0	26
28	107	74	91	99	67	83	8	114	1983	52	1971	0.00	0.0	0	0	26
29	104	74	89	100	68	84	5	114	2000	43	1971	0.00	0.0	0	0	24
30	106	72	89	100	68	84	5	113	1984	56	1988	0.00	0.0	0	0	24
31	108	75	92	100	68	84	8	M	M	55	1991	0.00	0.0	0	0	27

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locati ons Add to My Locati ons

Units: English | Metric

Table Graph Details

Actual Conditions For June 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year:_Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	103	74	89	101	68	84	5	114	2012	46	1980	0.00	0.0	0	0	24
2	110	71	91	101	68	85	6	112	1960	56	1983	0.00	0.0	0	0	26
3	102	70	86	101	69	85	1	113	1996	55	1971	0.00	0.0	0	0	21
4	105	72	89	102	69	85	4	114	1996	56	1998	0.00	0.0	0	0	24
5	106	68	87	102	69	85	2	116	1957	55	1999	0.00	0.0	0	0	22
6	108	68	88	102	69	86	2	114	2002	59	1993	0.00	0.0	0	0	23
7	103	69	86	102	70	86	0	117	1985	52	1993	0.00	0.0	0	0	21
8	108	72	90	103	70	86	4	118	1955	58	1998	0.00	0.0	0	0	25
9	110	75	93	103	70	87	6	118	1955	57	1995	0.00	0.0	0	0	28
10	105	82	94	103	70	87	7	116	1994	60	1969	0.00	0.0	0	0	29
11	107	74	91	104	71	87	4	114	1956	56	1976	0.00	0.0	0	0	26
12	109	73	91	104	71	87	4	116	1956	62	1998	0.00	0.0	0	0	26
13	109	75	92	104	71	88	4	115	1979	56	1998	0.00	0.0	0	0	27
14	102	70	86	104	72	88	-2	117	1966	59	1997	0.00	0.0	0	0	21
15	103	71	87	105	72	88	-1	117	2000	54	1962	0.00	0.0	0	0	22
16	105	74	90	105	72	89	1	116	1971	58	1990	0.00	0.0	0	0	25
17	102	76	89	105	73	89	0	116	1981	57	1995	0.00	0.0	0	0	24
18	98	68	83	106	73	89	-6	118	1981	60	1995	0.00	0.0	0	0	18
19	104	70	87	106	73	90	-3	117	1961	61	1975	0.00	0.0	0	0	22
20	109	73	91	106	74	90	1	118	1981	58	1975	0.00	0.0	0	0	26
21	109	79	94	106	74	90	4	116	2008*	64	1975	0.00	0.0	0	0	29
22	108	77	93	106	74	90	3	119	1960	65	2010*	0.00	0.0	0	0	28
23	106	70	88	107	75	91	-3	118	1961	63	1998	0.00	0.0	0	0	23
24	107	77	92	107	75	91	1	118	1994	63	1998	0.00	0.0	0	0	27
25	107	73	90	107	75	91	-1	122	1970	66	1991	0.00	0.0	0	0	25
26	106	79	93	107	76	92	1	122	1990	61	1965	0.00	0.0	0	0	28
27	103	74	89	107	76	92	-3	121	1973	62	1996	0.00	0.0	0	0	24
28	106	76	91	108	76	92	-1	123	1994	67	1991	0.00	0.0	0	0	26
29	107	81	94	108	77	92	2	121	1994	67	1997	0.00	0.0	0	0	29
30	109	81	95	108	77	92	3	119	1972	68	1997	0.00	0.0	0	0	30

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locati ons Add to My Locati ons

Units: English | Metric

Table Graph Details

Actual Conditions For July 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	109	85	97	108	77	93	4	118	1972	62	1982	0.00	0.0	0	0	32
2	108	81	95	108	78	93	2	119	2001	66	1995	0.00	0.0	0	0	30
3	108	86	97	108	78	93	4	119	1985	67	1979	0.00	0.0	0	0	32
4	103	86	95	108	78	93	2	121	1989	67	1956	0.00	0.0	0	0	30
5	106	86	96	108	79	93	3	118	1981	69	1987	0.00	0.0	0	0	31
6	109	83	96	108	79	94	2	117	1965	67	1994	0.00	0.0	0	0	31
7	111	82	97	108	79	94	3	117	1985	70	2005	0.00	0.0	0	0	32
8	110	87	99	109	79	94	5	119	1985	73	1949	0.00	0.0	0	0	34
9	103	84	94	109	80	94	0	118	1958	70	1987	0.00	0.0	0	0	29
10	109	84	97	109	80	94	3	118	1973	72	1986	0.00	0.0	0	0	32
11	107	78	93	109	80	94	-1	118	1958	69	1974	0.00	0.0	0	0	28
12	109	77	93	109	80	94	-1	118	1985	71	2000	0.00	0.0	0	0	28
13	112	86	99	109	80	94	5	119	2005	66	1962	0.00	0.0	0	0	34
14	104	86	95	109	81	95	0	118	2003	73	2011*	0.00	0.0	0	0	30
15	106	80	93	109	81	95	-2	117	2006*	71	2001	0.00	0.0	0	0	28
16	110	82	96	108	81	95	1	119	1960	69	1993	0.00	0.0	0	0	31
17	108	77	93	108	81	95	-2	121	2005	64	1983	0.00	0.0	0	0	28
18	105	80	93	108	81	95	-2	118	2005	67	1987	0.00	0.0	0	0	28
19	106	82	94	108	81	95	-1	119	1961	62	1987	0.00	0.0	0	0	29
20	105	77	91	108	81	95	-4	118	1978	70	1993	0.00	0.0	0	0	26
21	109	75	92	108	81	95	-3	118	2006	69	1973	0.00	0.0	0	0	27
22	112	75	94	108	81	95	-1	120	2006	69	1995	0.00	0.0	0	0	29
23	116	86	101	108	81	95	6	117	1981	69	1987	0.00	0.0	0	0	36
24	116	87	102	108	81	95	7	117	1980	73	1995	0.00	0.0	0	0	37
25	111	91	101	108	82	95	6	117	2000	71	1993	0.00	0.0	0	0	36
26	109	89	99	108	82	95	4	118	1995	71	1986	0.00	0.0	0	0	34
27	101	84	93	108	82	95	-2	120	1998	72	1993	0.00	0.0	0	0	28
28	108	84	96	108	82	95	1	123	1995	68	1987	0.00	0.0	0	0	31
29	109	84	97	108	82	95	2	116	1972	64	1987	0.00	0.0	0	0	32
30	113	87	100	108	82	95	5	117	1995	73	1948	0.00	0.0	0	0	35
31	114	89	102	108	81	95	7	120	1972	72	2001	0.00	0.0	0	0	37

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For August 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	110	87	99	108	81	95	4	120	1972	70	1959	0.00	0.0	0	0	34
2	96	79	88	108	81	94	-6	118	1995	70	1976	0.00	0.0	0	0	23
3	98	76	87	107	81	94	-7	118	1998	68	1976	0.00	0.0	0	0	22
4	97	71	84	107	81	94	-10	118	1969	67	1976	0.00	0.0	0	0	19
5	107	71	89	107	81	94	-5	118	2000	70	1976	0.00	0.0	0	0	24
6	106	75	91	107	81	94	-3	118	1995	66	1976	0.00	0.0	0	0	26
7	105	72	89	107	81	94	-5	117	1980	68	1988	0.00	0.0	0	0	24
8	104	74	89	107	81	94	-5	119	1980	69	1999	0.00	0.0	0	0	24
9	105	78	92	107	81	94	-2	115	1995	68	2009	0.00	0.0	0	0	27
10	107	83	95	107	81	94	1	116	2003	67	1949	0.00	0.0	0	0	30
11	109	86	98	107	81	94	4	116	1962	70	1999	0.00	0.0	0	0	33
12	101	82	92	107	81	94	-2	116	1962	69	1949	0.02	0.0	0	0	27
13	99	75	87	107	81	94	-7	119	1960	66	1993	0.06	0.0	0	0	22
14	105	83	94	107	81	94	0	117	1962	65	1968	0.00	0.0	0	0	29
15	107	82	95	107	80	94	1	115	1962	64	1993	0.00	0.0	0	0	30
16	108	85	97	107	80	94	3	116	1992	67	1980	0.00	0.0	0	0	32
17	111	88	100	107	80	94	6	116	1992	67	1980	0.00	0.0	0	0	35
18	98	82	90	107	80	93	-3	115	1992	64	1976	0.03	0.0	0	0	25
19	106	82	94	107	80	93	1	114	1973	66	1976	0.00	0.0	0	0	29
20	101	80	91	107	80	93	-2	113	1992	68	1980	0.15	0.0	0	0	26
21	99	69	84	107	80	93	-9	116	1969	69	2014	0.32	0.0	0	0	19
22	92	68	80	107	79	93	-13	116	1972	68	2014*	0.00	0.0	0	0	15
23	100	74	87	107	79	93	-6	116	2011*	64	1968	0.00	0.0	0	0	22
24	103	72	88	106	79	93	-5	119	1985	66	1968	0.00	0.0	0	0	23
25	104	81	93	106	79	93	0	115	1985	68	1973	0.00	0.0	0	0	28
26	103	83	93	106	79	93	0	115	2011	66	1951	0.00	0.0	0	0	28
27	104	79	92	106	79	92	0	115	2005	67	1973	0.00	0.0	0	0	27
28	109	79	94	106	78	92	2	118	1998	65	1973	0.00	0.0	0	0	29
29	111	76	94	106	78	92	2	118	1948	66	1975	0.00	0.0	0	0	29
30	112	76	94	106	78	92	2	116	1998	62	1957	0.00	0.0	0	0	29
31	111	80	96	106	78	92	4	119	1950	62	1992	0.00	0.0	0	0	31

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For September 2014

Choose another month / year: Month ▼ Year ▼ GO

Reports from: BLYTHE, CA [BLH]

Choose another location: Postal Code or City GO

(Lat: 33.62 Lon:-114.72)

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	108	80	94	105	78	91	3	121	1950	64	1966	0.00	0.0	0	0	29
2	110	77	94	105	77	91	3	118	1948	64	2000	0.00	0.0	0	0	29
3	109	77	93	105	77	91	2	118	1948	65	1964	0.00	0.0	0	0	28
4	107	80	94	105	77	91	3	115	1948	61	1985	0.00	0.0	0	0	29
5	102	83	93	105	76	91	2	113	1955	59	1976	0.00	0.0	0	0	28
6	103	83	93	104	76	90	3	114	1955	66	1992	0.00	0.0	0	0	28
7	100	83	92	104	76	90	2	112	1994	60	1985	0.00	0.0	0	0	27
8	98	79	89	104	75	90	-1	116	1979	65	2010	0.01	0.0	0	0	24
9	91	76	84	104	75	89	-5	114	1993	62	1961	0.03	0.0	0	0	19
10	100	77	89	103	75	89	0	114	1990	63	2005	0.00	0.0	0	0	24
11	104	75	90	103	74	89	1	115	1990	61	1985	0.00	0.0	0	0	25
12	107	74	91	103	74	88	3	113	1971	59	1985	0.00	0.0	0	0	26
13	107	75	91	102	74	88	3	112	1971	58	1985	0.00	0.0	0	0	26
14	107	83	95	102	73	88	7	113	1971	60	2005	0.00	0.0	0	0	30
15	110	83	97	102	73	87	10	113	2000	61	2005	0.00	0.0	0	0	32
16	101	80	91	101	73	87	4	110	1962	61	1970	0.02	0.0	0	0	26
17	98	80	89	101	72	87	2	112	1962	61	1977	0.00	0.0	0	0	24
18	103	80	92	101	72	86	6	111	1980	57	1985	0.00	0.0	0	0	27
19	99	74	87	100	71	86	1	113	1962	56	1985	0.00	0.0	0	0	22
20	102	77	90	100	71	85	5	108	1962	53	1971	0.00	0.0	0	0	25
21	101	75	88	99	70	85	3	108	2009*	59	1986	0.00	0.0	0	0	23
22	101	71	86	99	70	84	2	110	1966	55	1988	0.00	0.0	0	0	21
23	104	73	89	99	70	84	5	111	1966	56	2007	0.00	0.0	0	0	24
24	105	74	90	98	69	84	6	109	2002	54	1986	0.00	0.0	0	0	25
25	105	75	90	98	69	83	7	110	1963	59	1993	0.00	0.0	0	0	25
26	99	83	91	97	68	83	8	110	2010	53	1971	0.05	0.0	0	0	26
27	93	70	82	97	68	82	0	110	2010	54	1971	0.00	0.0	0	0	17
28	87	64	76	96	67	82	-6	108	2009	55	1982	0.00	0.0	0	0	11
29	90	63	77	96	67	81	-4	110	1980	56	2013	0.00	0.0	0	0	12
30	93	63	78	96	66	81	-3	109	1980	51	2005	0.00	0.0	0	0	13

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For October 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	95	65	80	95	66	81	-1	111	1980	53	1971	0.00	0.0	0	0	15
2	93	68	81	95	66	80	1	111	1980	52	1971	0.00	0.0	0	0	16
3	98	64	81	94	65	80	1	107	1987	49	2002	0.00	0.0	0	0	16
4	101	64	83	94	65	79	4	107	1987	53	2002	0.00	0.0	0	0	18
5	100	65	83	93	64	79	4	108	1987	52	2009	0.00	0.0	0	0	18
6	94	64	79	93	64	78	1	110	1987	49	2009	0.00	0.0	0	0	14
7	87	74	81	93	63	78	3	108	1987	49	2009	0.00	0.0	0	0	16
8	79	68	74	92	63	78	-4	106	1996	51	2011	0.02	0.0	0	0	9
9	92	67	80	92	63	77	3	106	1996	46	1949	0.01	0.0	0	0	15
10	93	66	80	91	62	77	3	107	1991	48	1949	0.00	0.0	0	0	15
11	96	68	82	91	62	76	6	105	1965	50	2013	0.00	0.0	0	0	17
12	99	64	82	91	61	76	6	105	1999	50	2000	0.00	0.0	0	0	17
13	92	64	78	90	61	76	2	106	1950	47	1969	0.00	0.0	0	0	13
14	93	57	75	90	61	75	0	103	1961	50	1994	0.00	0.0	0	0	10
15	91	61	76	89	60	75	1	103	1950	52	1986	0.00	0.0	0	0	11
16	89	61	75	89	60	74	1	102	1958	49	1980	0.00	0.0	0	0	10
17	92	69	81	89	59	74	7	101	2011*	46	1994	0.00	0.0	0	0	16
18	93	66	80	88	59	74	6	104	2003	41	1971	0.00	0.0	0	0	15
19	94	64	79	88	59	73	6	104	2003	41	1971	0.00	0.0	0	0	14
20	92	65	79	87	58	73	6	103	2003	42	1949	0.00	0.0	0	0	14
21	92	67	80	87	58	73	7	104	2003	44	1949	0.00	0.0	0	0	15
22	94	64	79	87	58	72	7	104	2003	44	1996	0.00	0.0	0	0	14
23	95	64	80	86	57	72	8	101	2003	39	1996	0.00	0.0	0	0	15
24	95	64	80	86	57	71	9	102	1959	42	1996	0.00	0.0	0	0	15
25	96	66	81	86	57	71	10	98	1965	44	1975	0.00	0.0	0	0	16
26	88	66	77	85	56	71	6	98	1965	41	1971	0.00	0.0	0	0	12
27	87	62	75	85	56	70	5	99	2008	45	1971	0.00	0.0	0	0	10
28	89	55	72	84	55	70	2	98	1965	44	1996	0.00	0.0	0	0	7
29	91	55	73	84	55	69	4	97	1965	33	1971	0.00	0.0	0	0	8
30	91	58	75	84	55	69	6	95	1966	27	1971	0.00	0.0	0	0	10
31	89	59	74	83	54	69	5	97	1966	29	1971	0.00	0.0	0	0	9

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locati ons Add to My Locati ons

Units: English | Metric

Table Graph Details

Actual Conditions For November 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	78	60	69	83	54	68	1	95	1997	42	1972	0.00	0.0	0	0	4
2	74	52	63	82	53	68	-5	93	1997	38	1971	0.00	0.0	0	2	0
3	75	53	64	82	53	67	-3	95	2010	40	1979	0.00	0.0	0	1	0
4	78	60	69	81	53	67	2	94	2010*	38	1956	0.00	0.0	0	0	4
5	84	54	69	81	52	67	2	94	1980	43	1994	0.00	0.0	0	0	4
6	87	51	69	80	52	66	3	94	1988	42	2011	0.00	0.0	0	0	4
7	86	53	70	80	52	66	4	92	2007	41	1993	0.00	0.0	0	0	5
8	89	54	72	80	51	65	7	92	1991	40	2011	0.00	0.0	0	0	7
9	88	54	71	79	51	65	6	89	1995	41	2000	0.00	0.0	0	0	6
10	88	53	71	79	50	64	7	89	1980	39	2010	0.00	0.0	0	0	6
11	83	54	69	78	50	64	5	88	2013*	36	1950	0.00	0.0	0	0	4
12	79	54	67	78	49	64	3	91	1999	32	1950	0.00	0.0	0	0	2
13	78	52	65	77	49	63	2	93	1999	35	1985	0.00	0.0	0	0	0
14	77	55	66	77	49	63	3	91	1999	32	2000	0.00	0.0	0	0	1
15	81	50	66	76	48	62	4	90	1999	39	1994	0.00	0.0	0	0	1
16	67	53	60	76	48	62	-2	88	1995	35	2000	0.00	0.0	0	5	0
17	70	43	57	75	47	61	-4	89	1995	35	1958	0.00	0.0	0	8	0
18	71	44	58	75	47	61	-3	87	2008*	34	1958	0.00	0.0	0	7	0
19	73	41	57	74	47	60	-3	87	2008*	35	1958	0.00	0.0	0	8	0
20	74	43	59	74	46	60	-1	87	2006	27	1994	0.00	0.0	0	6	0
21	75	51	63	73	46	60	3	87	1950	33	1994	0.00	0.0	0	2	0
22	76	44	60	73	45	59	1	88	1950	35	1992	0.00	0.0	0	5	0
23	74	53	64	72	45	59	5	86	1949	35	2010	0.00	0.0	0	1	0
24	74	45	60	72	45	58	2	87	1995	34	1971	0.00	0.0	0	5	0
25	71	43	57	71	44	58	-1	87	1950	32	1952	0.00	0.0	0	8	0
26	76	44	60	71	44	58	2	87	1995	34	2010	0.00	0.0	0	5	0
27	80	47	64	71	44	57	7	86	1954	26	2010	0.00	0.0	0	1	0
28	78	45	62	70	43	57	5	83	1949	30	1994	0.00	0.0	0	3	0
29	77	43	60	70	43	56	4	83	1953	33	1976	0.00	0.0	0	5	0
30	77	49	63	69	43	56	7	82	2008	32	1975	0.00	0.0	0	2	0

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For December 2014

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	72	47	60	69	43	56	4	82	2008*	33	1952	0.00	0.0	0	5	0
2	67	57	62	69	42	55	7	82	1959	30	1991	0.00	0.0	0	3	0
3	64	57	61	68	42	55	6	83	1958	32	1991	0.08	0.0	0	4	0
4	73	54	64	68	42	55	9	80	2012*	35	2009*	0.00	0.0	0	1	0
5	73	52	63	68	42	55	8	80	1962	31	2009	0.00	0.0	0	2	0
6	76	58	67	67	41	54	13	81	1966	32	1972	0.00	0.0	0	0	2
7	78	51	65	67	41	54	11	79	1995	29	2011*	0.00	0.0	0	0	0
8	76	54	65	67	41	54	11	78	1996	29	1978	0.00	0.0	0	0	0
9	77	52	65	66	41	54	11	80	1962	26	1978	0.00	0.0	0	0	0
10	78	46	62	66	41	54	8	82	1950	25	1971	0.00	0.0	0	3	0
11	72	50	61	66	41	53	8	81	1958	31	1994	0.00	0.0	0	4	0
12	70	46	58	66	41	53	5	82	2010*	24	1971	0.03	0.0	0	7	0
13	66	43	55	66	40	53	2	80	1995	30	1985	0.00	0.0	0	10	0
14	65	39	52	66	40	53	-1	78	1952	29	2001	0.00	0.0	0	13	0
15	64	40	52	65	40	53	-1	81	1977	24	1971	0.00	0.0	0	13	0
16	61	40	51	65	40	53	-2	85	1980	26	2005	0.28	0.0	0	14	0
17	60	47	54	65	40	53	1	82	1998	29	2005	0.39	0.0	0	11	0
18	63	49	56	65	40	53	3	77	1950	30	1968	0.00	0.0	0	9	0
19	63	43	53	65	40	53	0	76	1999	25	1968	0.00	0.0	0	12	0
20	61	42	52	65	40	53	-1	79	1950	29	2006*	0.00	0.0	0	13	0
21	62	46	54	65	40	53	1	76	1950	29	1968	0.00	0.0	0	11	0
22	71	45	58	65	40	53	5	77	1955	24	1968	0.00	0.0	0	7	0
23	73	56	65	65	40	53	12	82	1955	27	1968	0.00	0.0	0	0	0
24	65	42	54	65	40	53	1	81	2005	30	1968	0.00	0.0	0	11	0
25	65	44	55	65	41	53	2	77	1980	30	1953	0.00	0.0	0	10	0
26	59	40	50	65	41	53	-3	79	1980	30	2002	0.00	0.0	0	15	0
27	59	40	50	65	41	53	-3	80	1980	25	1987	0.00	0.0	0	15	0
28	56	31	44	65	41	53	-9	80	1980	27	1988	0.00	0.0	0	21	0
29	58	29	44	65	41	53	-9	87	1980	28	2003	0.00	0.0	0	21	0
30	60	31	46	66	41	53	-7	83	1980	27	1988	0.00	0.0	0	19	0
31	50	35	43	66	41	53	-10	79	1980	26	1988	0.00	0.0	0	22	0

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For January 2015

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	51	27	39	66	41	53	-14	82	1981	24	1976	0.00	0.0	0	26	0
2	57	27	42	66	41	54	-12	80	1981	27	2015	0.00	0.0	0	23	0
3	58	29	44	66	41	54	-10	78	1997	21	1974	0.00	0.0	0	21	0
4	62	31	47	66	41	54	-7	80	1981	23	1950	0.00	0.0	0	18	0
5	69	40	55	66	41	54	1	79	1981	22	1972	0.00	0.0	0	10	0
6	74	42	58	66	42	54	4	80	1962	25	1950	0.00	0.0	0	7	0
7	75	43	59	67	42	54	5	85	1962	24	1971	0.00	0.0	0	6	0
8	76	51	64	67	42	54	10	84	1962	20	1971	0.00	0.0	0	1	0
9	75	46	61	67	42	54	7	80	1962	25	1971	0.00	0.0	0	4	0
10	71	53	62	67	42	54	8	80	1962	26	1971	0.00	0.0	0	3	0
11	69	49	59	67	42	55	4	80	1986	27	1950	0.05	0.0	0	6	0
12	70	55	63	67	42	55	8	79	1983	26	1962	0.00	0.0	0	2	0
13	70	51	61	67	42	55	6	78	1996	25	2013	0.00	0.0	0	4	0
14	70	51	61	68	42	55	6	80	1983	25	2007	0.00	0.0	0	4	0
15	71	42	57	68	42	55	2	78	2014*	28	1987	0.00	0.0	0	8	0
16	73	44	59	68	42	55	4	83	1976	29	1964	0.00	0.0	0	6	0
17	72	43	58	68	42	55	3	82	2011*	25	2007	0.00	0.0	0	7	0
18	74	42	58	68	43	55	3	85	1971	30	2002	0.00	0.0	0	7	0
19	73	44	59	68	43	55	4	84	1971	29	1990	0.00	0.0	0	6	0
20	75	43	59	68	43	55	4	83	1971	30	2008	0.00	0.0	0	6	0
21	74	52	63	68	43	56	7	80	2009	30	1973	0.00	0.0	0	2	0
22	68	47	58	69	43	56	2	79	1994	31	1987	0.00	0.0	0	7	0
23	69	41	55	69	43	56	-1	82	1950	30	1972	0.00	0.0	0	10	0
24	77	45	61	69	43	56	5	82	1951	29	1996	0.00	0.0	0	4	0
25	75	49	62	69	43	56	6	89	1951	31	1972	0.00	0.0	0	3	0
26	61	51	56	69	43	56	0	81	2003	30	2002	0.19	0.0	0	9	0
27	69	53	61	69	43	56	5	79	2003	29	1972	0.01	0.0	0	4	0
28	71	50	61	69	43	56	5	80	2014*	29	1972	0.00	0.0	0	4	0
29	71	57	64	69	43	56	8	81	1953	30	1975	0.00	0.0	0	1	0
30	67	56	62	70	43	56	6	83	2003	26	1949	0.32	0.0	0	3	0
31	69	53	61	70	44	57	4	86	2003	30	1972	0.00	0.0	0	4	0

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For February 2015

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	74	49	62	70	44	57	5	84	2003*	28	2002*	0	0	0	3	0
2	73	45	59	70	44	57	2	85	1963*	31	1951*	0	0	0	6	0
3	77	47	62	70	44	57	5	84	1963*	23	1972*	0	0	0	3	0
4	79	48	64	70	44	57	7	84	1963*	26	2011*	0	0	0	1	0
5	80	49	64	70	44	57	7	87	1983*	33	1956*	0	0	0	1	0
6	82	50	66	70	44	57	9	88	1963*	30	1989*	0	0	0	0	1
7	82	48	65	71	44	57	8	89	1996*	31	1989*	0	0	0	0	0
8	84	53	68	71	44	58	10	88	1963*	35	2002*	0	0	0	0	3
9	84	52	68	71	45	58	10	86	1996*	30	1949*	0	0	0	0	3
10	83	58	70	71	45	58	12	87	1951*	32	1986*	0	0	0	0	5
11	82	60	71	71	45	58	13	90	1957*	33	1986*	0	0	0	0	6
12	81	53	67	71	45	58	9	85	1971*	29	1965*	0	0	0	0	2
13	84	51	68	72	45	58	10	90	1957*	31	1972*	0	0	0	0	3
14	87	50	68	72	45	59	9	87	2015*	31	1966*	0	0	0	0	3
15	82	51	66	72	46	59	7	86	2014*	26	1990*	0	0	0	0	1
16	83	51	67	72	46	59	8	87	1981*	22	1990*	0	0	0	0	2
17	80	54	67	72	46	59	8	88	1981*	31	1956*	0	0	0	0	2
18	81	48	64	72	46	59	5	93	1981*	35	1967*	0	0	0	1	0
19	81	50	66	73	46	60	6	90	1981*	31	1956*	0	0	0	0	1
20	80	54	67	73	46	60	7	86	1981*	32	1990*	0	0	0	0	2
21	80	50	65	73	47	60	5	92	1977*	32	1953*	0	0	0	0	0
22	75	55	65	73	47	60	5	88	1982*	32	1955*	0	0	0	0	0
23	67	54	60	74	47	60	0	87	2002*	31	1953*	0.04	0	0	5	0
24	71	48	60	74	47	61	-1	90	1986*	34	1996*	0	0	0	5	0
25	77	41	59	74	48	61	-2	93	1986*	32	1960*	0	0	0	6	0
26	79	44	62	74	48	61	1	92	1986*	35	1977*	0	0	0	3	0
27	77	49	63	75	48	61	2	93	1986*	30	1996*	0	0	0	2	0
28	74	57	66	75	48	61	5	93	1986*	31	1962*	0	0	0	0	1

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locati ons Add to My Locati ons

Units: English | Metric

Table Graph Details

Actual Conditions For March 2015

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year:_Month ▼ _Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	60	51	56	75	48	62	-6	90	1986*	34	1962*	0.74	0	0	9	0
2	64	50	57	75	48	62	-5	89	2009*	36	1997*	0.25	0	0	8	0
3	65	43	54	76	49	62	-8	90	1986*	31	1971*	0	0	0	11	0
4	69	50	60	76	49	62	-2	88	1986*	31	2002*	0	0	0	5	0
5	74	46	60	76	49	62	-2	91	1986*	33	2002*	0	0	0	5	0
6	82	46	64	76	49	63	1	92	1986*	36	1977*	0	0	0	1	0
7	83	53	68	76	49	63	5	90	1960*	37	1982*	0	0	0	0	3
8	83	49	66	77	49	63	3	91	1957*	35	1969*	0	0	0	0	1
9	87	51	69	77	50	63	6	92	2004*	34	1964*	0	0	0	0	4
10	87	56	72	77	50	64	8	95	1997*	41	2010*	0	0	0	0	7
11	84	56	70	78	50	64	6	93	1997*	38	1969*	0	0	0	0	5
12	88	63	76	78	50	64	12	92	2007*	37	1990*	0	0	0	0	11
13	88	66	77	78	50	64	13	95	2007*	30	1956*	0	0	0	0	12
14	92	62	77	78	50	64	13	95	2013*	38	1952*	0	0	0	0	12
15	91	60	76	78	50	64	12	94	2004*	34	1977*	0	0	0	0	11
16	91	56	74	79	50	65	9	98	2007*	36	1963*	0	0	0	0	9
17	91	59	75	79	51	65	10	99	2007*	36	2002*	0	0	0	0	10
18	85	66	76	79	51	65	11	94	1997*	37	1979*	0	0	0	0	11
19	76	63	70	79	51	65	5	96	1997*	39	1977*	0.03	0	0	0	5
20	83	58	70	80	51	65	5	99	2004*	41	2012*	0	0	0	0	5
21	93	56	74	80	51	66	8	100	2004*	40	1987*	0	0	0	0	9
22	90	56	73	80	51	66	7	98	2004*	39	2006*	0	0	0	0	8
23	86	57	72	80	51	66	6	95	1956*	43	2011*	0	0	0	0	7
24	87	60	74	81	51	66	8	95	1956*	37	1995*	0	0	0	0	9
25	89	65	77	81	52	66	11	96	1981*	41	1964*	0	0	0	0	12
26	89	65	77	81	52	66	11	96	1988*	40	1995*	0	0	0	0	12
27	94	57	76	81	52	67	9	100	1986*	36	1975*	0	0	0	0	11
28	97	59	78	82	52	67	11	97	2015*	40	1972*	0	0	0	0	13
29	96	64	80	82	52	67	13	96	2015*	37	1972*	0	0	0	0	15
30	97	61	79	82	52	67	12	100	1971*	38	1998*	0	0	0	0	14
31	96	63	80	82	52	67	13	100	2011*	38	1972*	0	0	0	0	15

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locati ons Add to My Locati ons

Units: English | Metric

Table Graph Details

Actual Conditions For April 2015

Choose another month / year: Month ▼ Year ▼ GO

Reports from: BLYTHE, CA [BLH]

Choose another location: Postal Code or City GO

(Lat: 33.62 Lon:-114.72)

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	89	60	74	83	53	68	6	99	2011*	44	2010*	0	0	0	0	9
2	86	61	74	83	53	68	6	98	1966*	40	1975*	0	0	0	0	9
3	85	60	72	83	53	68	4	101	1961*	40	1975*	0	0	0	0	7
4	87	54	70	83	53	68	2	106	1961*	41	1977*	0	0	0	0	5
5	87	59	73	84	53	68	5	100	1989*	42	1983*	0	0	0	0	8
6	81	51	66	84	54	69	-3	103	1989*	43	2006*	0	0	0	0	1
7	80	52	66	84	54	69	-3	105	1989*	44	1964*	0	0	0	0	1
8	78	56	67	84	54	69	-2	107	1989*	42	1999*	0	0	0	0	2
9	82	52	67	85	54	70	-3	102	1989*	42	2011*	0	0	0	0	2
10	85	51	68	85	55	70	-2	101	1960*	38	1975*	0	0	0	0	3
11	88	58	73	85	55	70	3	99	2014*	44	2001*	0	0	0	0	8
12	89	62	76	86	55	70	6	100	1990*	44	1967*	0	0	0	0	11
13	93	59	76	86	55	71	5	103	1985*	40	1983*	0	0	0	0	11
14	95	64	80	86	56	71	9	104	2002*	46	1983*	0	0	0	0	15
15	78	60	69	86	56	71	-2	104	1962*	46	2012*	0	0	0	0	4
16	80	55	68	87	56	71	-3	104	1984*	41	2009*	0	0	0	0	3
17	86	49	68	87	56	72	-4	103	1987*	44	1976*	0	0	0	0	3
18	94	54	74	87	57	72	2	104	1954*	41	1963*	0	0	0	0	9
19	95	60	78	88	57	72	6	106	1980*	44	1968*	0	0	0	0	13
20	93	59	76	88	58	73	3	103	1980*	46	1995*	0	0	0	0	11
21	87	56	72	88	58	73	-1	105	2012*	42	1967*	0	0	0	0	7
22	84	59	72	88	58	73	-1	106	2012*	41	1970*	0	0	0	0	7
23	82	61	72	89	58	74	-2	106	1949*	44	2010*	0	0	0	0	7
24	82	60	71	89	59	74	-3	105	1996*	46	1964*	0	0	0	0	6
25	79	57	68	89	59	74	-6	102	1987*	46	1989*	0	0	0	0	3
26	84	59	72	90	59	74	-2	106	1996*	48	1971*	0	0	0	0	7
27	90	62	76	90	60	75	1	106	1987*	45	1963*	0	0	0	0	11
28	96	62	79	90	60	75	4	106	1992*	44	1970*	0	0	0	0	14
29	98	65	82	91	60	76	6	107	1992*	45	1984*	0	0	0	0	17
30	101	67	84	91	61	76	8	105	1992*	46	1967*	0	0	0	0	19

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For May 2015

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	101	67	84	91	61	76	8	105	1985*	49	1990*	0	0	0	0	19
2	98	70	84	92	61	76	8	105	1966*	48	1967*	0	0	0	0	19
3	93	67	80	92	62	77	3	103	2014*	50	1991*	0	0	0	0	15
4	88	64	76	92	62	77	-1	105	2004*	49	1999*	0.07	0	0	0	11
5	89	62	76	92	62	77	-1	105	1997*	45	1964*	0	0	0	0	11
6	87	66	76	93	62	78	-2	108	1987*	47	1988*	0	0	0	0	11
7	81	59	70	93	63	78	-8	108	1989*	46	1988*	0	0	0	0	5
8	73	55	64	93	63	78	-14	109	2001*	49	1964*	0	0	0	1	0
9	81	49	65	94	63	78	-13	108	2001*	49	2015*	0	0	0	0	0
10	90	58	74	94	64	79	-5	109	1960*	48	1977*	0	0	0	0	9
11	96	62	79	94	64	79	0	113	1960*	50	1982*	0	0	0	0	14
12	92	65	78	95	64	79	-1	112	1996*	50	1980*	0	0	0	0	13
13	90	63	76	95	64	80	-4	108	1996*	50	1962*	0	0	0	0	11
14	77	63	70	95	64	80	-10	107	2013*	50	1998*	0	0	0	0	5
15	63	54	58	96	65	80	-22	107	2012*	53	1962*	0.28	0	0	7	0
16	78	50	64	96	65	80	-16	109	1997*	50	2015*	0	0	0	1	0
17	87	59	73	96	65	81	-8	110	1997*	53	1977*	0	0	0	0	8
18	88	65	76	96	65	81	-5	110	1970*	54	1977*	0	0	0	0	11
19	88	58	73	97	66	81	-8	113	2008*	49	2011*	0	0	0	0	8
20	91	63	77	97	66	81	-4	111	2008*	51	1949*	0	0	0	0	12
21	86	64	75	97	66	82	-7	110	2005*	47	1975*	0	0	0	0	10
22	82	60	71	98	66	82	-11	113	2000*	45	1971*	0	0	0	0	6
23	86	57	72	98	66	82	-10	110	2001*	50	1971*	0	0	0	0	7
24	87	62	74	98	66	82	-8	112	2001*	51	2010*	0	0	0	0	9
25	93	67	80	98	67	83	-3	113	1951*	51	1980*	0	0	0	0	15
26	94	63	78	99	67	83	-5	112	1974*	52	1996*	0	0	0	0	13
27	96	68	82	99	67	83	-1	114	1951*	50	1962*	0	0	0	0	17
28	100	67	84	99	67	83	1	114	1983*	52	1971*	0	0	0	0	19
29	102	65	84	100	68	84	0	114	2000*	43	1971*	0	0	0	0	19
30	105	68	86	100	68	84	2	113	1984*	56	1988*	0	0	0	0	21
31	106	71	88	100	68	84	4	112	2012*	55	1991*	0	0	0	0	23

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locati ons Add to My Locati ons

Units: English | Metric

Table Graph Details

Actual Conditions For June 2015

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year:_Month ▼ _Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	104	74	89	101	68	84	5	114	2012*	46	1980*	0	0	0	0	24
2	101	66	84	101	68	85	-1	112	1960*	56	1983*	0	0	0	0	19
3	99	69	84	101	69	85	-1	113	1996*	55	1971*	0	0	0	0	19
4	97	67	82	102	69	85	-3	114	1996*	56	1998*	0	0	0	0	17
5	95	64	80	102	69	85	-5	116	1957*	55	1999*	0	0	0	0	15
6	95	61	78	102	69	86	-8	114	2002*	59	1993*	0	0	0	0	13
7	101	67	84	102	70	86	-2	117	1985*	52	1993*	0	0	0	0	19
8	106	69	88	103	70	86	2	118	1955*	58	1998*	0	0	0	0	23
9	90	74	82	103	70	87	-5	118	1955*	57	1995*	0.04	0	0	0	17
10	99	73	86	103	70	87	-1	116	1994*	60	1969*	0	0	0	0	21
11	101	72	86	104	71	87	-1	114	1956*	56	1976*	0	0	0	0	21
12	106	73	90	104	71	87	3	116	1956*	62	1998*	0	0	0	0	25
13	106	81	94	104	71	88	6	115	1979*	56	1998*	0	0	0	0	29
14	110	80	95	104	72	88	7	117	1966*	59	1997*	0	0	0	0	30
15	113	81	97	105	72	88	9	117	2000*	54	1962*	0	0	0	0	32
16	113	81	97	105	72	89	8	116	1971*	58	1990*	0	0	0	0	32
17	116	78	97	105	73	89	8	116	2015*	57	1995*	0	0	0	0	32
18	119	82	100	106	73	89	11	119	2015*	60	1995*	0	0	0	0	35
19	113	76	94	106	73	90	4	117	1961*	61	1975*	0	0	0	0	29
20	112	77	94	106	74	90	4	118	1981*	58	1975*	0	0	0	0	29
21	110	82	96	106	74	90	6	116	2008*	64	1975*	0	0	0	0	31
22	113	81	97	106	74	90	7	119	1960*	65	2010*	0	0	0	0	32
23	114	82	98	107	75	91	7	118	1961*	63	1998*	0	0	0	0	33
24	115	79	97	107	75	91	6	118	1994*	63	1998*	0	0	0	0	32
25	108	84	96	107	75	91	5	122	1970*	66	1991*	0	0	0	0	31
26	112	83	98	107	76	92	6	122	1990*	61	1965*	0	0	0	0	33
27	111	84	98	107	76	92	6	121	1973*	62	1996*	0	0	0	0	33
28	110	88	99	108	76	92	7	123	1994*	67	1991*	0	0	0	0	34
29	111	86	98	108	77	92	6	121	1994*	67	1997*	0	0	0	0	33
30	108	86	97	108	77	92	5	119	1972*	68	1997*	0	0	0	0	32

M = Missing

Actual Conditions For July 2015

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	100	80	90	108	77	93	-3	118	1972*	62	1982*	0.16	0	0	0	25
2	106	79	92	108	78	93	-1	119	2001*	66	1995*	0	0	0	0	27
3	104	84	94	108	78	93	1	119	1985*	67	1979*	0	0	0	0	29
4	109	85	97	108	78	93	4	121	1989*	67	1956*	0	0	0	0	32
5	107	86	96	108	79	93	3	118	1981*	69	1987*	0	0	0	0	31
6	106	83	94	108	79	94	0	117	1965*	67	1994*	0	0	0	0	29
7	109	83	96	108	79	94	2	117	1985*	70	2005*	0	0	0	0	31
8	106	80	93	108	79	94	-1	119	1985*	73	1949*	0	0	0	0	28
9	99	74	86	108	80	94	-8	118	1958*	70	1987*	0	0	0	0	21
10	98	71	84	108	80	94	-10	118	1973*	71	2015*	0	0	0	0	19
11	98	74	86	108	80	94	-8	118	1958*	69	1974*	0	0	0	0	21
12	106	69	88	108	80	94	-6	118	1985*	69	2015*	0	0	0	0	23
13	110	78	94	108	80	94	0	119	2005*	66	1962*	0	0	0	0	29
14	109	82	96	108	80	94	2	118	2003*	73	2011*	0	0	0	0	31
15	106	78	92	108	81	95	-3	117	2006*	71	2001*	0	0	0	0	27
16	107	78	92	108	81	95	-3	119	1960*	69	1993*	0	0	0	0	27
17	107	83	95	108	81	95	0	121	2005*	64	1983*	0	0	0	0	30
18	99	79	89	108	81	95	-6	118	2005*	67	1987*	0.02	0	0	0	24
19	98	75	86	108	81	95	-9	119	1961*	62	1987*	0.05	0	0	0	21
20	100	76	88	108	81	95	-7	118	1978*	70	1993*	0	0	0	0	23
21	105	82	94	108	81	95	-1	118	2006*	69	1973*	0	0	0	0	29
22	104	79	92	108	81	95	-3	120	2006*	69	1995*	0	0	0	0	27
23	106	79	92	108	81	95	-3	117	1981*	69	1987*	0	0	0	0	27
24	108	78	93	108	81	95	-2	117	1980*	73	1995*	0	0	0	0	28
25	110	77	94	108	82	95	-1	117	2000*	71	1993*	0	0	0	0	29
26	112	76	94	108	82	95	-1	118	1995*	71	1986*	0	0	0	0	29
27	107	78	92	108	82	95	-3	120	1998*	72	1993*	0	0	0	0	27
28	107	77	92	108	82	95	-3	123	1995*	68	1987*	0	0	0	0	27
29	102	87	94	108	82	95	-1	116	1972*	64	1987*	0	0	0	0	29
30	110	85	98	108	82	95	3	117	1995*	73	1948*	0	0	0	0	33
31	109	80	94	108	81	94	0	120	1972*	72	2001*	0	0	0	0	29

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For August 2015

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	104	85	94	108	81	94	0	120	1972*	70	1959*	0	0	0	0	29
2	112	83	98	108	81	94	4	118	1995*	70	1976*	0	0	0	0	33
3	111	84	98	107	81	94	4	118	1998*	68	1976*	0	0	0	0	33
4	113	79	96	107	81	94	2	118	1969*	67	1976*	0	0	0	0	31
5	115	80	98	107	81	94	4	118	2000*	70	1976*	0	0	0	0	33
6	107	87	97	107	81	94	3	118	1995*	66	1976*	0	0	0	0	32
7	109	84	96	107	81	94	2	117	1980*	68	1988*	0	0	0	0	31
8	106	76	91	107	81	94	-3	119	1980*	69	1999*	0	0	0	0	26
9	108	80	94	107	81	94	0	115	1995*	68	2009*	0	0	0	0	29
10	107	78	92	107	81	94	-2	116	2003*	67	1949*	0	0	0	0	27
11	108	80	94	107	81	94	0	116	1962*	70	1999*	0	0	0	0	29
12	109	87	98	107	81	94	4	116	1962*	69	1949*	0	0	0	0	33
13	114	87	100	107	81	94	6	119	1960*	66	1993*	0	0	0	0	35
14	116	88	102	107	80	94	8	117	1962*	65	1968*	0	0	0	0	37
15	116	90	103	107	80	94	9	116	2015*	64	1993*	0	0	0	0	38
16	116	89	102	107	80	94	8	116	2015*	67	1980*	0	0	0	0	37
17	112	88	100	107	80	94	6	116	1992*	67	1980*	0	0	0	0	35
18	111	83	97	107	80	93	4	115	1992*	64	1976*	0	0	0	0	32
19	109	83	96	107	80	93	3	114	1973*	66	1976*	0	0	0	0	31
20	106	83	94	107	80	93	1	113	1992*	68	1980*	0	0	0	0	29
21	106	82	94	107	80	93	1	116	1969*	69	2014*	0	0	0	0	29
22	107	81	94	107	79	93	1	116	1972*	68	2014*	0	0	0	0	29
23	108	77	92	106	79	93	-1	116	2011*	64	1968*	0	0	0	0	27
24	110	81	96	106	79	93	3	119	1985*	66	1968*	0	0	0	0	31
25	97	86	92	106	79	93	-1	115	1985*	68	1973*	0	0	0	0	27
26	107	81	94	106	79	92	2	115	2011*	66	1951*	0	0	0	0	29
27	111	85	98	106	79	92	6	115	2005*	67	1973*	0	0	0	0	33
28	110	86	98	106	78	92	6	118	1998*	65	1973*	0	0	0	0	33
29	113	87	100	106	78	92	8	118	1948*	66	1975*	0	0	0	0	35
30	112	86	99	106	78	92	7	116	1998*	62	1957*	0	0	0	0	34
31	107	82	94	106	78	92	2	119	1950*	62	1992*	0	0	0	0	29

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For September 2015

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	104	82	93	105	78	91	2	121	1950*	64	1966*	0	0	0	0	28
2	103	78	90	105	77	91	-1	118	1948*	64	2000*	0	0	0	0	25
3	105	76	90	105	77	91	-1	118	1948*	65	1964*	0	0	0	0	25
4	101	79	90	105	77	91	-1	115	1948*	61	1985*	0	0	0	0	25
5	101	80	90	105	76	90	0	113	1955*	59	1976*	0	0	0	0	25
6	104	81	92	104	76	90	2	114	1955*	66	1992*	0	0	0	0	27
7	106	83	94	104	76	90	4	112	1994*	60	1985*	0	0	0	0	29
8	108	85	96	104	75	90	6	116	1979*	65	2010*	0	0	0	0	31
9	95	79	87	104	75	89	-2	114	1993*	62	1961*	0	0	0	0	22
10	100	84	92	103	75	89	3	114	1990*	63	2005*	0	0	0	0	27
11	104	78	91	103	74	89	2	115	1990*	61	1985*	0	0	0	0	26
12	103	82	92	103	74	88	4	113	1971*	59	1985*	0	0	0	0	27
13	108	82	95	102	74	88	7	112	1971*	58	1985*	0	0	0	0	30
14	102	80	91	102	73	88	3	113	1971*	60	2005*	0	0	0	0	26
15	97	76	86	102	73	87	-1	113	2000*	61	2005*	0	0	0	0	21
16	97	76	86	101	72	87	-1	110	1962*	61	1970*	0	0	0	0	21
17	97	70	84	101	72	86	-2	112	1962*	61	1977*	0	0	0	0	19
18	100	69	84	100	72	86	-2	111	1980*	57	1985*	0	0	0	0	19
19	104	72	88	100	71	86	2	113	1962*	56	1985*	0	0	0	0	23
20	106	75	90	100	71	85	5	108	1962*	53	1971*	0	0	0	0	25
21	96	78	87	99	70	85	2	108	2009*	59	1986*	0	0	0	0	22
22	95	76	86	99	70	84	2	110	1966*	55	1988*	0.04	0	0	0	21
23	99	74	86	98	70	84	2	111	1966*	56	2007*	0	0	0	0	21
24	106	76	91	98	69	84	7	109	2002*	54	1986*	0	0	0	0	26
25	110	79	94	98	69	83	11	110	2015*	59	1993*	0	0	0	0	29
26	107	84	96	97	68	83	13	110	2010*	53	1971*	0	0	0	0	31
27	107	77	92	97	68	82	10	110	2010*	54	1971*	0	0	0	0	27
28	105	78	92	96	67	82	10	108	2009*	55	1982*	0	0	0	0	27
29	105	76	90	96	67	81	9	110	1980*	56	2013*	0	0	0	0	25
30	107	75	91	96	66	81	10	109	1980*	51	2005*	0	0	0	0	26

M = Missing

Blythe, CA

Change Location: Enter a Postal Code, or City Go My Locations Add to My Locations

Units: English | Metric

Table Graph Details

Actual Conditions For October 2015

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	105	75	90	95	66	80	10	111	1980*	53	1971*	0	0	0	0	25
2	95	73	84	95	66	80	4	111	1980*	52	1971*	0	0	0	0	19
3	95	68	82	94	65	80	2	107	1987*	49	2002*	0	0	0	0	17
4	90	73	82	94	65	79	3	107	1987*	53	2002*	0	0	0	0	17
5	84	69	76	93	64	79	-3	108	1987*	52	2009*	0	0	0	0	11
6	82	64	73	93	64	78	-5	110	1987*	49	2009*	0.03	0	0	0	8
7	89	62	76	93	63	78	-2	108	1987*	49	2009*	0	0	0	0	11
8	99	67	83	92	63	78	5	106	1996*	51	2011*	0	0	0	0	18
9	100	71	86	92	62	77	9	106	1996*	46	1949*	0	0	0	0	21
10	99	76	88	91	62	77	11	107	1991*	48	1949*	0	0	0	0	23
11	99	71	85	91	62	76	9	105	1965*	50	2013*	0	0	0	0	20
12	98	73	86	90	61	76	10	105	1999*	50	2000*	0	0	0	0	21
13	99	75	87	90	61	76	11	106	1950*	47	1969*	0	0	0	0	22
14	102	72	87	90	61	75	12	103	1961*	50	1994*	0	0	0	0	22
15	101	79	90	89	60	75	15	103	1950*	52	1986*	0	0	0	0	25
16	95	71	83	89	60	74	9	102	1958*	49	1980*	0.24	0	0	0	18
17	89	71	80	89	59	74	6	101	2011*	46	1994*	0	0	0	0	15
18	89	72	80	88	59	74	6	104	2003*	41	1971*	0.24	0	0	0	15
19	82	65	74	88	59	73	1	104	2003*	41	1971*	0	0	0	0	9
20	83	63	73	87	58	73	0	103	2003*	42	1949*	0.33	0	0	0	8
21	82	61	72	87	58	72	0	104	2003*	44	1949*	0	0	0	0	7
22	84	60	72	87	58	72	0	104	2003*	44	1996*	0	0	0	0	7
23	89	61	75	86	57	72	3	101	2003*	39	1996*	0	0	0	0	10
24	90	64	77	86	57	71	6	102	1959*	42	1996*	0	0	0	0	12
25	86	66	76	86	56	71	5	98	1965*	44	1975*	0	0	0	0	11
26	91	62	76	85	56	71	5	98	1965*	41	1971*	0	0	0	0	11
27	89	59	74	85	56	70	4	99	2008*	45	1971*	0	0	0	0	9
28	88	65	76	84	55	70	6	98	1965*	44	1996*	0	0	0	0	11
29	85	67	76	84	55	69	7	97	1965*	33	1971*	0	0	0	0	11
30	83	64	74	84	55	69	5	95	1966*	27	1971*	0	0	0	0	9
31	86	58	72	83	54	69	3	97	1966*	29	1971*	0	0	0	0	7

M = Missing

Actual Conditions For November 2015

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year:_Month ▼ _Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	90	55	72	83	54	68	4	95	1997*	42	1972*	0	0	0	0	7
2	92	56	74	82	53	68	6	93	1997*	38	1971*	0	0	0	0	9
3	75	59	67	82	53	67	0	95	2010*	40	1979*	0	0	0	0	2
4	71	51	61	81	53	67	-6	94	2010*	38	1956*	0	0	0	4	0
5	69	45	57	81	52	67	-10	94	1980*	43	1994*	0	0	0	8	0
6	76	49	62	80	52	66	-4	94	1988*	42	2011*	0	0	0	3	0
7	77	53	65	80	52	66	-1	92	2007*	41	1993*	0	0	0	0	0
8	77	46	62	80	51	65	-3	93	2016*	40	2011*	0	0	0	3	0
9	80	45	62	79	51	65	-3	90	2016*	41	2000*	0	0	0	3	0
10	72	50	61	79	50	64	-3	89	1980*	39	2010*	0	0	0	4	0
11	71	48	60	78	50	64	-4	88	2013*	36	1950*	0	0	0	5	0
12	73	45	59	78	49	64	-5	91	1999*	32	1950*	0	0	0	6	0
13	78	44	61	77	49	63	-2	93	1999*	35	1985*	0	0	0	4	0
14	76	44	60	77	49	63	-3	91	1999*	32	2000*	0	0	0	5	0
15	72	48	60	76	48	62	-2	90	1999*	39	1994*	0.05	0	0	5	0
16	66	52	59	76	48	62	-3	88	1995*	35	2000*	0	0	0	6	0
17	69	48	58	75	47	61	-3	89	1995*	35	1958*	0	0	0	7	0
18	73	45	59	75	47	61	-2	87	2008*	34	1958*	0	0	0	6	0
19	79	45	62	74	47	60	2	87	2008*	35	1958*	0	0	0	3	0
20	83	51	67	74	46	60	7	87	2006*	27	1994*	0	0	0	0	2
21	80	57	68	73	46	60	8	87	1950*	33	1994*	0	0	0	0	3
22	78	46	62	73	45	59	3	88	1950*	35	1992*	0	0	0	3	0
23	76	43	60	72	45	59	1	86	1949*	35	2010*	0	0	0	5	0
24	79	44	62	72	45	58	4	87	1995*	34	1971*	0	0	0	3	0
25	71	52	62	71	44	58	4	87	1950*	32	1952*	0	0	0	3	0
26	65	44	54	71	44	58	-4	87	1995*	34	2010*	0	0	0	11	0
27	61	42	52	70	44	57	-5	86	1954*	26	2010*	0	0	0	13	0
28	63	36	50	70	43	57	-7	83	1949*	30	1994*	0	0	0	15	0
29	62	39	50	70	43	56	-6	83	1953*	33	1976*	0	0	0	15	0
30	64	34	49	69	43	56	-7	82	2008*	32	1975*	0	0	0	16	0

M = Missing

Actual Conditions For December 2015

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	67	36	52	69	42	56	-4	82	2008*	33	1952*	0	0	0	13	0
2	70	37	54	68	42	55	-1	82	1959*	30	1991*	0	0	0	11	0
3	72	37	54	68	42	55	-1	83	1958*	32	1991*	0	0	0	11	0
4	64	39	52	68	42	55	-3	80	2012*	35	2009*	0	0	0	13	0
5	74	40	57	68	42	54	3	80	1962*	31	2009*	0	0	0	8	0
6	71	42	56	67	41	54	2	81	1966*	32	1972*	0	0	0	9	0
7	73	44	58	67	41	54	4	79	1995*	29	2011*	0	0	0	7	0
8	73	42	58	67	41	54	4	78	1996*	29	1978*	0	0	0	7	0
9	69	43	56	66	41	54	2	80	1962*	26	1978*	0	0	0	9	0
10	71	41	56	66	41	54	2	82	1950*	25	1971*	0	0	0	9	0
11	72	53	62	66	41	53	9	81	1958*	31	1994*	0	0	0	3	0
12	67	47	57	66	40	53	4	82	2010*	24	1971*	0	0	0	8	0
13	70	38	54	66	40	53	1	80	1995*	30	1985*	0	0	0	11	0
14	62	46	54	66	40	53	1	78	1952*	29	2001*	0	0	0	11	0
15	58	37	48	65	40	53	-5	81	1977*	24	1971*	0	0	0	17	0
16	60	37	48	65	40	53	-5	85	1980*	26	2005*	0	0	0	17	0
17	62	29	46	65	40	53	-7	82	1998*	29	2015*	0	0	0	19	0
18	66	34	50	65	40	53	-3	77	1950*	30	1968*	0	0	0	15	0
19	63	35	49	65	40	53	-4	76	1999*	25	1968*	0	0	0	16	0
20	65	42	54	65	40	53	1	79	1950*	29	2006*	0	0	0	11	0
21	62	36	49	65	40	53	-4	76	1950*	29	1968*	0	0	0	16	0
22	71	46	58	65	40	53	5	77	1955*	24	1968*	0	0	0	7	0
23	72	44	58	65	40	53	5	82	1955*	27	1968*	0	0	0	7	0
24	63	46	54	65	40	53	1	81	2005*	30	1968*	0	0	0	11	0
25	60	42	51	65	40	53	-2	77	1980*	30	1953*	0	0	0	14	0
26	57	43	50	65	40	53	-3	79	1980*	30	2002*	0	0	0	15	0
27	57	36	46	65	41	53	-7	80	1980*	25	1987*	0	0	0	19	0
28	54	26	40	65	41	53	-13	80	1980*	26	2015*	0	0	0	25	0
29	59	35	47	65	41	53	-6	87	1980*	28	2003*	0	0	0	18	0
30	59	30	44	66	41	53	-9	83	1980*	27	1988*	0	0	0	21	0
31	61	34	48	66	41	53	-5	79	1980*	26	1988*	0	0	0	17	0

M = Missing

Actual Conditions For January 2016

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	59	33	46	66	41	53	-7	82	1981*	24	1976*	0	0	0	19	0
2	65	36	50	66	41	54	-4	80	1981*	27	2015*	0	0	0	15	0
3	67	41	54	66	41	54	0	78	1997*	21	1974*	0	0	0	11	0
4	54	47	50	66	41	54	-4	80	1981*	23	1950*	0.13	0	0	15	0
5	58	50	54	66	41	54	0	79	1981*	22	1972*	0.34	0	0	11	0
6	64	45	54	66	42	54	0	80	1962*	25	1950*	0.04	0	0	11	0
7	58	46	52	66	42	54	-2	85	1962*	24	1971*	0.04	0	0	13	0
8	61	41	51	67	42	54	-3	84	1962*	20	1971*	0	0	0	14	0
9	61	36	48	67	42	54	-6	80	1962*	25	1971*	0	0	0	17	0
10	62	47	54	67	42	54	0	80	1962*	26	1971*	0	0	0	11	0
11	62	45	54	67	42	54	0	80	1986*	27	1950*	0	0	0	11	0
12	63	37	50	67	42	55	-5	79	1983*	26	1962*	0	0	0	15	0
13	62	35	48	67	42	55	-7	78	1996*	25	2013*	0	0	0	17	0
14	64	35	50	68	42	55	-5	80	1983*	25	2007*	0	0	0	15	0
15	72	42	57	68	42	55	2	78	2014*	28	1987*	0	0	0	8	0
16	65	41	53	68	42	55	-2	83	1976*	29	1964*	0	0	0	12	0
17	69	42	56	68	42	55	1	82	2011*	25	2007*	0	0	0	9	0
18	65	44	54	68	42	55	-1	85	1971*	30	2002*	0	0	0	11	0
19	70	41	56	68	42	55	1	84	1971*	29	1990*	0	0	0	9	0
20	73	43	58	68	43	55	3	83	1971*	30	2008*	0	0	0	7	0
21	71	46	58	68	43	56	2	80	2009*	30	1973*	0	0	0	7	0
22	70	41	56	68	43	56	0	79	1994*	31	1987*	0	0	0	9	0
23	65	42	54	69	43	56	-2	82	1950*	30	1972*	0	0	0	11	0
24	71	43	57	69	43	56	1	82	1951*	29	1996*	0	0	0	8	0
25	70	43	56	69	43	56	0	89	1951*	31	1972*	0	0	0	9	0
26	68	47	58	69	43	56	2	81	2003*	30	2002*	0	0	0	7	0
27	70	42	56	69	43	56	0	79	2003*	29	1972*	0	0	0	9	0
28	72	44	58	69	43	56	2	80	2014*	29	1972*	0	0	0	7	0
29	71	41	56	69	43	56	0	81	1953*	30	1975*	0	0	0	9	0
30	82	45	64	70	43	56	8	83	2003*	26	1949*	0	0	0	1	0
31	77	48	62	70	44	56	6	86	2003*	30	1972*	0.01	0	0	3	0

M = Missing

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Actual Conditions For February 2016

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	62	45	54	70	44	57	-3	84	2003*	28	2002*	0	0	0	11	0
2	58	38	48	70	44	57	-9	85	1963*	31	1951*	0	0	0	17	0
3	60	39	50	70	44	57	-7	84	1963*	23	1972*	0	0	0	15	0
4	65	33	49	70	44	57	-8	84	1963*	26	2011*	0	0	0	16	0
5	71	48	60	70	44	57	3	87	1983*	33	1956*	0	0	0	5	0
6	71	42	56	70	44	57	-1	88	1963*	30	1989*	0	0	0	9	0
7	80	44	62	71	44	57	5	89	1996*	31	1989*	0	0	0	3	0
8	82	53	68	71	44	58	10	88	1963*	35	2002*	0	0	0	0	3
9	83	50	66	71	45	58	8	86	1996*	30	1949*	0	0	0	0	1
10	84	48	66	71	45	58	8	87	1951*	32	1986*	0	0	0	0	1
11	83	47	65	71	45	58	7	90	1957*	33	1986*	0	0	0	0	0
12	83	47	65	71	45	58	7	85	1971*	29	1965*	0	0	0	0	0
13	84	45	64	72	45	58	6	90	1957*	31	1972*	0	0	0	1	0
14	87	51	69	72	45	59	10	87	2016*	31	1966*	0	0	0	0	4
15	88	65	76	72	46	59	17	88	2016*	26	1990*	0	0	0	0	11
16	88	55	72	72	46	59	13	88	2016*	22	1990*	0	0	0	0	7
17	88	47	68	72	46	59	9	88	2016*	31	1956*	0	0	0	0	3
18	83	62	72	72	46	59	13	93	1981*	35	1967*	0	0	0	0	7
19	81	58	70	73	46	60	10	90	1981*	31	1956*	0	0	0	0	5
20	84	54	69	73	46	60	9	86	1981*	32	1990*	0	0	0	0	4
21	87	53	70	73	47	60	10	92	1977*	32	1953*	0	0	0	0	5
22	85	51	68	73	47	60	8	88	1982*	32	1955*	0	0	0	0	3
23	76	56	66	74	47	60	6	87	2002*	31	1953*	0	0	0	0	1
24	76	46	61	74	47	61	0	90	1986*	34	1996*	0	0	0	4	0
25	83	48	66	74	48	61	5	93	1986*	32	1960*	0	0	0	0	1
26	86	46	66	74	48	61	5	92	1986*	35	1977*	0	0	0	0	1
27	86	51	68	75	48	61	7	93	1986*	30	1996*	0	0	0	0	3
28	87	52	70	75	48	61	9	93	1986*	31	1962*	0	0	0	0	5
29	89	53	71	75	48	62	9	89	2016*	38	2012*	0	0	0	0	6

M = Missing

Choose another month / year:_Month ▼ _Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Actual Conditions For March 2016

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	90	53	72	75	48	62	10	90	2016*	34	1962*	0	0	0	0	7
2	89	56	72	75	48	62	10	89	2016*	36	1997*	0	0	0	0	7
3	88	55	72	76	49	62	10	90	1986*	31	1971*	0	0	0	0	7
4	88	55	72	76	49	62	10	88	2016*	31	2002*	0	0	0	0	7
5	84	57	70	76	49	62	8	91	1986*	33	2002*	0	0	0	0	5
6	81	59	70	76	49	63	7	92	1986*	36	1977*	0	0	0	0	5
7	67	45	56	76	49	63	-7	90	1960*	37	1982*	0	0	0	9	0
8	78	45	62	77	49	63	-1	91	1957*	35	1969*	0	0	0	3	0
9	84	54	69	77	50	63	6	92	2004*	34	1964*	0	0	0	0	4
10	87	58	72	77	50	64	8	95	1997*	41	2010*	0	0	0	0	7
11	87	57	72	78	50	64	8	93	1997*	38	1969*	0	0	0	0	7
12	76	50	63	78	50	64	-1	92	2007*	37	1990*	0	0	0	2	0
13	80	47	64	78	50	64	0	95	2007*	30	1956*	0	0	0	1	0
14	83	51	67	78	50	64	3	95	2013*	38	1952*	0	0	0	0	2
15	86	57	72	78	50	64	8	94	2004*	34	1977*	0	0	0	0	7
16	90	52	71	79	50	65	6	98	2007*	36	1963*	0	0	0	0	6
17	90	53	72	79	51	65	7	99	2007*	36	2002*	0	0	0	0	7
18	92	56	74	79	51	65	9	94	1997*	37	1979*	0	0	0	0	9
19	93	59	76	79	51	65	11	96	1997*	39	1977*	0	0	0	0	11
20	95	59	77	80	51	65	12	99	2004*	41	2012*	0	0	0	0	12
21	94	58	76	80	51	66	10	100	2004*	40	1987*	0	0	0	0	11
22	82	60	71	80	51	66	5	98	2004*	39	2006*	0	0	0	0	6
23	78	59	68	80	51	66	2	95	1956*	43	2011*	0	0	0	0	3
24	85	53	69	81	51	66	3	95	1956*	37	1995*	0	0	0	0	4
25	89	54	72	81	52	66	6	96	1981*	41	1964*	0	0	0	0	7
26	84	60	72	81	52	66	6	96	1988*	40	1995*	0	0	0	0	7
27	86	53	70	81	52	67	3	100	1986*	36	1975*	0	0	0	0	5
28	80	58	69	82	52	67	2	97	2015*	40	1972*	0	0	0	0	4
29	70	52	61	82	52	67	-6	96	2015*	37	1972*	0	0	0	4	0
30	71	45	58	82	52	67	-9	100	1971*	38	1998*	0	0	0	7	0
31	79	51	65	82	52	67	-2	100	2011*	38	1972*	0	0	0	0	0

M = Missing

Actual Conditions For April 2016

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	85	55	70	83	53	68	2	99	2011*	44	2010*	0	0	0	0	5
2	88	51	70	83	53	68	2	98	1966*	40	1975*	0	0	0	0	5
3	91	54	72	83	53	68	4	101	1961*	40	1975*	0	0	0	0	7
4	93	58	76	83	53	68	8	106	1961*	41	1977*	0	0	0	0	11
5	95	61	78	84	53	68	10	100	1989*	42	1983*	0	0	0	0	13
6	96	65	80	84	54	69	11	103	1989*	43	2006*	0	0	0	0	15
7	90	69	80	84	54	69	11	105	1989*	44	1964*	0.01	0	0	0	15
8	75	62	68	84	54	69	-1	107	1989*	42	1999*	0.03	0	0	0	3
9	83	62	72	85	54	70	2	102	1989*	42	2011*	0	0	0	0	7
10	74	57	66	85	55	70	-4	101	1960*	38	1975*	0.06	0	0	0	1
11	76	58	67	85	55	70	-3	99	2014*	44	2001*	0	0	0	0	2
12	85	57	71	86	55	70	1	100	1990*	44	1967*	0	0	0	0	6
13	90	60	75	86	55	71	4	103	1985*	40	1983*	0	0	0	0	10
14	90	62	76	86	56	71	5	104	2002*	46	1983*	0	0	0	0	11
15	82	61	72	86	56	71	1	104	1962*	46	2012*	0	0	0	0	7
16	84	65	74	87	56	71	3	104	1984*	41	2009*	0	0	0	0	9
17	87	65	76	87	56	72	4	103	1987*	44	1976*	0	0	0	0	11
18	91	56	74	87	57	72	2	104	1954*	41	1963*	0	0	0	0	9
19	95	56	76	88	57	72	4	106	1980*	44	1968*	0	0	0	0	11
20	99	62	80	88	58	73	7	103	1980*	46	1995*	0	0	0	0	15
21	98	62	80	88	58	73	7	105	2012*	42	1967*	0	0	0	0	15
22	97	61	79	88	58	73	6	106	2012*	41	1970*	0	0	0	0	14
23	87	65	76	89	58	74	2	106	1949*	44	2010*	0	0	0	0	11
24	93	62	78	89	59	74	4	105	1996*	46	1964*	0	0	0	0	13
25	81	60	70	89	59	74	-4	102	1987*	46	1989*	0	0	0	0	5
26	82	52	67	90	59	74	-7	106	1996*	48	1971*	0	0	0	0	2
27	85	59	72	90	60	75	-3	106	1987*	45	1963*	0	0	0	0	7
28	77	59	68	90	60	75	-7	106	1992*	44	1970*	0	0	0	0	3
29	88	55	72	91	60	76	-4	107	1992*	45	1984*	0	0	0	0	7
30	75	60	68	91	61	76	-8	105	1992*	46	1967*	0.04	0	0	0	3

M = Missing

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Actual Conditions For May 2016

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	84	55	70	91	61	76	-6	105	1985*	49	1990*	0	0	0	0	5
2	90	60	75	92	61	76	-1	105	1966*	48	1967*	0	0	0	0	10
3	95	66	80	92	62	77	3	103	2014*	50	1991*	0	0	0	0	15
4	102	65	84	92	62	77	7	105	2004*	49	1999*	0	0	0	0	19
5	90	66	78	92	62	77	1	105	1997*	45	1964*	0	0	0	0	13
6	79	60	70	93	62	78	-8	108	1987*	47	1988*	0	0	0	0	5
7	79	57	68	93	63	78	-10	108	1989*	46	1988*	0	0	0	0	3
8	85	56	70	93	63	78	-8	109	2001*	49	1964*	0	0	0	0	5
9	89	62	76	94	63	78	-2	108	2001*	49	2015*	0	0	0	0	11
10	93	64	78	94	64	79	-1	109	1960*	48	1977*	0	0	0	0	13
11	96	66	81	94	64	79	2	113	1960*	50	1982*	0	0	0	0	16
12	102	67	84	95	64	79	5	112	1996*	50	1980*	0	0	0	0	19
13	103	68	86	95	64	80	6	108	1996*	50	1962*	0	0	0	0	21
14	101	74	88	95	64	80	8	107	2013*	50	1998*	0	0	0	0	23
15	93	68	80	96	65	80	0	107	2012*	53	1962*	0	0	0	0	15
16	93	62	78	96	65	80	-2	109	1997*	50	2015*	0	0	0	0	13
17	92	65	78	96	65	81	-3	110	1997*	53	1977*	0	0	0	0	13
18	93	65	79	96	65	81	-2	110	1970*	54	1977*	0	0	0	0	14
19	100	70	85	97	66	81	4	113	2008*	49	2011*	0	0	0	0	20
20	96	72	84	97	66	81	3	111	2008*	51	1949*	0	0	0	0	19
21	86	59	72	97	66	82	-10	110	2005*	47	1975*	0	0	0	0	7
22	86	56	71	98	66	82	-11	113	2000*	45	1971*	0	0	0	0	6
23	90	60	75	98	66	82	-7	110	2001*	50	1971*	0	0	0	0	10
24	86	63	74	98	66	82	-8	112	2001*	51	2010*	0	0	0	0	9
25	86	56	71	98	67	83	-12	113	1951*	51	1980*	0	0	0	0	6
26	90	57	74	99	67	83	-9	112	1974*	52	1996*	0	0	0	0	9
27	94	67	80	99	67	83	-3	114	1951*	50	1962*	0	0	0	0	15
28	97	66	82	99	67	83	-1	114	1983*	52	1971*	0	0	0	0	17
29	94	64	79	100	68	84	-5	114	2000*	43	1971*	0	0	0	0	14
30	97	67	82	100	68	84	-2	113	1984*	56	1988*	0	0	0	0	17
31	102	69	86	100	68	84	2	112	2012*	55	1991*	0	0	0	0	21

M = Missing

Actual Conditions For June 2016

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	105	73	89	101	68	84	5	114	2012*	46	1980*	0	0	0	0	24
2	110	74	92	101	68	85	7	112	1960*	56	1983*	0	0	0	0	27
3	113	77	95	101	69	85	10	113	2016*	55	1971*	0	0	0	0	30
4	118	78	98	102	69	85	13	118	2016*	56	1998*	0	0	0	0	33
5	114	78	96	102	69	85	11	116	1957*	55	1999*	0	0	0	0	31
6	109	74	92	102	69	86	6	114	2002*	59	1993*	0	0	0	0	27
7	107	76	92	102	70	86	6	117	1985*	52	1993*	0	0	0	0	27
8	105	77	91	103	70	86	5	118	1955*	58	1998*	0	0	0	0	26
9	103	81	92	103	70	87	5	118	1955*	57	1995*	0	0	0	0	27
10	98	77	88	103	70	87	1	116	1994*	60	1969*	0	0	0	0	23
11	99	73	86	104	71	87	-1	114	1956*	56	1976*	0	0	0	0	21
12	98	70	84	104	71	87	-3	116	1956*	62	1998*	0	0	0	0	19
13	99	70	84	104	71	88	-4	115	1979*	56	1998*	0	0	0	0	19
14	102	70	86	104	72	88	-2	117	1966*	59	1997*	0	0	0	0	21
15	101	75	88	105	72	88	0	117	2000*	54	1962*	0	0	0	0	23
16	102	69	86	105	72	89	-3	116	1971*	58	1990*	0	0	0	0	21
17	106	73	90	105	73	89	1	116	2015*	57	1995*	0	0	0	0	25
18	110	73	92	106	73	89	3	119	2015*	60	1995*	0	0	0	0	27
19	119	83	101	106	73	90	11	119	2016*	61	1975*	0	0	0	0	36
20	124	86	105	106	74	90	15	124	2016*	58	1975*	0	0	0	0	40
21	111	87	99	106	74	90	9	116	2008*	64	1975*	0	0	0	0	34
22	113	84	98	106	74	90	8	119	1960*	65	2010*	0	0	0	0	33
23	112	79	96	107	75	91	5	118	1961*	63	1998*	0	0	0	0	31
24	111	80	96	107	75	91	5	118	1994*	63	1998*	0	0	0	0	31
25	109	83	96	107	75	91	5	122	1970*	66	1991*	0	0	0	0	31
26	111	82	96	107	76	92	4	122	1990*	61	1965*	0	0	0	0	31
27	114	89	102	107	76	92	10	121	1973*	62	1996*	0	0	0	0	37
28	115	85	100	108	76	92	8	123	1994*	67	1991*	0	0	0	0	35
29	103	88	96	108	77	92	4	121	1994*	67	1997*	0	0	0	0	31
30	106	86	96	108	77	92	4	119	1972*	68	1997*	0.03	0	0	0	31

M = Missing

Actual Conditions For July 2016

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	108	83	96	108	77	93	3	118	1972*	62	1982*	0	0	0	0	31
2	108	83	96	108	78	93	3	119	2001*	66	1995*	0	0	0	0	31
3	108	83	96	108	78	93	3	119	1985*	67	1979*	0	0	0	0	31
4	112	81	96	108	78	93	3	121	1989*	67	1956*	0	0	0	0	31
5	111	80	96	108	79	93	3	118	1981*	69	1987*	0	0	0	0	31
6	109	82	96	108	79	94	2	117	1965*	67	1994*	0	0	0	0	31
7	107	79	93	108	79	94	-1	117	1985*	70	2005*	0	0	0	0	28
8	109	79	94	108	79	94	0	119	1985*	73	1949*	0	0	0	0	29
9	113	81	97	108	80	94	3	118	1958*	70	1987*	0	0	0	0	32
10	115	78	96	108	80	94	2	118	1973*	71	2015*	0	0	0	0	31
11	107	75	91	108	80	94	-3	118	1958*	69	1974*	0	0	0	0	26
12	109	79	94	108	80	94	0	118	1985*	69	2015*	0	0	0	0	29
13	109	76	92	108	80	94	-2	119	2005*	66	1962*	0	0	0	0	27
14	114	80	97	108	80	94	3	118	2003*	73	2011*	0	0	0	0	32
15	115	88	102	108	81	95	7	117	2006*	71	2001*	0	0	0	0	37
16	109	86	98	108	81	95	3	119	1960*	69	1993*	0	0	0	0	33
17	105	88	96	108	81	95	1	121	2005*	64	1983*	0	0	0	0	31
18	109	82	96	108	81	95	1	118	2005*	67	1987*	0	0	0	0	31
19	110	84	97	108	81	95	2	119	1961*	62	1987*	0	0	0	0	32
20	113	84	98	108	81	95	3	118	1978*	70	1993*	0	0	0	0	33
21	116	86	101	108	81	95	6	118	2006*	69	1973*	0	0	0	0	36
22	116	87	102	108	81	95	7	120	2006*	69	1995*	0	0	0	0	37
23	113	88	100	108	81	95	5	117	1981*	69	1987*	0	0	0	0	35
24	110	88	99	108	81	95	4	117	1980*	73	1995*	0	0	0	0	34
25	112	84	98	108	82	95	3	117	2000*	71	1993*	0	0	0	0	33
26	113	89	101	108	82	95	6	118	1995*	71	1986*	0	0	0	0	36
27	116	88	102	108	82	95	7	120	1998*	72	1993*	0	0	0	0	37
28	115	90	102	108	82	95	7	123	1995*	68	1987*	0	0	0	0	37
29	114	87	100	108	82	95	5	116	1972*	64	1987*	0	0	0	0	35
30	101	76	88	108	82	95	-7	117	1995*	73	1948*	0.24	0	0	0	23
31	105	82	94	108	81	94	0	120	1972*	72	2001*	0	0	0	0	29

M = Missing

Actual Conditions For August 2016

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	105	83	94	108	81	94	0	120	1972*	70	1959*	0	0	0	0	29
2	105	83	94	108	81	94	0	118	1995*	70	1976*	0	0	0	0	29
3	107	85	96	107	81	94	2	118	1998*	68	1976*	0	0	0	0	31
4	107	86	96	107	81	94	2	118	1969*	67	1976*	0	0	0	0	31
5	109	85	97	107	81	94	3	118	2000*	70	1976*	0	0	0	0	32
6	110	83	96	107	81	94	2	118	1995*	66	1976*	0	0	0	0	31
7	112	84	98	107	81	94	4	117	1980*	68	1988*	0	0	0	0	33
8	111	81	96	107	81	94	2	119	1980*	69	1999*	0	0	0	0	31
9	104	83	94	107	81	94	0	115	1995*	68	2009*	0	0	0	0	29
10	104	84	94	107	81	94	0	116	2003*	67	1949*	0	0	0	0	29
11	104	83	94	107	81	94	0	116	1962*	70	1999*	0	0	0	0	29
12	106	85	96	107	81	94	2	116	1962*	69	1949*	0	0	0	0	31
13	113	87	100	107	81	94	6	119	1960*	66	1993*	0	0	0	0	35
14	112	88	100	107	80	94	6	117	1962*	65	1968*	0	0	0	0	35
15	116	87	102	107	80	94	8	116	2016*	64	1993*	0	0	0	0	37
16	115	83	99	107	80	94	5	116	2015*	67	1980*	0	0	0	0	34
17	110	85	98	107	80	94	4	116	1992*	67	1980*	0	0	0	0	33
18	108	84	96	107	80	93	3	115	1992*	64	1976*	0	0	0	0	31
19	105	79	92	107	80	93	-1	114	1973*	66	1976*	0	0	0	0	27
20	104	84	94	107	80	93	1	113	1992*	68	1980*	0	0	0	0	29
21	98	77	88	107	80	93	-5	116	1969*	69	2014*	0.14	0	0	0	23
22	106	78	92	107	79	93	-1	116	1972*	68	2014*	0	0	0	0	27
23	102	81	92	106	79	93	-1	116	2011*	64	1968*	0	0	0	0	27
24	108	78	93	106	79	93	0	119	1985*	66	1968*	0	0	0	0	28
25	107	83	95	106	79	93	2	115	1985*	68	1973*	0	0	0	0	30
26	102	81	92	106	79	92	0	115	2011*	66	1951*	0	0	0	0	27
27	101	80	90	106	79	92	-2	115	2005*	67	1973*	0	0	0	0	25
28	106	75	90	106	78	92	-2	118	1998*	65	1973*	0	0	0	0	25
29	111	78	94	106	78	92	2	118	1948*	66	1975*	0	0	0	0	29
30	112	80	96	106	78	92	4	116	1998*	62	1957*	0	0	0	0	31
31	110	82	96	106	78	92	4	119	1950*	62	1992*	0	0	0	0	31

M = Missing

Actual Conditions For September 2016

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year:_Month ▼ _Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	104	83	94	105	78	91	3	121	1950*	64	1966*	0	0	0	0	29
2	106	84	95	105	77	91	4	118	1948*	64	2000*	0	0	0	0	30
3	106	81	94	105	77	91	3	118	1948*	65	1964*	0	0	0	0	29
4	101	72	86	105	77	91	-5	115	1948*	61	1985*	0	0	0	0	21
5	99	69	84	105	76	90	-6	113	1955*	59	1976*	0	0	0	0	19
6	99	66	82	104	76	90	-8	114	1955*	66	2016*	0	0	0	0	17
7	95	79	87	104	76	90	-3	112	1994*	60	1985*	0	0	0	0	22
8	100	79	90	104	75	90	0	116	1979*	65	2010*	0	0	0	0	25
9	105	77	91	104	75	89	2	114	1993*	62	1961*	0	0	0	0	26
10	110	75	92	103	75	89	3	114	1990*	63	2005*	0	0	0	0	27
11	109	78	94	103	74	89	5	115	1990*	61	1985*	0	0	0	0	29
12	103	78	90	103	74	88	2	113	1971*	59	1985*	0	0	0	0	25
13	95	73	84	102	74	88	-4	112	1971*	58	1985*	0	0	0	0	19
14	92	67	80	102	73	88	-8	113	1971*	60	2005*	0	0	0	0	15
15	96	60	78	102	73	87	-9	113	2000*	60	2016*	0	0	0	0	13
16	99	61	80	101	72	87	-7	110	1962*	61	2016*	0	0	0	0	15
17	102	63	82	101	72	86	-4	112	1962*	61	1977*	0	0	0	0	17
18	105	67	86	100	72	86	0	111	1980*	57	1985*	0	0	0	0	21
19	99	72	86	100	71	86	0	113	1962*	56	1985*	0	0	0	0	21
20	86	72	79	100	71	85	-6	108	1962*	53	1971*	0.13	0	0	0	14
21	88	72	80	99	70	85	-5	108	2009*	59	1986*	0	0	0	0	15
22	97	72	84	99	70	84	0	110	1966*	55	1988*	0	0	0	0	19
23	88	63	76	98	70	84	-8	111	1966*	56	2007*	0	0	0	0	11
24	95	60	78	98	69	84	-6	109	2002*	54	1986*	0	0	0	0	13
25	97	73	85	98	69	83	2	110	2015*	59	1993*	0	0	0	0	20
26	99	78	88	97	68	83	5	110	2010*	53	1971*	0	0	0	0	23
27	93	76	84	97	68	82	2	110	2010*	54	1971*	0	0	0	0	19
28	96	71	84	96	67	82	2	108	2009*	55	1982*	0	0	0	0	19
29	95	71	83	96	67	81	2	110	1980*	56	2013*	0	0	0	0	18
30	100	71	86	96	66	81	5	109	1980*	51	2005*	0	0	0	0	21

M = Missing

Actual Conditions For October 2016

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Choose another month / year: Month ▼ Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	99	74	86	95	66	80	6	111	1980*	53	1971*	0	0	0	0	21
2	97	71	84	95	66	80	4	111	1980*	52	1971*	0	0	0	0	19
3	86	62	74	94	65	80	-6	107	1987*	49	2002*	0	0	0	0	9
4	87	62	74	94	65	79	-5	107	1987*	53	2002*	0	0	0	0	9
5	88	62	75	93	64	79	-4	108	1987*	52	2009*	0	0	0	0	10
6	91	61	76	93	64	78	-2	110	1987*	49	2009*	0	0	0	0	11
7	94	63	78	93	63	78	0	108	1987*	49	2009*	0	0	0	0	13
8	98	68	83	92	63	78	5	106	1996*	51	2011*	0	0	0	0	18
9	98	69	84	92	62	77	7	106	1996*	46	1949*	0	0	0	0	19
10	97	66	82	91	62	77	5	107	1991*	48	1949*	0	0	0	0	17
11	96	67	82	91	62	76	6	105	1965*	50	2013*	0	0	0	0	17
12	97	63	80	90	61	76	4	105	1999*	50	2000*	0	0	0	0	15
13	95	62	78	90	61	76	2	106	1950*	47	1969*	0	0	0	0	13
14	97	62	80	90	61	75	5	103	1961*	50	1994*	0	0	0	0	15
15	97	62	80	89	60	75	5	103	1950*	52	1986*	0	0	0	0	15
16	94	65	80	89	60	74	6	102	1958*	49	1980*	0	0	0	0	15
17	87	62	74	89	59	74	0	101	2011*	46	1994*	0	0	0	0	9
18	90	64	77	88	59	74	3	104	2003*	41	1971*	0	0	0	0	12
19	93	66	80	88	59	73	7	104	2003*	41	1971*	0	0	0	0	15
20	93	64	78	87	58	73	5	103	2003*	42	1949*	0	0	0	0	13
21	96	65	80	87	58	72	8	104	2003*	44	1949*	0	0	0	0	15
22	98	61	80	87	58	72	8	104	2003*	44	1996*	0	0	0	0	15
23	95	63	79	86	57	72	7	101	2003*	39	1996*	0	0	0	0	14
24	90	68	79	86	57	71	8	102	1959*	42	1996*	0.14	0	0	0	14
25	87	65	76	86	56	71	5	98	1965*	44	1975*	0	0	0	0	11
26	91	65	78	85	56	71	7	98	1965*	41	1971*	0	0	0	0	13
27	91	66	78	85	56	70	8	99	2008*	45	1971*	0	0	0	0	13
28	93	67	80	84	55	70	10	98	1965*	44	1996*	0	0	0	0	15
29	93	71	82	84	55	69	13	97	1965*	33	1971*	0	0	0	0	17
30	92	67	80	84	55	69	11	95	1966*	27	1971*	0	0	0	0	15
31	81	60	70	83	54	69	1	97	1966*	29	1971*	0	0	0	0	5

M = Missing

Actual Conditions For November 2016

Choose another month / year:_Month ▼ _Year ▼ GO

Choose another location: Postal Code or City GO

Enter a Different Station: station GO

Reports from: BLYTHE, CA [BLH]

(Lat: 33.62 Lon:-114.72)

Obs. Date	Act. High	Act. Low	Act. Avg	Norm. High	Norm. Low	Norm. Avg.	Norm. Dept.	Rec. High	Rec. Year	Rec. Low	Rec. Year	Precip. Amt	Snow Amt.	Snow Ground	Heat Deg Day	Cool Deg Day
1	80	53	66	83	54	68	-2	95	1997*	42	1972*	0	0	0	0	1
2	84	61	72	82	53	68	4	93	1997*	38	1971*	0	0	0	0	7
3	89	63	76	82	53	67	9	95	2010*	40	1979*	0	0	0	0	11
4	86	59	72	81	53	67	5	94	2010*	38	1956*	0	0	0	0	7
5	87	59	73	81	52	67	6	94	1980*	43	1994*	0	0	0	0	8
6	89	58	74	80	52	66	8	94	1988*	42	2011*	0	0	0	0	9
7	89	57	73	80	52	66	7	92	2007*	41	1993*	0	0	0	0	8
8	93	63	78	80	51	65	13	93	2016*	40	2011*	0	0	0	0	13
9	90	63	76	79	51	65	11	90	2016*	41	2000*	0	0	0	0	11
10	87	57	72	79	50	64	8	89	1980*	39	2010*	0	0	0	0	7
11	86	54	70	78	50	64	6	88	2013*	36	1950*	0	0	0	0	5
12	86	54	70	78	49	64	6	91	1999*	32	1950*	0	0	0	0	5
13	87	57	72	77	49	63	9	93	1999*	35	1985*	0	0	0	0	7
14	89	52	70	77	49	63	7	91	1999*	32	2000*	0	0	0	0	5
15	86	51	68	76	48	62	6	90	1999*	39	1994*	0	0	0	0	3
16	85	55	70	76	48	62	8	88	1995*	35	2000*	0	0	0	0	5
17	72	52	62	75	47	61	1	89	1995*	35	1958*	0	0	0	3	0
18	72	47	60	75	47	61	-1	87	2008*	34	1958*	0	0	0	5	0
19	72	42	57	74	47	60	-3	87	2008*	35	1958*	0	0	0	8	0
20	73	51	62	74	46	60	2	87	2006*	27	1994*	0	0	0	3	0
21	73	54	64	73	46	60	4	87	1950*	33	1994*	0.01	0	0	1	0
22	74	50	62	73	45	59	3	88	1950*	35	1992*	0	0	0	3	0
23	74	43	58	72	45	59	-1	86	1949*	35	2010*	0	0	0	7	0
24	75	52	64	72	45	58	6	87	1995*	34	1971*	0	0	0	1	0
25	76	44	60	71	44	58	2	87	1950*	32	1952*	0	0	0	5	0
26	65	42	54	71	44	58	-4	87	1995*	34	2010*	0	0	0	11	0
27	70	46	58	70	44	57	1	86	1954*	26	2010*	0.05	0	0	7	0
28	66	38	52	70	43	57	-5	83	1949*	30	1994*	0	0	0	13	0
29	66	44	55	70	43	56	-1	83	1953*	33	1976*	0	0	0	10	0
30	65	38	52	69	43	56	-4	82	2008*	32	1975*	0	0	0	13	0

M = Missing

Appendix D

Field Data

Appendix D

Field Data

Active Channels

Field Data Sheet : Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sam pl e Point # an d/ o r Drainage ID # R S'-f0.-	Date: nl13//rn	Representativephoto taken?_Y_ Ye s /_ No
Upland Indicators	*WatercourseIndicators*	
Av Horlwn	Bars: mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
Blotubation	Bifurcat ed flow	Secondary channels
caliche·coatings. layers, rubble	B1ot1c crusts	Secondary channel bypassing obstruction
carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathenng	Crusts: carbonate, sail, & soda	Sand filled channels
Coppice dunes: acuve & relict	Cut banks	Scour holesdownstream of obstructions
Deflated surfaces	Des1ccat1on Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drrft:organic	Sediment ramps
Over-turned rock	Exposed roots below intact soillayer	Sediment sorting
Relict bar & swale	Flow or streaming llneations	Sediment· tails
Relict channel	Headcuts	Springs
Rock fracture in place	lmbricated gravel	Stainingof rocks
Rock varnish	Knick Points	St epped-bed morphology in gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundati on. nood1ng, ponding , or substrate saturation	egetatlon - channel alignment
SOIidevelopment	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water levelmarks
Woody debris in place	Rliis	Wrack, woody

Note s:

• Adapted from: A Field Guide to the Identificat ion of the Ordinary High Water Mark (OHWM} In the Arid West Region of the Western United State s, A Delineation Manual (Lichvar and Mccolley 2008}; and Methods to Describe and Delineate Episodic Stream Processon Arid Landscapes for Permitting Utllty-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet : Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # and/or **DrainageID#** h:"S L\ b

Date: ,, / 13)/{p

Representative photo **taken?** **Yes / No**

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
Biotubatlon	Bifurcated flow	Secondary channels
caliche ; coatings. layers,rubble	B,ouc crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts. carbonate, salt, & soda	Sand hlled channels
Coppice dunes: active & relict	u t banks	Scourholes downstream of obs-tructlons
Deflated surface5	Desiccatoon Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	[illegible] organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Reltct bar & swale	Flow or streaming lineat1ons	Sediment· tails
Relict channel	Headcuts	Springs
Rock fracture in place	lmbricated gravel	Stainingof rocks
Rock varnish	l(n,ck Points	Stepped-bed morphology in gravel
No flow or ponding indicators	Levee **Ridges** sand & gravel	Substrate staining
Rublfied rock undersides	Observed ,nundat,on: flooding. ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water levelmarks
Woody debris In place	Rliis	Wrack, woody

Notes:

• Adapted from: A Field Guide to the ldentlflc.alionof the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Llchvar and Mccoll ey 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utltrty-Scale Solar Power Plants (Brady and Vyverberg , 2013) .

Field Data Sheet : Identificat ion of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# **and/or** **Drainage ID#** _/(_ **51./** *C-*	**Date:** *1,/13)1'1*	**Re prese ntative photo taken?**/______Yes /_ No
U pland Indicators	***Watercourse Indicators***	

AV Horizon	Bars: mud, sand & gravel	Rippl es
Biotic Soll Crust	Beach ridges	/ Scour
Biotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Bioticcrusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
CJast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	u t b anks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drape	Sediment plastering
Desert pavement	0 r[ft: organic	Sediment ramps
Over-turned rock	EMposed rootsbelow intact soil layer	Sediment sorting
Relict bar & swale	w or streaming llneatlons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morpho logy In gravel
No flow or pondingindicators	Levee Ridges: sand &gravel	Substrate staining
Rubifled rockundersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation -channel alignment
Soil development	Out of channel flow	Water-cut benches
Surface roundingof landform	Overtumed rocks	Water levelmarks
Woody debris In place	Rills	Wrack: woody

Notes:

• Adapted from: AField Gulde to the Identificationof the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Lithvar and McColley 2008); and Methods 0 Describe and Delineate Episodic Stream Process on ArldLandscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # **and/ or** **Drainage ID #** t.-<LIł0	**Date:** 11I| /I/>	**Representative photo taken?** Yes/ .,P o

Upland Indicators	***W at ercourse Indicators***	
Av Horizon	Bars: mud. sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
Biotubat1on	Bifurcate d flow	Secondary channels
Callche: coatings, layers,rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts· carbonate, salt,&soda	Sand filled channels
Coppice dunes: active & relict	/ut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sedimen t plastering
Desert pavement	Dri ft; organic	Sediment ramps
Over-turned rock	Exposed roo ts below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming llneations	Sediment: tails
Relict channel	Headcuts	Spr ings
Rock fracture In place	Imbrlcated gravel	Stalningof rocks
Rock varnish	I<mck Points	Stepped-bed morphology In gravel
No flow or ponding indicators	Levee Ridges: sand &gravel	Substrate staining
Rubified rockundersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soll development	Out of channel flow	Water-cut be nches
Surface rounding of land form	Overturn ed rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

Notes:

• Adapt ed fr om: A Field Guide to the Identificationof the Ordinary High Water Mark (OHWM) i n the Arid West Regionof the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Ari d la ndscapes for Permitting Utility-ScaleSolar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet : Identification of Geomorphic Indicat ors of Upland and Watercourse Areas

Sample Point # and/or **Drain ageID#** _ /(J ;)	Date: JI/12/ /	Representative photo ta ken?_ Yes I L.o

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Blotubation	Bifurcated now	Secondary channels
CJliche coatings,!avers, rubble	Biotic crusts	Secondary channel bypassing obstruction
carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathenng	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: acuve & relict	✓ Cut banks	Scour holesdownstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Dn ft : organic	Sediment ramps
Over turned rock	Exposed roots below intact soillayer	Sediment sorting
Relictbar &swale	Flow or streaming llneat1ons	Sediment: tail s
Relict channel	Headcuts	Springs
Rock fracture In place	lmbri cated gravel	Sta,n,ng of rocks
Rock varnish	Knick Pomts	Stepped bed morphology in gravel
No flow or ponding Indicators	Levee Ridges: sand &gravel	Substrate staining
Rublfled rock undersides	Observed1nundation:llooding,ponding,or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debrisin place	**Rliis**	Wrack: woody

Notes:

•Adapted from: AField Guide to the Identificationof the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting U!illty-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# and/or Drainage ID# I	**Date:** 1 /ltp / (ID	**Representative photo taken?** _ _Yes /i **No**

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	v"" 'Scour
Biotubation	Bifurcated flow	Secondary channels
Caliche'. coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	/ Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud· cracks, curls/ drapes	Sediment plastering
Desert pavement	''' *f* Drift:organic	Sediment ramps
Over - turned rock	Exposed rootsbelow intact soillayer	Sediment sorting
Relict bar & swale	Flow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	lmbrlcated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No now or pondingindicators	Levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soll development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

Notes:

- Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Uchvar and McColley 2008); and Methods to Describe and Dellneate Episodic Stream Process on Arid landscapes for Permitting Utility-Scale Solar Power Plants(Bradyand Vyverberg, 2013).

Field Data Sheet : Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # RR
and/or
Drainage ID# I'DS

Date: 11/13//(

Representative photo taken? __ Yes/ _ b

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic SollCrust	Beach ridges	yscour
Biotubation	Bifurcated flow	Secondary channels
Caliche: coatings. layers. rubble	B,ouccrusts	Secondary channel bypasstng obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts, carbona te, salt,& soda	Sand filled channels
Coppice dunes; active & relict	/Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Oes1ccatlon Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	' Drift: organ,c	Sediment ramps
Over-turned rock	EMposed roots below intact soil layer	Sediment sorting
Relict bar & swale	/low ostreaming llneatlons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture 1n p lace	Imbncated gravel	Stainingor rocks
Rock varnish	Knick Points	Stepped-bed morpho logy in gravel
No flow or ponding Indicators	Levee Rodges sand & gravel	Substrate staining
Rublfied rock undersides	Observed inundation: flooding, ponding, or substrate saturatlon	Vegetation - channel alignment
Soildevelopment	Out or channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water *level* marks
Woody debris In place	Rills	Wrack: woody

Note s:

•Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) fn the Arid West Region of the Western United States, A Delineation Manual (lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# and/or DrainageID # RRLO'=f

Date: 1 1/13)/l,

Representative photo taken? **Yes/** l. o

Upland Indicators	*Watercourse Indicators*	
Av Horizon	**Bars:**mud, sand & gravel	Ripples
BioticSollCrust	Beach **ridges**	Scour
Biotubation	Bifurcat ed now	Secondary channels
Caliche : coatings, layers,rubble	B1ot1c crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	**Sediment sheets**
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	u t banks	Scour holesdownstream or obstructions
Deflated surfaces	Desiccation Mud: cracks, curl s/ drapes	Sedimen t plastering
Desert pavement	" 1/ ' 'o nft: organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soillayer	Sedimen t sorting
Relict bar &swale	/low ostreaming llneations	Sediment: tails
Relict channel	Headcuts	**Springs**
Rock frac ture on pl ace	lmbr ica ted gravel	Staining o f rocks
Rock varnish	Kmck Points	Stepped-bed morphology in gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation. flooding, ponding, or substrate saturation	Veget ation - channel alignmen t
Soil developmen t	Out of channel flow	Water-cut benches
Surface roun ding of land form	Overtu rned rocks	Water level marks
Woody debris In place	Rills	**Wrack; woody**

Notes :

•Adapted from: A Field Gulde to the Identificationof the Ordinary High Water Mark (OHWM)in the Arid West Region of the Western **United States, A Delineation Manual (Lichvar and Mccolley 2008) ; and Methods to Describe and Delineate EpisodicStream Processon** Arid Landscapes for Permitting Utility-ScaleSolar Power Plants (Brady and Vyverberg, 2013).

Dormant Channels

Summary of Observed Physical Indicators of Fluvial Inactivity Associated with Abandoned Water Courses Within the Study Area

NOTE THAT DATA SHEETS ARE ORGANIZED BY TYPE OF HYDROLOGIC DISCONNECTION DESCRIBED BELOW

Watercourse ID	Description of Hydrologic Disconnection	Physical Indicators of (fluvial inactivity)
RR1, RR2, & RR3	Small localized erosional features (rill erosion) associated with dirt access road through plowed farm field. Storm water flow contained within localized land feature. Plowed soils intercept surface water flow (Attachment A, Figure 7, Sheet 5).	Hydrologically isolated; no evidence of flow to or from the channels. Field indicators of surface flow found only to be over a short distance within the channel before infiltrating into the soil.
RR7 & RR8	Small localized erosional features (rill erosion) located on margins of graded dirt access road. Storm water flow contained within localized land feature. Roadway intercepts / cuts flow off. Roadway is actively maintained (Attachment A, Figure 7, Sheet 15).	Hydrologically isolated; no evidence of flow to or from the channels. Field indicators of surface flow found only to be over a short distance within the channel before infiltrating into the soil.
RR9, RR10, RR11, RR12, RR13, RR14, RR15, RR16, RR17, RR18, RR22, RR23, & RR40	Small localized erosional features (rill erosion) located on margins of an abandoned graded dirt access road. Storm water flow contained within localized land feature. Roadway intercepts / cuts surface water flow off (Attachment A, Figure 7, Sheet 11).	Hydrologically isolated; no evidence of flow to or from the channels. Field indicators of surface flow found only to be over a short distance within the channel before infiltrating into the soil.
RR6	Excavated ditch adjacent to abandoned cropland no longer irrigated from well-water source; Without irrigation, no excess irrigation runoff to ditch adjacent to constructed berm (Attachment A, Figure 7, Sheet 11).	Hydrologically isolated; no evidence of flow to or from the channel. No field indicators of flow found.
RR19, RR20a-f, RR21a-b, RR24a-e, RR25a-e, RR26, RR27a-b, RR28a-b, RR29, RR30a-b, RR31, RR32, RR33, RR34a-c, RR35, & RR36	Small localized erosional features (rill erosion) located on margins of an abandoned graded earthen levee surrounding a former irrigated cropland. Features result of levee construction (Attachment A, Figure 7, Sheet 11).	Hydrologically isolated; no evidence of flow to or from the channels. Field indicators of surface flow found only to be over a short distance within the channel before infiltrating into the soil.
RR37, RR38a, RR38b, & RR39	Storm water flow contained within localized land feature. Surface water flow cut-off upgradient by deeply incised dirt roadway maintained by periodic road grading; Roadway captures upslope surface water flows where they are absorbed into the soil. Roadway cut exposed underlying sand sheets / dune soils covered by alluvial fan deposits (see Appendix A, Figure 7, Sheets 10 & 15 and Figure 8). Hydrologically isolated with no flow to or from channels observed. Roadway is actively maintained.	Hydrologically isolated; no evidence of flow to or from the channels. Field indicators of surface flow found only to be over a short distance within the channel before infiltrating into the soil.
RR47b, RR69, RR70, RR73, RR83, & RR85	Upgradient surface water flow cut-off from the west and northwest by sand sheet movement (see Appendix A, Figure 7, Sheet 10; and Figure 8).	Hydrologically isolated; no evidence of flow to or from the channels. Field indicators of surface flow found only to be over a short distance within the channel before infiltrating into

Summary of Observed Physical Indicators of Fluvial Inactivity Associated with Abandoned Water Courses Within the Study Area

NOTE THAT DATA SHEETS ARE ORGANIZED BY TYPE OF HYDROLOGIC DISCONNECTION DESCRIBED BELOW

Watercourse ID	Description of Hydrologic Disconnection	Physical Indicators of (fluvial inactivity)
		the soil.
RR90, RR91, RR92, RR93, RR94, RR95, RR96, RR97, RR98, RR99, RR 100, RR101, & RR 102,	Upgradient surface water flow cut-off by sand sheet movement and dune soils. Hydrologically isolated with no flow to or from channels observed (see Appendix A, Figure 8). (see Appendix A, Figure 7, Sheets 16 and 17; and Figure 8).	Hydrologically isolated; no evidence of flow to or from the channels. Field indicators of surface flow found only to be over a short distance within the channel before infiltrating into the soil.
RR77 & RR80	Surface water flows from Pallowalla Wash/ channel diverted by earthen dike and intercepted by detention channel to protect solar farm project located to the northwest (see Appendix A, Figure 7, Sheet 6; and Figure 8).	Hydrologically isolated; no evidence of flow to or from the channels. Field indicators of surface flow found only to be over a short distance within the channel before infiltrating into the soil.
RR66, RR67, RR68, RR81, & RR82, RR106	Sand sheet formation between discharge point and historical stream channels prevents surface water from reaching channels (see Appendix A, Figure 7, Sheets 2, 3, 5, & 6; and Figure 8).	Hydrologically isolated; no evidence of flow to or from the channels. Field indicators of surface flow found only to be over a short distance within the channel before infiltrating into the soil.
RR42 – RR47a, RR48 - RR58, RR60, RR71, RR72, RR74 – RR76, RR84, RR86 - RR88, RR103, & RR104	Sand sheet formation and movement combined with maintained incised dirt roadway cuts-off surface water flow to historical stream channels preventing surface water from reaching channels (see Appendix A, Figure 7, Sheets 9 & 10; and Figure 8).	Hydrologically isolated; no evidence of flow to or from the channels. Field indicators of surface flow found only to be over a short distance within the channel before infiltrating into the soil.

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # ______ **and/or** **Drainage ID #** RR&I	Date: 11/r /1r..	Representative photo taken? __ Yes/ . . L-o

Upland Indicators	I I	***Watercourse Indicators***
Av Horizon	Bars: mud, sand & gravel	Ripples
Blotrc SollCrust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Bioticcrusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts:carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	/utbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks,curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots belowIntact sol! layer	Sediment sorting
Relict bar &swale	ow or streaming llneat1ons	Sediment:: tails
Relict charinel	Headcuts	Springs
Rock fracture In place	Imbrlcated gravel	Stammg of rocks
Rock varnish	Knick Points	Stepped -bed morphology In gravel
No now or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rockundersides	Observed Inundation: flooding, ponding,or substrate saturation	Vegetation -channel allgnment
Soll development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris 111 place	Rliis	Wrack: woody

Notes:

•Adapted from: AField Gulde to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Uthvarand McColley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas,

Sample Point # ______ **and/or** **Drainage ID #** RR.	Date: 11/13/Jlit	**Representative photo taken?** **Yes/** **No**

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
81otlcSoll Crust	Beach ridges	Scour
Blotubatlon	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / **rock** weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	i/utbanks	Scour holesdownstream of obstructions
Deflated surfaces	Desiccat1on Mud : cracks, curls/ drapes	Sediment plastering
Desert pavement	Dri ft: organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	lmbncated gravel	Staining of rocks
Rock varnish	Knick ?01nts	Stepped-bed morpho logy in gravel
No flow or pondinglnd1ca t or s	Levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides	Observed Inundation: flooding, ponding, or substrate saturatl on	Vegetation - channel alignment
Solldevelopment	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rliis	Wrack: woody

Notes:

• Adapted from: A FieldGuide to the Identification of the Ordinary High Water Mark(OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Uchvar and Mccolley 2008); and Methods to Describe and Delineate EpisodicStream ?rocess on AridLandscapes for Perm i tt ing Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identific ation of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # **and/or** **Dra i nage ID #** RR(o3>	**Date:** U /J3) J<.0	**Representative photo taken?** **Yes/** **No**
Upland Indicators	I ' ***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripp le s
B1otlc Soll Crust	Beach ridges	Scour
Biotubatlon	Bifurcated flow	Secondary channels
Caliche: coatlngs, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts:carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	/Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud : cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	E posed roots below Intact soil layer	Sediment sorting
Relict **bar** & swale	/Flow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed Inundation: flooding. ponding, or substrate saturation	Vegetation - channel alignment
Soildevelopment	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

Notes:

• Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United St.ates, A Delineation Manual (Lichvar and McCollev 2008); and Mel hods to Describe .and Delineate Episodic Stream Process on Aridlandscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point #: and/or Drainage ID# /<RC,':f	Date: 11)13)/ l f	Representative photo taken?_ Yes/ L.0

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruc-t1on
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand ntled channels
Coppice dunes: active & relict	l/Cutbanks	Scour holes downstream of obstructions
Deflated surfaces	Desfccatlon Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sediment sorting
Relict bar & swale	/low o streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rubffled rock undersides	Observed inundation: noodlng, ponding, or substrate saturation	Vegetation - channel alignment
Solldevelopment	Out of channel flow	Water-cut benches
Surface rounding of landform	Overtumed rocks	Water level marks
Woody debris in place	Rliis	Wrack: woody

Notes:

"Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Llchvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # : **and/or Drainage ID #** RR.GS	**Date:**)/;3// I	**Representative photo taken?**__ **Yes/** /. o

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars: mud, sand &gravel	Rlpples
BioticSoil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flo w or streaming llneations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides	Observed inundation : noodlng, ponding, or substrate saturation	Vegetation - channel alignment
Solldevelopment	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water levelmarks
Woody debris in place	Rliis	Wrack: woody

Notes :

"Adapted from: AField Gulde to the Identlfic-ationof the Ordinary High Water Marl< (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Llthvarand Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Protess on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet : Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # and/or Drainage ID # J?R. , : .1	Date: 11/13)/i	Representative photo taken? _ _ Yes / .L. 0

Upland Indicators	Watercourse Indicators	
Av Horizon	Bars:mud, sand & gravel	Ripples
Biotic SollCrust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts:carbonate, salt,& soda	Sand filled channels
Coppice dunes: **active** & relict	I, tbanks	Scour holes downstream of obstructions
Deflated surfaces	Des1cca1ton Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sediment sorting
Relict bar & swale	/low ostreaming ilneations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbri cated gravel	Staining of rocks
Roclcvarmsh	Knick Points	Stepped-bed morphology in gravel
No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rubifled rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soildevelopment	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Waterlevel marks
Woody debris In place	Rills	Wrack: woody

Notes:

•Adapted from: A FieldGuide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Uchvar and McColley 200B); and Methods to Describe and Delineate Episodic Stream Processes on **Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).**

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # and Drainage ID # RR'1C,

Date: JJ/13/ J

Representative photo taken? Yes/

Upland Indicators	/ **Watercourse Indicators**	
Av Horizon	Bars: mud,sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Caliche:coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts:carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks,curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	,-Flow or streaming lineations ./	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soildevelopment	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

Notes:

• Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Uchvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Processon Arid Landscapes for Permitting Utility-Scale Sola,Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # f:t1 :
and/or
Drainage ID # R.R

Date: uJ,))

Representative photo taken? _ _ Yes/ L.o

Upland Indicators	f I *W atercour se Indicators*	
Av Horizon	Bars: mud, sand &gravel	Ripples
Biotic SoilCrust	Beach ridges	Scour
Biotubat1on	Bifurcated flow	Secondary channels
Callche : coatings , layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	1/ t ban ks	Scour holes downstream of obstructions
DeOated surfaces	Desiccation Mud: cracks,curls / drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turn ed rock	Exposed rootsbelowIntact soil layer	Sediment sorting
Relict bar & swale	low or streaming llneations	Sediment: tails
Relict channel	Headcuts	Spnngs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morpho logy in gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundati on: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soildevelopment	Out of channel flow	Water-cut benches
Surface rounding of landform	Overtumed rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

Notes:

*Adapted from: AFieldGuide to the Identifi cation of the Ordinary High Water Marl((OHWM) in the Arid West Region of the Western United States, A Delineatio n Manual (llchvar and Mccolley2008) and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants(Brady and Vyverberg, 2013).

Active Watercourses

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# ______ and/or D rainage ID # FP 1	Date: n/r //o I	Representative photo taken? 'V''' Yes/ __ No SP /-)-:

Upland Indicators	**_Watercourse Indicators_**	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach rrdges	Scour
Blotubation	Bifurcated flow	Secondary channels
Caliche: coatings , layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Oast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream or obstructions
Deflated surfaces	V esiccatlon Mud: cracks curls/ drapes	Sediment plastering
Desert pavement	a'''·'Drift:organic	Sediment ramps
Over-turn ed rock	Exposed roots below Intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineations	Sediment· **tails**
Relict channel	Headcuts	Springs
Rock fracture In place	Imbrlcated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No rlow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inu ndation : noodlng, ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cut benches
Surface ro unding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

Notes:

•Adapted from: A Field Gulde to the Identificati on of the Ordinary High Water Mark {OHWM} In the Arid West Regionof the Western United States, A Delineation Manual (Lichvar and McColley 2008}; and Methods to Describe and Delineate Episodic Stream Process on AridLandscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# and/or Drainage ID# **FP ;L**	Date : 11/r)/&J	Representative photo taken? / Yes /_ No 1, 7. ! t..\
Upland Indicators	' I ***Watercourse Indicators***	
Av Horizon	Bars: mu,d sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Caliche: coatings, layers,rubble	Bioticcrusts	Secondary channel bypassing obstruction
Carbonate etching	Drainageswales	Sediment sheets
Clast / rock weathering	Crusts:carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Dnh:organic	Sediment ramps
Over-turned rock	Exposed rootsbelow Intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineations	Sediment:tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or pondingIndicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observedinundation: flooding,ponding,or substrate saturation	Vegetation - channelalignment
Soil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debrisIn place	Rills	Wrack: woody

Notes:

•Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Processes on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# ffJ and/or **Dra inage ID#**	Date 11/23/1	Representativephototaken? Yes/ _ _ No
Upland Indicators	I f ***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripp les
Biotic Soll Crust	Beach ridges	Scour
Biotubation	Bifurcated now	Secondary channels
canche: coatings, layers,rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	*Sand* filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated sur faces	Desiccation Mud: cracks, curls *I* drapes	Sediment plastering
Desert pavement	Drif t: organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sedlmen t sorting
Rellct bar & swale	Flow or streaming lineatlons	Sediment· tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped -bed morphology in gravel
No flow or pondingIndicators	Levee Ridges: sand & gravel	Substrate staining
Rubifled rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channelalignment
Soll development	Out of channel now	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

Notes:

• Adapted from: A Field Gulde to the Identificationof the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (lichvar andMccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Abandoned Channels

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# |+ :
and/or
Dra in age ID # {ZJl. \

Date: ll /11 Hlu

Representativephoto taken? __I Yes / _ **No**

Upland Indicators	Watercourse Indicators	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubatlon	Bifurcated now	Secondary channels
Callche: coatings, layers,rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	and filled channels
Coppice dunes: active& relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	,osedroots below Intact soil layer	Sediment sorting
Relict bar & swale	/Flow orstreaming llneatlons v	Sediment: tails
Relict channel	Headcuts	Springs
Rock fractureIn place	lmbrlcated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding indicators	levee Ridges: sand & gravel	Substrate staining
Rubilledrock undersides –	Observed inundat ion: flooding, ponding, or substrate saturation	Vegetation - channel alignment
0011development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rliis	Wrack: woody

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• Adapted from: A Field Gulde to the Identificationof the Ordinary High Water Mark (OHWM)In the Arid West Region of the Western United States, A Delineation Manual (Uc.hvar and Mccolley 2008); and Methods to Desaibe and Delineate Episodi cStream Process on Aridlandscapes for Permitting Utlll ty-Scale Solar Power Plants (Brady and Vyverberg. 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Wat ercourse Areas

Sample Point# \..,_ **and/ or Drainage ID#** Q._(2._t	**Date:** //1\i/\v	**Representativephoto taken?___!_Yes/_ No**

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bar5:mud, sand & gravel	Ripp les
Biotic Soil Crust	Beach ridges	Scour
Biotuballon	Bifurcated flow	Secondary channels
Callche coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obst ruction
Carbonate etching	Drainage swales	Sediment sheets
Cla5t / rock weathering	Crusts: carbonate, salt,& soda	an d filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls / drapes	Sediment plastering
Desert pavement	Ori :organic	Sediment ramps
Over-turned rock	Exposed rootsbelow Intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming llneatlons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracturein place	lmbrlcated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rub,fied rock undersides ,,.	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation -channel alignment
!/' Soll development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills .	Wrack: woody

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•Adapted from A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Processon Arid Landscapes for Permitt ing Utili ty•Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample **Point#** |+ -. **and/or** 0..(7..6 D ag#	Date : \\,, ,\li	Representativephoto taken? Yes / _ **No**

U pland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand &gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Blo!ubation	Bifurcated flow	Secondary channels
Caliche· coatings, layers,rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	I/' Sand filled channels
Coppice dunes: active & relict	Cutbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastering
Desen pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roo ts below Intact soil layer	Sediment sorting
Reflct bar & swale	f'fo w or streaming llneations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No rtow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cut benches
Surface rounding of landforrn	Overturned rocks	Water level marks
Woody debris in place	Jlills	Wrack : woody

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• Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Uchvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Processon Arid Landscapes for Permitting Utility-Scale Solar Power Plants {Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point#)._0 **and/or** **Drainage ID #** 12-.r<. "=}-	**Date :** lt/ ,\) /H.1	**Representative phototaken?** _!_ **ves** /_ **No**

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
BioticSollCrust	Beach ridges	co ur
Blotubatlon	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etchmg	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, sail,& soda	Sand fllled channels
Coppice dunes: active & relict	Cut banks I	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaminglineatlons \	Sediment: tails
Relict channel	Headcuts	Springs
Rock ŗracture in place	Imbrlcated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
j/" Soll development	Out of channel flow	Water-cut benches
Surface roun ding of landform	overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

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*Adapted from: A Field Gulde to the Identification of the Ordinary High Water Mark(OHWM) in the **Arid** West Region of the Western United States, A Delineation Manual (Uchvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on AridLandscapes for Permitting Utllity•Scale Solar Power Plants (Brady and Vyverberg, 2013).

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Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

1 L Sample Point# _ i.J II and/or tJJ .., Drainage ID# t,.t--	Date: \. / I?. / \\IJ	Representative photo taken? _ Ves / _ No

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand &gravel	Ripples
Biotic Soil Crust	Beach ridges	our
Biotubation	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt. & soda	Sand filled channels
Coppice dunes: active & relict	/ Cutbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation M ud· cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sediment sorting
Relict bar & swale	/lowo streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rliis	Wrack : woody

Notes: Small localized channel adjacent to graded dirt Road. No flow into or out of channel. Some spotty flow within channel result of local Rainfall, but no flow outside banks. Flow infiltrated into channel soil.

• Adapted from: /,.fieldGuide to the Identification of the Ordinary HighWater Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (lichvarand Mccolley 2008); and Methodsto Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants {Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point #---!..;;__ _, and/or tJ• J ':\ Drainage 10 # I\ f<. " I	**Date:** II / I /' I(J	**Representative photo taken? _f___ves /_ No**
Upland Indicators	***Watercourse Indicators***	
Av Hori{on	Bars: mud, sand & gravel	Ripples
B1otfc Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Callche: coatings, (ayers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	n d filled channels
Coppice dunes: active & rellct	Cutbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud : cracks, curls/drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relfct bar & swale	Flow or streamingllneatlons \I	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rliis	Wrack: woody

Notes: Small/localized Rill on margin of an abandoned dirt Road. Isolated, no flow into or out of channel. flow within channel spotty & contained in channel. Local precipitation caused flow w/ flow draining into channel soil.

"" Adapted from: A Field Gulde to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Llchvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # ’— ’ : **andJor** **D rainage**ID II ! t	**Date :** 1\ /\'At \\o	Representative photo taken? _ Yes/ _ No
Upland Indicators	***Watercourse Indicators*** I	
Av Horizon	Bars mud, sand & gravel	Ripples I
Biotic Soll Crust	Beach ridges	scour
Biotubatlon	Bifurcated flow	Secondary channels
Caliche coatings. layers,rubble	Bioticcrusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
C!ast / rock weathering	Crusts·carbonate, salt,& soda	Sand filled channels
Coppice dunes:active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud : cracks, curls / drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	EMposed roots below Intact soil layer	Sediment sorting
Relict bar & swale	/low ostreaming Hneations	Sediment: tails
Relict channel	Headcuts	Spnngs
Rock frac ture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding Indicators	levee Ridges: sand & gravel	Substrate staining
Rubined rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
oil development	Out of channel flow	Water-cut benches
Surface rounding of l;indform	Overturned rocks	Water level marks
Woody debris in place	**Rills**	Wrack:woody

Note..: /(l! Cf,(f b)

*Adapted from: A Field Gulde to the Identification of the Ordinary High Water Mark(OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Uchvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Processon Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

SamplePoint# 1..,(8
and/ or
Drainage ID # Rl2-I 1

Date : \\1, / I'"

Representativephoto taken? _ I **Yes/ _ No**

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Galiche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainageswales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	and filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation M ud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	£>(p o sedroo ts below Intact sol! layer	Sediment sorting
Relict bar & swale	Flow or streaming lineatlons	Sediment. tails
Relict channel	Headcuts	Springs
Rock fracture In place	I mbrlcated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology1n gravel
No flow or ponding Indicators	LeveeRidges: sand & gravel	Substrate staining
Rublfled rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
1I development	Out of channel no w	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in pl ace	Rliis	Wrack: woody

Notes: /tfe 9(/0

•Adapted from: A FieldGuide to the Identificationof the Ordinary High Water Mark(OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Llchvar and McColley 2008); and Methodsto Describe and Delineate EpisodicStream Processon Arid Landscapes for Permitting Utility-ScaleSolar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# LI **and/or** **Drainage ID #** ,Ztz \l	**Date:** l /l?../l"'	**Representativephoto taken?** _ **Ves** / _ **No**

Upland Indicators	*Watercourse Indicators*	
Av Horlrnn	Bars: mud, sand & gravel	Ripples
BioticSoil Crust	Beach ridges	Scour
B1otubatlon	Bifurca t ed flow	Secondary channels
Callche:coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	and filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud : cracks. curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming llneations v'	Sediment: talls
Relict channel	Headcuts	Springs
Rock fracture In place	I mbrlcated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flowor pondingindicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed i nundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water l evel marks
Woody debris In place	Rills	Wrack: woody

Notes: 5 /r'A5' (1,)

*Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Llchvar and Mc.Colley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # :_q **and/or** **Drainage ID #** t J.-	**Date :** \1/ t,l / \ lp	**Representativephoto taken?__ Yes/ __ No**

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	/"d filled channels
Coppice dunes: active& relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed rootsbelow intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rockundersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
oil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

Notes 5 t:,,,._

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• Adaptedfrom: AFieldGuide to the Identificationof the Ordinary High Water Mark(OHWM) In the Arid West Region of the Western United States, A Delineation Manual (lichvar andMccolley 2008;) and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # 1 (,- **and/or** **Drainage ID#** Kt' I	**Date:** '\J I'I llu	**Representative photo taken?** _ 1_ **Ves / _ _ No**
Upland Indicators	***W atercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
Biotubation	Bifurcated now	Secondary channels
Callche·coatings, layers, rubble	Bioticcrusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	d filled channels
Coppice dunes: active & relict	Cutbanks	Scour holes downstream of obstructions
Denated surfaces	Desiccation Mud : cracks, curls / drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineatlons	Sediment. tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
,,.-5011development	Out of channel now	Water-cut benches
Surface roundingof landform	Overturned rocks	Water l evel marks
Woody debris In place	Rills	Wrack: woody

No _._p j? 7 (}'-4(,Nb/ ./ R. I/

• Adapted from : A Field Gulde to the Idenll flcatlon of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Llchvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid l..hdscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# L.. C. 1-
and/or t'
Drainage ID # 1 I'-- .)

Date: \l/lJ./ llr

Representative photo taken? **Yes** / **No**

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Caliche coatings, layers, rubble	Bioticcruru	Secondary channel bypasslng obstruction
Carbonate etching	Drainage swales	Sediment sheets
Oast / rock weathering	Cru5ts: carbonate, salt, & soda	nd filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstruct,om
Deflated surfaces	Deslccation Mud : cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift : organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming llneatlons /	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channelalignment
l ..sfiil development	Out of channel flow	Water-cul benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

Notes: Same as RRG (See Notes)

• Adapted from: A Field Guide to the Identificationof the Ordinary High Water Mark(OHWMJ In the Arid WestRegion of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes tor Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# . . -l **and/or** **Drainage ID #** t 'r-''''	**Date:** \I ,i lllP	**Representative photo taken?**_ **Yes/ No**

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Blotubatlon	Bifurcated flow	Secondary channels
Caliche: coatings, layers,rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	filled channels
Coppice dunes: active &relict	Cutbank5	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud : cracks, curls/ drapes	Sediment plastering
Oese11 pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sediment sorting
Relict bar & swale	Flow or s ream,ng lfneatlons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbncated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	ObservedInundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
0oil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Ove11urned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

Notes: JeR_ 7 $tI,(#)

• Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Uchvar and Mccolley 2008) and Methods to Describe and Delineate Episodic Stream Process on Aridl..Indscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # L9 ; **and/ or** Drainage ID# |<'	Date : \ /\.lllto	Representative photo taken? _ _ Yes / _ _ No

Upland Indicators	**Watercourse Indicators**	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	nd filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks,curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineations /	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
l., .Soil development	Out of channel flow	Water-cut benches
Surface roundingor landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

Note 4;>/?./c1($'/V)

•Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Llchvar and McColley 2008); and Methods to Describe and Delineate Episodic Stream Processes on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverbe.rg, 2013).

Field Data Sheet : Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # -Z..t\ and/or **Drainage ID#**

Date: ', I IIII

Representative photo taken? _ Yes/___No

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic SoilCrust	Beach ridges	Scour
Bfotubatlon	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts:carbonate, salt, & soda	d filled channels
Coppice dunes: active & relict	Cut banks	Scour holes dowmtream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding Indicators	levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
V Oll development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

Notes: A f?-. ff

Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Llchvar and McColley 2008); and Methods to Describe and Delineate Episodic Stream Processes on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# v **and/or** Drainage ID # ▪	Date: ll /l ;1. /Ho	Representative photo taken?__ Yes/_ **No**

Upland Indicators	Watercourse Indicators	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	/cour
Biotubation	Bifurcated flow	Secondary channels
Caliche · coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets 't.
Oast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastenng
Desert pavement	Drift: organic	Sediment ramps
Over-turned roe](	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides .,	Observed inundation: flooding. ponding, or substrate saturation	Vegetation - channel alignment
\Aoil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	- Rills	Wrack; woody 2

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" • Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark {OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid landscapes for Permitting Utility-Scale Solar Power Plants {Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # ,0 **and/or** Dra i nag e ID# K :,]	**Date:** | r I \ lP / l t.P	**Representative photo taken?**__ **Yes** / __ **No**

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	/our
Biotubation	Bifurcated flow	Secondary channels
<:aliche : coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
DeOated surfaces	Desiccation Mud : cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	lo w or streaming llneations	Sediment: talls
Relict channel	Headcuts	Springs
Rock fracture In place	lmbr!cated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morpho logy in gravel
No flow or pondingIndicators	Levee Ridges: sand & gravel	Substrate staining
Rubifled rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channelalignment
\/'3'oil development	Out of channel flow	Water-cut benches
Surface rounding of Jandform	Overturned rocks	Water level marks
Woody debris In place	Rills l	Wrack: woody

Notes: ••) :2, { '11.J

•Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Aridlandscapes for Permitting Utllity-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# iT **and/or** **Drainage** ID # f	**Date:** /l\lll\JJ	**Representative photo taken?** _ **Yes/** _ **No**

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars:mud, sand & gravel	Ripples
BioticSoll Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
callche:coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, &soda	Sand filled channels
_ Cuppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
ll eflated surfaces	Desiccation Mud : cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soll layer	Sediment sorting
Reflct bar & swale	Flow or streaming llneatl ons	Sediment; tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbrlcated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
/o flow or ponding Indicators	levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides	Observed inundati on: flooding, ponding, or substrate saturation	Vegetation - channel alignment
} _soil"lfevelopment	Out of channel now	Water-cut benches
/urface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rliis	Wrack : woody

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* Adapted fronl: A Field Guide to the Identificati on of the Ordinary"'iigh Water Mark(OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Uchvar and McColley 2008); and Methods to Describe and Delineate Episodic Stream Process on AridLandscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # l '- **and/or** **Drainage ID #** it-.. li	**Date:** 1\/\?-h\.p	**Representative photo taken?** V **Yes/**___**No**

Upland Indicators	Watercourse Indicators	
Av Horizon	Bars: mud, sand& gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Bioturbation	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
ell ated surfaces	Desiccation Mud: cracks, curls / drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding indicators	Levee Ridges, sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack : woody

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Notes:

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•Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Processes on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # •Lfl, **and/ or Drainage ID#** IC\	**D ate:** \ /11 /1,11	**Representative photo taken?_ _ Yes / _ No**

Upland Indicators	***Wate rcourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripp les
Biotic Soil Crust	Beach ridges	/Scour
Biotubation	Bifurcated flow	Secondary channels
Caliche:coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand fil led channels
Coppice dunes: active & relict	Cutbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift : organic	Sediment ramps
Over-turned rock	Exposedroots below tntact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Stainingo f rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubifled rock undersides	Observed Inundation: nooding, ponding, or substrate saturation	Vegetation - channel allgnment
oildevelopme	to channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

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• A d a pted from : A Field Guide to th e Ident ificati on of th e Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Uchvar and M ccolley 2008); and M ethods to Describe and Delineate Episodic Stream Processon Arid Landscapes for Permitting Utlll ty-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identific at ion of Geomorphic Indicators of Upland and Wate rcourse Areas

Sample Point /t 'l1J , **and/or** **Drainage ID #** . . t: I . W	**Date:** l, Jtt,	**Representative photo taken?** Lves **No** ___
Upland Indicators	***W atercourse Indicators***	
Av Horizon	**Bars:** mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	/our
B1otubatlon	Bifurcated now	Secondary channels
Callche : coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes· active & relict	Cutbank5	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No now or ponding indicators	Levee Ridges: !.and & gravel	Substrate staining
Rubified rock undersides	Observed inundation ; flooding, ponding, or substrate saturation	Vegetation- channel alignment
0"011development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rliis	Wrack : woody

Notes: G fiR.. /C, (1tf.'4/J,AA- ./, L_:_;_)

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Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# **and/or** **Drainage ID** RR ;;i0 b	**Date:** J1!1d-JJ (,	**Representative photo taken?** _ Yes/
Upland Indicators	***Watercourse Indicators***	
AV Horiwn	Bars: mud. sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Blotubatlon	Bifurcated now	Secondary channels
Caliche: coatings, layers,rubble	Biotic crusts	Secondary channel bypassing obstruction
carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	Cu t banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls / drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intat t soil layer	Sediment sorting
Relict bar & swale	Flo w or streaming llneations	Sedlmerit·tails
Relict channel	Headcuts	Springs
Rock fract\Jre In place	Imbrlcated gravel	Stainingof rocks
Rock varnish	Knlck Po,nts	Stepped-bed morphology in gravel
No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rubrfled rock undersides	Observed lnundatlon : flooding, ponding, or substrate saturation	Vegetation - channel alignment
l Soil development	Out or channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debrisin place	Rill s	Wrack: woody

Notes: ft/ I'1 (t '-6 J

· **Adapted** from: A Field Gulde to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point It J<R an d/ or **Drainage ID** # ;:Ji)C--	Date: il1/;))jI,	Representative photo taken?___ Yes / -P0
Upland Indicators	' I ***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Blotubation	Bifurcated flow	Secondary channels
Callthe: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	ut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls / drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	flow or str eaming llneations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	lmbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or pondingindicators	Levee Ridges: sand & gravel	Substrate staining
Rublfled rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
t,.>d'I development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

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Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # **and/or** Drainage ID # RR;;>o0\	**Date:** 1 ,/, / 1	Representative photo take n? Yes/

Upland Indicators	*Watercourse Indicators*	
Av Hamon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Blotubatlon	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swale	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Copplce dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact sofl layer	Sediment sorting
Relict bar & swale	Flow ontreamIng llneations	Sediment : tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbrlcated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation : flooding, ponding, or substrate saturation	Vegetation - channel alignment
v"S oll development	Out of channel flow	Water cut benches
Surface rounding of landform	Overturned rocks	Water levelmarks
Woody debris In place	Rills	Wrack: woody

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Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # and/or Drainage ID # RR-:::Jr> e_..

Date: 11 /1;;>//&?

Representative photo taken? _ Yes / d.

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Blorubation	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	utbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift·organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	low or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gra\lel
No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
/Soil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills -	Wrack: woody

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Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid *West* Region of the Western United States, A Delineation Manual (Uchvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point lt and/or Drainage ID lt jf(<d ƌ	**Date:** II JrJ/Jt,,.	**Representative photo taken? Yes/** / **No**
Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand &gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated now	Secondary channels
caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
carbonate etching	Drainage swales	Sediment sheets
aast / rock weathering	Crusts: carbonate, salt,&soda	Sand filled channels
Coppice dunes: active &relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Vlow streaming lineations	Sediment: tails
Rellt t channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	**Vegetation** - channel alignment
Soil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

Notes: S 6:::> feR.– Ic:; {;: ,ep)

• Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Uchvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Proi;esson Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # rL.
and/ or
Drainage ID# '○' 1- I 0v

Date: \ / IL / I4"

Representative photo taken? ....::!_Yes / _ _ **No**

Upland Indicators	Watercourse Indicators	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	/cour
BlotubatiOn	Bifurcated flow	Secondary channels
Cailche:coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	Cutbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls / drapes	Sediment plastering
Desert pavement	Drift;organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaminglineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Irnbrlcated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate **staining**
RubiOed rock undersides	Observed Inundation: flooding,ponding, or substrate saturation	Vegetation - channel alignment
_/'Soil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rliis	Wrack : woody

Notes: AP- JC, a.,A/DJIU.A

***Adapted** from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Westem United States, A Oelineatfon Manual (Uchvar and McColley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet : Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # **and/or** **Dra inageID#** RRJlb	Date: 11})-:;_/Jt. I I	Re presentative photo taken? __ Yes/ L.0

Upla nd Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Blotubation	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts; carbonate, salt,& soda	Sand filled channels
Coppice dunes: active& relict	i/-utbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or stream ing lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Staining of rocks
Rock varnish	knick Points	Stepped-bed morphology in gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides ,,	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
ii development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Waterlevelmarks
Woody debris *In* place	Rills	Wrack : woody

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• Adap ted from: A fieldGuide to the Identificationof the Ordinary HighWater Mark (OHWM) in the Arid WestRegion of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Aridlandscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# ____________ **and/or** **Drainage** ID # r!_ r \)	**Date:** , ' /l IL / Il1	**Representative photo taken ?** _ **Yes/** _ **No**

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	/cour
Biotubation	Bifurcated now	Secondary channels
CaHche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainageswales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	Cul banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud : cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift : organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineatlons	Sediment: tails
Rellct channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding indicators	Levee Ridges: sand &gravel	Substrate staining
Rublfied rockundersides ,,,,	Observed Inundation: noodlng, ponding, or substrate saturation	**Vegetation** - channel alignment
Soil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

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Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# l<7i and/or Drainage ID# __(:2d't	Date: II /13/ /f.t, I	Representative photo taken?_ Yes / 0-
Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
caliche: coatings, layers,rubble	Biotic crusts	Secondary channel bypassing obstruction
carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	/ Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Des1ccation Mud: cracks, curls / drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sediment sorting
Relict bar & swale	/lowcstre l ison	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbrlcated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped,bed morphology In gravel
No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
011 development	Out of channel flow	Water•cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

Notes: R.fc; (..L(,AJiJ/ ")

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Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# **and/or** **Drainage ID#** .Rf<. c).':J. L-	**Date:** 11/r ,,	**Representative photo taken? _ Yes / / No**
Upland Indi cators	I ***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Rlpp le.s
BioticSoil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Callche: CO'ltlngs, layers, rubble	Blotlc crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	ut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	?w or streaming llneations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped -bed morphology in gravel
No [low or pondingindicators	Levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides –	Observed inundation : flooding, ponding, or substrate saturation	Vegetation - channel alignment
/ Soil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

Note s: { fe..fc- /7 (>".ijJ)1/)

•**Adapted** from: A Field Gulde to the Identificationof the Ordinary High **Water Mark (OHWM)** In the **Arid West Region** of th e **Western United States, A Delineation** Manual **(lichvar and Mccolley 2008);** and **M ethods to** Describe and Delineate **Episodic Stream Process** on **Arid landscapes** for **Permitting** Utility-Scale Solar **Power** Plants **(Brady** and Vyverberg, **2013).**

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# **and/or Drainage ID #** R '-t cl	**Date:** It I 13//(/}	**Representativephoto taken?** _ Yes/

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand &gravel	Ripples
Biotic S011Crust	Beach ridges	Scour
Biotubalion	Bifurcated flow	Secondary channels
Callche, coatings, layers,rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Oast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	V Cul banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	/ Flow or streaming llneations	Sedlment: talls
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation; flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soll development	Out o f channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water levelmarks
Woody debris In place	Riffs	Wrack : woody

Notes: 7'--<- Q-;:> J: /1 ($.4-P A/")

•Adapted from: A Field Guide to the Identificationof the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delfneation Manual (Uchvar and McColley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utili ty-ScaleSolar Power Plants j8rady and Vyverberg 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# RR and/or **Drainage** ID# d-'-\L	Date: 11) 13 /J	Representative photo taken? _ Yes/ /,o

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand &gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubatlon	Bifurcated flow	Secondary channels
callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	t ut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls / drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineations	Sediment: rails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No now or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubifled rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rliis	Wrack; woody

Notes:

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• Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point II 7-'1 and/or ‾fu , ,, .J (N Drainage ID#	Date: \ \ /llP /l(n	Representative photo taken? _ ·_ Yes / __ No

Upland Indicators	Watercourse Indicators	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	/cour
Biotubatlon	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Biotic:crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	/ Flow or streaming llneations	Sediment: tails
Relictchannel	Headcuts	Springs
Rock fracture in place	lmbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed lnundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soll development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

Notes: > l'1{ > NL'7U-.;>)

" Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual {Llchvarand Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants(Brady and Vyver be rg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # ________ **and/or Drainage 10#** R f<";).'5 b	**Date:** ;,);3//	**Representative photo taken?** Yes/

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Rlpples
Biotic Soll Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate. salt,& soda	Sand filled channels
Coppicedunes: active & relict	ut banks	Scour holes downstream of obstructions
Deflated surfaces	Deslccation Mud:cracks, curls / drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	El<posed roots below intact soil layer	Sediment sorting
Relict bar & swale	/ow or streaming llneat,ons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	lmbrlcated gravel	Stainmg of rocks
Rock varnish	Knick Points	Stepped -bed morphology In gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation : flooding. ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debrisIn place	Rliis	Wrack: woody

Notes "'":...:- ftR I c,_ (/VD/'°::,)

•Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utllity-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # and/or Drainage ID # RR;JSL--	Date: n)1!::>/ l	Representative photo taken? _ _ Yes/ INo

Upland Indicators	I i ***Watercourse Indicators***	
Av Horizon	Bars:mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
Blotubation	Bifurcated flow	Secondary channels
callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	u t b anks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: crack,scurls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sediment sorting
Rellct bar & swale	o w or streaming llneations	Sediment: tails
Rellct channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel altgnment
Soll development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

Notes : 5 J?R /7 {>\LP AA:))

•Adapted from: A Field Gulde to the Identificationof the Ordinary HighWater Mark {OHWM) in the Arid WestRegion of the Western United States, A Delineation Manual {li chvar andMcColley 2008); and Methods to Describe and Delineate Episodic Stream Processon Arid Landscapes for Permitting Utllity-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet : Id e ntific ation of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # **and/or Drainage ID #** R {<d d	**Date:** n J J3 /It,	**Representative photo taken? _ _ Yes/** b

Upland Indicators	I ***Wa ter courseIndicat ors***	
Av Horizon	Bars: mud, sand &gravel	Ripples
BioticSoll Crust	Beach ridges	Scour
Blotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate,salt,& soda	Sand filled channels
Coppice dunes: active & relict	/Cutbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud · cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Eicposed rootsbelow intact soil layer	Sediment sorting
Relict bar & swale	y/')'fow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding indicators	Levee Ridges: sand &gravel	Substrate staining
Rubmed rock undersides	Observed inundation: flooding, ponding, or substrate saturatio n	Vegetation - channel alignment
011development	Out of channel flow	Water-cut benches
Surface roun ding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills -	Wrack: woody

Notes: R le;(,,u:rl)

• Adapted from: AField Guide to the Identificatio n of the Ordinary High Water Mark (OHWM)in the Arid West Region of the Western United States, A Delineation Manual (Llchvar and McColley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utllity-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet : Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # and/or Dr ai na ge ID# : RR cl5e.-	**Date:** If JI3))I, I I	**Repre sentativephoto taken?__ Yes / _ o_**

Upla nd Indicators	*W a t ercourse Ind icat ors*	
Av Horizon	Bar s: mud, sand &gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
Biotubation	Bifurcated now	Secondary channels
caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active& relict	Cu t banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: crack,scurls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turn ed rock	Ei<posed rootsbelow Intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming llneatfons	Sediment : tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped -bed morp hology In gravel
No flow or pondmg indicators	Levee Ridges: sand & gravel	Subst rate staining
Rubified rockundersides	ObservedInundation: nooding, ponding, or substrate saturation	Vegetation - channel alignment
I development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris m place		Wrack: woody

Notes: .O 0-? Rills

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• **Adapted** from: AField Guide to the Identifi cation of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Lichvar and McColley 2008); and M ethods to Describ e and Delineate Episodic Stream Process on Arid la ndscapes for Permitting Utility-Scale Solar Power Plants (Srady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorph ic Indicators of Upland and Watercourse Areas

Sa"'ple Point# ¼ **and/or** **Drainage ID#** r	Date: l /\LR/ llP	Representative photo taken? _ Yes/_ **No**

Up land Indicators	***Water course Indicators***	
Av Horizon	Bars: mud, sand & gravel	Rfpples
Biotic Soil Crust	Beach ridges	cour
Biotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand fil led channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructfons
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organ1c	Sediment ramps
Over-turned rock	EMposed roots below Intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming llneati ons	Sediment: t.ills
Relict channel	Headcuts	Springs
Rock fracture fn place	Imbrlcated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology 1n gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubifled rock undersides	Observed inu ndation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soll development	Out o f channel now	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

Notes: ,,,:

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• **Adapted** from : A Fi el d Guide t o the Ide n tificat i on or the Ordinary HighWater Mark (OHWM) In the Arid West Region of the Western United States, A Delineatio n Ma nu al (Uchvar and M cco ll ey 2008); and M eth ods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitti ng Utlll t y-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point#
a nd / or
DrainageID /t RR;>]a._

Date: n/1 /IA
I /

Representative photo taken? _ **Yes/** L.0

Upland Indicators	*Watercourse Indicat or s*	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soll Crust	Beach rfdges	Scour
Blotubatlon	Bifurcated flow	Secondary channels
(a liche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand Oiled channe ls
Coppice dunes: active & relict	/utbanks	Scour holes dow nstream of obstructions
Deflated surfaces	Desiccation Mud: crack,scurls/ drapes	Sediment plastering
Desert pavement	Drift:organk	Sediment ramps
Over- turned rock	Exposed roots below Intact soil layer	Sediment sorting
Relict bar &swale	/low ostreaming lineatlons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbrlcated gravel	Staining of rocks
Rock varnlsh	Knick Polnts	Stepped -bed morphology In gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rub1fied rock undersides	Observed inundation : flood ing, ponding, or substrate saturation	Vegetation - channel alignment
,,,,,,,em1 development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

Notes: ;'''
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•Adapted from: A Field Guide to the Identificationof the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineati on Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapesfor Permitting Utility-Scale Solar Power Plants(Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # 9r **and/or** **Drainage ID #** k'1 L1-b	**Date:** I\/l V / / \J	**Representative photo taken?** __ **Yes** / __ **No**

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
BioticSoil Crust	Beach ridges	/cour
Biotubatlon	Bifurcated flow	Secondary channels
Callche:coatings, layers, rubble	Blotfc crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, &soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Deslccation Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turnedrock	Exposed roots below Intactsoil layer	Sediment sorting
Reflct bar & swale	/ Flow or streaminglineatfons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or pondingindicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed Inundation: flooding, ponding or substrate saturation	Vegetation - channel alignment
,/oll development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rliis	Wrack: woody

Notes: /r /7 (5'4?' .,,v4)

• Adapted from: A FieldGuide to the Identification of the Ordinary High Water Mark (OI-IWM} In the Arid West Region of the Western United States, A Oellneatlon Manual (llchvarand Mccolley 2008); and Methods to Describe and Delineate EpisodicStream Process on Arid Landscapes for Permitting Utlllty-Scale Solar Power Plants(Brady and Vyverberg. 2013).

Field Data Sheet: Identificat ion of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # 61 **and/or Drainage ID#** ft --...	**Date:** l1 / \1Ji { l t?	**Representative photo taken?_1__ves /__ No**

Upland Indicators	*Wa te rcourse In d ic a tors*	
Av Horiion	Bars mud, sarid & gravel	Ripples
Biotic Soil *Crust*	Beach ridges	/cour
Biotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, sail, & soda	Sand nl led channels
Coppicedunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud : cracks, curls / drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below intact solllayer	Sediment sorting
Relict bar & swale	Flow or streaming lineatlons ./	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides /	Observed Inundation: flooding, ponding, or substrate saturallon	Vegetation - channel alignment
poll development	Out of channel flow	Water-cut benches
Surface roundi ng of landform	Overturned rocks	Water level marks
Woody debris In place	Rliis -	Wrack : woody \ \

Notes:

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• **Adapted** from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Oelineatlon Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic StTeam Process on Aridl andscapes for PermittJng Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # and/ or Drainage ID # RRd b	**Date:**))Iı l!fA (•	**Representative photo taken? _ Yes / No**

Upland Indicators	***Wat ercourse Indicators***	
Av Horizon	Bars:mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Caliche: coati ngs, layers, rubble	Biotic crusts	Secondary channel bypassing obstr uction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts; carbonate, salt,& soda	Sand Rliedchannels
Coppice dunes: active & relict	Ibanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sediment sorting
Relict bar & swale	V Flow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Stainingof rocks
Rock varnish	Knick Points	St epped-bed morphology m gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Subst rate stalhing
Rublfled rockundersides	Observed inundati on: flooding, ponding, or substrate saturatwn	Veget ation - channel alignment
!'development	Out ofchannel flow	Water-cut benches
Surface rounding of landform	*Overturned* rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

Notes: , ,

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• Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Uchvar i!nd Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013}.

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

'), Sample Point # ________ **and/ or** ·,· **Drainage**ID # \	Date: , /| '-1 /| \a	Representative photo taken?_' ▯_ Yes/ _ ***No***

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
BioticSoll Crust	Beach ridges	/cour
Blotubatlon	Bifurcated flow	Secondary channels
Calle.he: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflatedsurfaces	Desiccation Mud : cracks,curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rublfled rock undersides	Observed Inundation: flooding, ponding,or substrate saturation	Vegetation - channelalignment
oil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

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• Adapted from: A Field Gulde to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Llchvar and McColley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # **and/or** Drainage ID # qy J ..,aJ(}..	**Date:** ᴵ/ tlPII LP	**Representative photo taken?** }_ Yes / _ _ No
Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
BloLUbation	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift : organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	/ Flow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
/Soil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

Notes: >--- 6P fik_1 1(5 Jh' A/)

• Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Uchvar and McColley 2008); and Methods to Describe and Delineate Episodic Stream Processon Arid Landscapes for Permitting Utility-Scale Solar Power Plants(Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # and/or **Drainage ID#** Rf?., b '2D	Date: JJ/O//I	Representative photo taken? _ _ Yes / _L.o
Upland Indicators	'/ / ***Watercourse Indicators***	
Av Horlzon	Bars: mud, sand & gravel	Ripples
BioticSoll Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Bioticcrusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand Fliied channels
Coppice dunes: actlve & relict	ut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed rootsbelow intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineatfons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or pondingindicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channelalignment
c., _,)d1l development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

Notes: 1'?,e._1 ti(J.P " I'-!>)

•Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWMJ In the Arid West Region of the Western United States, A Delineation Manual (Lichvar and McColley 2008); and Methods to Describe and Delineate Episodic Stream Processon Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet : Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# 1_I **and/or** **Drainage ID #** / I,J	**Date:** / l / lP	**Representativephoto taken?** __ ' **Yes/** _ **No**

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	vscour
Biotubatlon	Bifurcated flow	Secondary channels
Callche: coatings. layers, rubb le	B1ot1ccrusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	Cutbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation M ud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineatrons	Sediment : tails
Relict channel	Headcuts	Springs
Rock fractureIn place	Imbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding Indicators	levee Ridges: sand &gravel	Substrate staining
Rublfied rock underside5	Observed Inundation : flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soll development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level m.irks
Woody debris In place	Rills	Wrack: woody

Notes:

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• Adapted from: AField Gulde to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United State5, A Delineati on Manual (Lichvar and Mccolley 2008); and M ethods to Descrbe and Delineate Episodic Stream Process on AridLandscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# !2!,f} . and/or **Drainage** ID # C t '.,a,..	**Date:** /hp /lIP	Representative photo taken? V Yes / __ No
Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	/our
Biotubatlon	Bifurcated flow	Secondary channels
Caliche: coatings, layers,rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes; active &relict	Cul banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud : cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift : organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sortrng
Relict bar & swale	Flow or streaming lineat1on s ./	Sediment: tails
Relict channel	Headcut s	Springs
Rock fracture in place	tmbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding Indicators	LeveeRidges: sand & gravel	Substrate staining
Rubified rock undersides	Observed Inundation : flooding, po11ding, or substrate saturation	Vegetation - channelalignment
Solldevelopment	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rliis	Wrack: woody

Notes:

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•Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Uchvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point *II* '' ;| ______ and/or **Drainage** ID*It* ,	Date : **\\/1v/1v**	Representative photo taken? .:!___Yes/ __ No

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
BioticSoil Crust	Beach ridges	/our
Biotubation	Bifurcated now	Secondary channels
Caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand OIied channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
DeOated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below intact soillayer	Sediment sorting
Rellct bar & swale	/ Flow or streaming Hneatlons	Sediment: tails
Relict channel	Headcuts	Sprlngs
Rock fracture In place	Imbricated gravel	Stainingof rock.s
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding Indicators	Leve.e Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation : flooding, ponding, or substrate saturation	Vegetation - channel alignment
V o!ioll development	Out of channel now	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rliis	Wrack: woody

Notes: > All.\". ***f> AI)***

• Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (lichvar and McColley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permi tt ing Utility -Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point#) ,v i
and/or
DrainageID # \/ ii- ..) 0.,

Date: /ltt>/lv

Representative photo take n? __ Yes / _ _ **No**

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	/cour
Blotubatlon	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Bioticcrusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Denated surfaces	Desiccation Mud : cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed rootsbelow intact soillayer	Sediment sorting
Relict bar & swale	Flow or streaming llneations	Sediment: **tails**
Relict channel	Headcuts	Springs
Rock fracture in place	imbrlcated gravel	Stainingof rocks
Rock varnish	Knick Point s	Stepped-bed morphology In gravel
No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides	Observed inu ndation: flooding, ponding, or substrate saturation	Vegetation -channel alignment
evelopment	Out of channel flow	Water-cutbenches
Surface rounding of iandform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

Notes: ' ? fi/?._IC,(s /Vcl

• Adapted from: A Field Gulde to the Identificationof the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Uchvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Aridlandscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg. 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas /

Sample Point # **and/or** **Drainage ID #** RR3ib	**Date:** JJ/13//h	**Representative photo taken?** _ **Yes** / [✓ No]

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand &gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Caliche : coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	ut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Dr! : organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	o w or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	**Knick** Points	Stepped-bed morphology in gravel
No flow or ponding Indicators	Levee Ridges· sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation : flooding, ponding, or substrate saturation	Vegetation - channel alignment
.,-A'oll development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

Notes:

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• Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# **and/or** **Drainage ID #** R£ 3'ic.-	Date: Jl/13/1(,.	Representative phot o taken? _ [✓ Yes] No
Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand &gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
Biotubatlon	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstrun lon
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbona te, salt, & soda	Sand filled channels
Coppice dunes: active & relict	u t banks	Scour holesdownstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Elcposed roots below intact soil layer	Sediment sorting
Relict bar & swale	/low ostreaming llneatlons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbrlcated gravel	Stainingof roe.ks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubifled rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
/ Soildevelopment	Out of channel flow	Water•cul benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rliis	Wrack: woody

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ˈ Adapted from: A FieldGuide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western UnitedStates, A Delineation Manual (Llchvar and Mccolley ZOOS;)and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

(,

Sample Point # [redacted] **and/or** **Drainage ID #** i::	**Date:** \ /|v/||P	**Representative photo taken?** .,J __Yes/ __ No

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	-' cour
Biotubation	Bifurcated flow	Secondary channels
Calfche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	Cutbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud : cracks, curls / drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineallons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides /	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
oil development	Out of channel now	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rliis	Wrack: woody

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• Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Llchvar and Mc:Colley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg. 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # Lj4 • **and/or** **Drainage ID#** \ - I	**Date:** /tlP /lll	**Representative photo taken? _ Yes/ _ No**
Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars:mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Caliche: coatings, layers,rubble	Bioticcrusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast I rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes;active &relict	/utbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sedimetnramps
Over-turned rock	Exposed rootsbelow intactsoil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or pondingIndicators	LeveeRidges: sand & gravel	Substrate staining
Rubilied rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cut benches
Surface roundingof landform	Overturned rocks	Water level marks
Woody debris '" place	Rills	Wrack: woody

Notes: >c.-J t>?(tR 1'1{> ..,v"lt.6)

• Adapted from: A Field Guide to the Identificationof the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual jlichvar and McColley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# ______ **and / o r** **Drainage ID #** RR ,..	**Date:** 11/1 /)l I	**Representative photo taken?** **Yes/L** **No**

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: org, mic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
/ No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cut benches
/ Surface rounding of landform	overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

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- **Adapted** from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Processes on Arid landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet : Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# , ______ **and/or** **Drainage ID#** V r - 0...	**Date:** t: / I\J /1'1	**Rep res en ta tive pho to take n? .:!.__ves/ ____ No**

Upland Indicators	*Wat ercourseIndica tors*	
Av Horizon	Bars: mud, sand & gravel	Ripples
BioticSollCrust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers,rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
.:c.umce dunes: active & relict	Cut banks	Scour holes downstream of obstructions
lle llated surfaces	Desiccation M ud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift : organic	Sediment ramps
Over turned rock	Exposed roots below Intactsoillayer	Sediment sorting
Rel,ct bar & swale	Flow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in pl ace	lmbrlcated gravel	Staining of rocks
Rock varnish	l(r1ik Points	Steppe-d bed morphology in gravel
/o **flow** or pondingindicators	Levee Rid ges: sand & gravel	Substrate staining
Rublfied rock undersides	Observed Inundation : flooding, ponding, or substrate saturation	Vegetation-channel alignment
Soll developme nt	Out of channel flow	Water-cut benches
V .8\Jrface roun ding of landform	Overturned rocks	Water level marks
Woody debrisIn place	Rliis	Wrack: woody

No te s:

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• Adapted fr om: A Field Guide to the Identifi cation of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Llchvar and McColley 2008); and Methods to Describe and Delineate Episodic Stream Process on Ari d Landscapes for Permitti ng Utility -Scale Solar Power Plants (Bradyand Vyverberg, 2013).

Field Data Sheet : Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # and /or Drainage ID fl **Rf<** 'c

Date: l\)J1ti)J'1 / /

Representative photo taken? _ Yes/ o

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand &gravel	Ripples
BioticSoll Crust	Beach ridges	Scour
Biotubatlon	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts:carbonate, salt,& soda	Sand filled channels
c,w n,ce dunes: active & relict	Cut banks	Scour holes downstream of obstructions
I'" nated surfaces	Desiccation Mud : cracks, curls / drapes	Sediment plastering
Desert pavement	Drift· organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming llneations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	lmbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped- bed morphology in gravel
o flow orpondingIndicators	Levee Ridg es: sand & gravel	Substrate staining
Rublfled rock undersides	Observed Inundation: flooding,ponding, or substrate saturat ion	Vegetation - channelalignment
Soil development	Out of channel flow	Water-cut benches
-Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

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• Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Uchvarand Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identificat ion of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # L\ -:.J **and/ or** f-..((_ **Drainage ID#**	**Date :** | I / |\P / i	**Representativephototaken?** __I **Yes/** _ **No**

Upla nd Indicat ors	*Wate rcourse Ind ic a t ors*	
Av Horizon	Bars: mud, sand &grave l	Ripp les
BioticSollCrust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Callche : coatings, layers, rubble	Biotlc crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
C'last / rock weathering	Crust s: carbonate, salt,& soda	Sand filled channels
Coppicedunes: active & relict	Cut banks	Scour holes downstream of obstructions
Denated surfaces	Desiccation M ud: cracks, curls / drapes	Sedimen1 plastering
Desert pavement	Drift : organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Rellct bar & swale	Flow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fractu re in place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
o flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides	Observed inundation : flooding. ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cut benches
urface roundio1landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

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•Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM In the Arid West Region of the Western United States, A Dellneation Manual (Uchvar and McColley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid landscapes for Permitt ing Utility -Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # Ri L/ **and/or** **Drainage** ID # R.. 'c	**Date:** 11/1 /II	Representativephoto taken? Yes/ L.o
Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	Cutbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
/ No flow or ponding Indicators	Levee Ridges: sand& gravel	Substrate staining
Rubified rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-wt benches
rfacerounding of landform	Overturned rocks	Water level marks
Woody debris In place	J Rills	Wrack: woody

Notes: [illegible] t,y..P/• ,I/ow [illegible]

• **Adapted from: A Field Guide to the Identification of the** Ordinary High **Water Mark (OHWM) in the Arid West Region of the Western United States, A** Delineation Manual (Lichvar and **Mccolley 2008); and Methods** to **Describe** and **Delineate Episodic Stream Process** on **Arid Landscapes for Permitting** Utility-Scale **Solar Power Plants (Brady and Vyverberg, 2013).**

Field Data Sheet : Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# : /\R ,CJ and/or **Drainage ID #** (A	Date: 11J, J1i	Representative photo taken? Yes/ o

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars:mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
B1otubatlon	Bifurcated flow	Secondary channels
Caliche:coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relic!	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks. cuds/ drapes	Sediment plastering
Desert pavement	Dnft:organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming llneations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology m gravel
\ /o flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soll development	Out of channel flow	Water-cut benches
urface rounding of landform	Overturned rocks	Water levelmarks
Woody debris In place	Rills	Wrack: woody

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• Adapted from: A Field Gulde to the Identificationof the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on AridLandscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identificationof GeomorphicIndicators of Upland and Watercourse Areas

Sample Point# **and** **Drainage** ID # YJ<-=J-0	**Date:** 11/11)1	**Representative photo taken?** Yes/..£.
*Upland **Indicators***	' *Wate rcourseIndicators*	
AV HoriZOl'l	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers,rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rockweathering	Crusts: carbonate. salt,& soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streamlhg llneations	Sediment: **tails**
Relict channel	Headcuts	Springs
Rock fracture in place	Imbrlcated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology ln gravel
I/ No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rublfied rockundersides	Observed inundation : flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soll development	Out of channel flow	Wate-r cut benches
urfa ce rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

Notes:

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•Adapted from: A Field Guide to the Identi fication of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (llchvar and McColley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-ScaleSolar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # and/ or Drainage ID# /f1<13	Date: //J,:!)I	Representative photo taken? _ Yes / £N o

Upland Indicators	**Watercourse Indicators**	
Av Horlion	Bars:mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubatlon	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage Swales	Sediment sheets
Clast / rockweathering	Crusts; carbonate, salt, & soda	Sand filledchannels
Coppice dunes: active & relfct	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls / drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rode	EKposed roots below Intact sell layer	Sediment sorting
Relict bar & swale	Flow or streaming llneatlons	Sediment: talls
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology m gravel
/No flow or ponding indicators	levee Ridges: sand & gravel	Substrate staining
Rubifled rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cut benches
/Surface rounding of landform	overturned rocks	Water level marks
Woody debrisin place	Rills	Wrack: woody

Notes # Jt(t)/t.A;/4/d

***Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).**

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # and/or **Drainage** ID # RR'U-	Date: ıı] 3 {.p	Representativephoto taken? _ Yes/ LNo

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Blotubat,on	Bifurcated flow	Secondary channels
Caliche: coatings, layers,rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed rootsbelowIntact soil layer	Sediment sorting
Relict bar &swale	Flow or streaming llneations	Sediment· tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
o now or pondingIndicators	Levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides	Observed mundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
oil development	Out of channel flow	Water-cut benches
/urface roudi glandform	Overturned rocks	Water level marks
Woody debrisIn place	Rills	Wrack : woody

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"Adapted from: AField Guide to the Identificationof the Ordinary HighWater Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate episodic Stream Process on AridLandscapes for PermittingUtility-Scale Solar Power Plants(Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point I#________________ and / or **Drainage**ID # S	Date: 11/13/ /	Representative photo taken? _ _ Yes / .L.o
Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
81otubat1on	Bifurcated flow	Secondary channels
caliche coatings, layers,rubble	81ot1c crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clan / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes· active & relict	Cutbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls / drapes	Sediment plastering
Desert pavement	Drift • organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming llneauons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology m gravel
\ / o flow or ponding Indicator	Levee Ridges: sand & gravel	Substrate staining
Rub1fled rock undersides	Observed inundation. flooding , ponding, or substrate saturation	Vegetation - channel alignment
oil development	Out of channel flow	Water-cut benches
rfacerounding of landform	Overturned rocks	Water level marks
Woody debris m place	Rills	Wrack: woody

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• Adapted from : A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Dellneatl on Manual (Lichvar and M ccoll ey 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point // ; and/or Drainage ID # KR.90	Date: JJ lr)lfo	Representative photo taken? _ Yes/ -6

Upland Indicators	Watercourse Indicators	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
Blotubatlon	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Bioticcrusts	Secondary channel bypassing obstruction
carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
COppice dunes : active & relict	Cutbanks	Scour holes downstream of ob5truct1ons
Defiated surfaces	Desiccation Mud : cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	lo w or streaming lineatlons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped -bed morphology in gravel
/o flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rublfled rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
So,l development	Out of channel flow	Water-cut benches
urf ace rounding of landform	overturned rocks	Water level marks
Woody debris In place	Rills J	Wrack: woody A

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• Adapted from: A Field Gulde to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Llchvar and Mccolley 2008); and Methods to Describe and Delfneate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Shee t: Identifi cation of Geomorphic Indicator s of Upland and Watercourse Areas

Sample Point # and/or **Drainage ID#** RI<9I

Date: II/11:>/ J<.t;

Representativephoto taken? _ Yes/ . L–o

Upland Indicators	*Watercourse Indicators*	
Av Horiion	Bars: mud, sand & gravel	Ripples
BioticSoll Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	Cu1banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud. cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift;organic	Sediment ramps
Oller-turned rock	Exposed roots below intact soil layer	Sediment sortfng
Relict bar &swale	Flow or streaming lineatfons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped -bed morphology In gravel
/ No flow or pondingindicators	levee Ridges: sand & gravel	Substrate staining
Rubifled rock undersides	Observed inundation : flooding, ponding, or substrate saturation	Vegetation - channel alignment
S011 development	Out of channel flow	Water-cut benches
vurface rounding of landform	Overturned rocks	Water levelmarks
Woody debris In place	Rills	Wrack: woody

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•Adapted fro m: A Field Guide to the identificationof the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on AridLandscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyn rberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point#
and/or
Drainage ID # RR

Date:)I)1) }(/)

Representative photo taken? Yes / £ No

Upland Indicators	Watercourse Indicators	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Cru.ts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls / drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Staining of rocks
Rock varnish	Knlcl(Points	St epped-bed morphology ,n gravel
o flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate stainong
Rubified rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
,,,.satJ development	Olltof channel flow	Water-cut benches
/urf.lce rounding of landform	Overturned rodes	Water levelmarks
Woody debris In place	Rliis	Wrack: woody

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Field Data Sheet : Identification of GeomorphicIndicators of Upland and Watercourse Areas

Sample Point# ________ **and/or** **Drainage ID #** RR.CJ:>	**Date :** J/ J,3)/lh	**Representative photo taken?** **Yes/ /.o**

Upl a nd Indicators	***WatercourseIndicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotrc Soll Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
dast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud : cracks, curls/ drapes	Sediment plastenng
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below ,ntact soil layer	Sediment sorting
Relict bar &swale	Flow or streaming llneatlons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Jmbrlcated gravel	Stainingof rocks
Rock varnish	Knick Pofnts	Stepped-bed morphology In gravel
o flow or pondingIndicators	Levee Ridges: sand & gravel	Substra te staining
Rublfled rockundersides	ObservedInundation: flooding,ponding,or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cut benches
Surface rounding of landform	overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

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Field Data Sheet : Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# : and/or **Drainage** ID # Kf?CJ'i	Date: 1JJ13/1v	Representativephoto taken?_ Yes / ⎿__ No

Upland Indicators	*Watercourse Indicators*	
Av Hamon	Bars:mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Bfotubation	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Bioticcrusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream or obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineations	Sediment: tails
Relfct channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or pondingIndicators	Levee Ridges: sand & gravel	Substrate staining
Rub,fled rock undersides	Observed inundation : flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack : woody

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Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Area

Sample Point # and/or Drainage ID# J?R't5	Date: JI),))	Representative photo taken? _ Yes / .L- o
Upland Indicators	***W atercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
Blotubation	Bifurcated flow	Secondary channels
callche: coatings, layers, rubble	Biotfc crusts	Secondary channel bypassing obstruction
carbonate etching	Drainage swales	Sediment sheets
Cfast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineatlons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Stainingo f rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
o flow or ponding Indicators	Levee Ridges: sand &gravel	Substrate staining
Rubifled rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cut benches
ur face rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rliis	Wrack: woody

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• Adapted from: A Fleld Guide to the Identification of the Ordinary High Water Mark {OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (8rady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# ____________ **and/or** **Drainage ID #** P1?9	**Date:** 11/r /1	**Representative photo taken**?__ **Yes/** L_ **No**

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
B1ot1c Soll Crust	Beach ridges	Scour
Blotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers. rubble	Bioticcrusts	Secondary channel bypassing obstruction
Carbonate etchi ng	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filledchannels
Coppice dunes: actlve & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud. cracks, curls/ drape:.	Sediment plastering
De:.ert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineatlons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
/ No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides	Observed inundation : flood!ng, ponding, or substrate saturation	Vegetation - channel ahgnment
Soll development	Out of channel now	Water-cut benches
,/5urface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

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Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Pofnt # and/or **Drainage ID #** .f P9r	Date: IJ/t / /(p	Representative photo taken? Yes /£.

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated now	Secondary channels
Caliche: coatings, layers, rubble	Bioticcrusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	sand filled channels
Coppice dunes: active & relict	Cutbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls / drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	El<posed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streamlng llneations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology m gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rockundersides	Observed 1nundat1on: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

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Guide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # and/or **Drainage** ID # Rf.9.	Date: 11/1ll/	Representativephoto taken? Yes/ L.o

Upland Indicators	Watercourse Indicators	
Av Horizon	Bars: mud, sand & gravel	Ripples
BioticSoll Crust	Beach ridges	Scour
Blotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Oast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstrucUons
Deflated surfaces	Desiccation Mud:cracks, curls / drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed rootsbelow Intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineations	Sediment· tails
Relict channel	Headcuts	Springs
Rock fracture In place	lmbrlcated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
o flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observedinundation: flooding,ponding,or substrate saturation	Vegetation - channel allgnment
Soil development	Out of channel flow	Water-cut benches
,/urface rounding of fandform	Overturned rocks	Water levelmarks
Woody debris In place	Rliis	Wrack: woody

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Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# and/or Drainage ID# KKC-J'J	Date: 11/13)/C,,	Representative photo taken? _ Yes/..0o

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubatlon	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Biotfccrusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filledchannels
Coppice dunes: active & rellct	Cutbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below intact sol! layer	Sediment sorting
Relict bar &swale	Flow or streaming lineatlons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbrlcated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology ln gravel
l o flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out or channel flow	Water-cut benches
urfa ce rounding of landform	Overturned rocks	Water level marks
Woody debris ln place	Rill s	Wrack: woody

Notes: _5C-J 12.R C/o /4- AI

• Adapted from: A Fleld Guide to the Identlficatioo of the Ordinary High Water Mark {OHWM) In the Arid West Regioo of the Western United States, A Delineation Manual {Llchvar and Mccolley 2008); and Methods to Describe aod Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants {Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# RR_ **an d /or** **Drainage ID #** /00	**Date:** ll/1 //(,,;	**Representative photo taken? _ Yes /_____o**
Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars:mud, sand & gravel	Ripples
BioticSoil Crust	Beach ridges	Scour
Blotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Biotic.crusts	Secondary channel bypassing obstruction
carbonate etching	Drainage swales	Sediment sheets
dast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls / drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	El<posed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming llneations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbrlcated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morpho logy In gravel
Vo flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soll development	Out of channel flow	Water-cut benches
urface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

Notes: 0-::::>R./?_1u(,i.;)

•Adapted from: Field Guide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (llch11ar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Processon Arid Landscapes for Permittlng Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013}.

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # and/ or Drainage ID# Rf< /Ol	Date: ti)13/JfA 1	Representative photo taken?_ Yes / .L.o

Upland Indicators	**Watercourse Indicators**	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubatlon	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Biotic crusts	Secondary channe l bypassing obstruction
carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crust s: carbonate, salt,& soda	Sand filledchannels
Coppice dunes:active & relict	Cutbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud : cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift organic	Sediment ramps
Over-turned rock	Exposedroots below intact soil layer	Sediment saning
Relict bar & swale	Flow or streaming llneations	Sediment : tails
Relict channel	Headcut s	Springs
Rock fracture in place	Imbrfcated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or pondingindicators	Levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides --	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
V Soil development	Out of channel flow	Water-cut benches
i/urface rounding of landform	Overtumed rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

Notes:

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•Adapted from: A Field Gulde to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Uch11ar and McColley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid l andscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet : Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# **and/ or** **DrainageID#** KPID	**Date:** ulr /1	**Representativephototaken?** **Yes/** o
Upland Indicators	l ***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
Blotubation	Bifurcated flow	Secondary channels
Cal1che: coatings, layers,rubble	Blotlc crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	E posed rootsbelow intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming llneatlons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Steppe -d bed morphology in gravel
_/N0 flow or ponding Indicators	levee Ridges: sand & gravel	Substrate st aining
Rubified rockundersides	Observedinundation: flooding, ponding, or subst rate saturation	Veget ation - channel alignment
Soil development	Out of channel flow	Water-cut benches
./urface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

Notes:

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• Adapted from: A Field Gulde to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas.

Sample Point # **and/or Drainage** ID# Rf:,t"	**Date:** ll)13) }	**Representativephoto taken? _ Yes/ /__ No**

Upland Indicators	'| r *Watercourse Indicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ndges	Scour
Biotubation	Bifurcated flow	Secondary channels
Caliche: coatings,layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	Cutbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming llneatlons	Sediment: talls
Relict channel	Headcuts	Springs
Rock fracture in place	lmbrlcated gravel	Stainingof rocks
Rock varnish -	Knick Points	Stepped -bed morphology in gravel
/o flow orpondingindicators	Levee Ridges: sand & gravel	Subst rate staining
Rubified rockundersides -	Observed lnundation: nooding, ponding, or substrate saturation	Vegetation - channel alignment
oil development	Out of channel flow	Water-cut benches
urfa ce rounding of landform	Overturned rocks	Water levelmarks
Woody debris in place	Rills -	Wrack: woody J .....,

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"Adapted from: A Field Gulde to the Identificationof theOrdinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Aridlandscapes for Permitting Utility-Scale Solar Power Plants(Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

SamplePoint # **and/ or** **Dra in ageID#** RR.BO	**Date:** II);3)}<.t;	**Representative photo taken? _ Yes / __**6-

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
Blotubation	Bifurcated now	Secondary channels
Calh:he: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstru c:t1on
Carbonate etching	Dralnage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation M ud: cracks,curls / drapes	Sediment plastering
Desert pavemen t	Dr ift: organic	Sediment ramps
Over-turned rock	Exposed roots belowln tact soIl layer	Sediment sorting
Relict bar & swale	f low or streamingllneatlons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
/No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate stammg
Rubified rock undersides	Observed in undation: Aoodlng, ponding, or substrate saturation	Vegetation - channel alignment
iidevelopment	Out of channel now	Water-cut benches
/ Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rllls ·,··	Wrack: woody

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• Adapted from: A Field Gulde to the Identificationof the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid la nd scapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet : Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # **and/ or** **Drainage ID #** RR	**Date:** [illegible]	**Representative photo taken?** _ **Yes** / _ **No**

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Bioturbation	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	low or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cut benches
/urface roughness landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

Notes:
[illegible]

From: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual flichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet : Identi fication of Geomorphic Indicators of Upland and Wat ercourse Areas

Sample Point # **and/ or** **Drainage ID #** 1?1?(':f	**Date :** 111, 1,	**Representative photo taken? _ _ Yes/ o**

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars: mud, sand& gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
Blotubation	Bifurcated now	Secondary channels
Caliche: coatings,layers,rubble	Bioticcrusts	Secondary channel bypassing obstruct ion
Carbonate etchmg	Drainage swales	Sediment sheets
aast / rock weathering	Crusts: carbonate,salt, & soda	Sand filled channels
Coppice dunes: active & relict	Cutbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud : cracks. curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
over-turned rock	Exposed roots below int.ict soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineatlons	Sediment: tails
Rellct channel	Headcuts	Springs
Rock fracture In place	Imbrlcated gr.ivel	Stainingof rocks
Rock varnish	Knick Points	Stepped •bed morphology 1n gravel
J0 flow or pondingindicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel now	Water-cut benches
,/urfacerounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rliis	Wrack : woody

Notes:

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• Adapted from: A Fleld Gulde to the Identification of the Ordinary HighWater Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (llchvar and Mccolley 2008); and Methods to Describe and Dellneate Episodic Stream Process on Aridlandscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013)

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point#

and/or Drainage ID # RR&l.

Date : nl /l

,

Representative photo taken? Yes / ...L-0

Upland Indicators	Watercourse Indicators	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Blotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: crack5, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact sol!layer	Sediment sorting
Relict bar & swale	Flow or streaming lineatlons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	lmbrlcated gravel	Staining of rocks
Rock varnish	Knie Points	Stepped-bed morphology 1n gravel
No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rubifled rock undersides	Observed inundation: flooding. ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cut benches
/rface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

Notes: > 1?./2 J6{>--V)

• Adapted from: A FieId Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (lichvar and Mccolley 2008); and Methods to Describe and Delineate EpisodicStream Process on Arid landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point #_______________ **and/or** **D rai nage** ID # t?R&\	Date: JI)r:,//(p	Representativephoto taken? _ Yes/ **No**

Upland Indicators	*W ate rcourseIndicators*	
Av Horiwn	Bars: mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts carbonate, salt & soda	Sand fllled channels
Coppice dunes: active & relict	Cutbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed rootsbelow Intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineatlon s ....--	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbrlcated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
o flow or pondingindicators	Levee Ridges: sand & gravel	Substrate staming
Rubifled rock undersides	Observedinundation: flooding,ponding,or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cut benches
urf ace rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

Notes: > 0",,>RR..lt,{,(S, /vOl) ..

•Adapted from: A Field Gulde to the Id enti fication of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Uchvar and McColley 2008); and Methods to Describe and Dellneate Episodic Stream Process on AridLandscapes for Permitt ing Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# ______

ard

DrainageID # RR

Date: ;J/13/J

Representativephoto taken? Yes/

Upland Indicators	*Watercourse In dicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Caliche:coatings, layers,rubble	Biotic crusts	Secondary channe l bypassing obst ruction
Carbonate etching	Drainage swales	Sediment sheets
dast / rock weathering	Crusts: carbonate, salt & soda	Sand filled channels
Coppice dunes: active &rellcl	Cul banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming llneations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morpho logy m gravel
/No flow or ponding Indicators	levee Ridges: sand & gravel	Substrate staining
Rubifled rockundersides	Observed 1nundat1on: fl ooding, ponding. or substrate saturation	Vegetation - channelallgnmeni
oil development	Out of channel flow	Water-cut benches
rface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

Notes: [illegible]

- Adapted from: A Field Gulde to the Identificationof the Ordinary High Wat.er Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (lichvar andMccolley 2008); and Methods to Describe and Delineate EpisodicStream Process on Aridlandscapesfor Permittlng Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet : Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # and/or Drainage ID II f-\"t::! / Q/J;	Date: 1/ II3/ /{,,,	Representative photo taken? Yes/ L.o

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Rfpples
Biotic Soll Cwst	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
callche: coatings, layers,rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active& relict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Rellct bar &swale	Flow or streaming llneations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology m gravel
/No flow or ponding Indicators	Levee Ridges: sand &gravel	Substrate staining
Rubified rockundersides	Observed 1nundat1on: flooding, ponding, or substrate saturation	Vegetation- channel alignment
Soil development	Out of channel flow	Water-cut benches
urface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills -	Wrack: woody

Notes: 5 Rf2_0t(»o)

• Adapted from: A Field Gulde to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delfneation Manual (Lichvar and McColley 2008); and Methods to Describe and Delineate E'pisodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet : Identific at ion of Geomorphic Indicator s of Upland and Watercourse Areas

Sample Point# ; **and/or Drainage ID #** 'PR'4::J.	**Date:** 111, 1,	**Representative photo taken?** **Yes/** /. o
Upland Ind icat ors	I I ***Watercourse In d icators***	
Av Horizon	Bars:mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand nl led channels
Coppice dunes: active & relict	Lba n ks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed rootsbelow Intact soil layer	Sediment sorting
Reifct bar & swale	/ow or streaminglIneatlons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology m gravel
No flow or pondingIndicators	Levee Ridges: sand & gravel	Substrate staining
Rublfled rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel allgnment
, .-Soildevelopment	Outofchannelflow	Water-cut benches
Surface ro unding of landform	Overturned rocks	Water level marks
Woody debris In pl ace	Rliis	Wrack: woody

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• Adapted from: A FieldGuide to the Identification ofthe Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. A Delineation Manual (Ilchvar and McCollev 2008): and Methods to Describe and Delineate Episodic Stream Process on

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # ____________ **and/or** **Drainage ID#** RR Y..3	**Date :** 11/13/J(/J	**Representativephoto taken?**__ **Yes/** L. 0

Upland Indicators	I I *Watercourse Indicators*	
Av Horizon	BarS-: mud, sand & gravel	Ripples
Biotic SollCrust	Beach ridges	Scour
Blotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	B1ot 1ccrusts	Secondary channel bypas.slng obstruction
carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	u t banks	Scour holes downstream of obstructions
DeOated surfaces	Desiccation Mud cracks,curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	w or streaminglineatlons	Sediment: t.iils
Relictchannel	Headcuts	Springs
Rock fracture m place	Imbricatedgravel	Staining of **rocks**
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rublned rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soll development	Out of channel flow	Water-cut benches
Surface roun ding of landform	Overtumed rocks	Waterlevel marks
Woody debris in place	Rliis	Wrack: woody

Notes b-;;> Rk l/ 2(AA;))

*Adapted from: A Field Gulde to the Identification of the Ordinary High Water Mark {OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Llchvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapesfor Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet : Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# : **RR** 4_lf **and/or** **Drainage ID #**	**Date:** 11/11>)/	**Representative photo taken? _ Yes/**
Upland Indicators	I ***Watercourse Indicators***	
Av Horizon	Bars:mud, sand & gravel	Ripples
BioticSollCrust	Beach ridges	Scour
Blotubatlon	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Brotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate,salt,& soda	Sand filled channels
Coppice dunes: active & rehct	u t banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud.cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	/ ow or streamingllneations	Sediment: tails
Relictchannel	1-teadcuts	Springs
Rocle fracture In place	lmbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology 1ngravel
No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
/ oil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rliis	Wrack: woody

Notes:

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•Adapted from: A FieldGuide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (lfchvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arld Landscapes for Permitting Utility -Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse A eas

Sample Point # **and/or** **Drainage 10 #** RR. 5	**Date:** JI/I / I	**Representative photo taken?** **Yes/** L.o

Upland Indicators	*Water course Indicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
BioticSollCrust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers. rubble	Blotlc crusts	Secondary channel bypassing ob stru ct ion
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	/Cutbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud. cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Rellct bar & swale	w or streaming lineatlons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbncated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology 1ngravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation -channel alignment
0011 development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

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"Adapted from: A Field Gulde 10 the Identificati on of the Ordinary High Water Mark (OHWM} In the Arid West Regionof the Western United States, A Delineation Manual (Llchvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on AridLandscapes for Permltting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Area

Sample Point # and/or Drainage ID# RR 4'7	Date / / ; ;, / / '	Representative photo taken? Yes/ £,
Upland Indicators	I ***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Blotubation	Bifurcated flow	Secondary channels
Calfche· coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& sod.i	Sand filled channels
Coppice dunes: active & relict	u t b anks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud· cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	/low o streaming lineatlons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding indicators	Levee Ridges: sand &gravel	Substrate staining
Rubified rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel flow	Water-cul benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

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•Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, *A* Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vvverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicator s of Upland and Watercourse Areas

Sample Point // an d/or Drain a ge ID # /..f-:J- "'-

Date: 11/1:&//(?

Representative photo taken? _ **Yes** / ________

Upland Indicators	I { ***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic.Soil Crusl	Beach ridges	Scour
Biolubation	Bifurcated flow	Secondary channels
Caliche : coating,s layers,rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainageswales	Sed,ment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channel s
Coppice dunes: active & relict	/ ut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccati on Mud: cracks, curls / drapes	Sediment plasteri ng
Desert pavement	Drift : organic	Sediment ramps
Over-turned rock	Exposed roots below inlact soll layer	Sedime nt sortmg
Relict bar & swale	Flow or streaming lineat1on s	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Jmbricated gravel	Staining of rocks
Rock varnish	**Knick** Po ints	Stepped-bed morphology in gravel
No now or ponding indicators	Levee Rid ges: sand & gravel	Substrate staining
Rubl fied rock undersides	Observed inunda tion: flooding, ponding, or substrate saturation	Vegetation -channelalignment
/5 0 11development	Out of channel **flow**	Water -cut benches
Surfa ce rounding of landform	Overturned rocks	Water level marks
Woody debrism place	Rills	Wrack: woody

Notes:

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• [illegible]ion of the Ordinary High Water Mark {OHWM) in the Arid West Regio n of the We stern United States, A Delineation Manual (Lichvar and McColtey 2008); and Methods to Describe and Delineate Episodic Stream Processon Ari d Landscapes for Permitt i ng Utility -Scale Solar Power Plants (Brady and Vyverb erg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # and/or Drainage ID # &'i.8.	Date: 1,/,3//lo	Representative photo taken?_ Yes/ .L.0

Upland Indicators	l ' Watercourse Indicators	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Blotubation	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relfct	u t banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift : organic	Sediment ramps
Over-turned rock	Exposed roots below intact sotllayer	Sediment sorting
Relict bar & swale	low or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No now or pondingindlcato	levee Ridges:sand & gravel	Substrate staining
Rublfled rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
l development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

Notes: 5 /(,lf!_

*Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Processes on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# J?. **and/or** **Drainage ID** # >RL{9	Date: 11/13/;	Representative photo taken? Yes/ L.o I
Upland Indicators	I t ***Watercourse Indicators***	
Av Horfzon	Bars:mud, sand & gravel	Ripples
BioticSoil Crust	Beach ridges	Scour
Blotubation	Bifurcated flow	Secondary channels
callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / roe weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	Ut banks	Scour holesdownstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming llnearlons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbrlcated gravel	Stainingof rocks
Rock varnish	nick Points	Stepped-bed morphology,n gravel
No flow or pondingindicators	Levee **Ridges:** sand & gravel	Substrate staining
Rublfle d rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation -channel alignment
oildevelopment	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water levelmarks
Woody debris in place	Rliis	Wrack: woody

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*Adapted from: AField Gulde to the Identificationof the Ordinary High Water Mark (OHWM) in the Arid West Regionof the Western United States, A Delineation Manual (Uchvar and McColley 2008};and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# and/ or Drainage ID# RRS0	Date: 11/;:::,);r:	Representative photo taken? _ Ve.s / L. 0
Upland Indicators	***Watercourse Indicators***	
AvHorizon	Bars: mud, sand & gravel	Rlpples
Biotic Sorl Crust	Beach ridges	Scour
Blotubatlon	Bifurcated flow	Secondary channels
Callche : coatings. layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	/ut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls / drapes	Sedlment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soillayer	Sediment sorting
Relict bar & swale	lo w or streaming llneations	Sediment· tails
Relict channel	Headcuts	Springs
Rock fratture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding indicators	l evee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed Inundation: flooding, ponding, *or* substrate saturation	Vegetation - channel alignment
/ oll development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water levelmarks
Woody debrisin place	Rliis	W rack: woody

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- dr Field Gulde to the Identifl catfon of the Ordinary High Water Mark {OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utllity-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # and/ or Drainage ID # RRS /	**Date:** 11/ 1'3/ l l,	**Representative photo taken?** _ **Yes/ No**
Upland Indicators	f ***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Caliche : coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	/Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls / drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	/ low or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding indicators	Levee Ridges : sand & gravel	Substrate staining
Rublfled rock undersides _,L	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
oil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rliis	Wrack: woody

Notes:

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"Adapted from A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # **and/or** **Drainage ID#** RRs-;;.	**Date:** II/13,/)I	**Representative photo taken? _ Yes/ No**

Upland Indicators	(***Watercourse Indicators***	
Av Horizon	Bars: mud,sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
Biotubatlon	Bifurcated now	Secondary channe ls
Caliche: coatings, layers,rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etchlng	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts:carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	ut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks,curls/ drapes	Sediment plastering
Desert pavement	Drrft:organ,c	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming llnea1ions	Sediment: talls
Relict channel	Headcuts	Springs
Rock fracture in place	Imbrlcated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology Tn gravel
No flow or ponding Indicators	Levee Ridges: sand &gravel	Substrate staining
Rubified rock undersides L	Observed Inundation: flooding, pondlng, or substrate saturatlon	Vegetation - channel alignment
Ooil development	Out of channel flow	Water-cut benches
Surface roundlng of landform	Overturned rocks	Water level marks
Woody debris in place	Rliis	Wrack: woody

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"Adapted from: A Fleld Guide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Uchvar and Mccolley 2008); and Method5 to De5cribe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utllity-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# **and/or** **Drainage ID#** /?R.53	**Date:** 11)1.Y If,,;	**Representative photo taken?** **Yes/_____o**

Upland Indicators	I I *Watercourse Indicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic SollCrust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Caloche : coatings, layers,rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt. & soda	Sand filled channels
Coppice dunes: active & relict	ut banks	Scour holesdownstream of obstructions
Deflated surfaces	Desfccatlon Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soillayer	Sediment sorting
Relict bar &swale	/low o streaming llneations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture ln place	lmbrlcated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding indicators	levee Ridges: sand &gravel	Substrate staining
Rublfied rockundersides	Observed Inundation · flooding,ponding. or substrate saturation	Vegetation - channel alignment
/_ .....-Soil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water levelmarks
Woody debris in place	**Rliis**	Wrack: woody

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•Adapted from: A Field Guide to the Identi fication of the Ordi nary High Water Marl((OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# and /or **Drainage ID #** .RR.1£	Date: II /13)/	Representativephoto taken? _ Yes/ L.0

Upland Indicators	I I	**Watercourse Indicators**
Av Horizon	Bars: mud, sand &gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
Blotubatlon	Bifu rcated flow	Secondary channels
Calfche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbona te, salt, & soda	Sand filled channels
Coppice dunes:active & relict	u t banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: **cracks,** cur ls / drapes	Sediment plasterfng
Desert pavement	Drift : organic	Sediment ramps
Over turned rock	Exposed roots below Intactsoillayer	Sediment sorting
Relict bar & swale	/low o streaming llneations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	Imbrfcated gravel	Staining of rocks
Rock varnish	Knick Points	Steppe-d bed morphology in gravel
No flow or ponding Indicators	levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides _L_	Observed Inundati on: flooding, ponding, or substrate saturation	Vegetation - channel alignment
oil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturnedrocks	Water level marks
Woody debris In place	R111s	Wrack : woody

Notes:

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• Adapted from: A Field Guide to the Identi fication of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (llchvar ,md Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utlli ty•Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of GeomorphicIndicators of Upland and Watercourse Areas

Sample Point #_________: and / or **Drainage ID #** RR5ro	**Date :**)I/13//	**Representa tive photo taken? _** **Yes/** L

Upland Indicators	/ / *W atercourse Indicators*	
Av Horlzon	Bars: mud, sand & gravel	Ripp le s
Biotic Soll Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Callche· coat ings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbona te, salt,& soda	Sand fllled channels
Coppice dunes: active & re lict	Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soillayer	Sediment sorting
Relict bar & swale	Flow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding Indicators	levee Ridges: sand & gravel	Subs1rate staining
Rubified rock undersides	Observed Inunda tion: floodi ng, ponding, or substrate saturation	Veget ation - channel alignment
evelopment	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

Notes:

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•Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United Stat es, A Delineation Manual (Uchvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Ari d Land scapes for Permitting Utili ty-Scale Solar Power Plants (Brady and Vyverber,g 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# **and/or** **Drainage ID #** !<RS3-	**Date:** J1/13)Jl -1 I	**Representative photo taken? __ Yes/** INo
Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic SollCrust	Beach ridges	Scour
Blotubation	Bifurcated flow	Secondary channels
Callche : coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast *I* rock weathering	Crusts: carbona te, salt, & soda	Sand filled channels
Coppice dunes: active & rellct	u t banks	Scour holes downstream of obstructions
Deflated surfaces	Deslctc1tlon Mud · cracks, curls/ drapes	Sediment plastering
Desen pavement	Drift·organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sediment saning
Relict bar & swale	w or streaming llneatlons	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture in place	lmbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped -bed morphology in gravel
No flow or ponding indicators	levee Ridges: sand & gravel	Substrate stalning
Rublfled rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
evelopment	Out of channel flow	Water-cut benches
Surface rounding of landlorm	Overturned rocks	Water level marks
Woody debris In place	Rliis	Wrack: woody

Notes:

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"Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Uchvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet : Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # and/or Drainage ID# RRS'&

Date: II /13,/ '

Representative photo taken? __ **Yes/** [✓ No]

Upland Indicators	***Watercourse Indicators***	
Av 1-lor i zon	Bars: mud, sand& gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	u t banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks,curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	./lovv streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding Indicators	*Levee* Ridges: sand & gravel	Substrate staining
Rubified rock undersides 1-	Observed inundation : flooding, ponding, or substrate saturation	Vegetation - channel alignment
oil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rliis	Wrack: woody

Notes: [illegible]

- Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Lichvar and McColley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point // and / or **Drainage ID #** J?R(pO	**Date:** 11/1 1/fo	**Representative photo taken? _ Yes/** L0
Upland Indicators	I ***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active &relict	Cut banks	Scour holes downstream of obstructions
Denatedsurfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relictbar & swale	Flow or streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture *in* place	Imbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or pondingIndicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation: noodlng, ponding, or substrate saturation	Vegetation - channel alignment
oil development	Out *of* channel now	Water-cut benches
urface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rliis	Wrack: woody

Notes: 5 A_e_ l(2.{S)

• ,Adapted from : A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Proce on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicator s of Upland and Watercourse Areas

Sample Point #
and/or
Drainage ID # RR=t-1

Date: u/811
t' •

Represent ati ve photo taken? _ Yes/ L .0

Upland Indicators	**Wa tercourse Indicators**	
Av 1-toriZon	Bars : mud, sand & gravel	Ripples
Biotic SollCrust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sedimen t sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relltt	/ 1 ut banks	Scour holes downstream of obstructrons
Denated surfaces	Desiccation Mud: cracks, curls/ drapes	Sediment plasterrng
Desert pavemen1	Drift: organic	Sediment ramps
Over-turn ed rock	Exposed roots below Intact soil !aver	Sedimen t sorting
Relict bar & swale	/ Flow or streamrng llnea tl ons	Sediment : tails
Relictchannel	1-tea d cu ts	Springs
Rock fracture in place	lmbrfcated gravel	Stainingof rocks
Rock varnish	Knick Pornts	Stepped-bed mo rphology fn gravel
No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate stainrng
Rubified rock undersides	Observed Inundation: flooding, ponding, or substrate sa1uration	Vegetation - channel alignment
oil developmen t	Out of channel now	Water -cut benches
Surface ro undi ng of landform	Overturned rocks	Water level marks
Woody debris In place	Rliis	Wrack : woody

Notes:

At 4 c./s.A;l' ..<J"N2:::.)

• Ad a pted from : A Field Guide to the Identifi cation of the Ordinary 1-tlgh W at er M ark (OHW M) in the Arid West Region of the Western United States, A Delineatio n Manual (Lithvar and Mccolley 2008); and M ethods to Describe and Delineat e Episodic Stream Process on Arid Landscapes for Permi tting Utili ty-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # **and/or** **Drainage ID #** RR-:/	**Date:** 11/1 11,	**Representative photo taken?** **Yes/ /____No**

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand &gravel	Ripples
BioticSoll Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Calfche, coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts:carbonate, salt,& soda	Sand filled channels
Coppice dun es: active & relict	Cut banks	Scour holesdownstre?am of obstructions
Deflated surfaces	Desiccation Mud : cracks, curls/ drapes	Sediment plastering
Desert pave?ment	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below Intact soil layer	Sediment sorting
Rellct bar & swale	Flow or streamlng llneallons ./	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture 1n place	lmbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding indicators	Levee Ridges· sand & gravel	Substrate staining
Rubifled rock undersides /	Observedinundation: flooding,ponding,or substrate saturation	Vegetation - channel alignment
Soil development	Out of channel now	Water-cut benches
Surface ro unding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

Notes: Rll 12.,

A.Jul)

" Adapted from: A fieldGulde to the Identi fication of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Llchvar and Mccolley 2008); and Method5 to Describe and Delineate Episodic Stream Process on Arid Land5capes for Permitting Utlllty-Scate Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# : **and/or** **Drainage ID #** RR.r'T	**Date:** n/13/Jk	**Representative photo taken?** *Yes/* /. o

Upland Indicators	***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
Biotubatlon	Bifurcated flow	Secondary channels
Caliche : coatings, layers, rubble	Biotic crusts	Secondary channel bypassmg obstruction
carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	/Cut banks	Scour holes downstream of obstructions
Deflated surfaces	De51ccatlon Mud:cracks, curls/ drapes	Sediment plasterrng
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed root5 below intact soil layer	Sediment sorting
Rellct bar & swale	/Flow or streaming llneations	Sedlment: tails
Relict channel	Headcuts	Springs
Rock.fracture In place	fmbricated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding Indicators	levee Ridges: sand & gravel	Substrate staining
Rublfled rock undersides	Observed inundation: flooding, ponding. or substrate saturation	Vegetation - channel alignment
oil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rliis	Wrack: woody

Notes:

R/2- L;z_/)

• Adapted from: A Fleld Gulde to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Lkhvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverb erg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# **a nd/ or** **Drainage ID#** Ri S	**Date:** 11/13) /	**Re presentative photo taken? _ _ Yes /#**

Upland Indicat ors	/ ***Watercourse Indicators***	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic SoilCrust	Beach ridges	Scour
Blotubation	Bifurcated flow	Secondary channels
Callche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes:active & relict	u t b anks	Scour holesdownstream of obstructions
Deflated surfaces	Desiccation Mud : cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots belowintact soil layer	Sediment son Ing
Rel ict bar & swale	/tow orueaminglineations	Sediment: tails
Relict channel	Headcuts	**Springs**
Rock fracture in place	lmbrlcated gravel	Stainingof rocks
Rock varnish	Knick Point s	Stepped-bed morphology in gravel
No flow or pondingindicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observedinundation: flooding, ponding, or substratesaturation	Vegetation - channel alignment
J;"!,olldevelopment	Out of channel flow	Water-cut benches
Surface ro undi ng of landform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

Notes: 12 l/?../ ,4,...,<.,D

- **Adapt ed from: A** Field Guide to the **Identification of** the Ordinary High **Water Mark (OHWM)** In the **Arid West Region of** the **Western United States, A** Delineation Manual (Lichvar and Mccolley **2008); and Methods to Describe** and Delineate **Episodic** Stream **Process** on **Arid Landscapes for** Permitting Utility-Scale Solar **Power** Plants **(Brady and Vyverberg**, 2013).

Field Data Sheet : Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # **and/ or** **Drainage ID#** !< +<.	Date: ll) 13)/'	Representativephoto taken? __ Yes/ L.o

Upland Indicators	/ ***Watercourse Indicators***	
Av Horilon	Bars: mud, sand & gravel	Ripp les
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Caliche : coa t ings, layers.rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	sand filled channels
Coppice dunes: actrve & rel[ct	/Cutbanks	Scour holesdownstream of obstructions
Deflated surfaces	Desiccation Mud: cracks. curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	/lowstreaming llneations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbrlcated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation: flooding. ponding, or substrate saturation	Vegetation - channelalignment
I development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rliis	Wrack: woody

Notes:

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> R '-1l.

•Adapted from: A FleldGuide **to the** Identi fication **of the** Ordinary **High Water Mark(OHWM)** In **the Arid *West* Region of the Western United States, A** Delineation Manual (Wchvar **and McColley 2008);** and **Methods to Describe and Delineate** Episodic Stream **Process** on **Arid Landscapes for Permitting** Utility-Scale **Solar Power** Plants **(Brady and Vyverberg, 2013).**

Field Data Sheet : Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# and/or Drainage ID# RR.€'1

Date: I // I 3))fc

Representative photo taken? _ **Yes/** /. o

Upland Indicators	Watercourse Indicators	
Av Hor12on	Bars : mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Biotubation	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relic1	Vutbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud : cracks,curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over-turned rock	Exposed rootsbelow intact soil layer	Sediment sorting
Relict bar & swale	Flow or streaming lineations	Sediment: talis
Relict channel	Headcuts	Springs
Rock fracture in place	Imbricated gravel	Staining of roci<s
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or pondingIndicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed Inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
ii development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

Notes : 5 6-:::, AR_I/2(b' ,A)

•Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet : Identific ation of Geomorphic Indicator s of Upl and and Watercourse Areas

Sample Point# and/or Drainage ID# lit8(4	**Date:** III /!)II	**Representative photo taken?__ Yes/**_Loo

Upla nd Indi c a t o r s	*W a t erco ur se Ind ic ato rs*	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic SollCrust	Beach ridges	Scour
Biotubat1on	Bifurcated flow	Secondary channels
callche:coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruct ion
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt,& soda	Sand filled channels
Coppice dunes: active & relict	VCutbanks	Scour holes downstream of obstructions
Denated surfaces	Desiccation Mud: cracks,curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below *in ta ct* soil layer	Sediment sorting
Relict bar & swale	/lowo streaming lIneatlons	Sediment: talls
Relict channel	Headcuts	Springs
Rock fracture In place	Imbricated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology i n gravel
No flow or ponding Indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation : flooding, ponding. or substrate saturation	Vegetation - channel alignment
0011developmen t	Ou t of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rliis	Wrack : woody

Notes: HR_1/2.)

"Adapted from : A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# :
and / or
DrainageID# L(R<_2!/-

Date: ,, J /3) /(,,

Representative photo taken? **Yes/** ●L-o

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars. mud, sand &gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
Blotubatlon	Bifurcated flow	Secondary channels
Callche: coatings, layers, rub ble	Biotic crusts	Secondary channel bypassing obstruc tion
carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	/ulbanks	Soles downstream of obstructions
Deflated surfaces	Desiccation Mud:cracks, curls/ drapes	Sediment plastering
Desert pavement	Ori : organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sedimen t sorting
Relict bar & swale	VFlow or streaming llneatlons	Sediment: tails
Rellct channel	Headcuts	Springs
Rock fracture In place	lmbrlcated gravel	Stainingof rocks
Rock varnish	l(nkkPoints	Stepped-bed morphology 1n gravel
No flow or pondingIndicators	Levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides	Observed mundat1on: floo ding, ponding, or substrate saturation	Vegetation - channel alignment
ii d evelopment	Out of channel flow	Water-cut benches
Surface ro undi ng of land form	Overturned rocks	Water level marks
Woody debris in place	Rliis	Wr ack: woody

Notes:

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•Adapted from : A Field Gulde to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Llchvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stream Process on Ari d Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point# and/ or Drainage ID# f<R	Date: n/1;.I/	Representative photo taken? __ Yes/.L-0

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soil Crust	Beach ridges	Scour
Blotubation	Bifurcated flow	Secondary channels
Callche; coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	I/Cutbanks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks, curls / drapes	Sediment plastering
Desert pavement	Drift ; organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swale	/Flow streaming lineations	Sediment: tails
Relict channel	Headcuts	Springs
Rock fracture In place	Imbr lcated gravel	Stainingof rocks
Rock varnish	Knick Points	Stepped-bed morphology in gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetatron - channel alignment
oil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Over turned rocks	Water level marks
Woody debris in place	Rills	Wrack: woody

Notes:

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- Adapted from: A Fleld Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, A Delineation Manual (Uchvar and McColley 2008); and Methods to Describe and Delineate Episodic Stream Process on Aridlandscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # **and/or** **Drainage ID#** KR l0>	**Date:** // /,3,Ill- r	Representative photo taken? Yes / o

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars: mud, sand & gravel	Ripples
Biotic Soll Crust	Beach ridges	Scour
Biotubatfon	Bifurcated flow	Secondary channels
Caliche: coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	u t banks	Scour holes downstream or obstructions
Deflated surfaces	Desiccation M ud· cracks, curls/ drapes	Sediment plastering
Desert pavement	Drift: organic	Sediment ramps
Over-turned rock	Exposed roots below intact soil layer	Sediment sorting
Relict bar & swal e	? w or streaming llneatlons	Sediment: tafls
Relict channel	Headcuts	Springs
Rock fract ure m place	Imbr icated gravel	Staining of rocks
Rock varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rublfied rock undersides	Observed inundation: flooding, ponding, or substrate saturation	Vegetation - channel alignment
development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris in place	Rliis	Wrack: woody

Notes: > /4 '-{ (i.d,,/40)

•Adapted from A Field Gulde to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Lichvar and Mccolley 2008); and Methods to Describe and Delineate Episodic Stre.im Process on Arid l.ilndscapes for Permitting Utill ty-Scale Solar Power Plan ts (Brady and Vyverberg, 2013).

Field Data Sheet: Identification of Geomorphic Indicators of Upland and Watercourse Areas

Sample Point # ____________ **and/or** Drainage ID # RRlo4	Date: 11/r l	Representative photo taken? _ Yes/ _ **No**

Upland Indicators	*Watercourse Indicators*	
Av Horizon	Bars; mud, sand & gravel	Ripples
Biotic Soil Crust	Beach **ridges**	Scour
Bioturbation	Bifurcated flow	Secondary channels
Caliche:coatings, layers, rubble	Biotic crusts	Secondary channel bypassing obstruction
Carbonate etching	Drainage swales	Sediment sheets
Clast / rock weathering	Crusts: carbonate, salt, & soda	Sand filled channels
Coppice dunes: active & relict	/Cut banks	Scour holes downstream of obstructions
Deflated surfaces	Desiccation Mud: cracks. curls/ drapes	Sediment plastering
Desert pavement	Drift:organic	Sediment ramps
Over•turned rock	Exposed roots below IntaCL soillayer	Sediment sorting
Relict bar & swale	/ low or streaming lineations	Sediment: tails
Relict channel	Headcuts	**Springs**
Rock fracture In place	Imbricated gravel	Staining of rocks
Roel(varnish	Knick Points	Stepped-bed morphology In gravel
No flow or ponding indicators	Levee Ridges: sand & gravel	Substrate staining
Rubified rock undersides	Observed Inundation: flooding, ponding. or substrate saturation	Vegetation - channel alignment
oil development	Out of channel flow	Water-cut benches
Surface rounding of landform	Overturned rocks	Water level marks
Woody debris In place	Rills	Wrack: woody

Notes:

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•Adapted from: A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) In the Arid West Region of the Western United States, A Delineation Manual (Lichvar and McColley 2008); and Methods to Describe and Delineate Episodic Stream Process on Arid Landscapes for Permitting Utility-Scale Solar Power Plants (Brady and Vyverberg, 2013).

Appendix E1

Representative Onsite Photographs

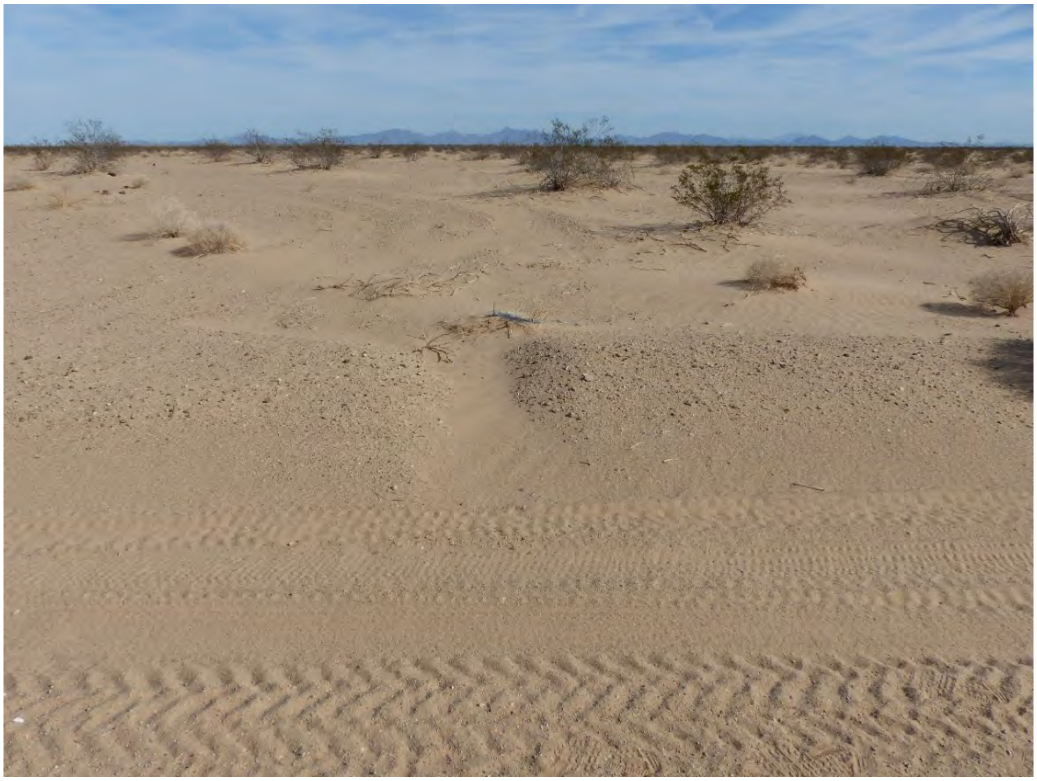


Photo Point / Watercourse ID# RR1, dormant channel east side of north-south road.

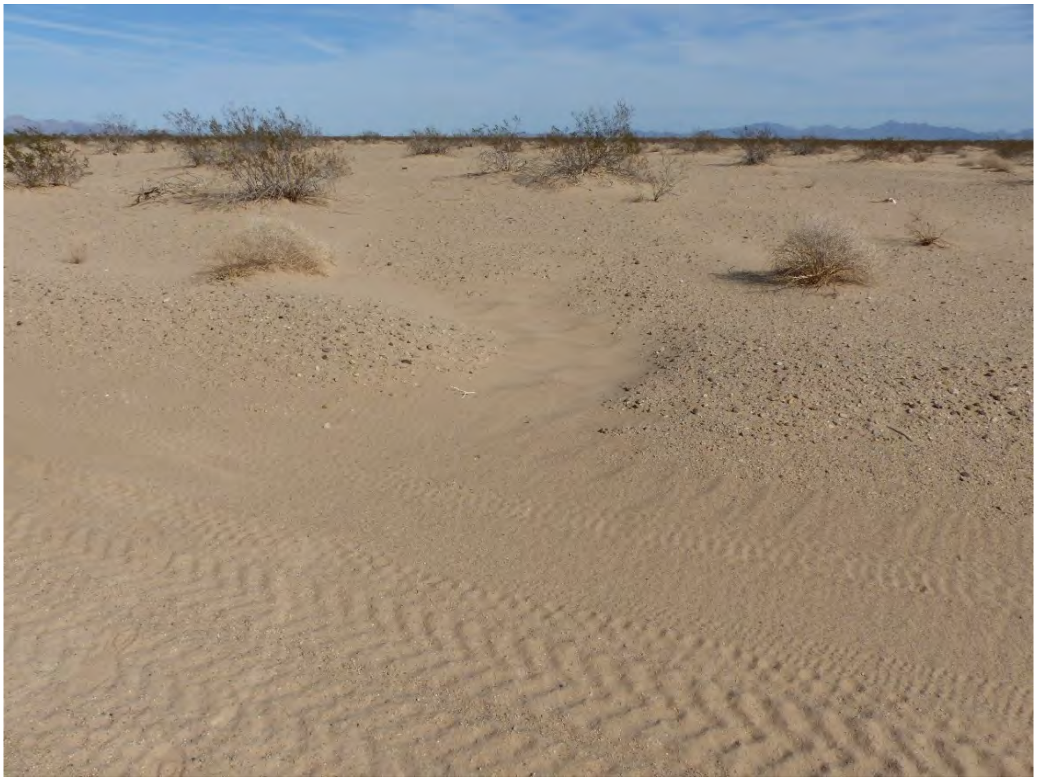


Photo Point / Watercourse ID# RR2, dormant channel east side of north-south road.

Photo Point / Watercourse ID# RR3, dormant channel west side of north-south road, looking southwest.

Photo Point / Watercourse ID# RR6, looking southwest.

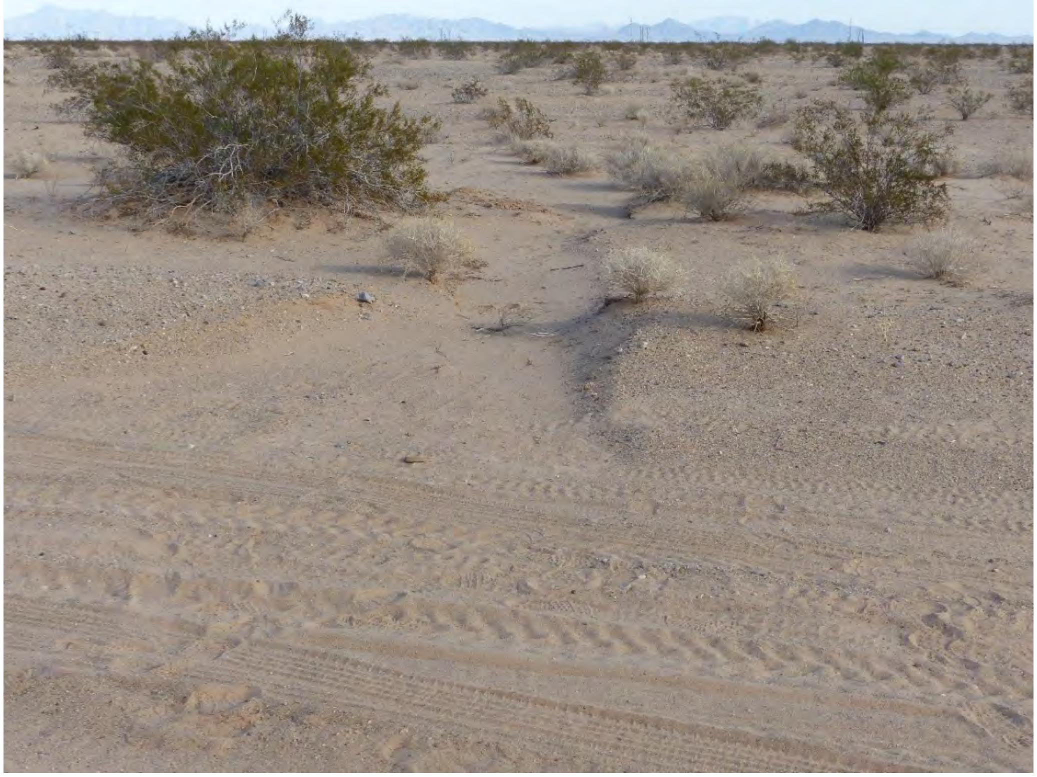


Photo Point / Watercourse ID# RR7, dormant channel looking east.

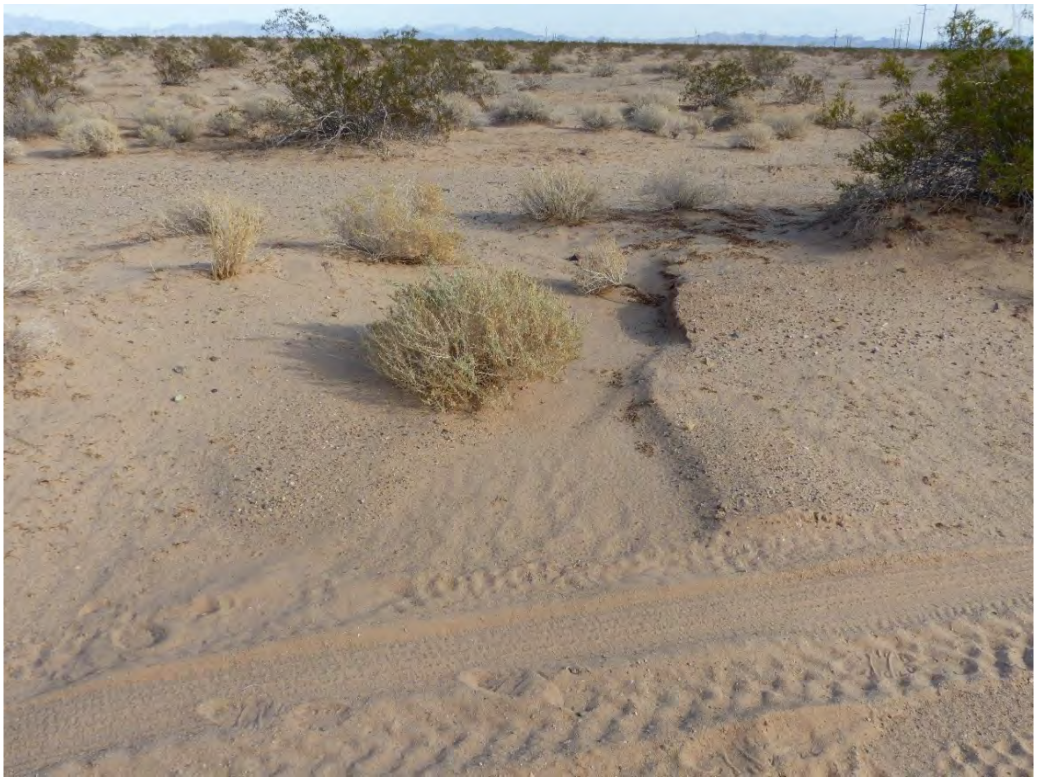


Photo Point / Watercourse ID# RR8, dormant channel looking east.

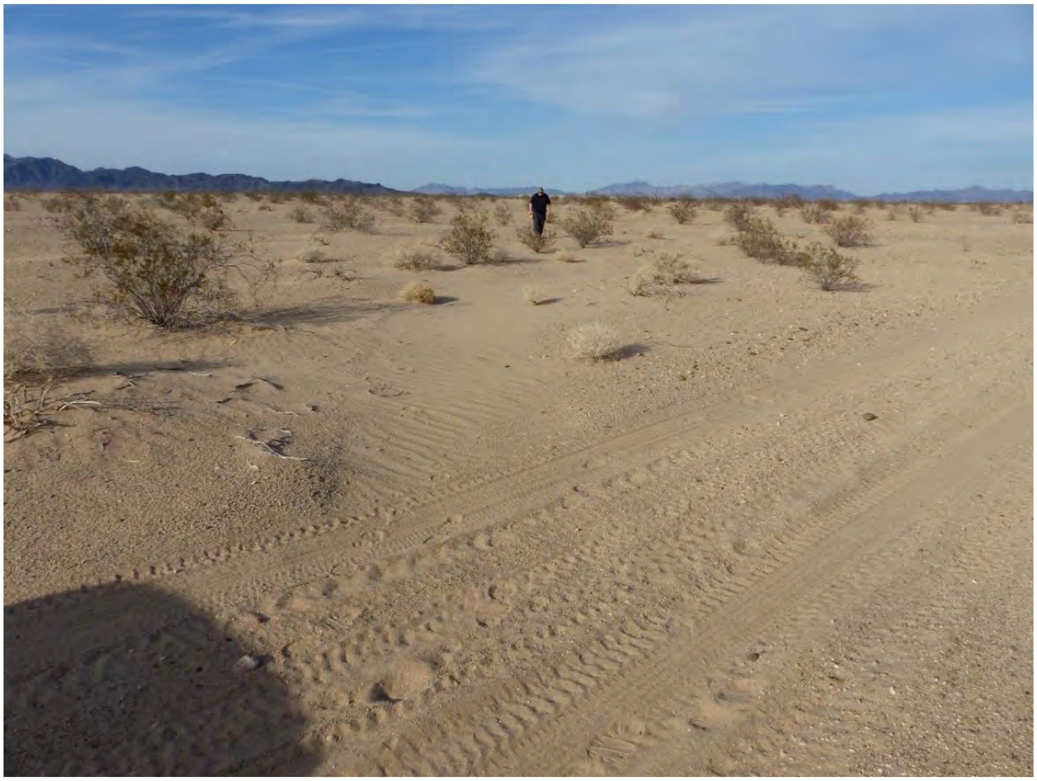


Photo Point / Watercourse ID# RR9, dormant channel looking northwest.

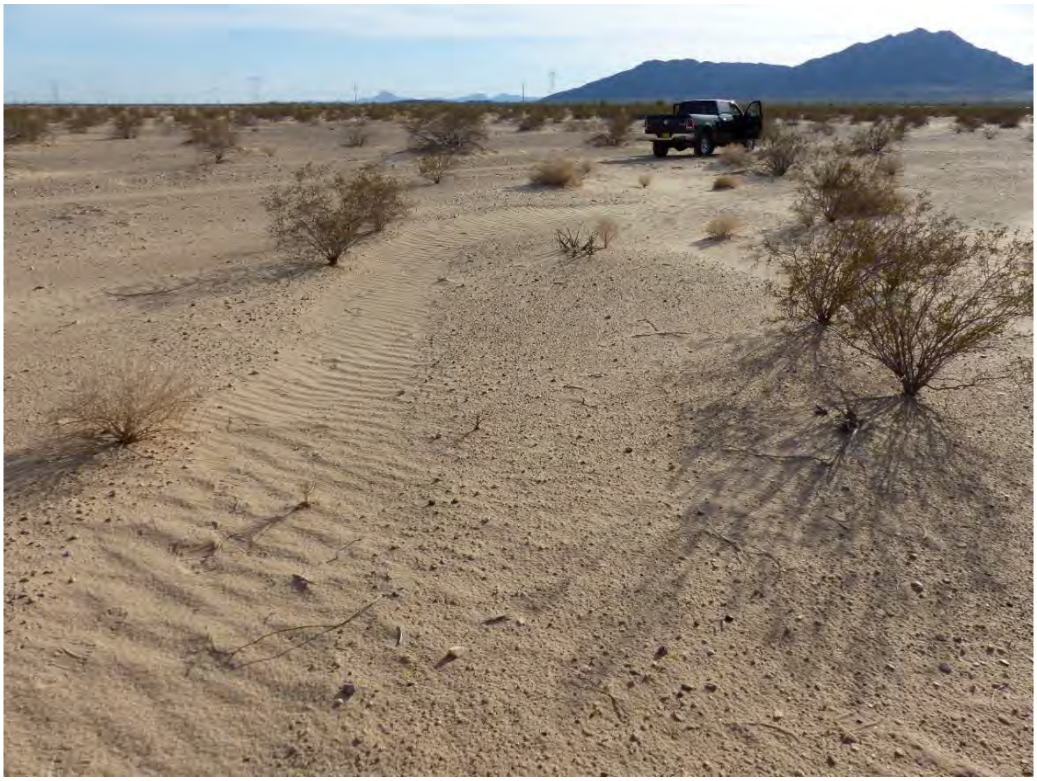


Photo Point / Watercourse ID# RR10, dormant channel looking south.

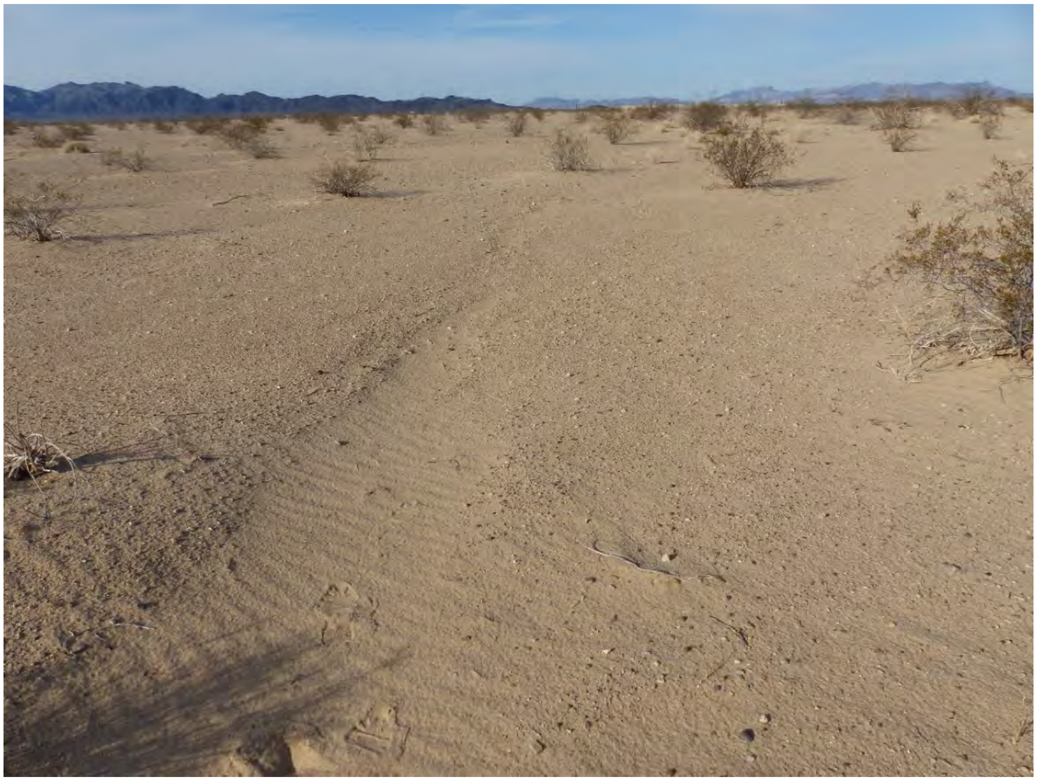


Photo Point / Watercourse ID# RR11, dormant channel looking northwest.

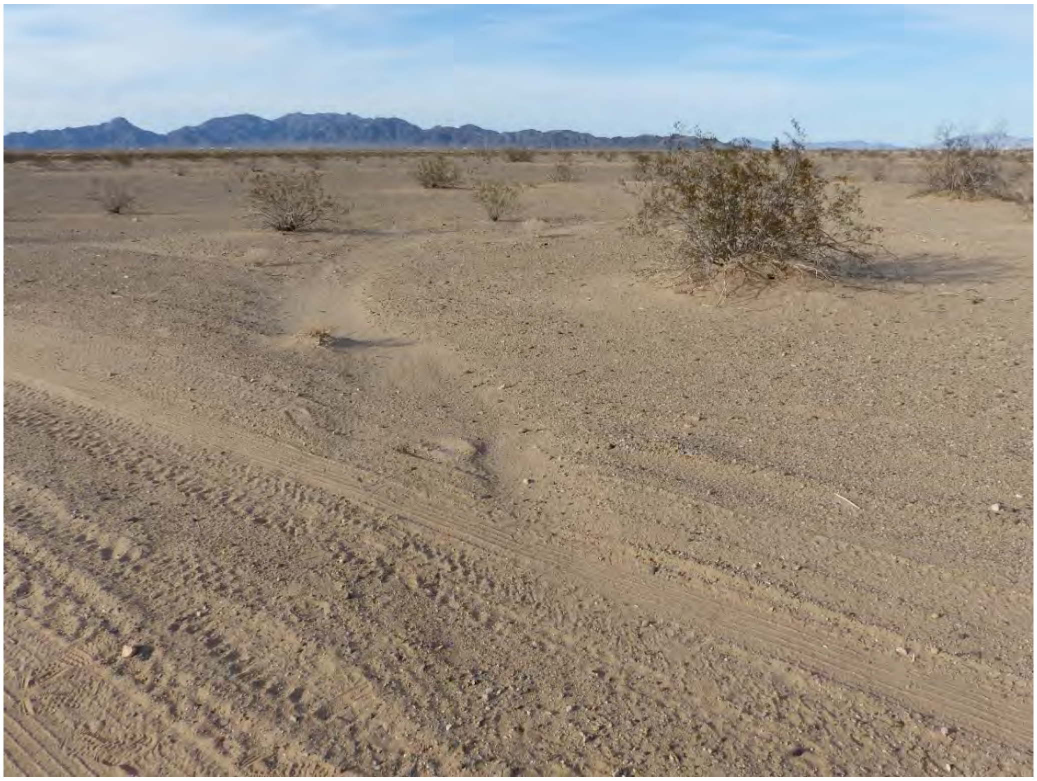


Photo Point / Watercourse ID# RR 12, dormant channel north side of road, looking north.

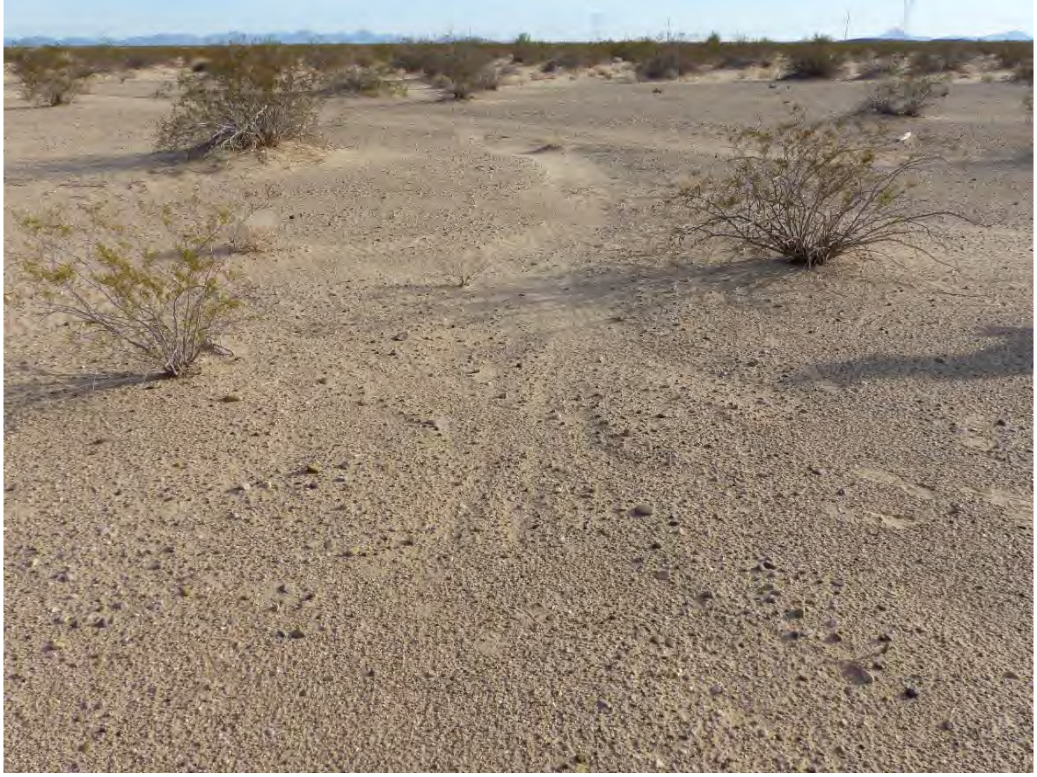


Photo Point / Watercourse ID# RR13, dormant channel north side of road, looking east-southeast.

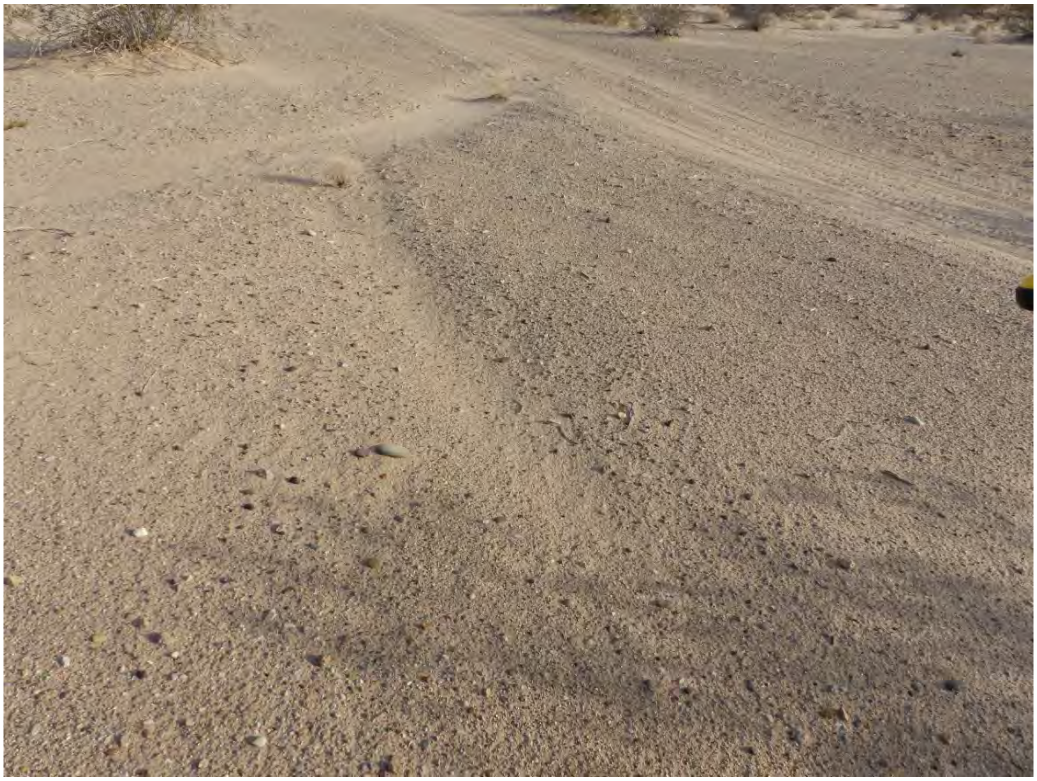


Photo Point / Watercourse ID# RR14, dormant channel north side of road, looking east-southeast.

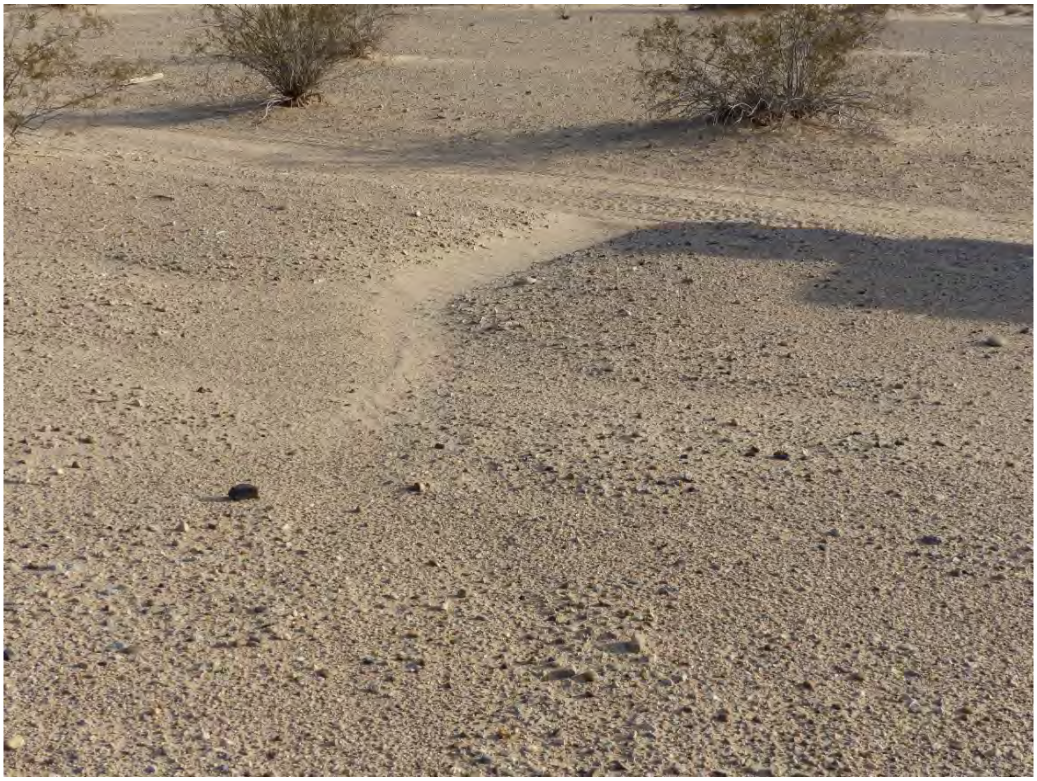


Photo Point / Watercourse ID# RR15, dormant channel north side of road, looking southeast.

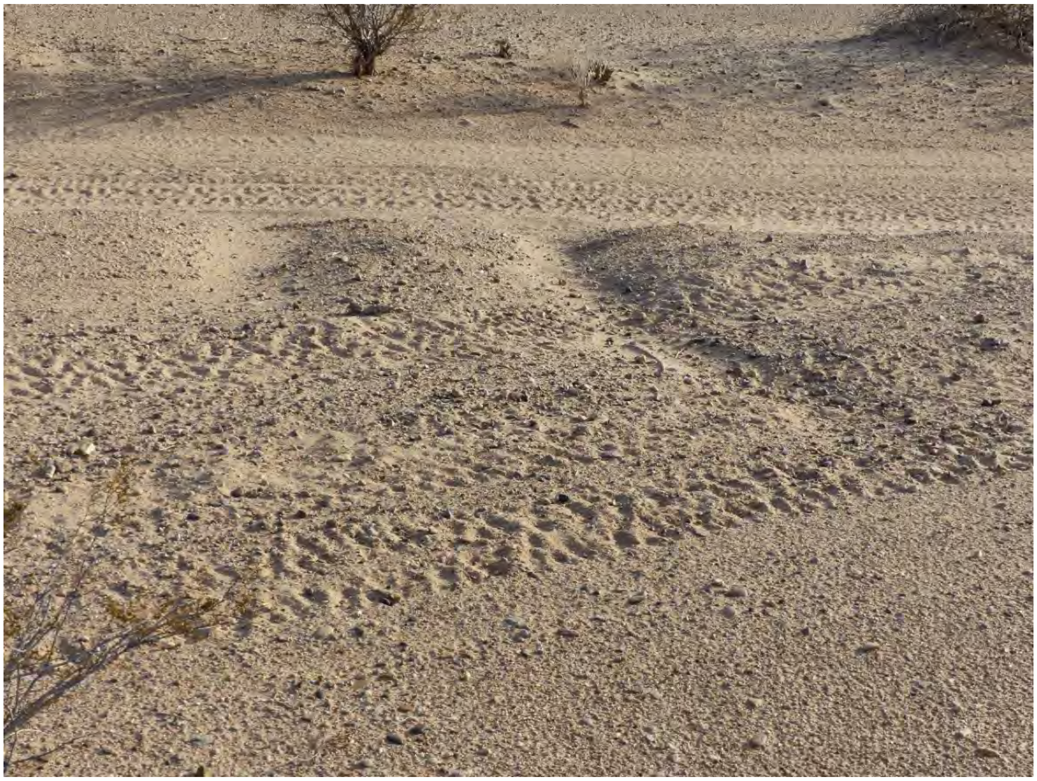


Photo Point / Watercourse ID# RR16 and RR17, dormant channel north side of road, looking south.

Photo Point / Watercourse ID# RR18, dormant channel north side of road, looking south.

Photo Point / Watercourse ID# RR19, dormant channel north side of road, looking southwest.

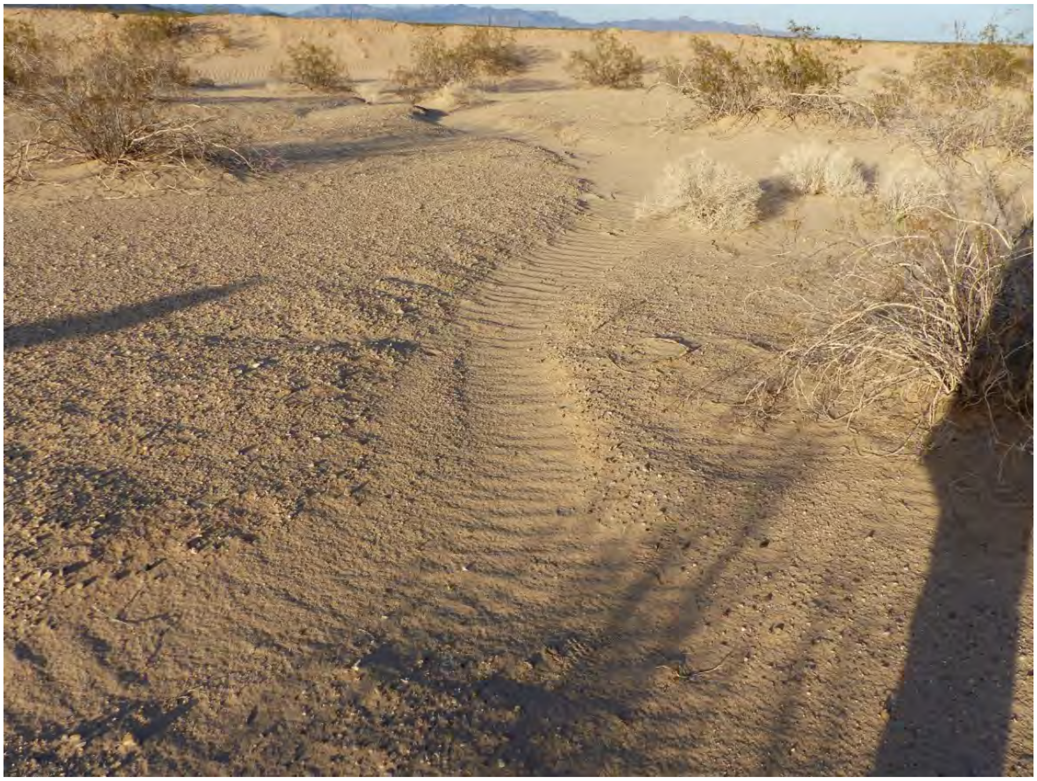
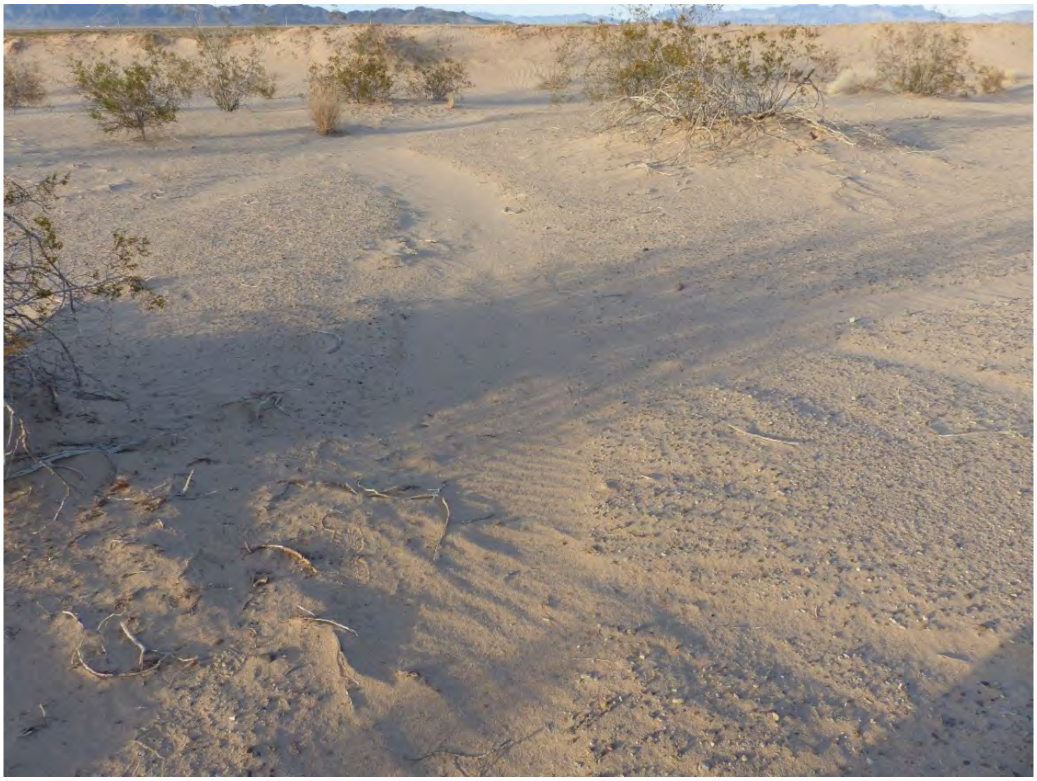


Photo Point / Watercourse ID# RR18, dormant channel on south side of berm on southern side of farmed area.



PPhoto Point / Watercourse ID# RR19, dormant channel on south side of berm on southern side of farmed area.

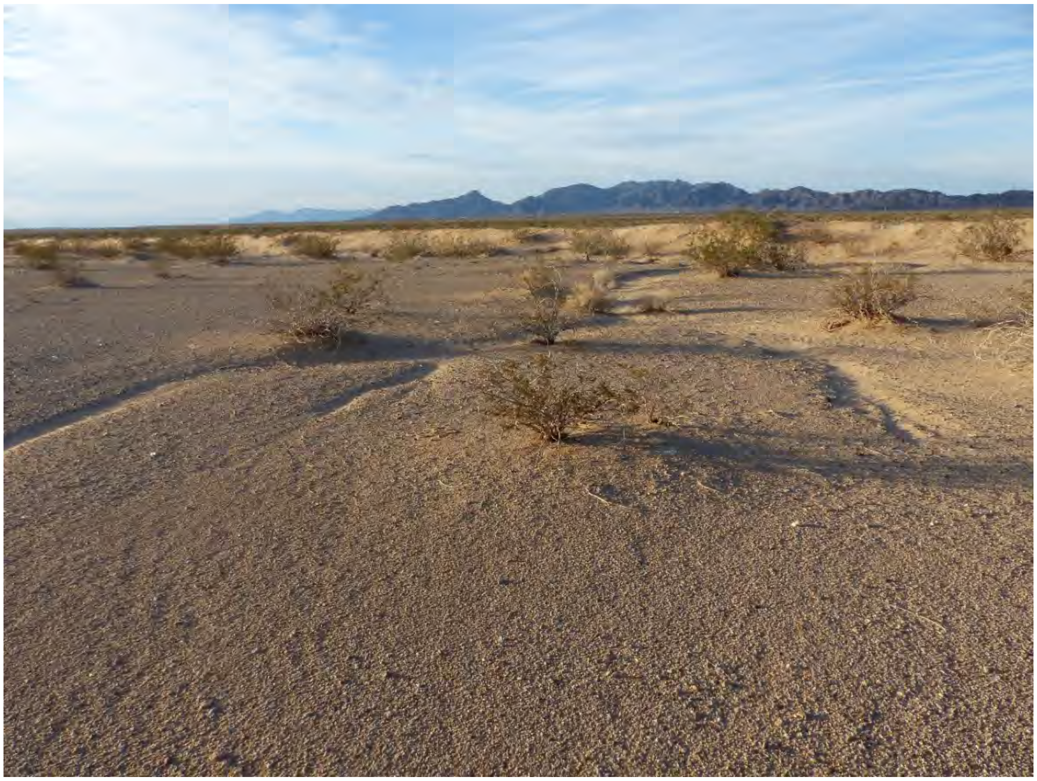


Photo Point / Watercourse ID# RR20, dormant channel with 5 forks on south side of berm, south side of farmed area.

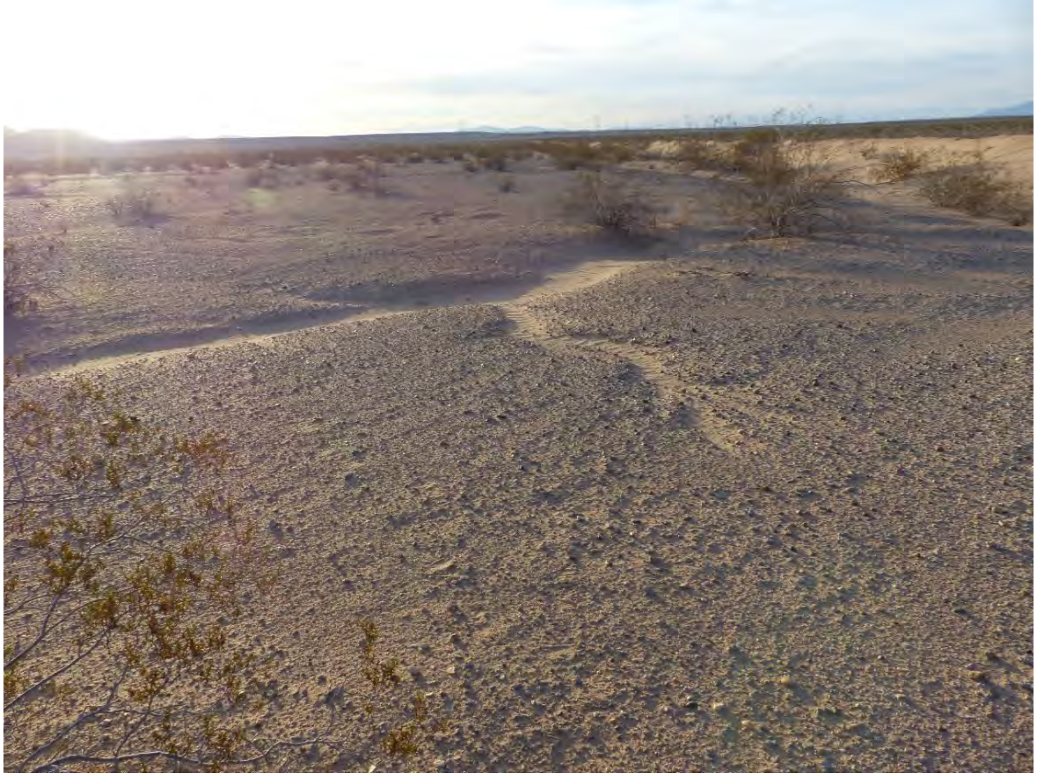


Photo Point / Watercourse ID# RR21a, dormant channel on south side of berm on southern side of farmed area.

Photo Point / Watercourse ID# RR22. Dormant channel.

Photo Point / Watercourse ID# RR23. Dormant channel.

Photo Point / Watercourse ID# RR24a. Dormant channel on east end of south side of berm on south side of farmed area.

Photo Point / Watercourse ID# RR25a. Dormant channel on south side of berm on south side of farmed area.

Photo Point / Watercourse ID# RR26. Dormant channel on south side of berm on south side of farmed area.

Photo Point / Watercourse ID# RR27a. Dormant channel on south side of berm on south side of farmed area.

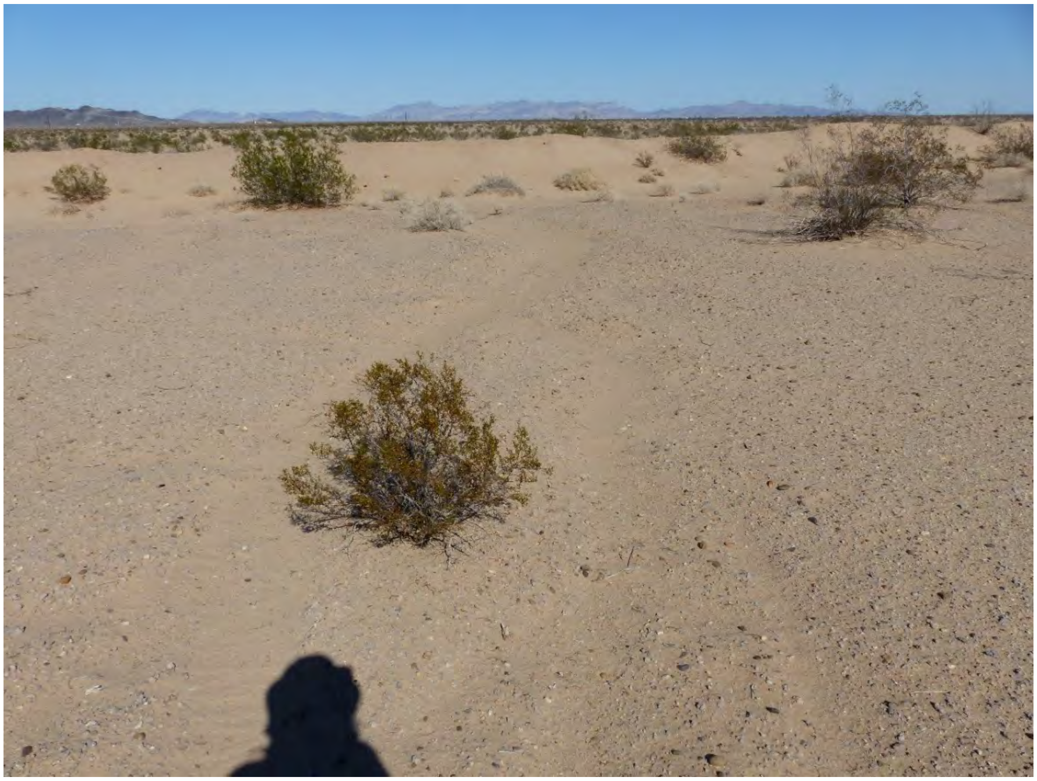


Photo Point / Watercourse ID# RR28a. Watercourse on south side of berm on south side of farmed area.

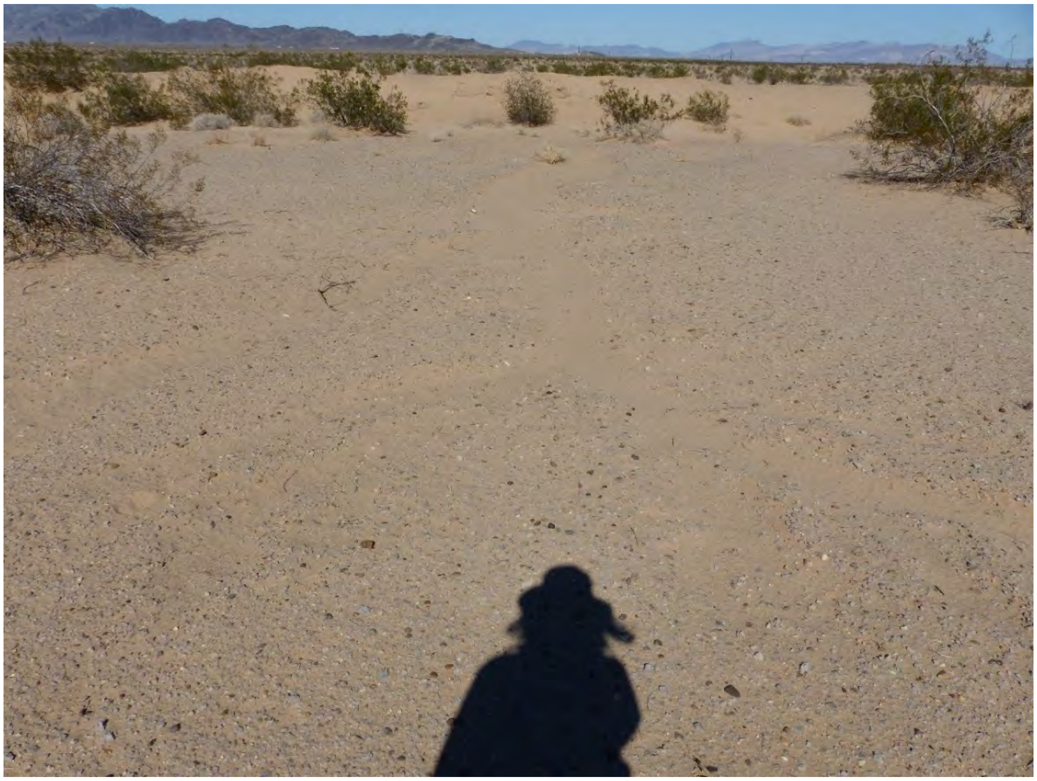


Photo Point / Watercourse ID# RR29. Dormant channel on south side of berm on south side of farmed area.

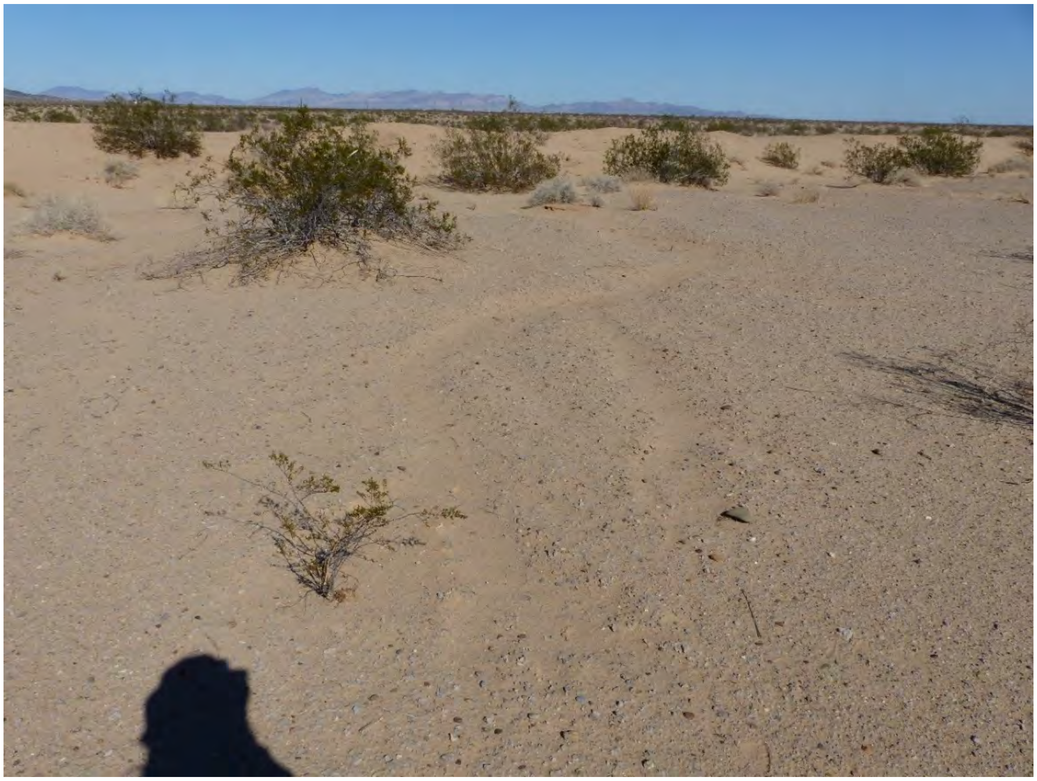


Photo Point / Watercourse ID# RR30a. Dormant channel on south side of berm on south side of farmed area.

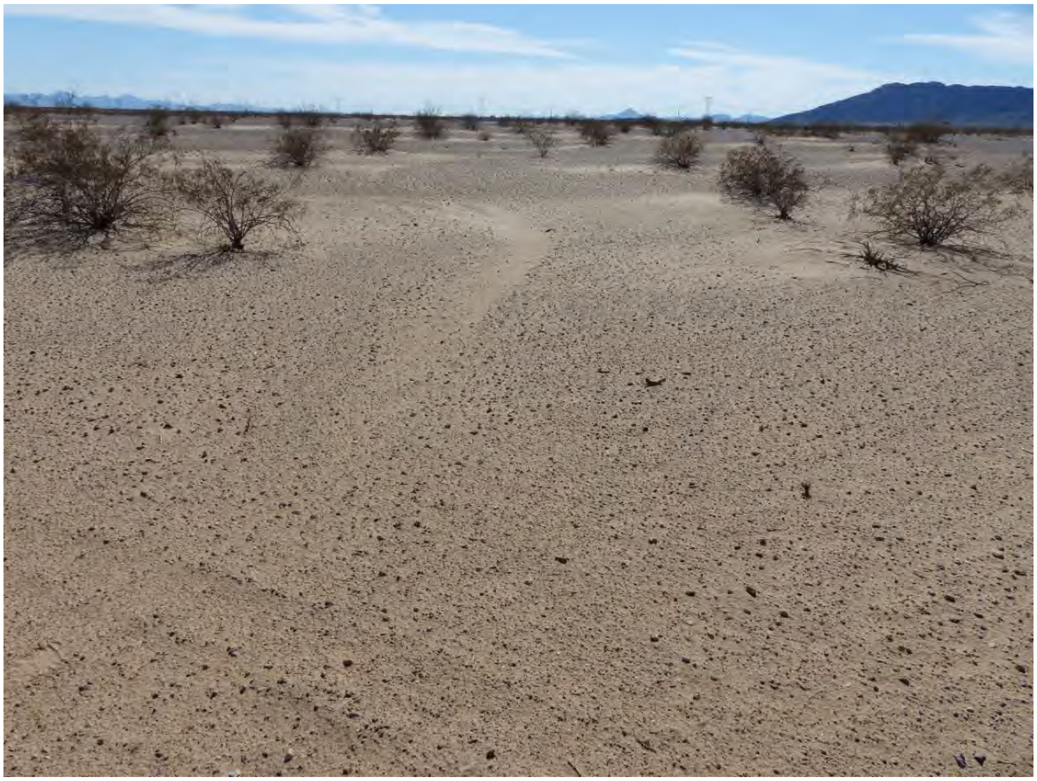


Photo Point / Watercourse ID# RR31. Dormant on south side of berm on south side of farmed area.

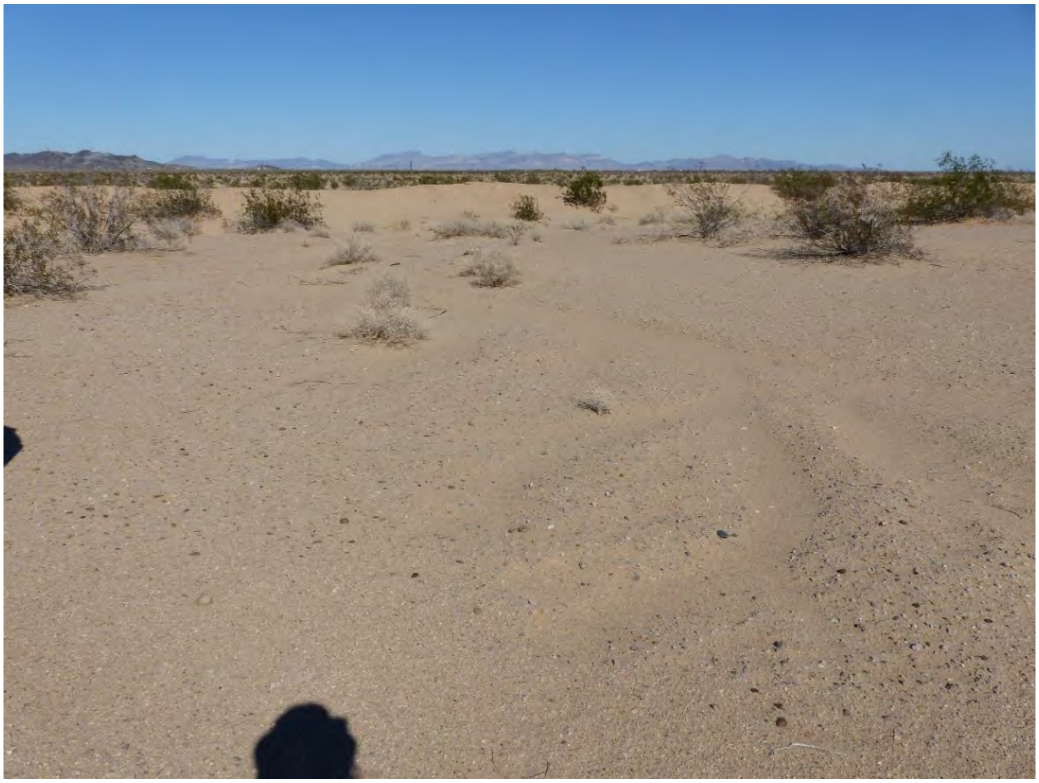


Photo Point / Watercourse ID# RR32. Dormant channel with many side channels on south side of berm on south side of farmed area.

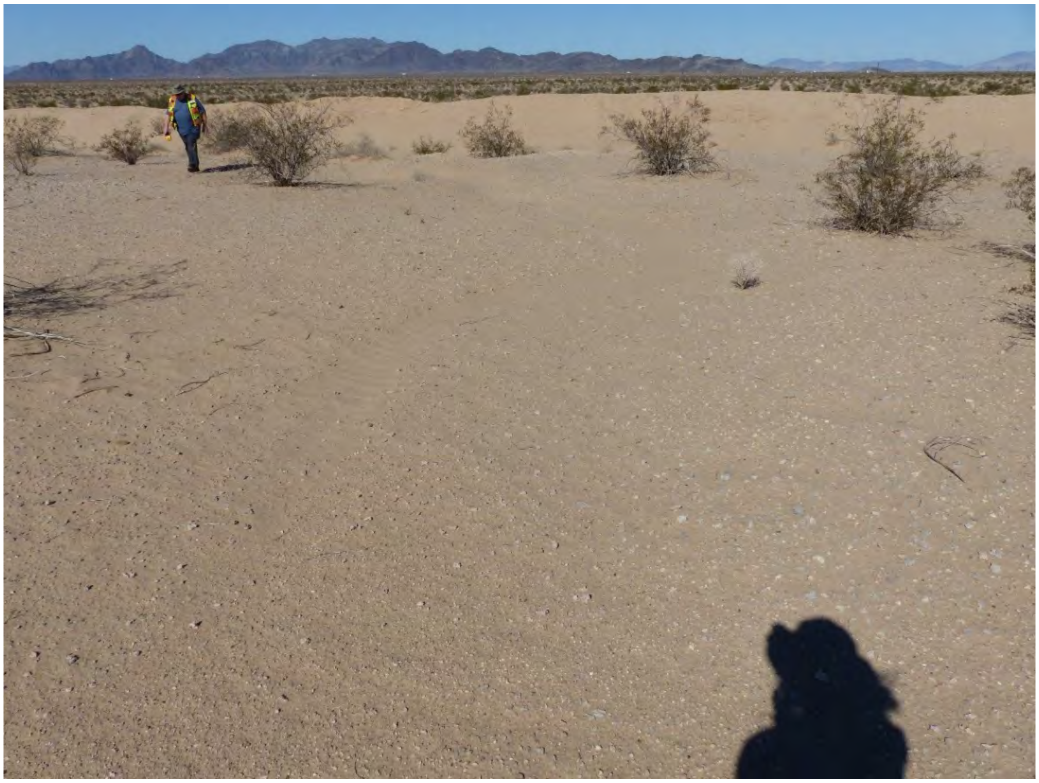


Photo Point / Watercourse ID# RR33. Dormant channel on south side of berm on south side of farmed area.

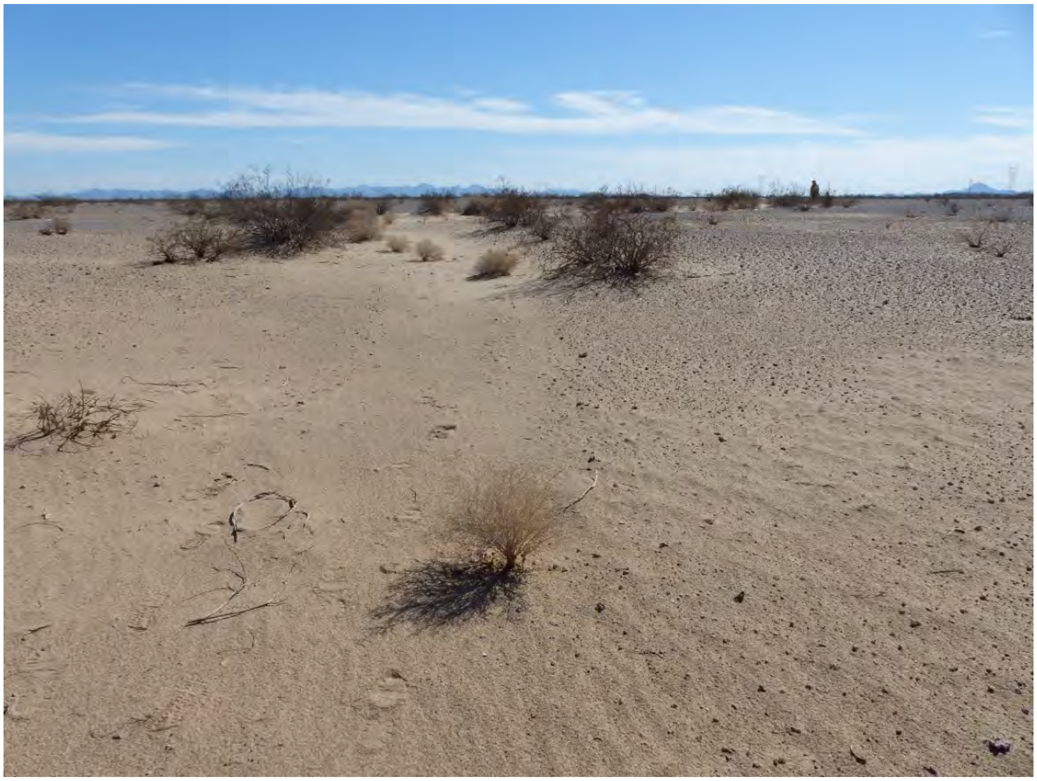


Photo Point / Watercourse ID# RR34a. Dormant channel on south side of berm on south side of farmed area.

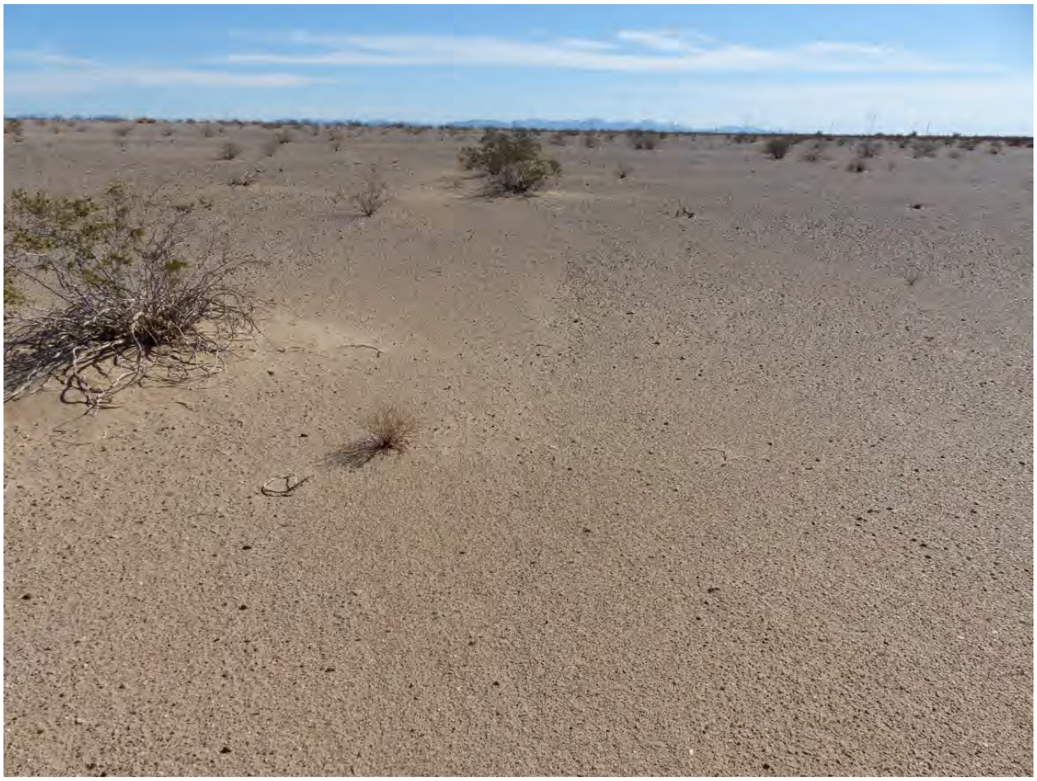


Photo Point / Watercourse ID# RR35. Dormant channel on south side of berm on south side of farmed area.

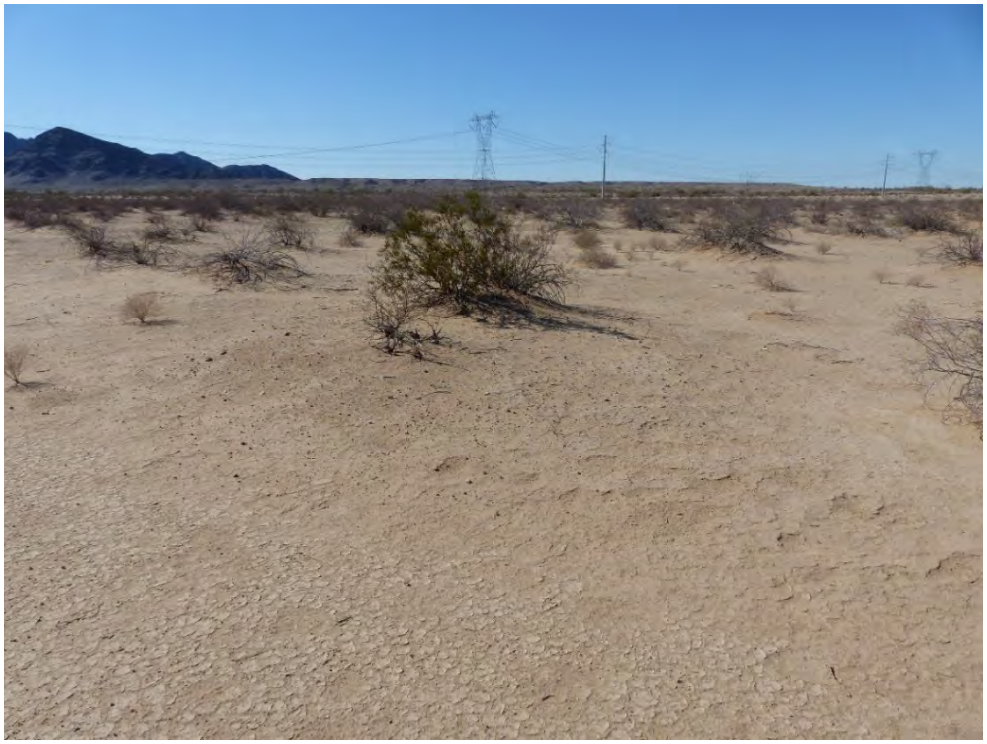
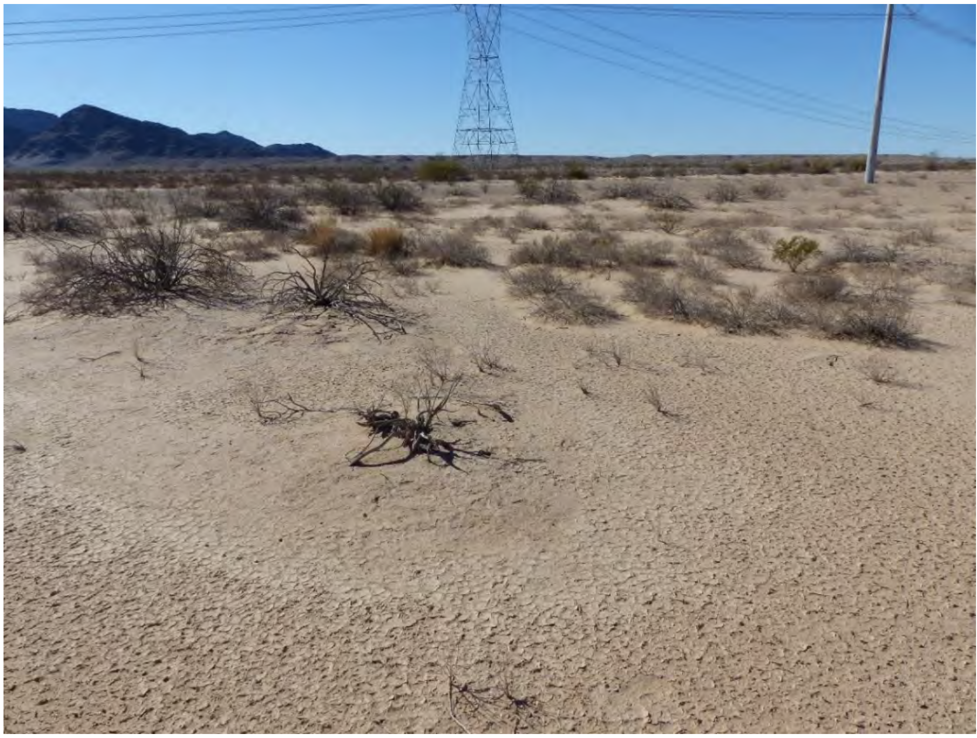


Photo Point 41. Desiccation mud cracks and curls found in active Watercourse ID# FP2 bordered by (in upper right of photograph) upland surface indicators (coppice dunes, deflated surfaces, and surface rounding of landform) within abandoned Watercourse ID# FP3. Desiccation mud cracks and curls absent in FP3 watercourse.



a

Photo Point 42. Desiccation mud cracks and curls found within active Watercourse ID# FP2 evident in photograph.

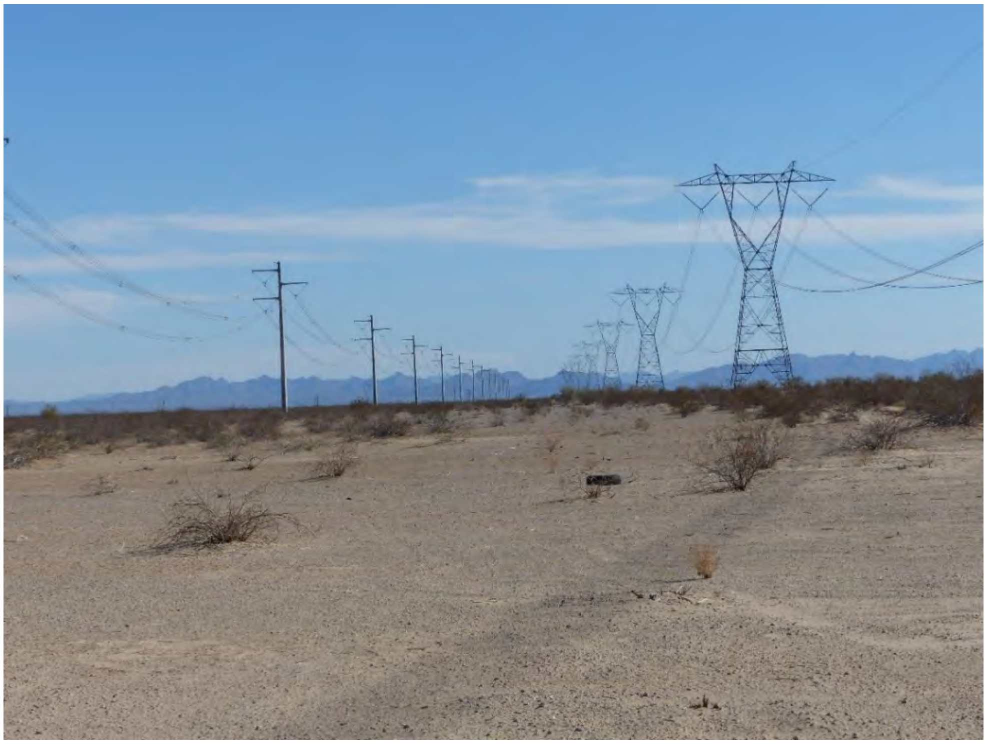


Photo Point 43. Western edge of Watercourse ID# FP2. Note upland surface feature- deflated surfaces and coppice dunes.

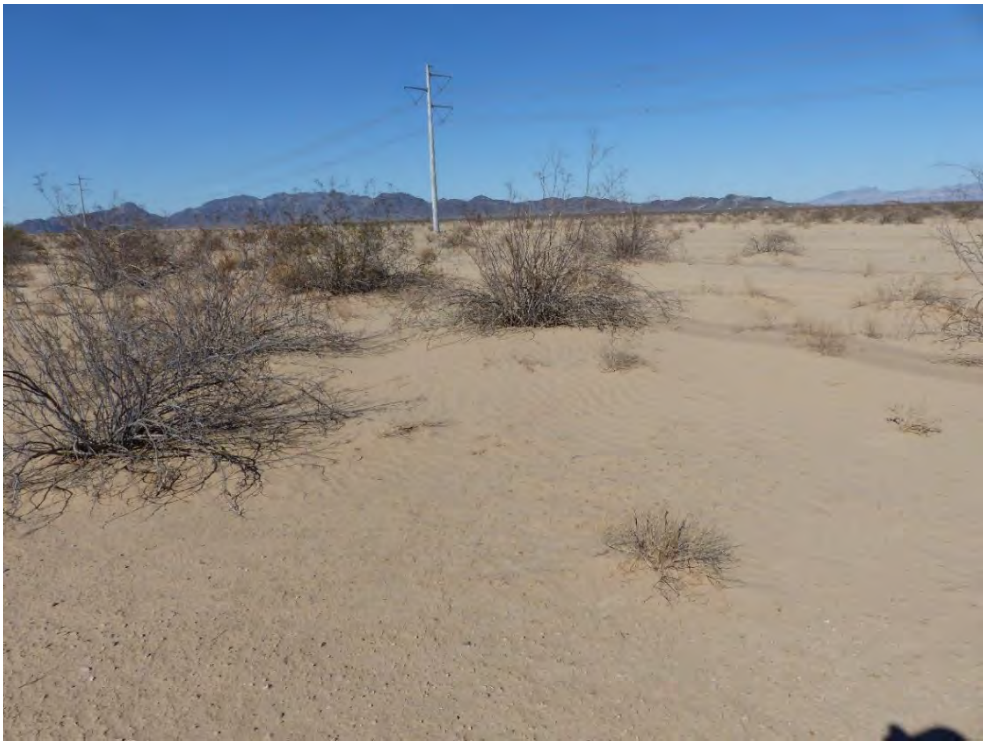


Photo Point / Watercourse ID# RR36, sand filled watercourse west side transmission line corridor.

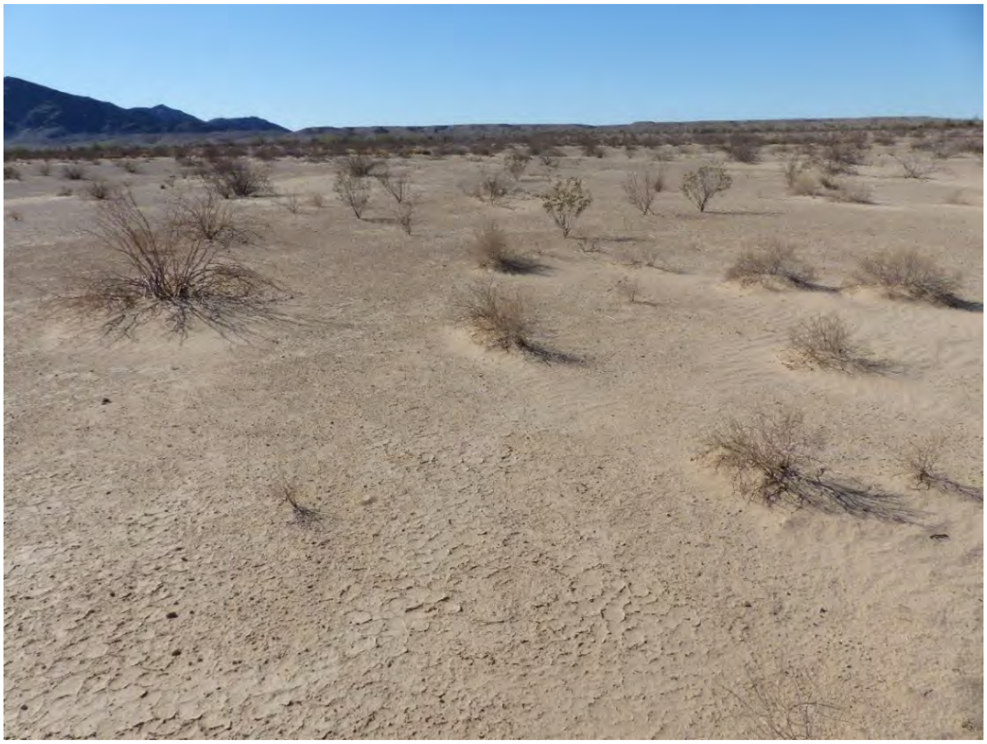


Photo Point / Watercourse FP#3. Active Watercourse. Desiccation mud cracks and curls evident in photograph.

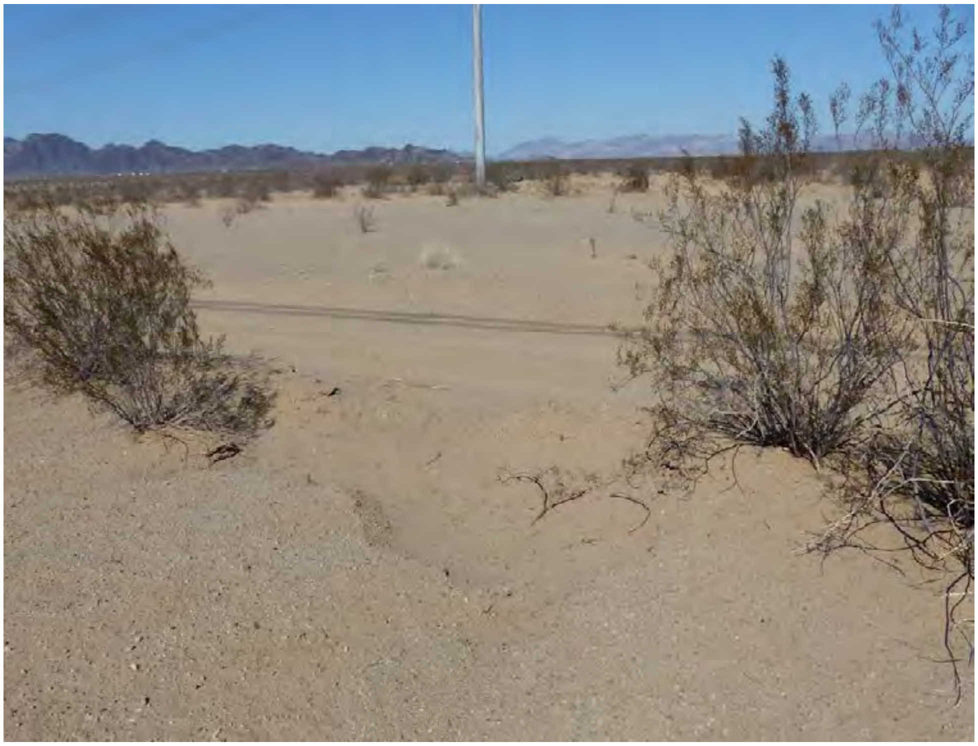


Photo Point / Watercourse ID# RR37. Abandoned channel.

Photo Point / Watercourse ID# RR38. Abandoned channel.

Photo Point / Watercourse ID# RR39. Abandoned channel.

Photo Point / Watercourse ID# RR40. Abandoned channel.

Photo Point / Watercourse ID# RR41.

Photo Point 32

Photo Point 33

Photo Point 34

Photo Point 35

Photo Point 36

Photo Point PP11 looking west.

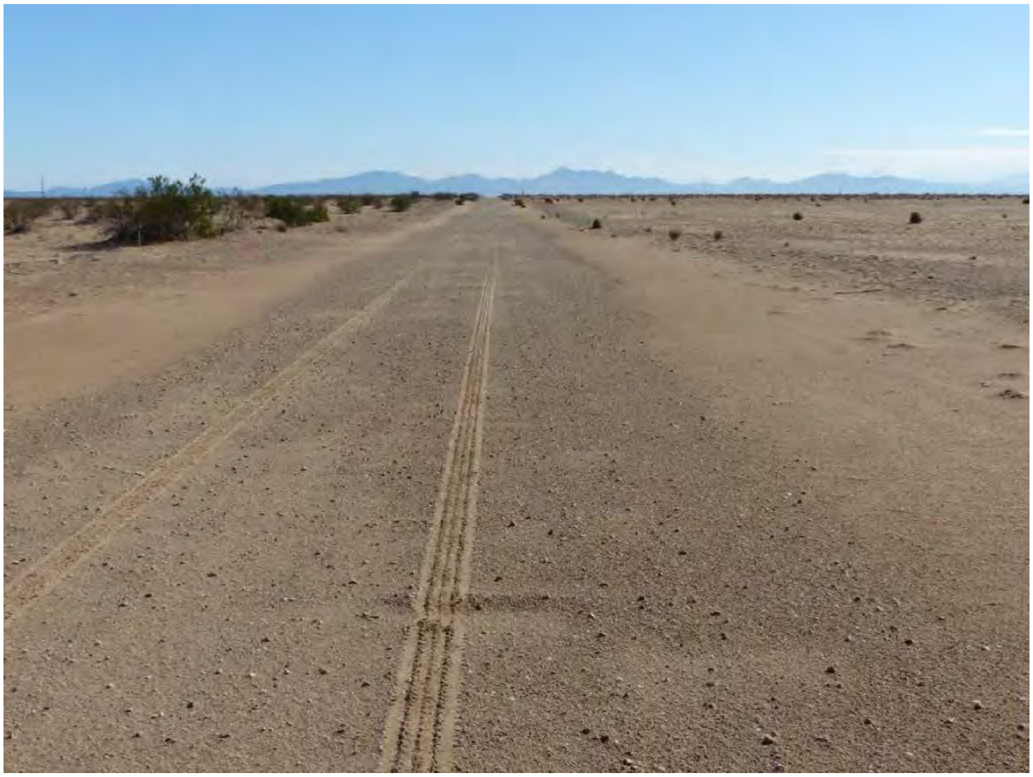


Photo Point PP12 looking east.

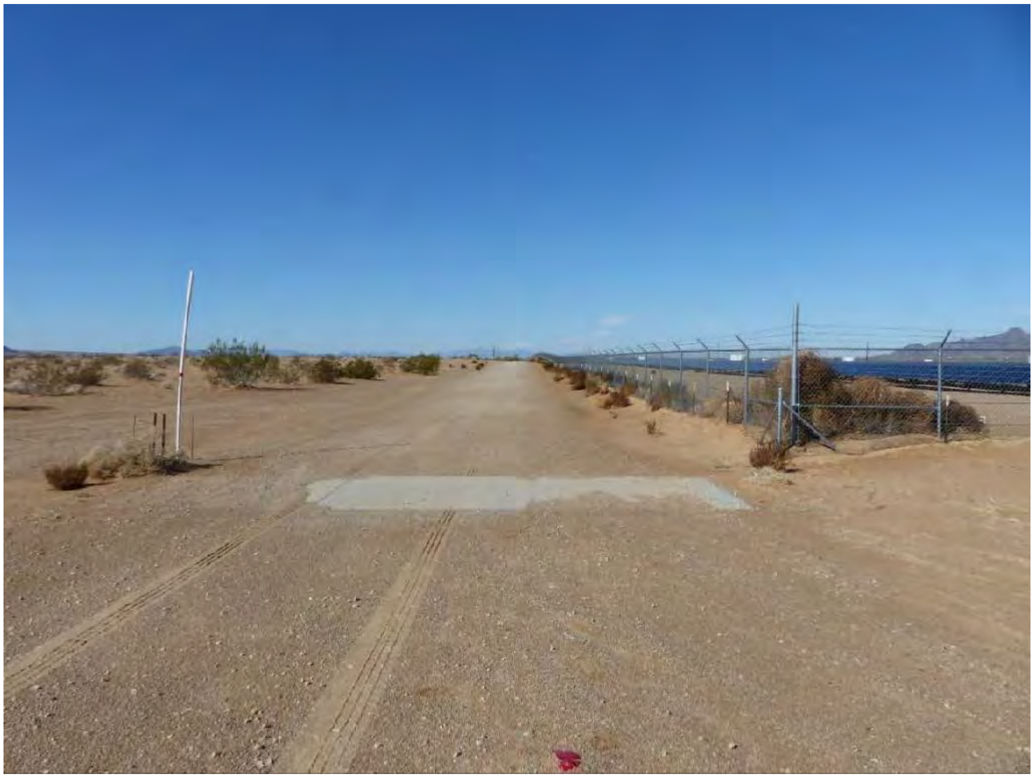


Photo Point PP13 looking west; concrete structure is a utility box not a drainage culvert.

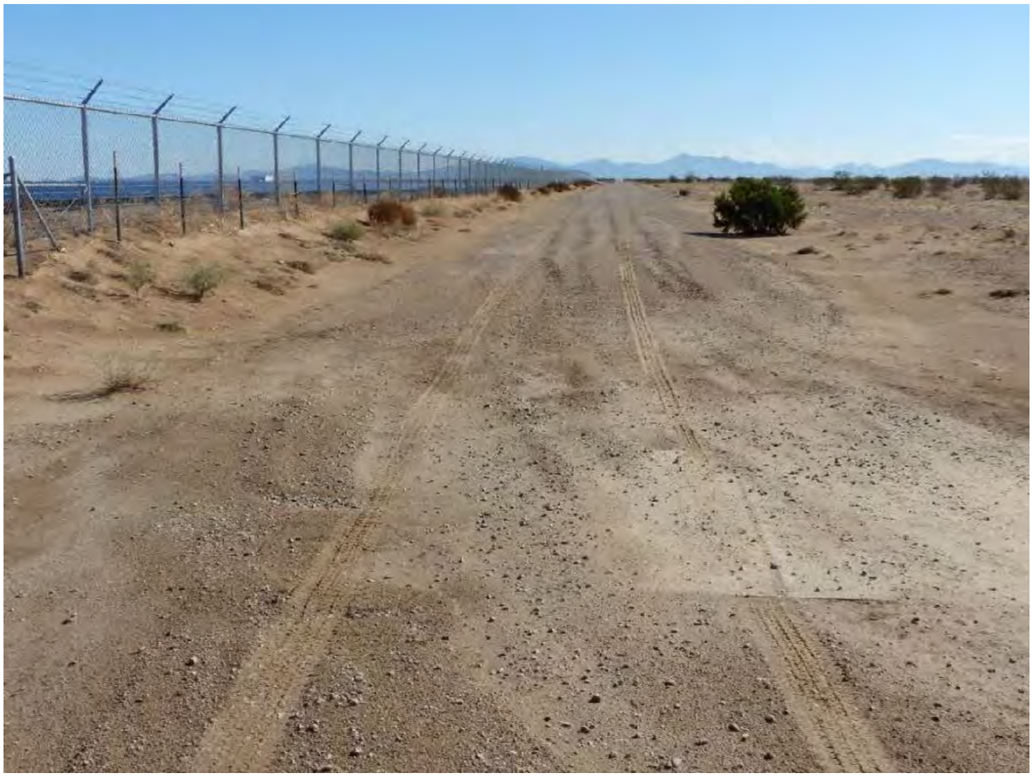


Photo Point PP14 looking east.

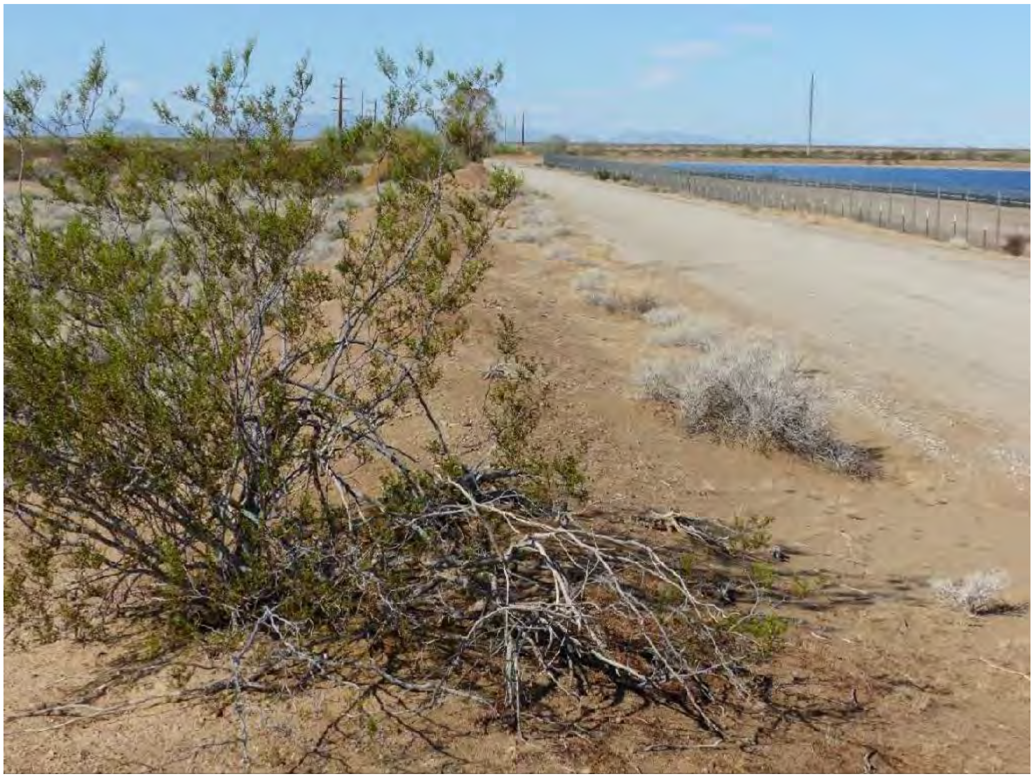


Photo Point PP15 looking west; dirt flood control levee on south side of road designed to protect solar farm from flooding from Pallowalla Wash.

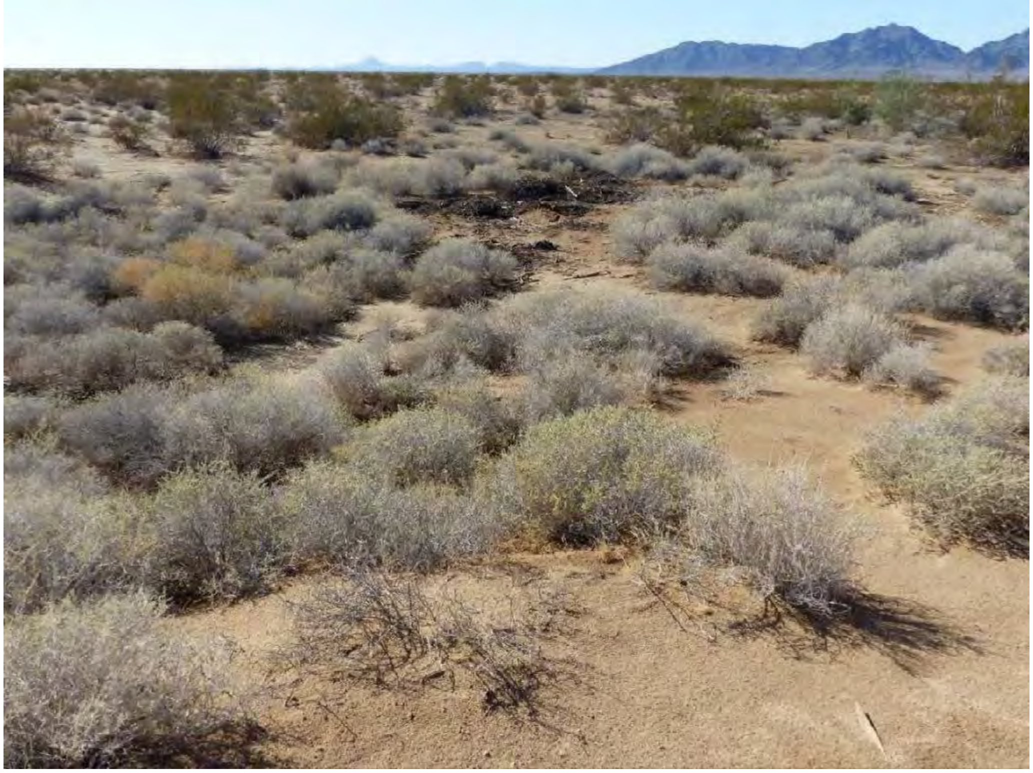


Photo Point PP16 looking south at terminus of Pallowalla Wash where there is no bed and bank and unconfined surface water sheet flow begins which dissipates into desert soils.

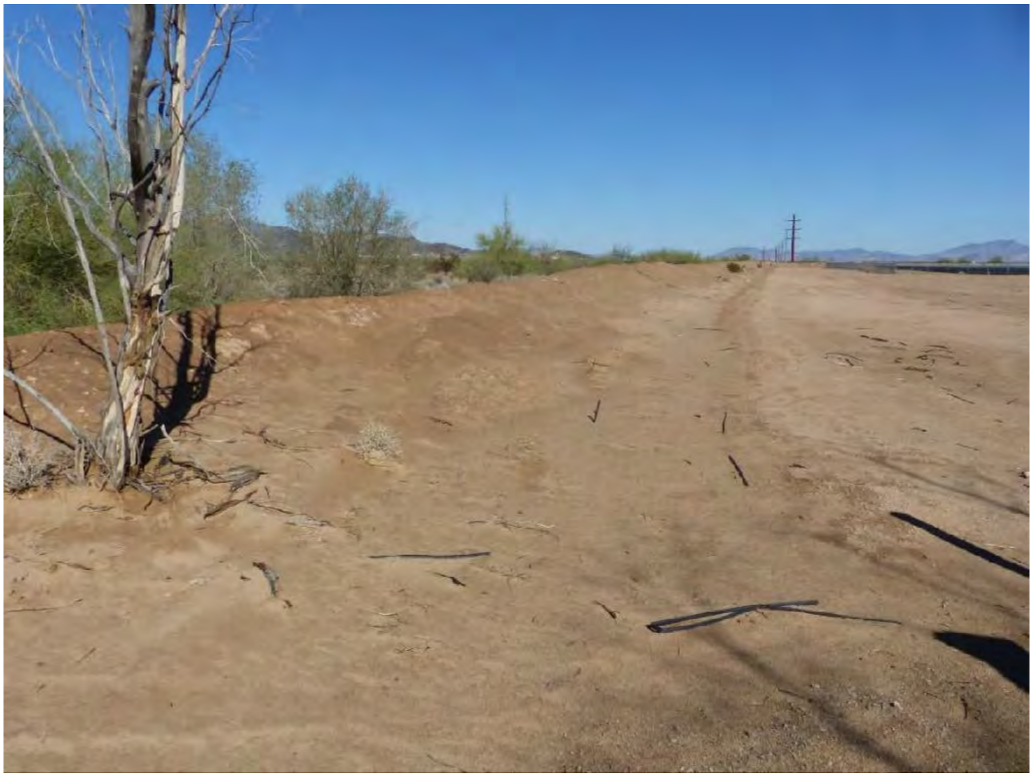


Photo Point PP17 looking north; Pallowalla Wash flood control levee to west.

Photo Point PP17; Pallowalla Wash Looking east before terminus at Photo Point PP16.

Photo Point PP18 looking northeast.

Photo Point PP19 looking north.

Photo Point PP19 looking west.

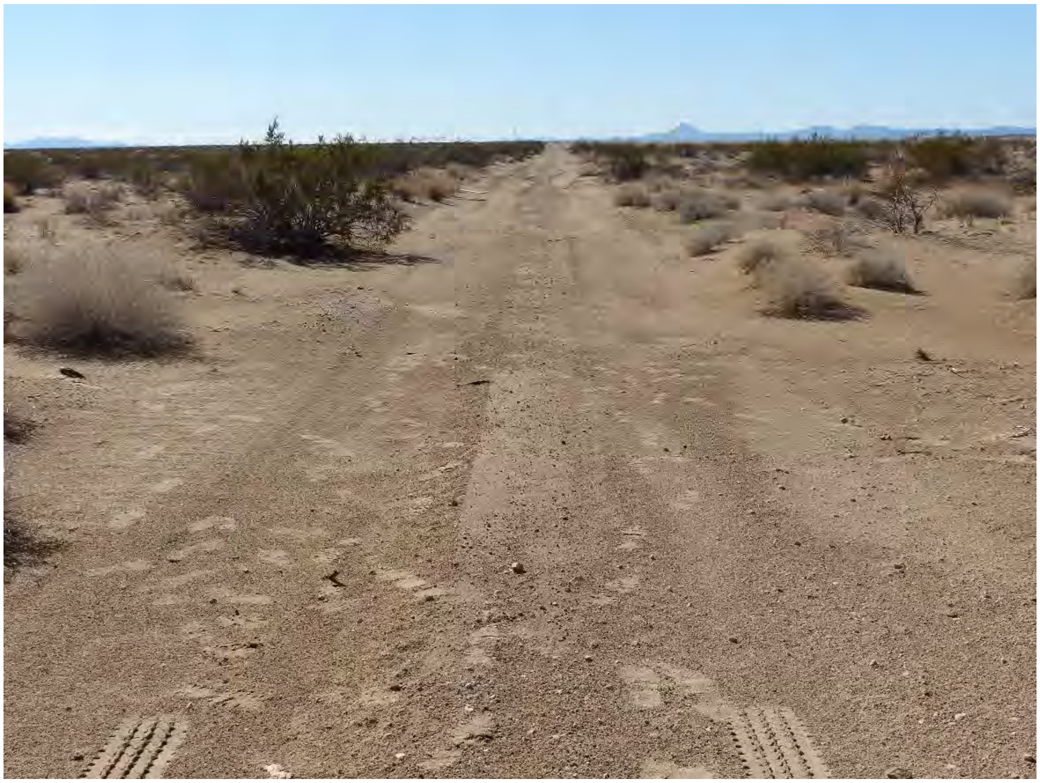


Photo Point PP20 looking south. Small drainage from the east enters road, but does not cross it.

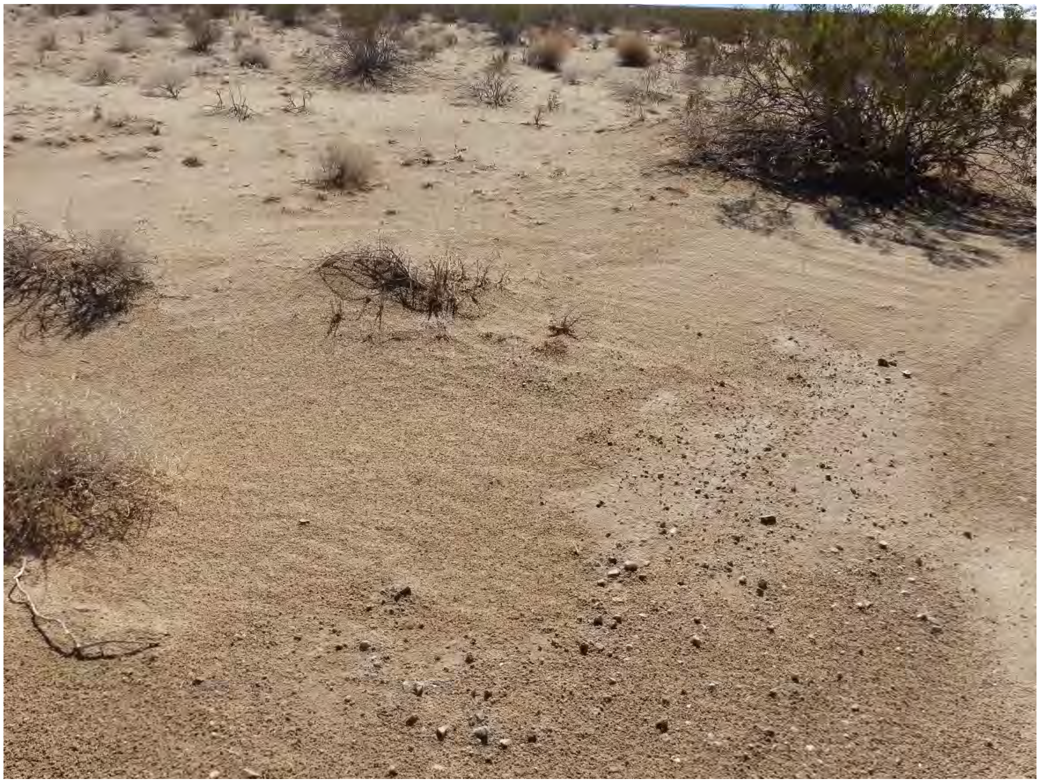


Photo Point PP20a. Drainage at Photo Point PP20 dissipates in the road.

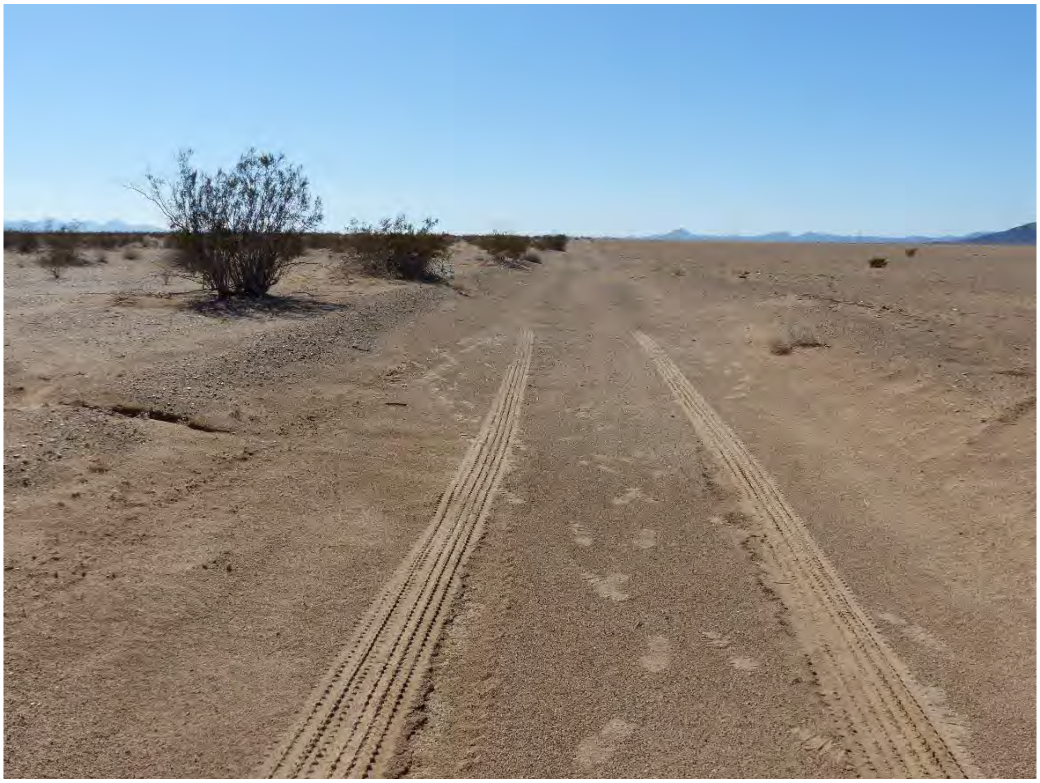


Photo Point PP21 looking south. Small channel entering road from the east, but does not flow across the road.

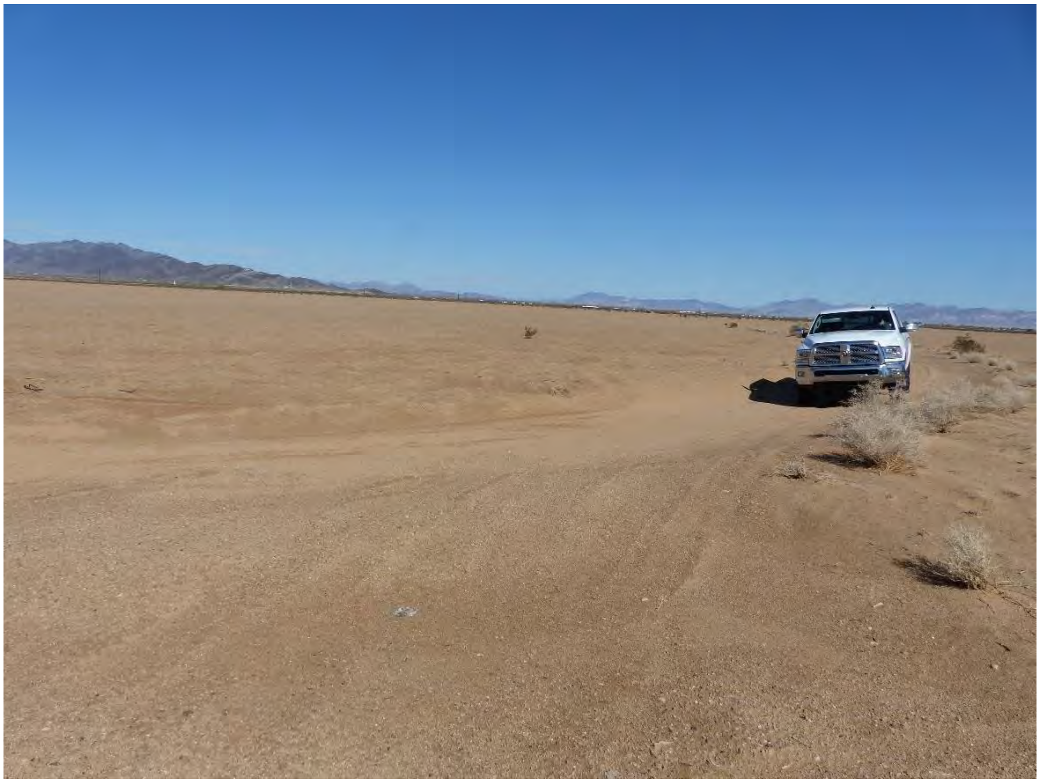


Photo Point PP22 looking north-northwest. Location is south of northern portion of solar farm project site; southern portion of project site is to the south.

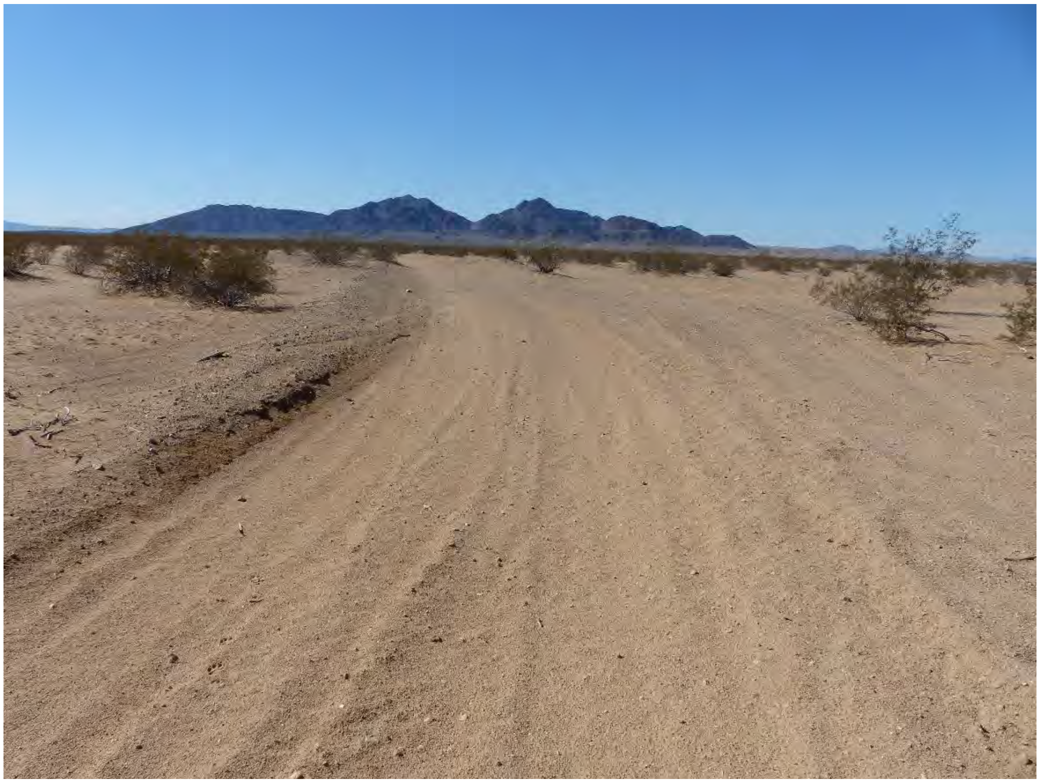


Photo Point PP23 looking southwest onto project site. Note berm on project site side of road.

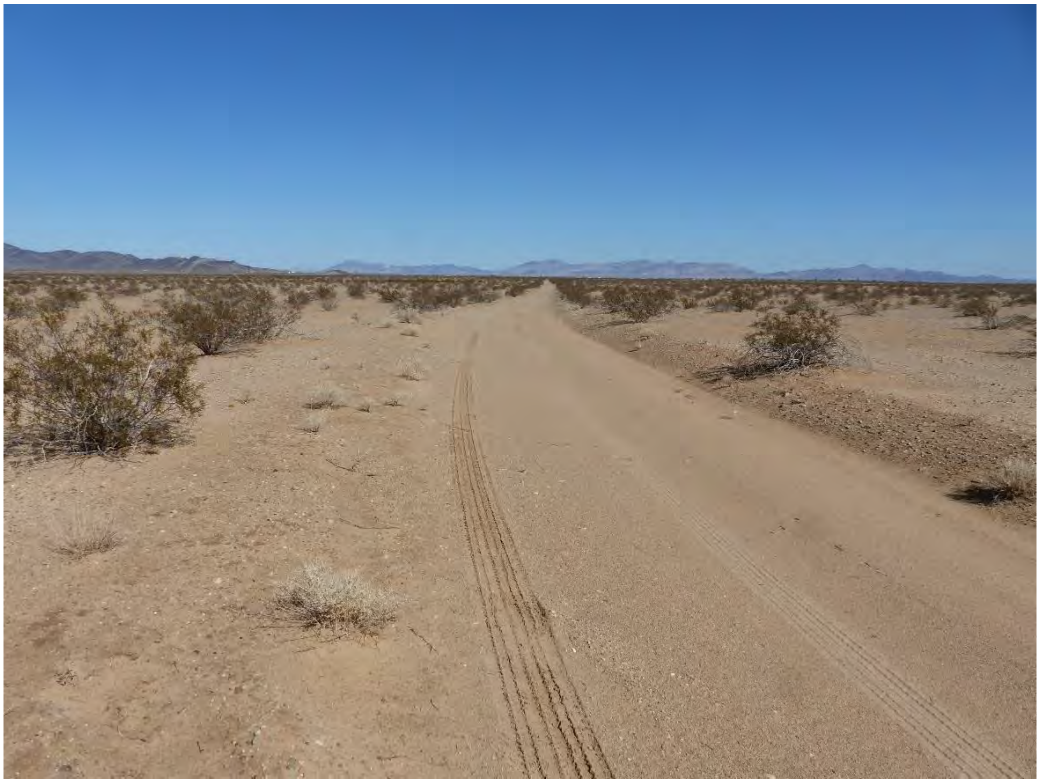


Photo Point PP24 looking north. Internal road in southern portion of the project site.

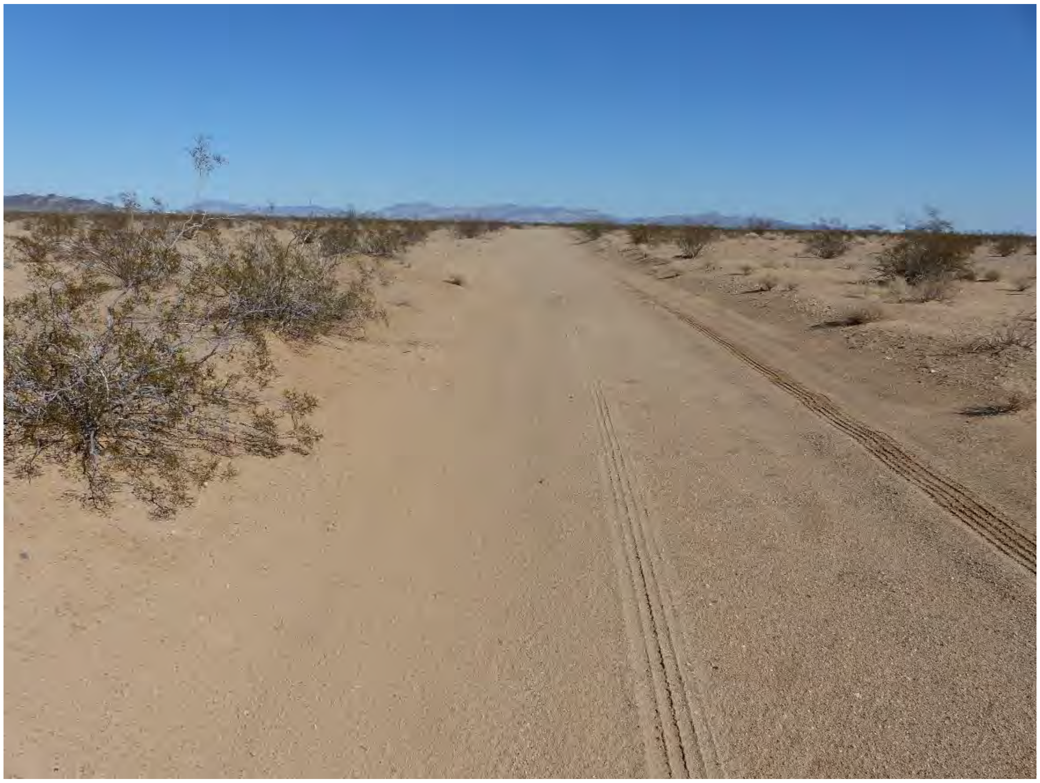


Photo Point PP25 looking north. Internal road in southern portion of the project site.

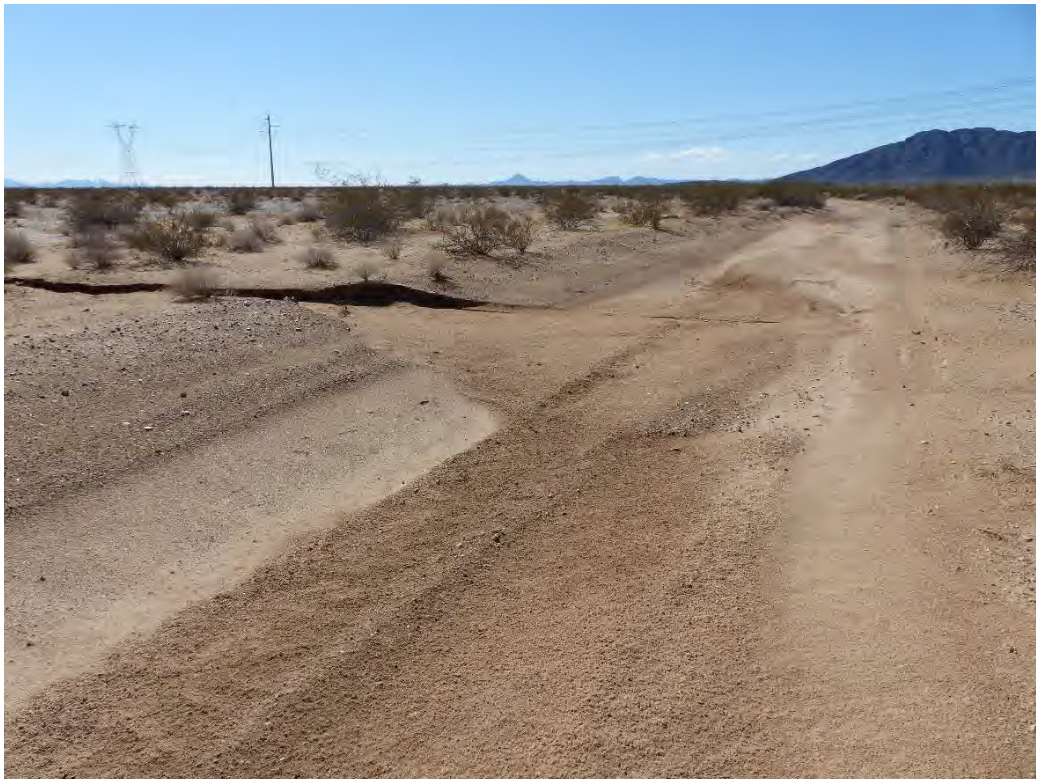


Photo Point PP26 looking south. Internal road in southern portion of the project site. Channel from the east drains onto but does not cross the road.

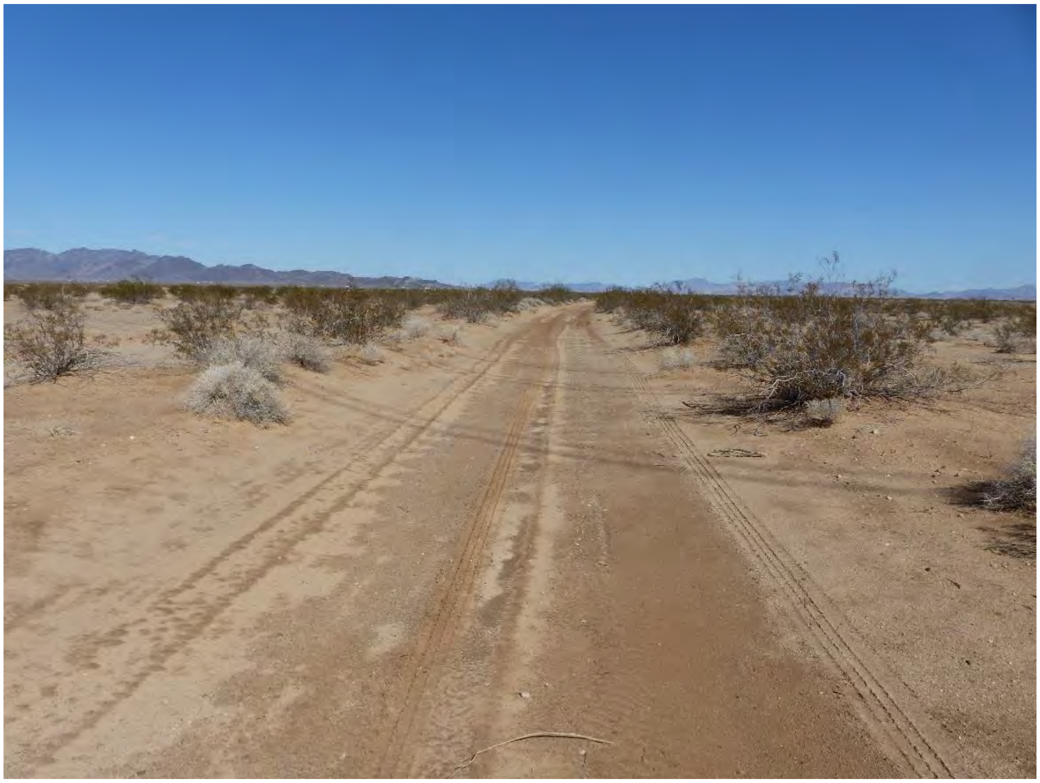


Photo Point PP27 looking north onto project site from just outside southwestern project site boundary.

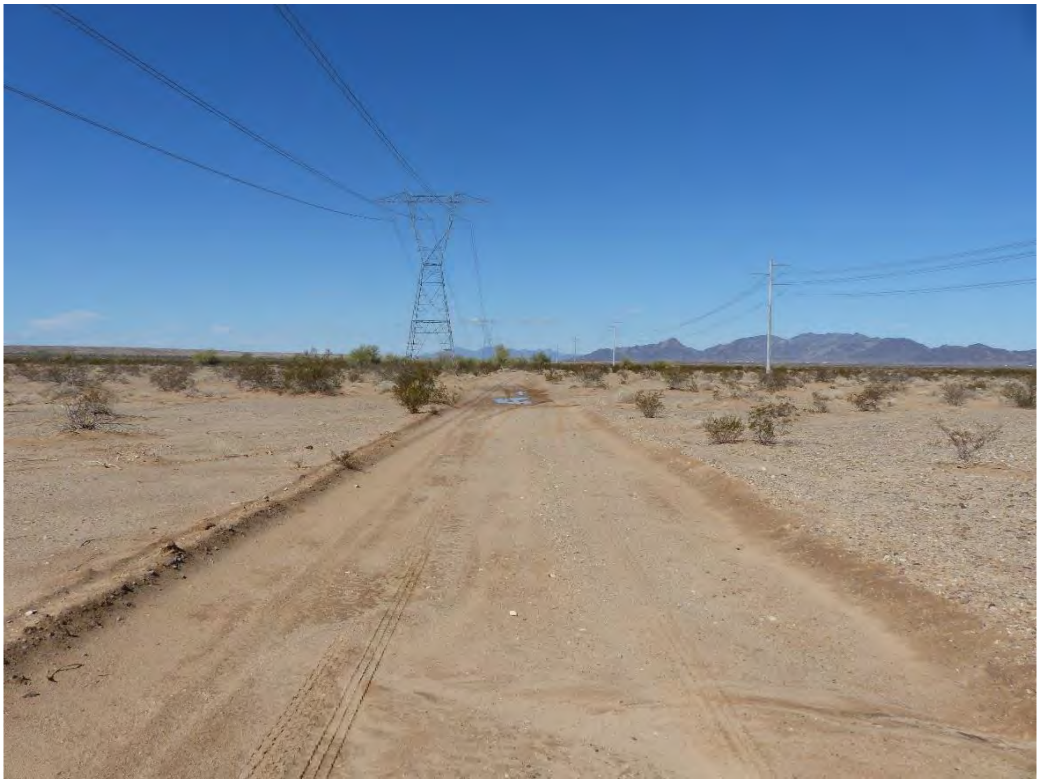


Photo Point PP28 looking northwest. Location is offsite on road parallel to southwestern boundary of project site.

Photo Point PP29 looking northeast along power line route. Location is south of southern project site boundary.

Photo Point PP30 looking northeast along power line route. Location is south of southern project site boundary.

Photo Point PP31 looking northeast along power line route. Project site boundary is west-northwest of road.

Photo Point PP32 looking northeast along power line route. Project site boundary is west-northwest of road.

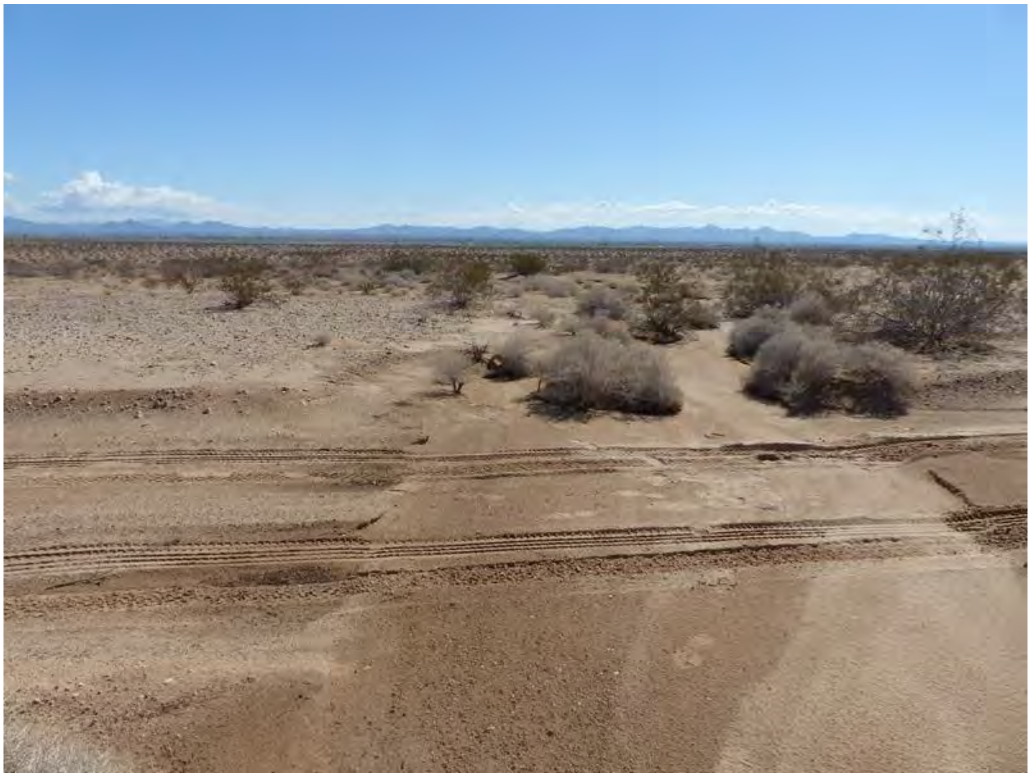


Photo Point PP33 (Watercourse ID# R140) looking northwest; small drainages entering road from the west.

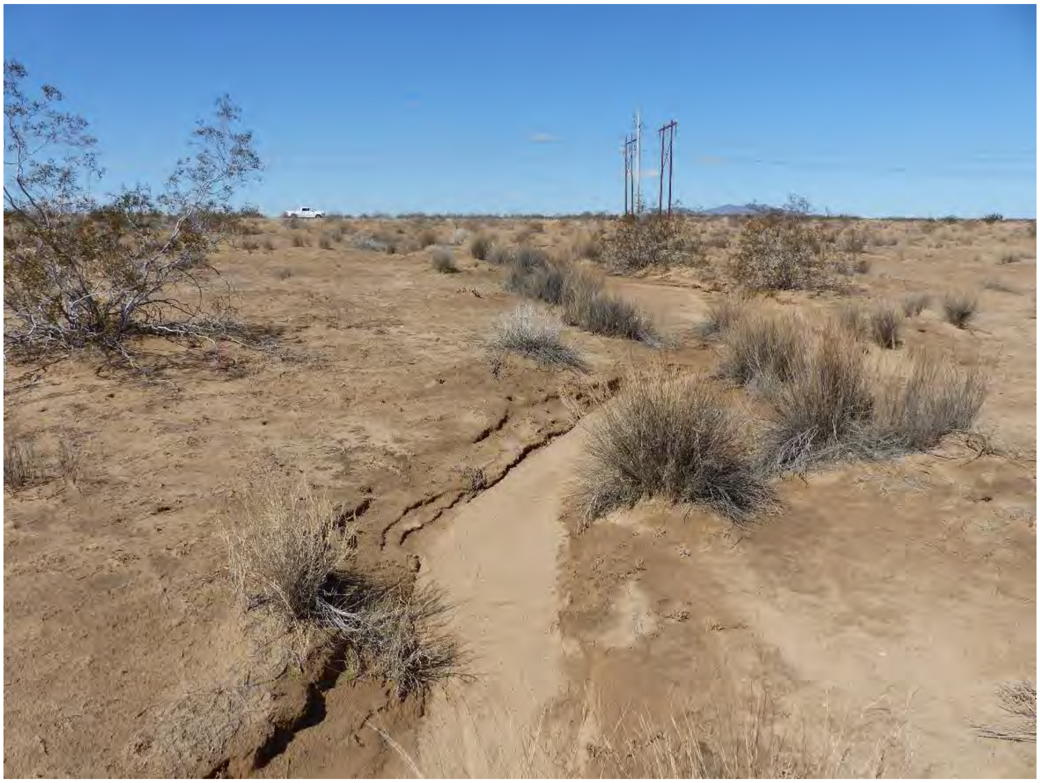


Photo Point PP33a looking northwest toward road from drainage, which terminates in a small playa *basin southeast of project site; see figure.*

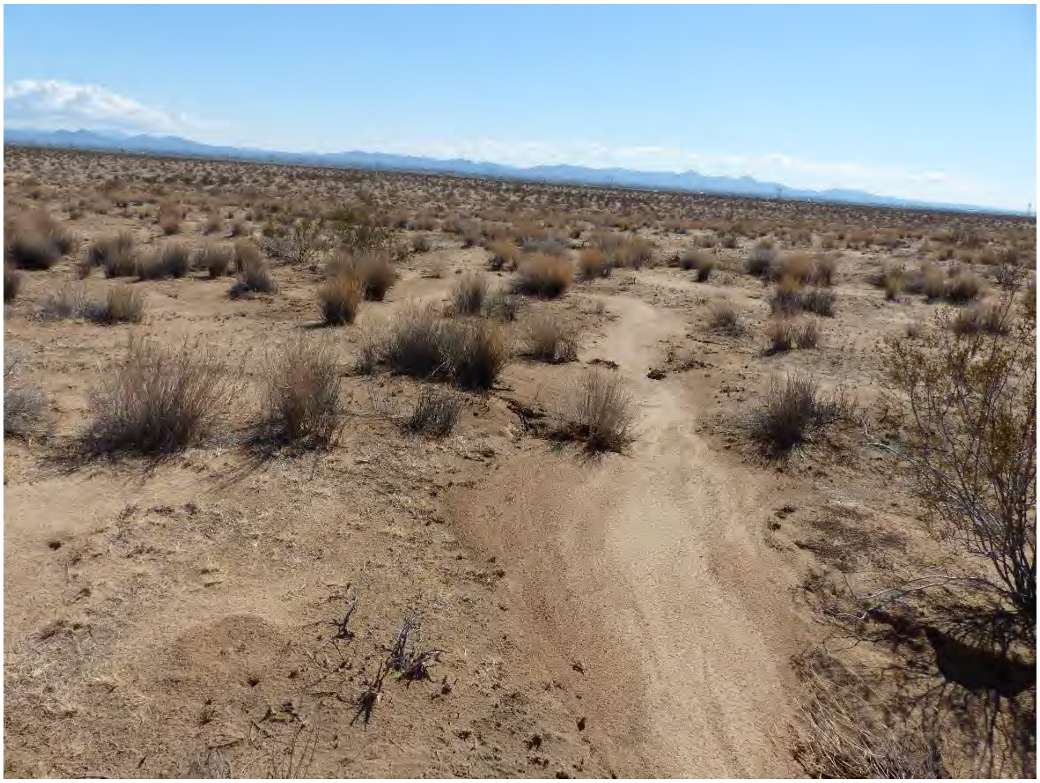


Photo Point PP33b looking northwest.

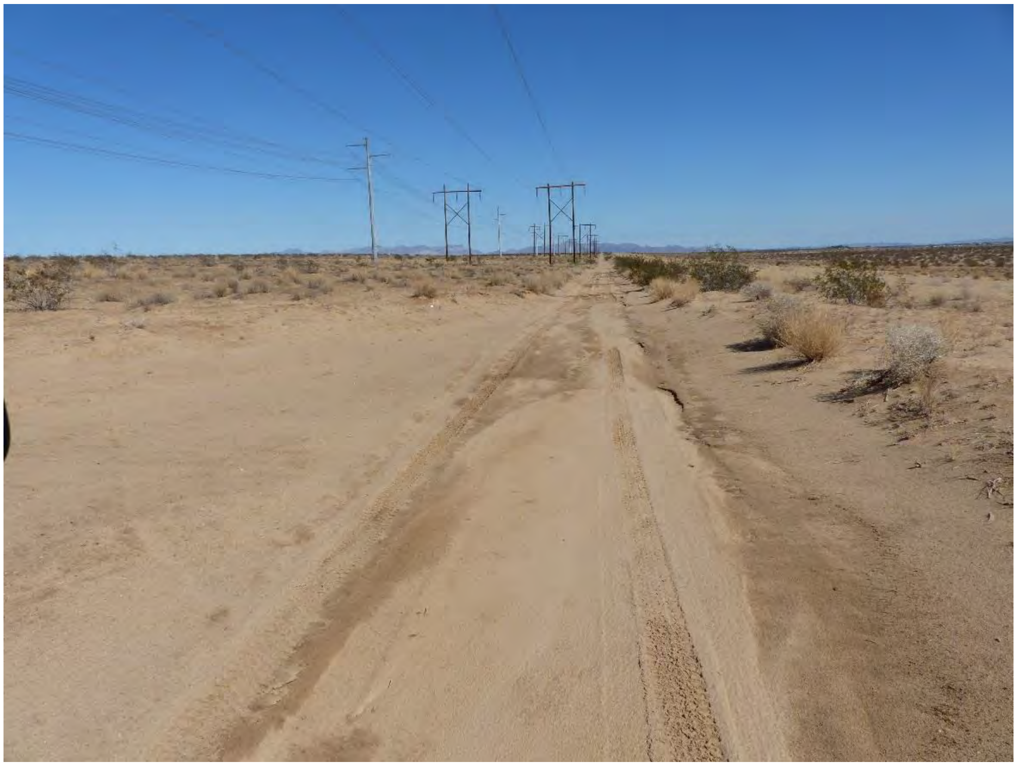


Photo Point PP34 looking northeast.

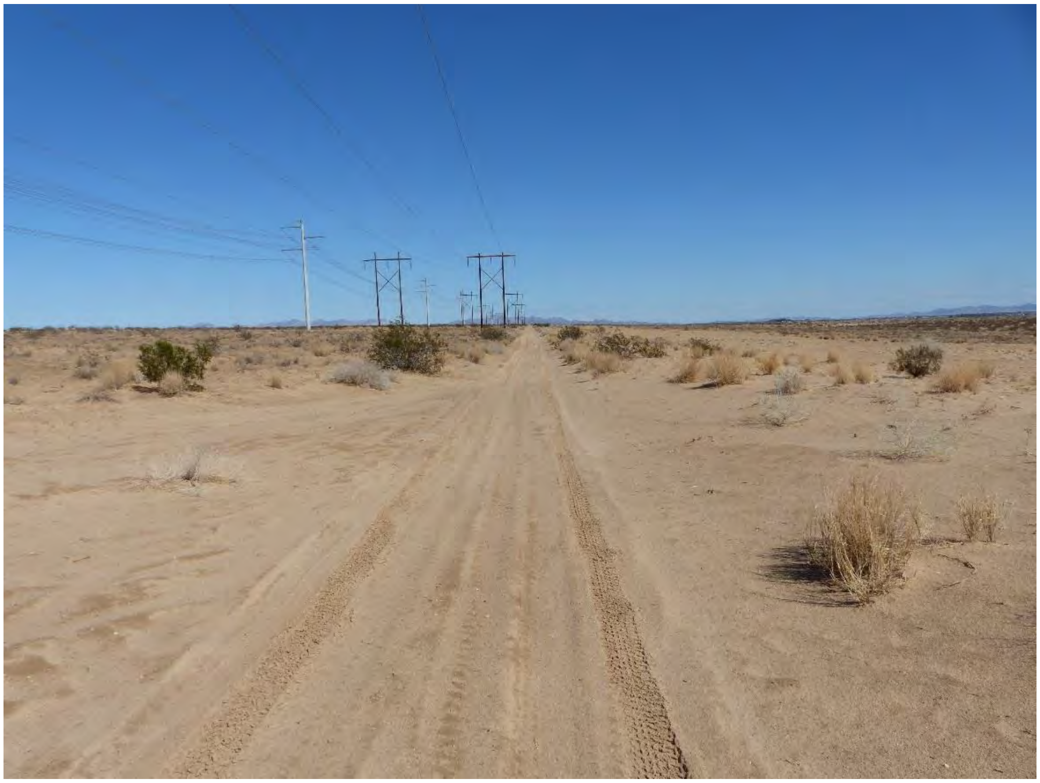


Photo Point PP35 looking northeast.

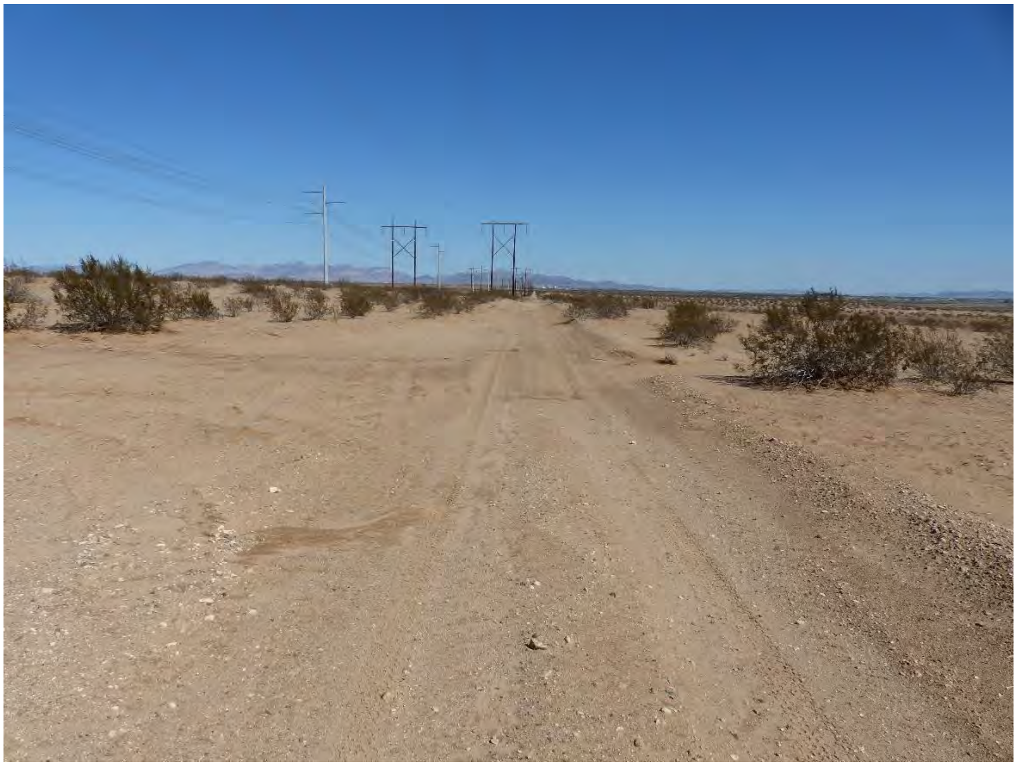


Photo Point PP36 looking northeast.

Photo Point PP37 (Watercourse ID# R142) looking southeast. Headwater of onsite drainage.

Photo Point PP37 (Watercourse ID# R142) looking northwest. Drainage flows to road from project site.

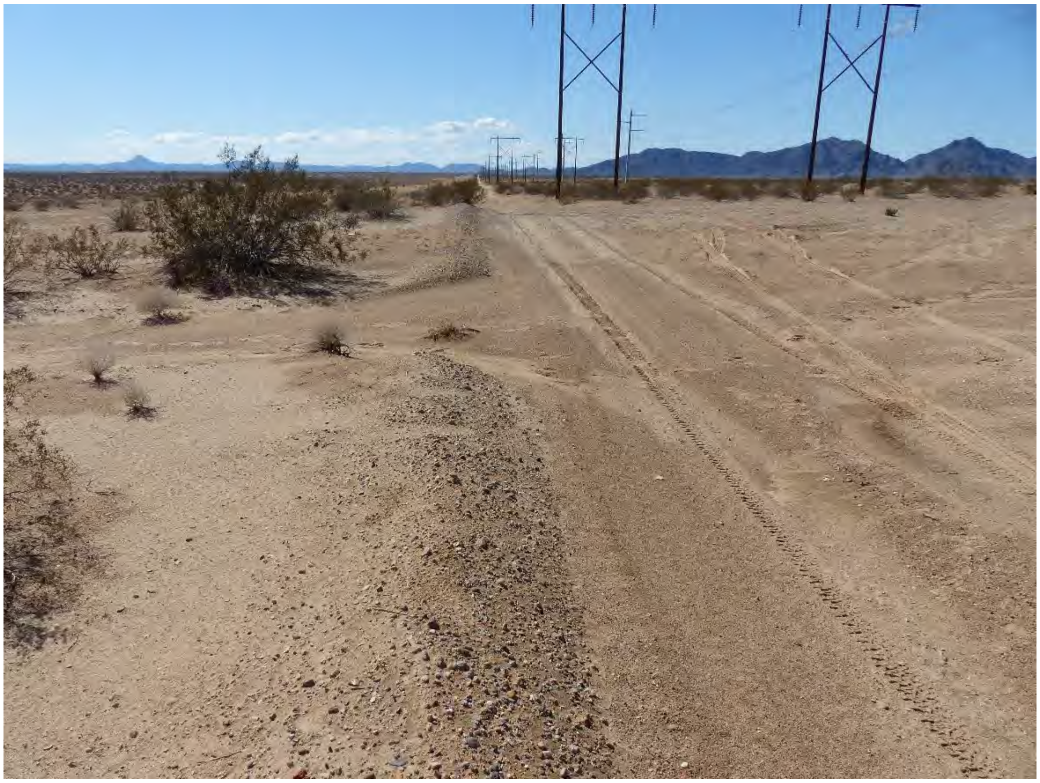


Photo Point PP37 looking south. Channel trending eastward.

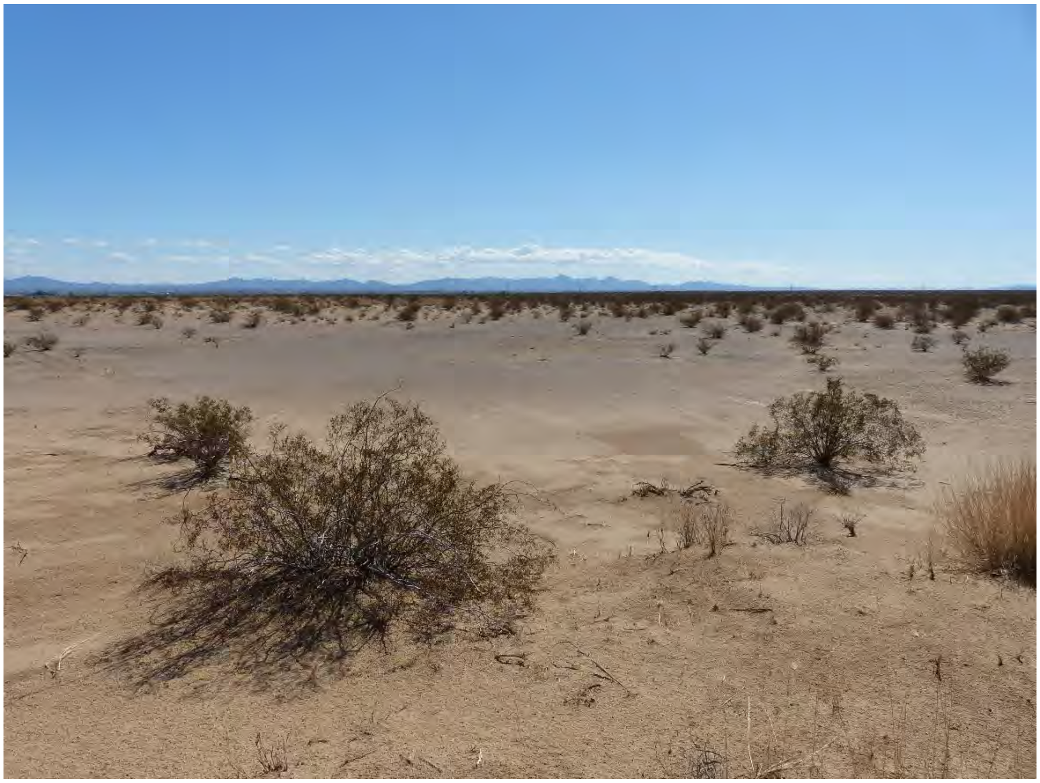


Photo Point PP37 looking southeast. Drainage terminates in playa basin southeast of project site.

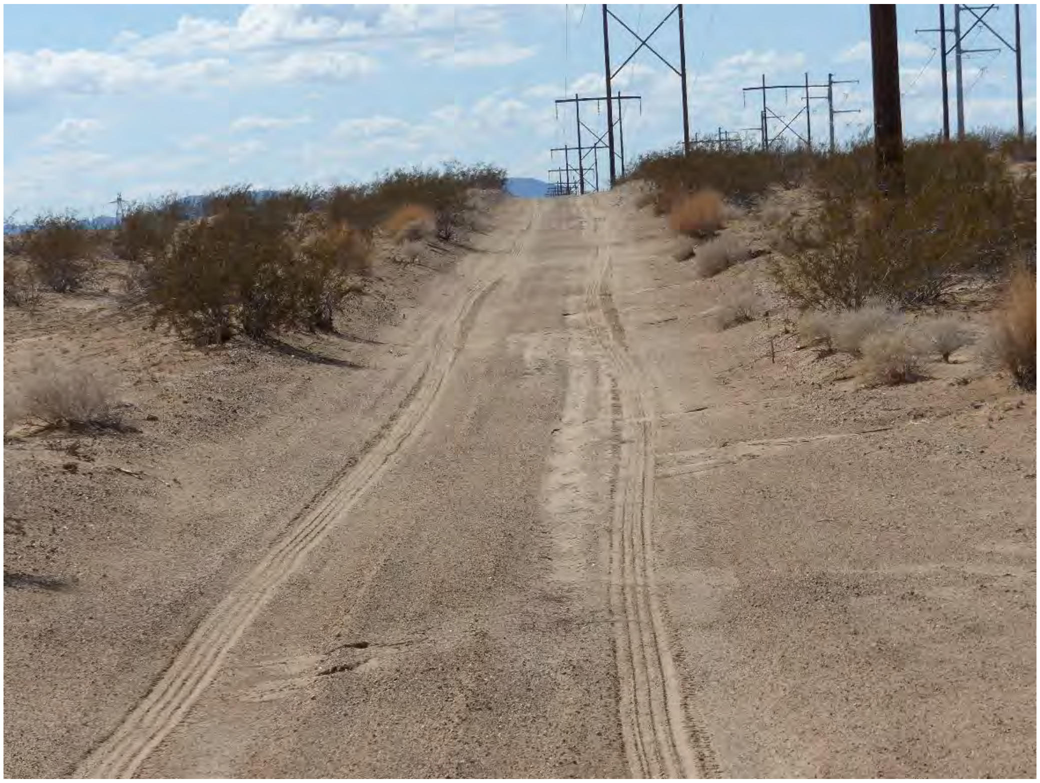


Photo Point PP38 looking southwest near property corner.

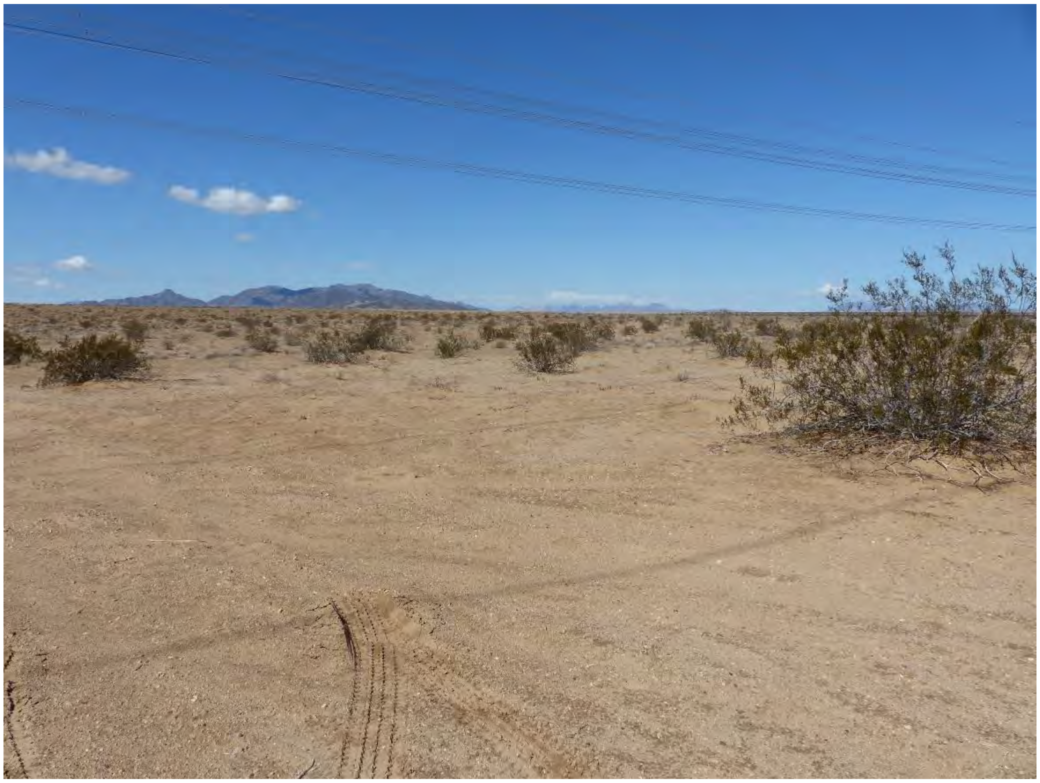


Photo Point PP39 looking northwest onto project site.

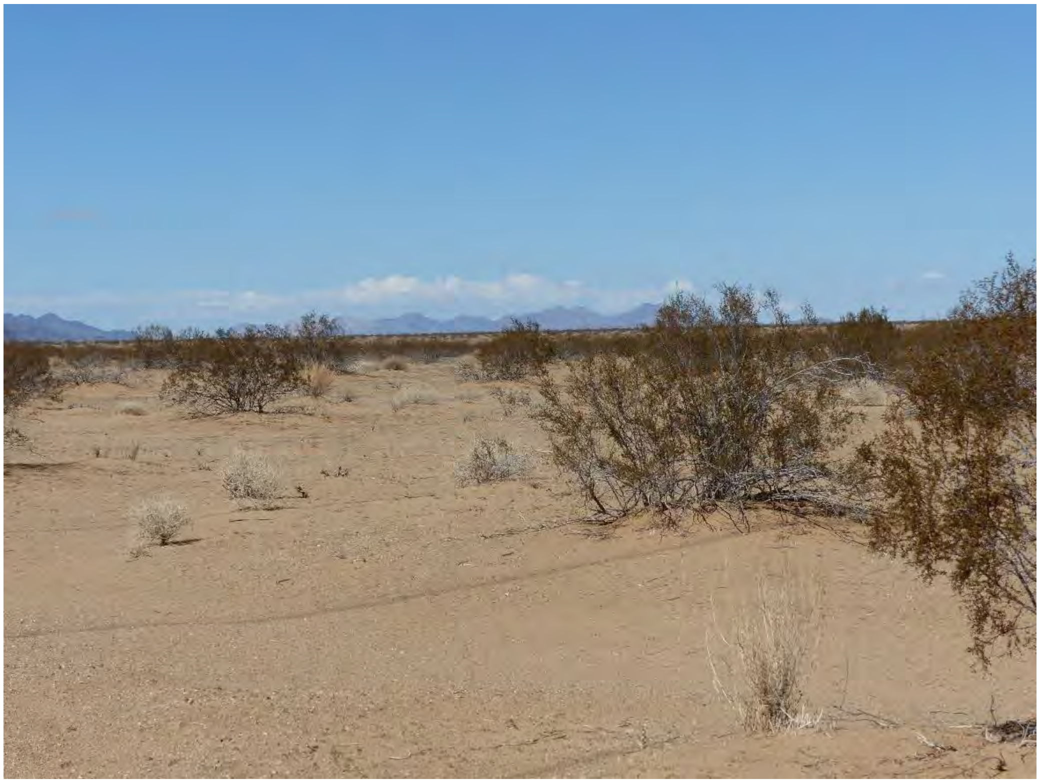


Photo Point PP40 looking northwest onto project site; sheet sand in background.

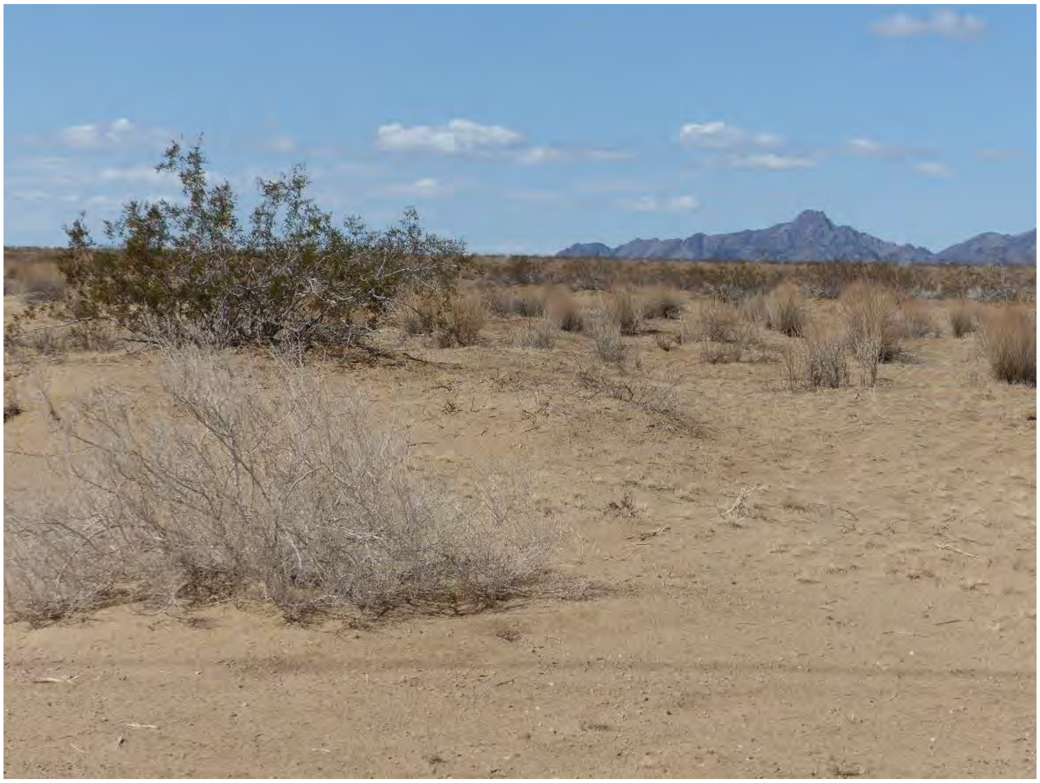
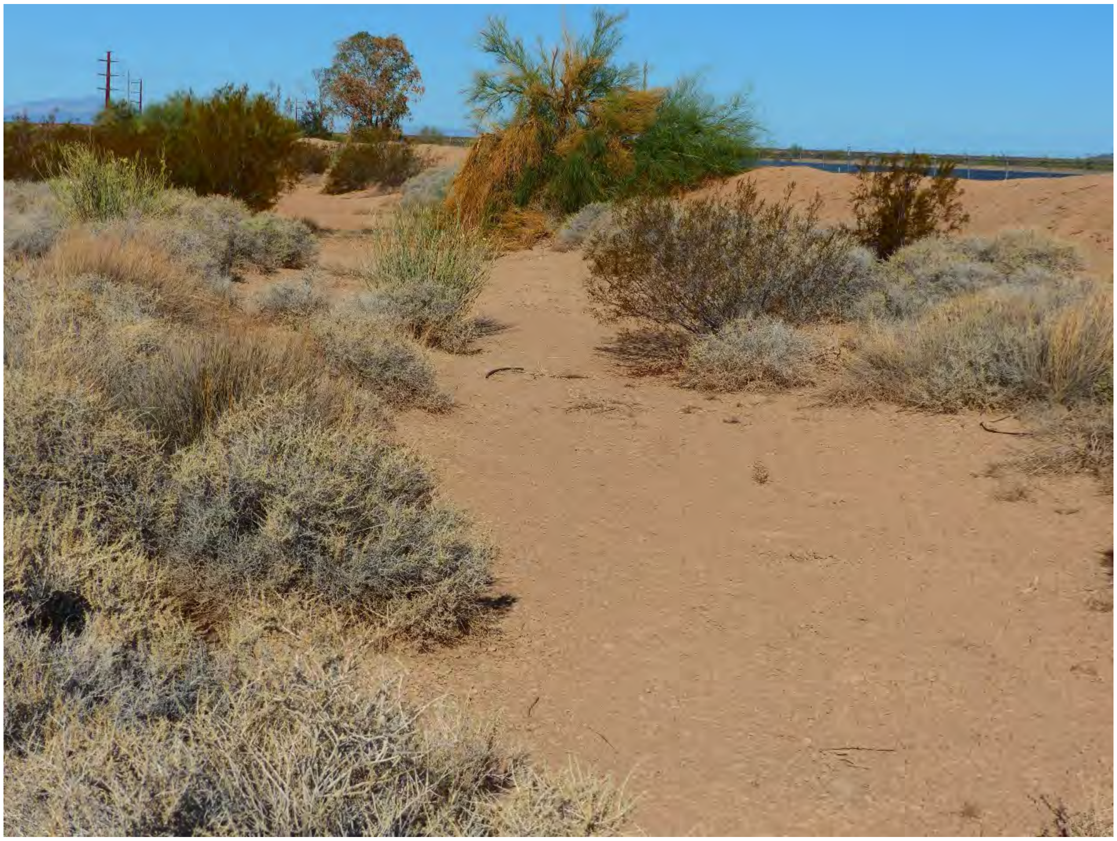
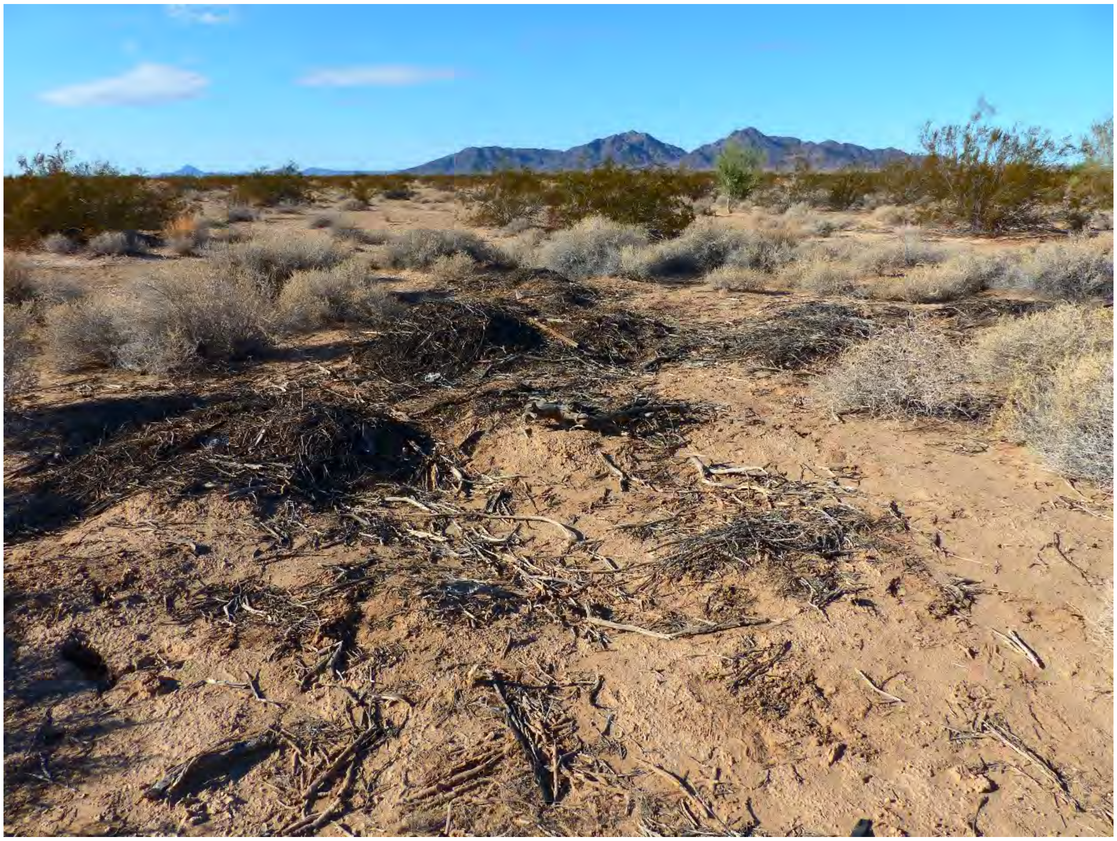


Photo Point PP41 looking northwest toward project site; sheet sandin background.

Photo Point PP42 looking west. Main portion of project site is approximately 1 – 1.25 miles to the west.



SP 1 – Looking West Near End of Palowalla Ditch, 09-16-2015.



SP2 – Looking Southeast 20 Feet Beyond the End of Palowalla Ditch, 09-16-2015.

SP3 – Looking North In Watercourse FP#1 Near End of Palowalla Ditch, 09-16-2015.

SP4 - Looking South at Edge of Watercourse FP#1 Associated With Palowalla Ditch

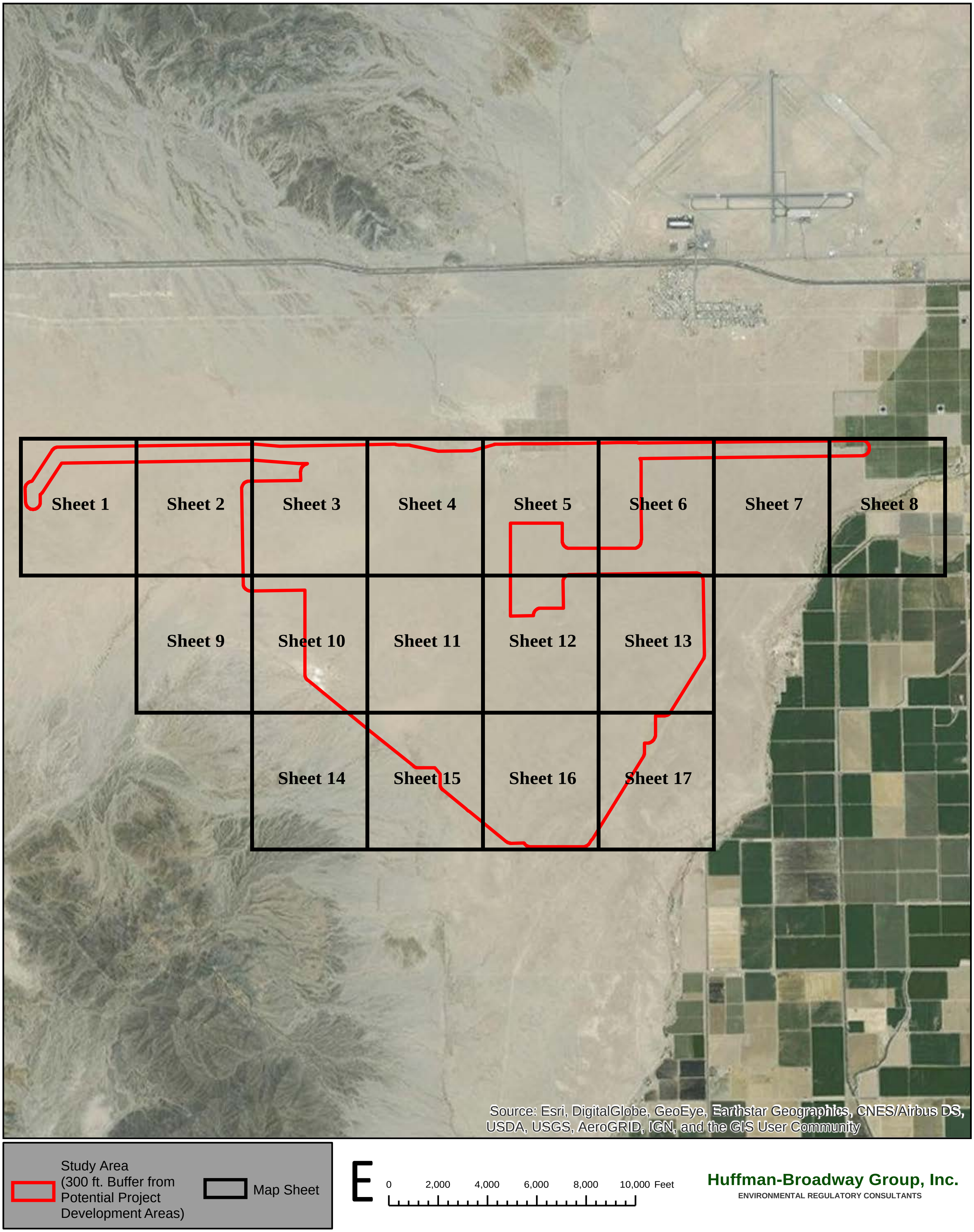
SP5 – Looking South Along Palowalla Ditch

SP6 – Looking South Within Palowalla Watercourse FP#1

SP7 – Looking Southeast within Watercourse FP#1

SP8 – Looking Southeast Within Palowalla Watercourse FP#1

Appendix E2
Photopoint Location Map


Sheet 1
Sheet 2
Sheet 3
Sheet 4
Sheet 5
Sheet 6
Sheet 7
Sheet 8
Sheet 9
Sheet 10
Sheet 11
Sheet 12
Sheet 13
Sheet 14
Sheet 15
Sheet 16
Sheet 17
Study Area (300 ft. Buffer from Potential Project Development Areas)
Map Sheet
0
2,000
4,000
6,000
8,000
10,000 Feet

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

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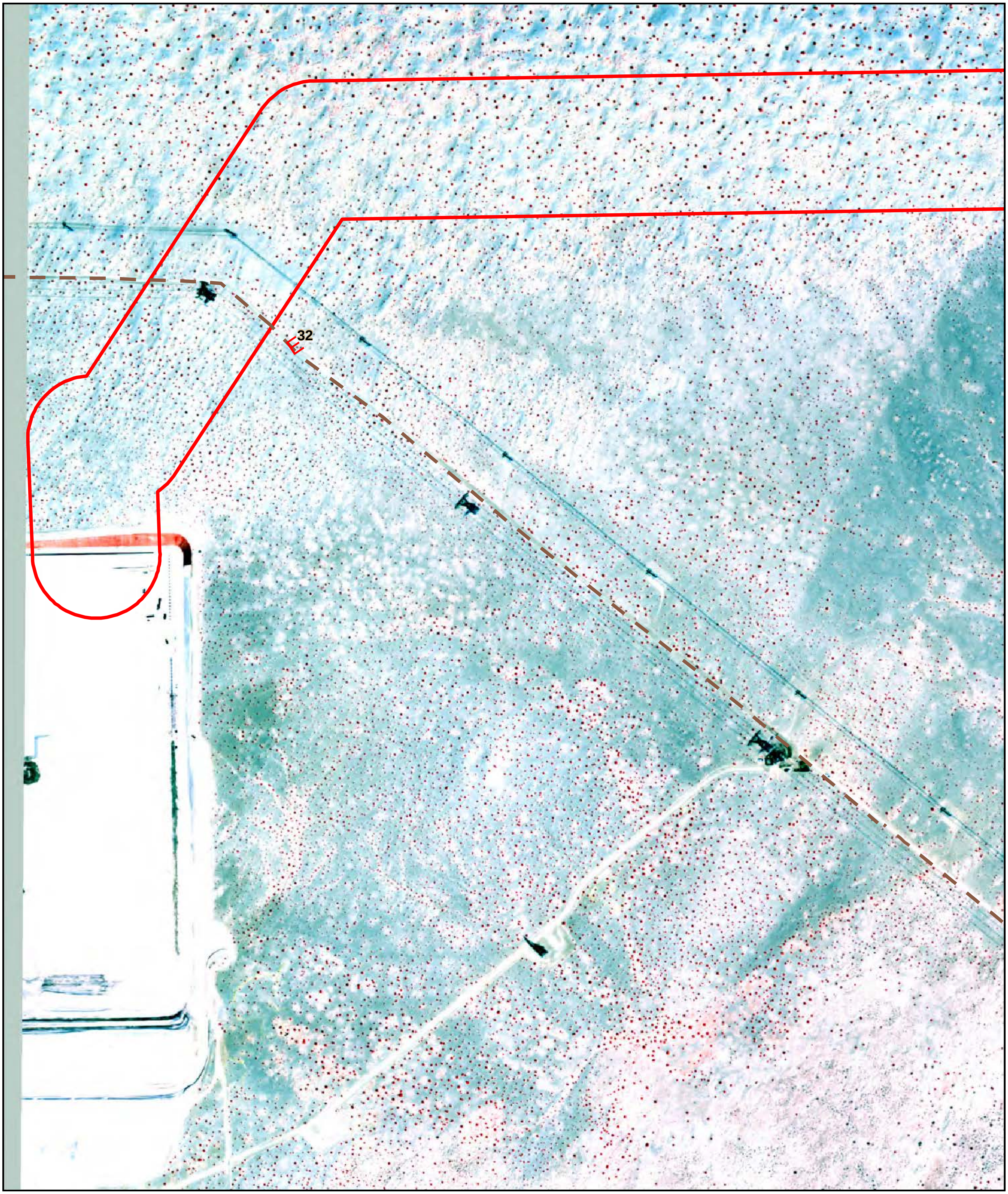
ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix E. Representative Photo Point Locations, Index Map

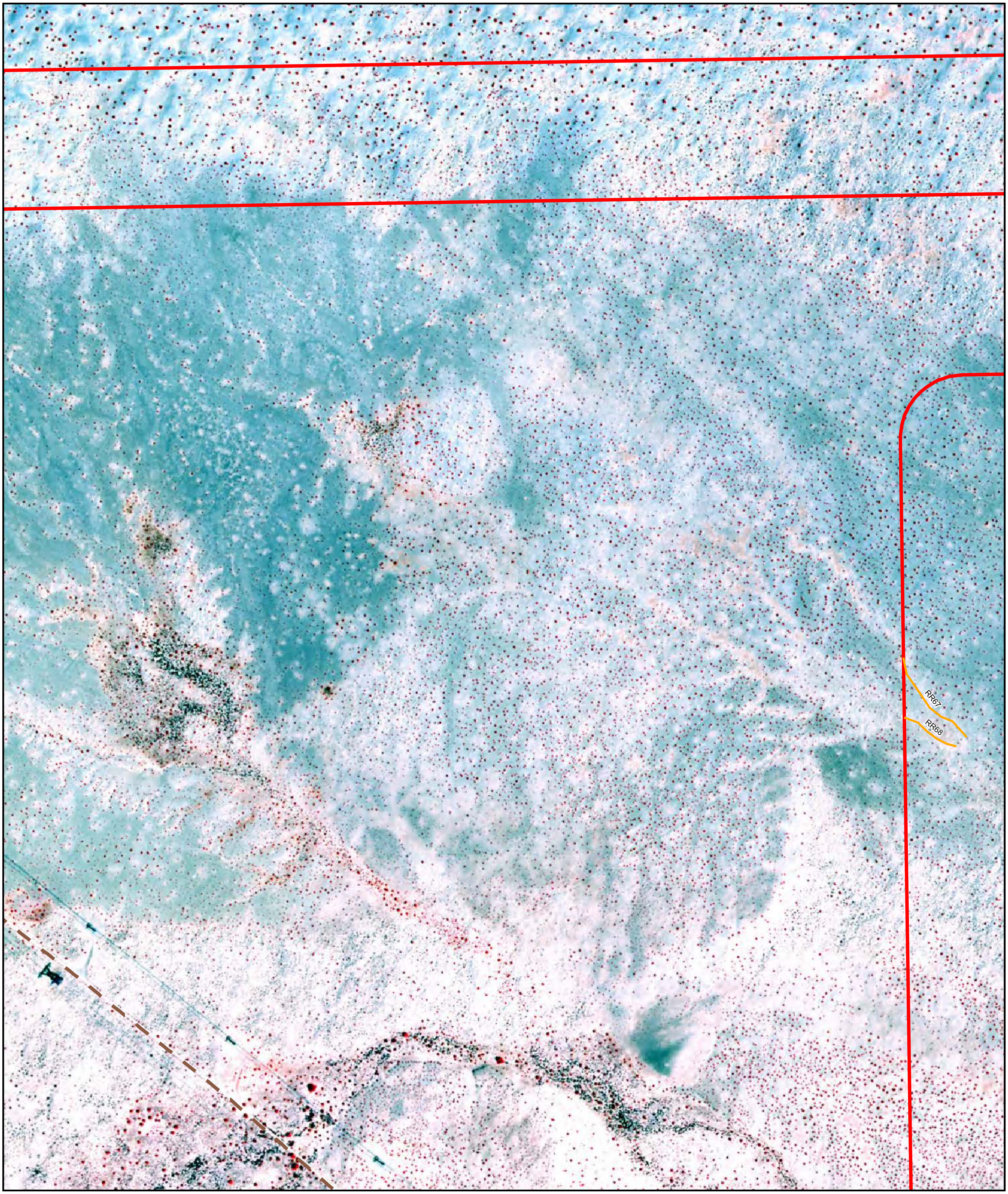
Desert Quartzite LLC Solar Farm Project,
Town of Blythe, Riverside County, California


32
E
0 100 200 300 400 500 600 700 Feet
Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix E. Representative Photo Point Locations, Sheet 1

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California



E

E

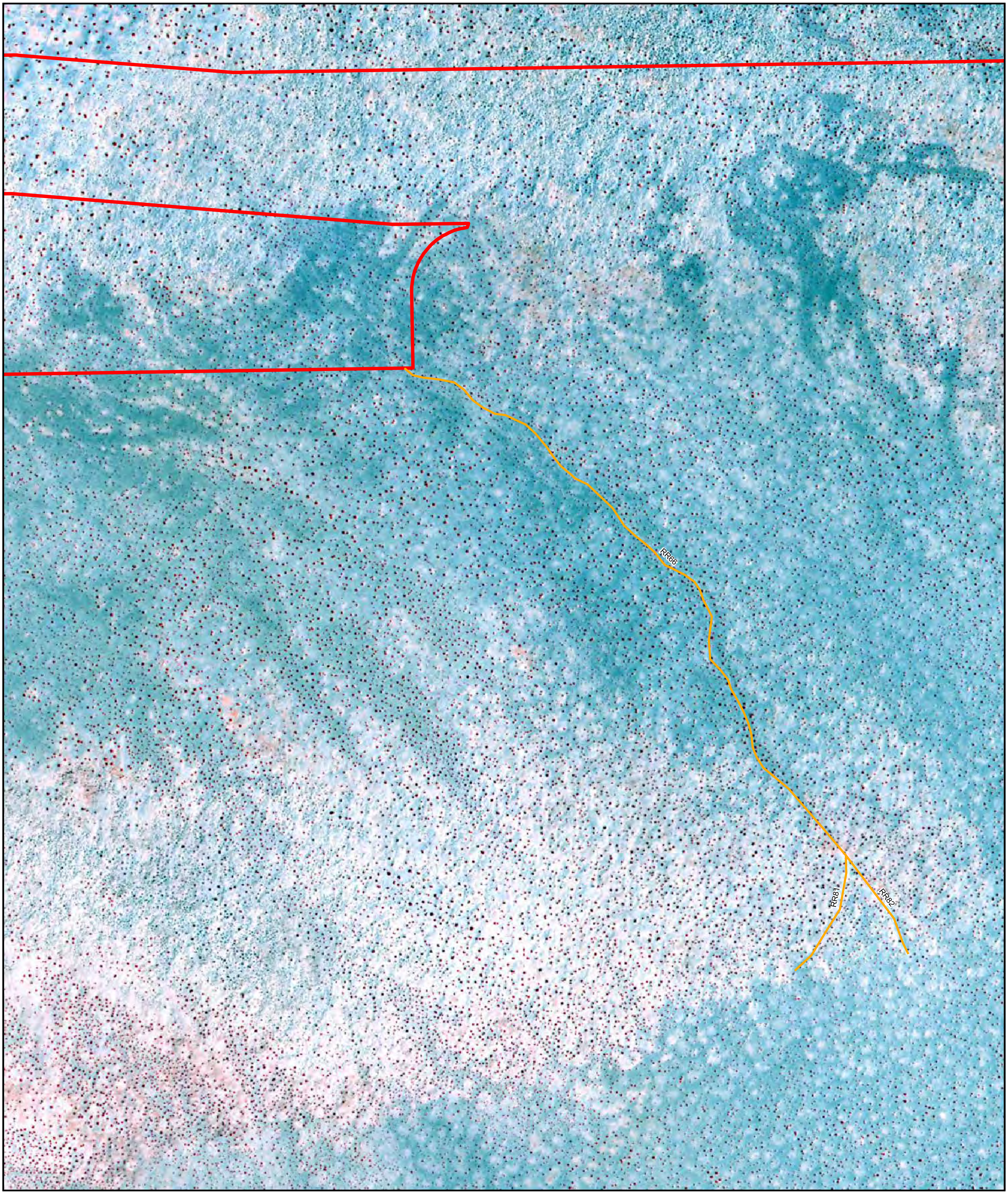
0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix E. Representative Photo Point Locations, Sheet 2

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California



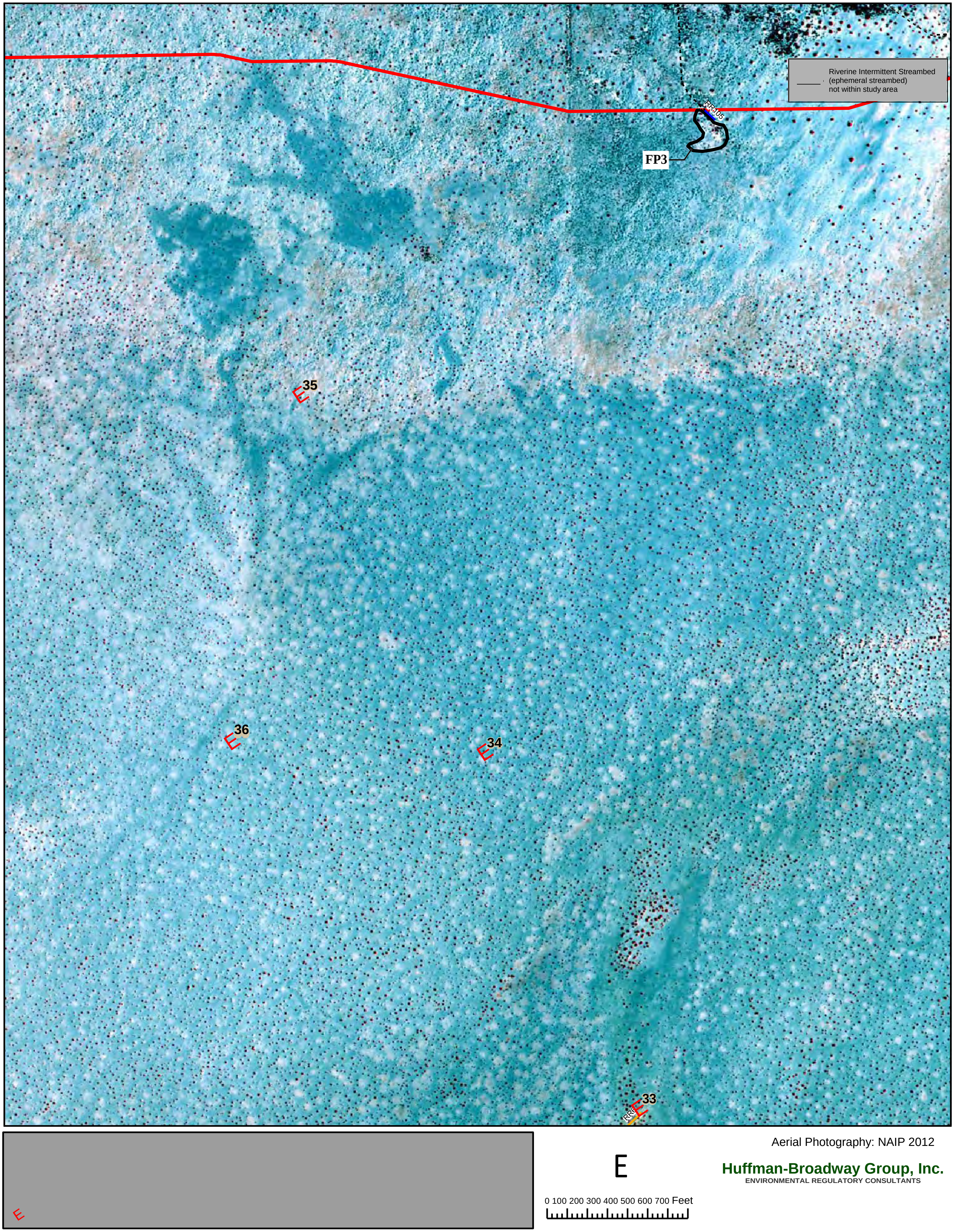
E

0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix E. Representative Photo Point Locations, Sheet 3
Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California

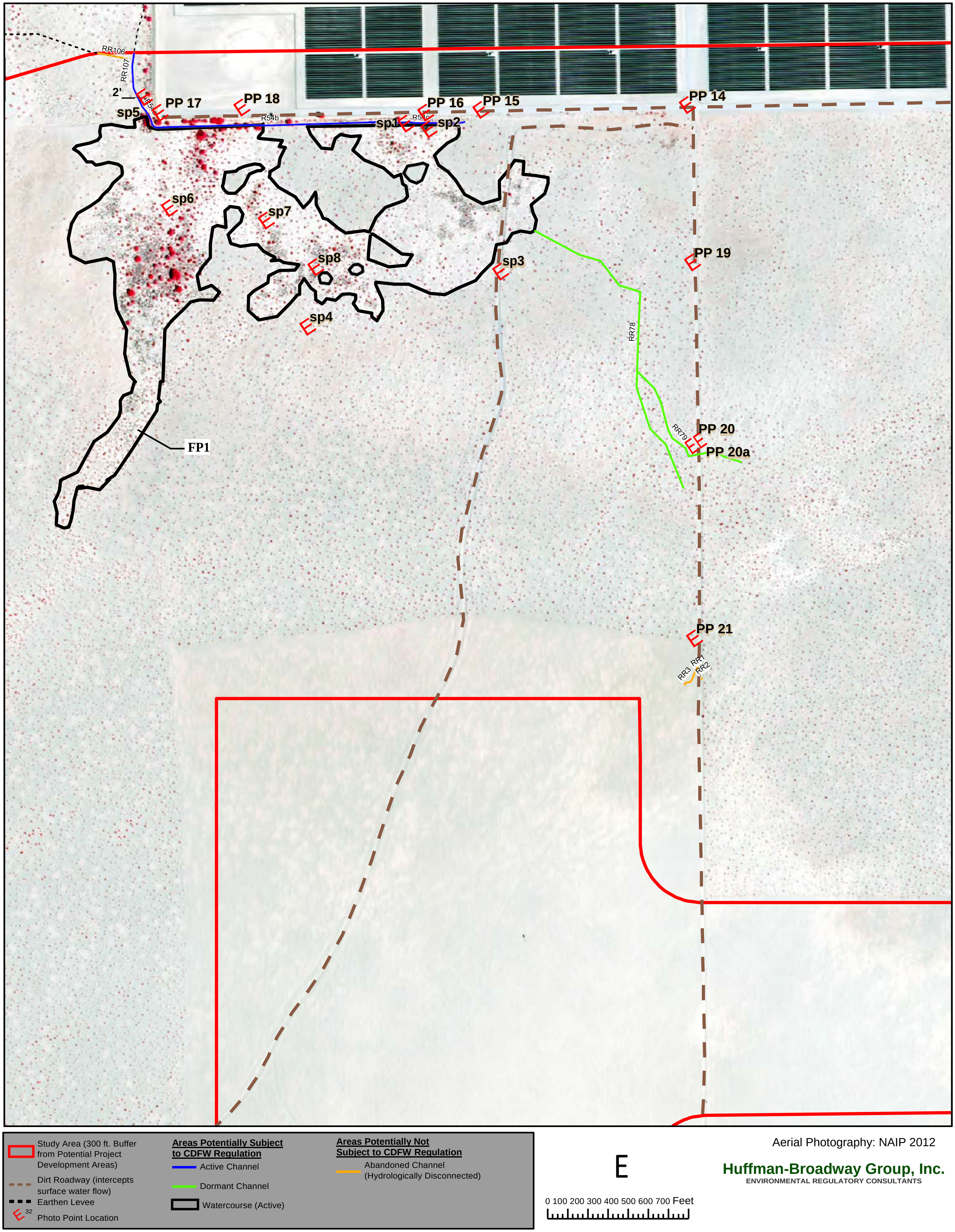

Riverine Intermittent Streambed
(ephemeral streambed)
not within study area
RR105
FP3
35
36
34
33
RR
E
E
0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix E. Representative Photo Point Locations, Sheet 4

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California

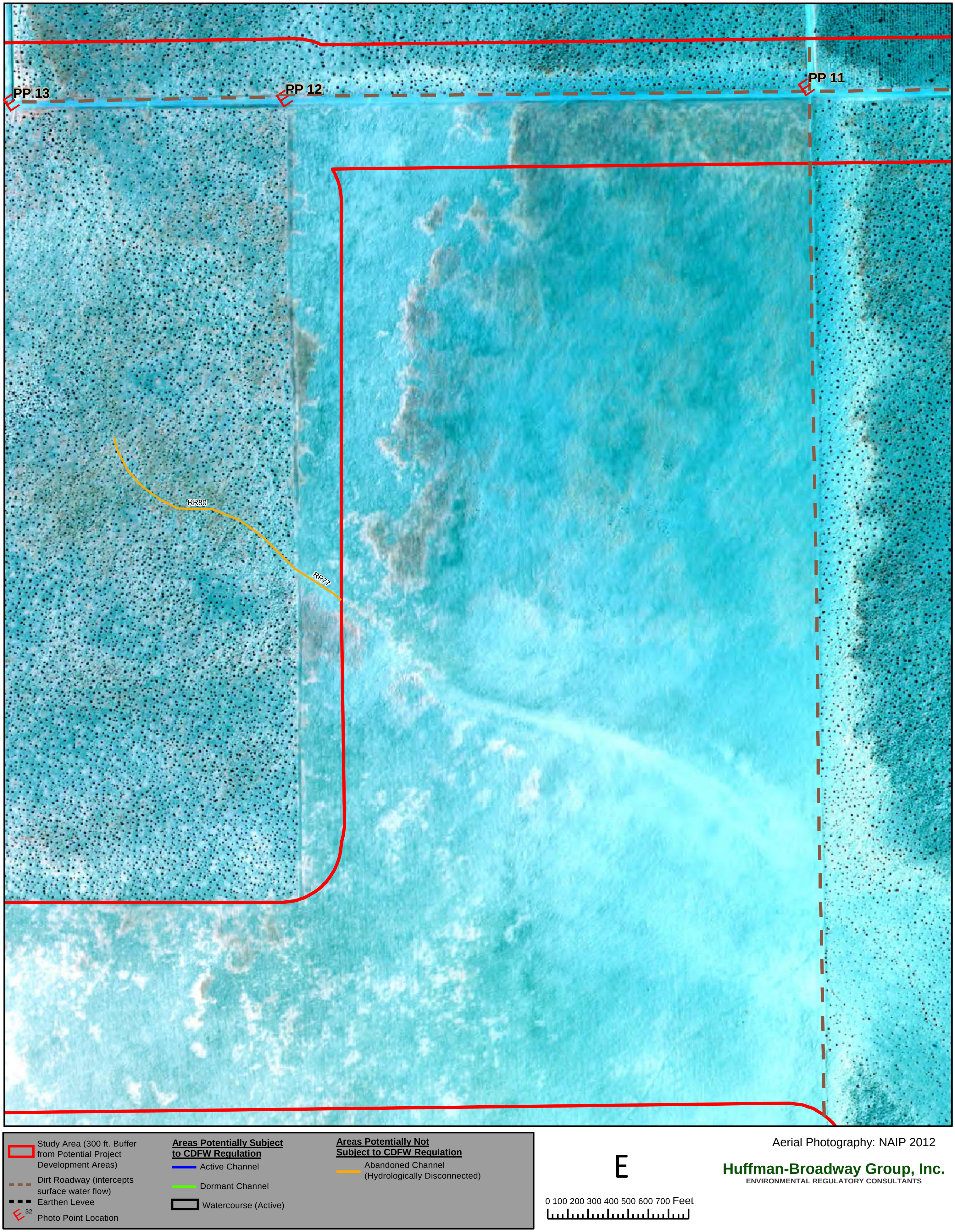

RR106
RR107
2'
sp5
PP 17
R54a
PP 18
R54b
sp1
R54c
sp2
PP 16
PP 15
PP 14
sp6
sp7
sp8
sp3
PP 19
sp4
RR78
FP1
RR79
PP 20
PP 20a
PP 21
RR3
RR1
RR2
Study Area (300 ft. Buffer from Potential Project Development Areas)
Dirt Roadway (intercepts surface water flow)
Earthen Levee
32
Photo Point Location
Areas Potentially Subject to CDFW Regulation
Active Channel
Dormant Channel
Watercourse (Active)
Areas Potentially Not Subject to CDFW Regulation
Abandoned Channel (Hydrologically Disconnected)
E
0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix E. Representative Photo Point Locations, Sheet 5

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California

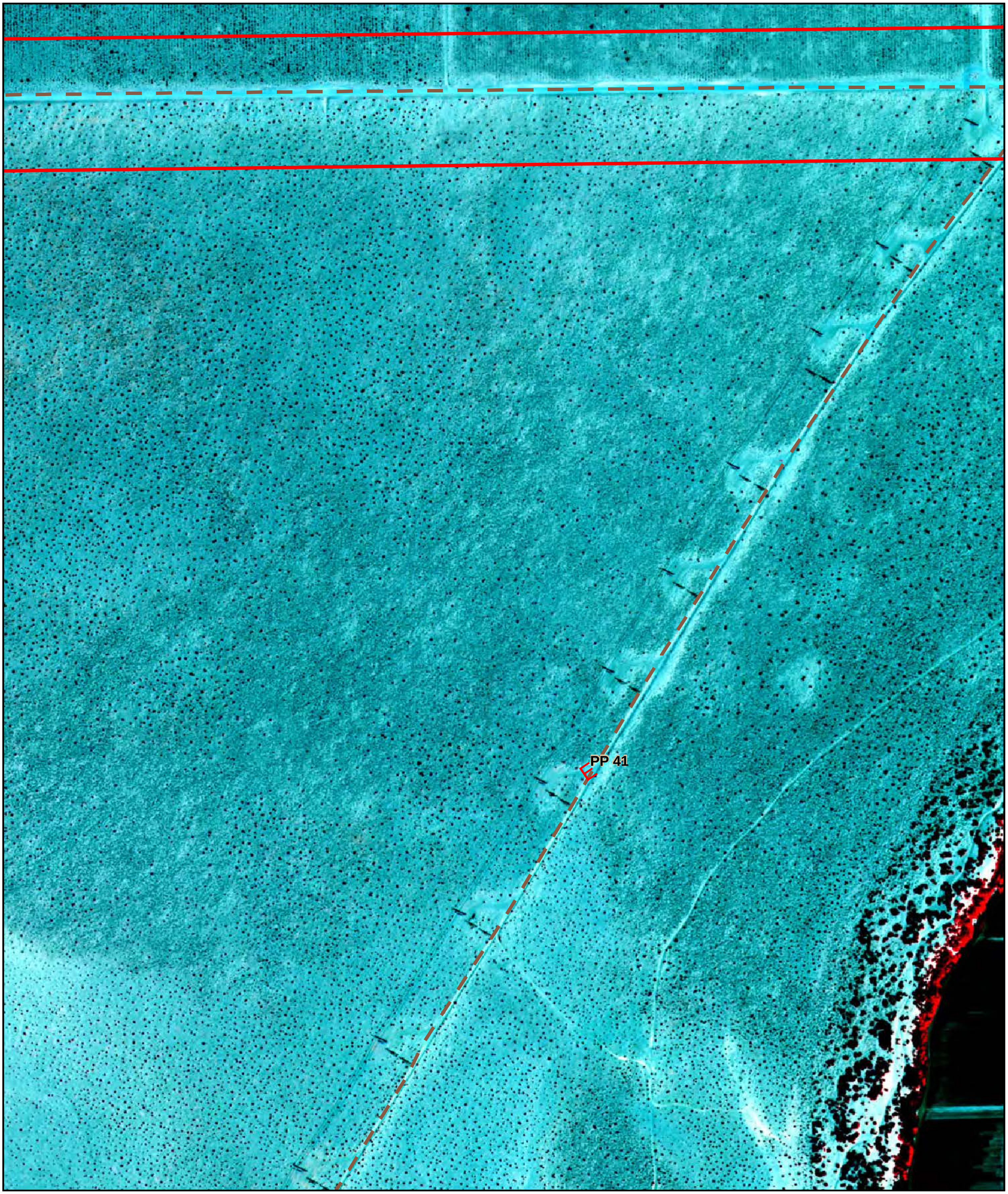

PP 13
PP 12
PP 11
RR80
RR77
Study Area (300 ft. Buffer from Potential Project Development Areas)
Dirt Roadway (intercepts surface water flow)
Earthen Levee
32 Photo Point Location
Areas Potentially Subject to CDFW Regulation
Active Channel
Dormant Channel
Watercourse (Active)
Areas Potentially Not Subject to CDFW Regulation
Abandoned Channel (Hydrologically Disconnected)
E
0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix E. Representative Photo Point Locations, Sheet 6

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California



🟥 Study Area (300 ft. Buffer from Potential Project Development Areas)

- - - Dirt Roadway (intercepts surface water flow)

■ ■ ■ Earthen Levee

E 32 Photo Point Location

Areas Potentially Subject to CDFW Regulation

— Active Channel

— Dormant Channel

▭ Watercourse (Active)

Areas Potentially Not Subject to CDFW Regulation

— Abandoned Channel (Hydrologically Disconnected)

E

0 100 200 300 400 500 600 700 Feet

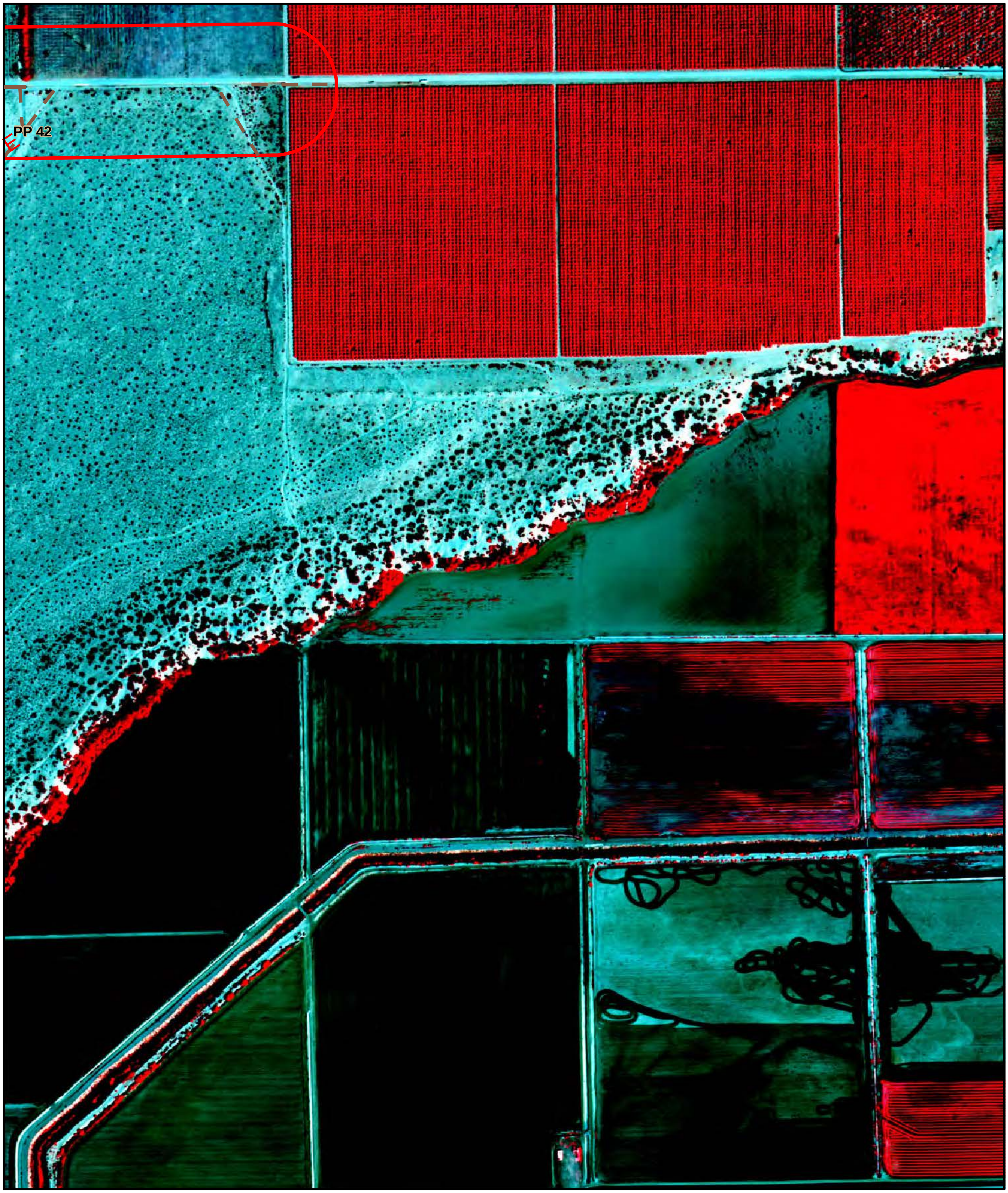
Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.

ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix E. Representative Photo Point Locations, Sheet 7

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California



🟥 Study Area (300 ft. Buffer from Potential Project Development Areas)

- - - Dirt Roadway (intercepts surface water flow)

■ ■ ■ Earthen Levee

E 32 Photo Point Location

Areas Potentially Subject to CDFW Regulation

Active Channel

Dormant Channel

Watercourse (Active)

Areas Potentially Not Subject to CDFW Regulation

Abandoned Channel (Hydrologically Disconnected)

E

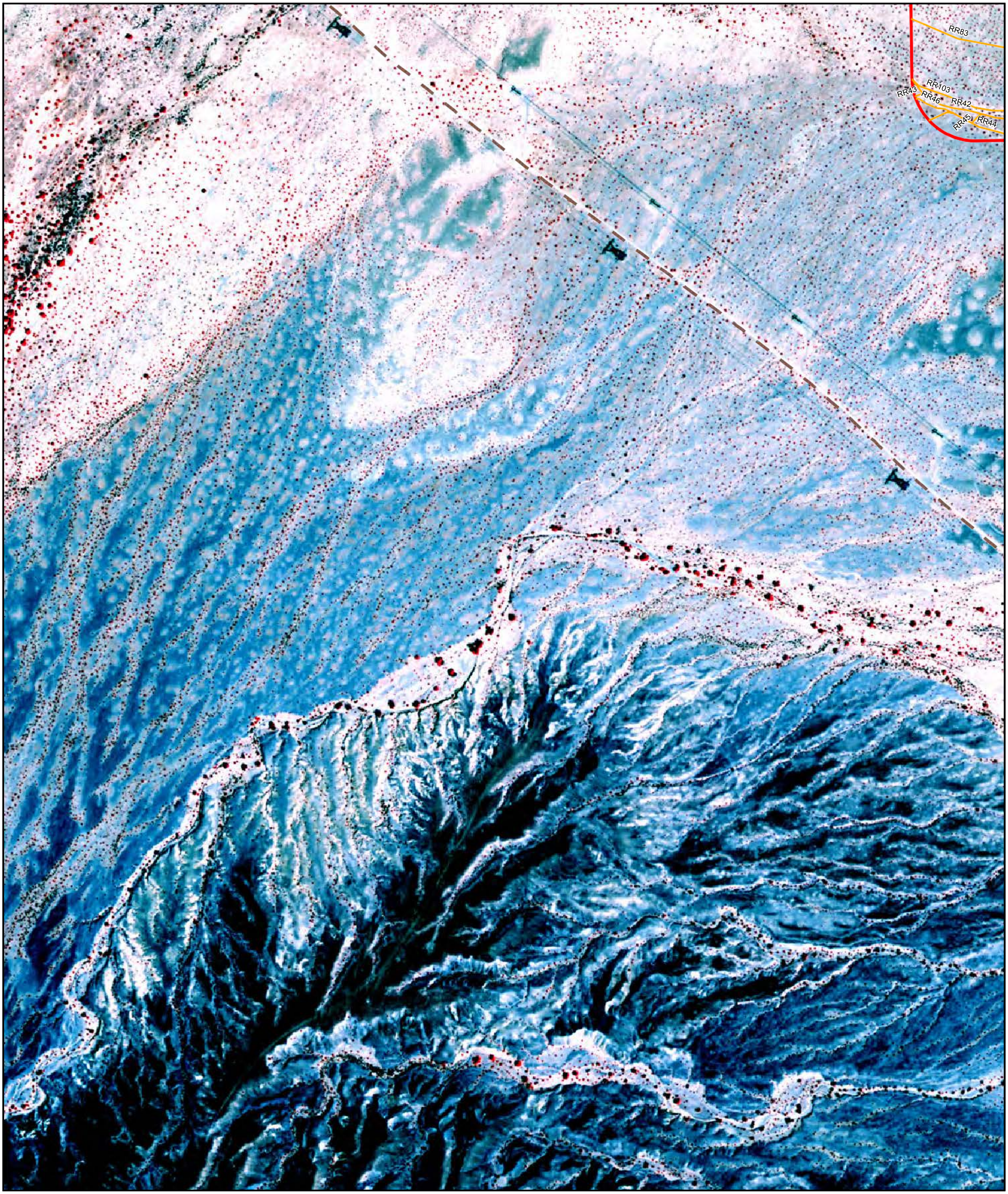
0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix E. Representative Photo Point Locations, Sheet 8

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California


RR83
RR103
RR43
RR46
RR42
RR45
RR44

E

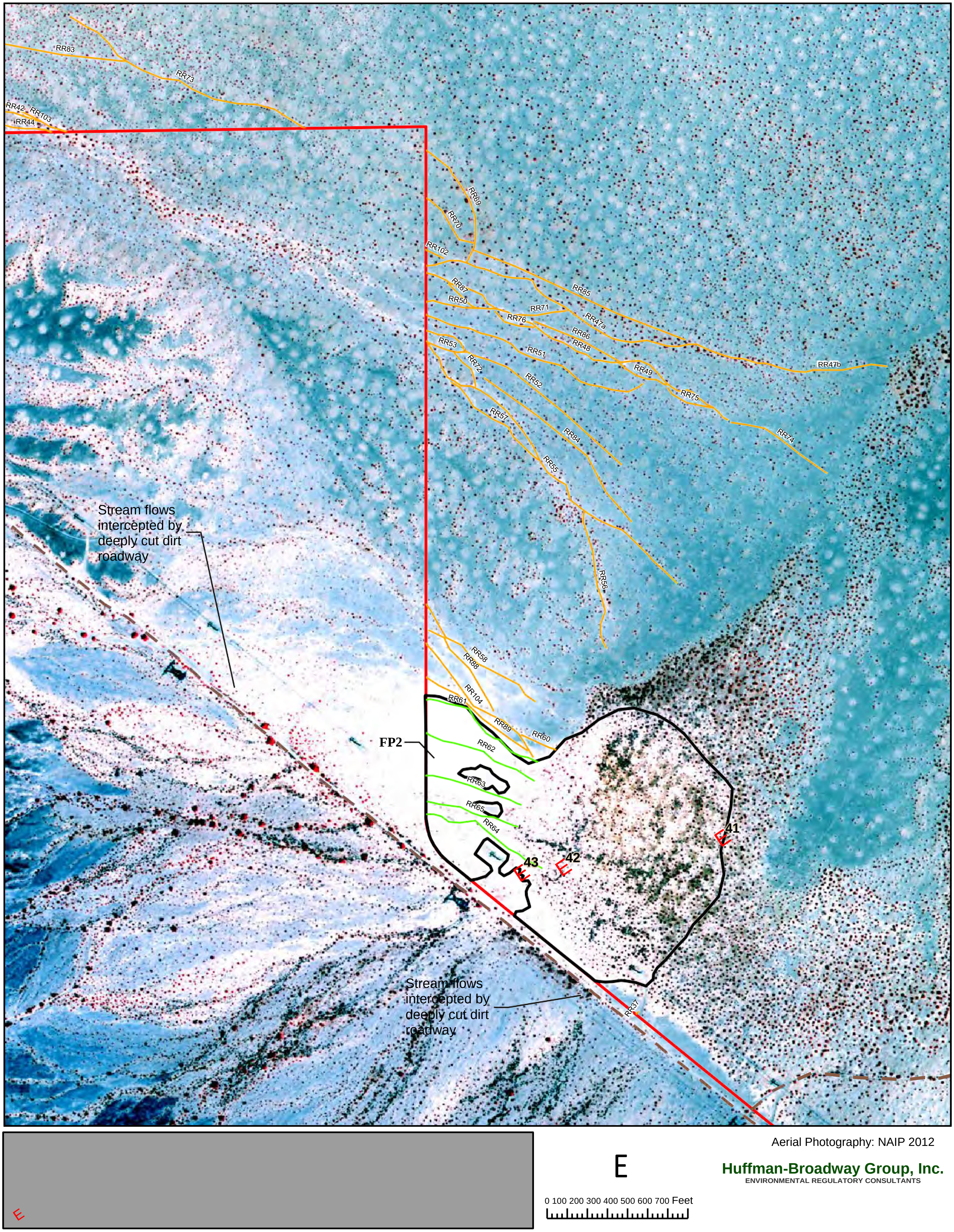
0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix E. Representative Photo Point Locations, Sheet 9

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California

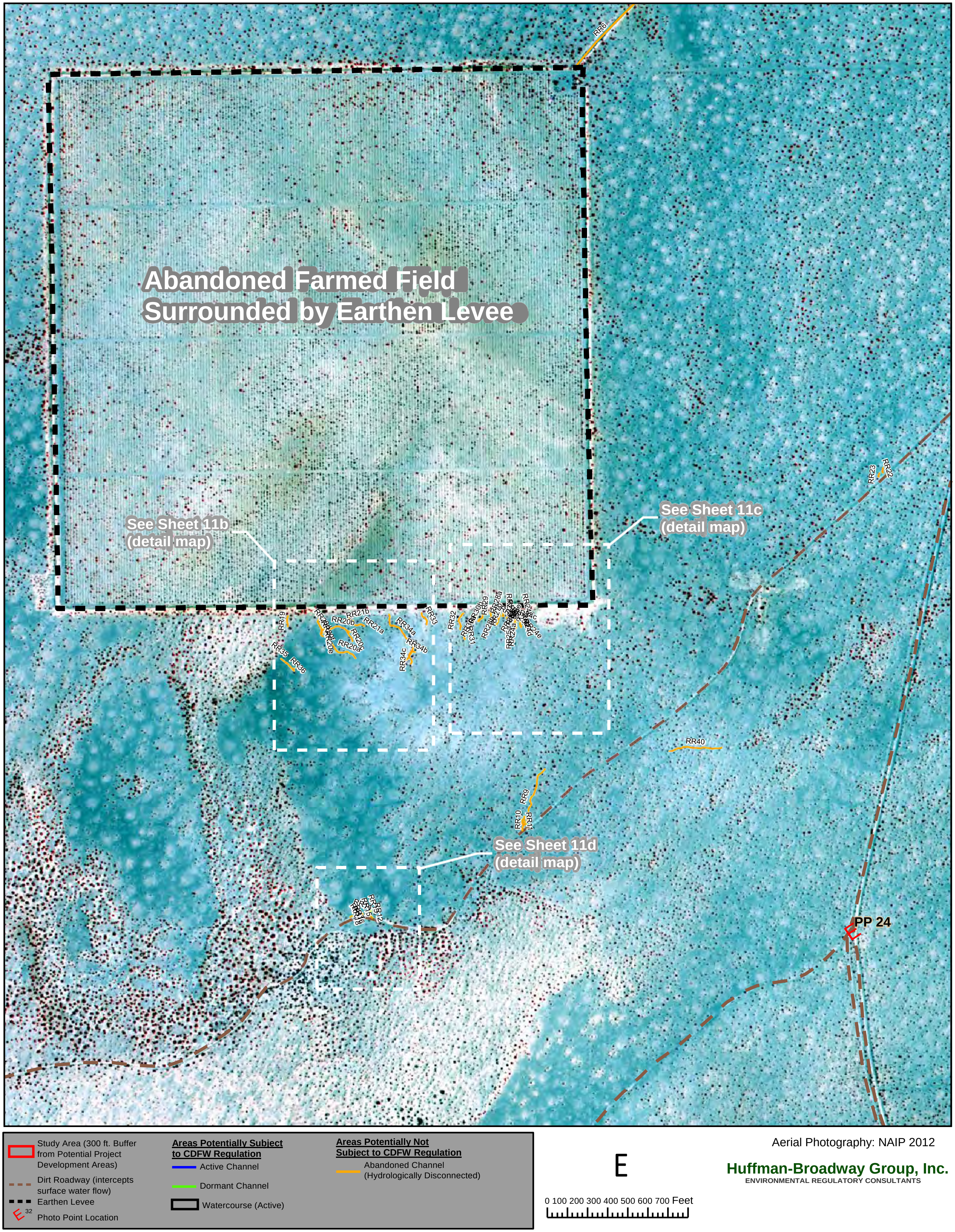

RR83
RR73
RR42
RR103
RR44
RR69
RR70
RR102
RR87
RR85
RR50
RR71
RR47a
RR76
RR86
RR48
RR53
RR51
RR72
RR49
RR47b
RR52
RR75
RR57
RR74
RR84
RR55
Stream flows intercepted by deeply cut dirt roadway
RR56
RR58
RR88
RR104
RR61
RR89
RR60
FP2
RR62
RR63
RR65
RR64
41
43
42
Stream flows intercepted by deeply cut dirt roadway
RR37
E
0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix E. Representative Photo Point Locations, Sheet 10

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California

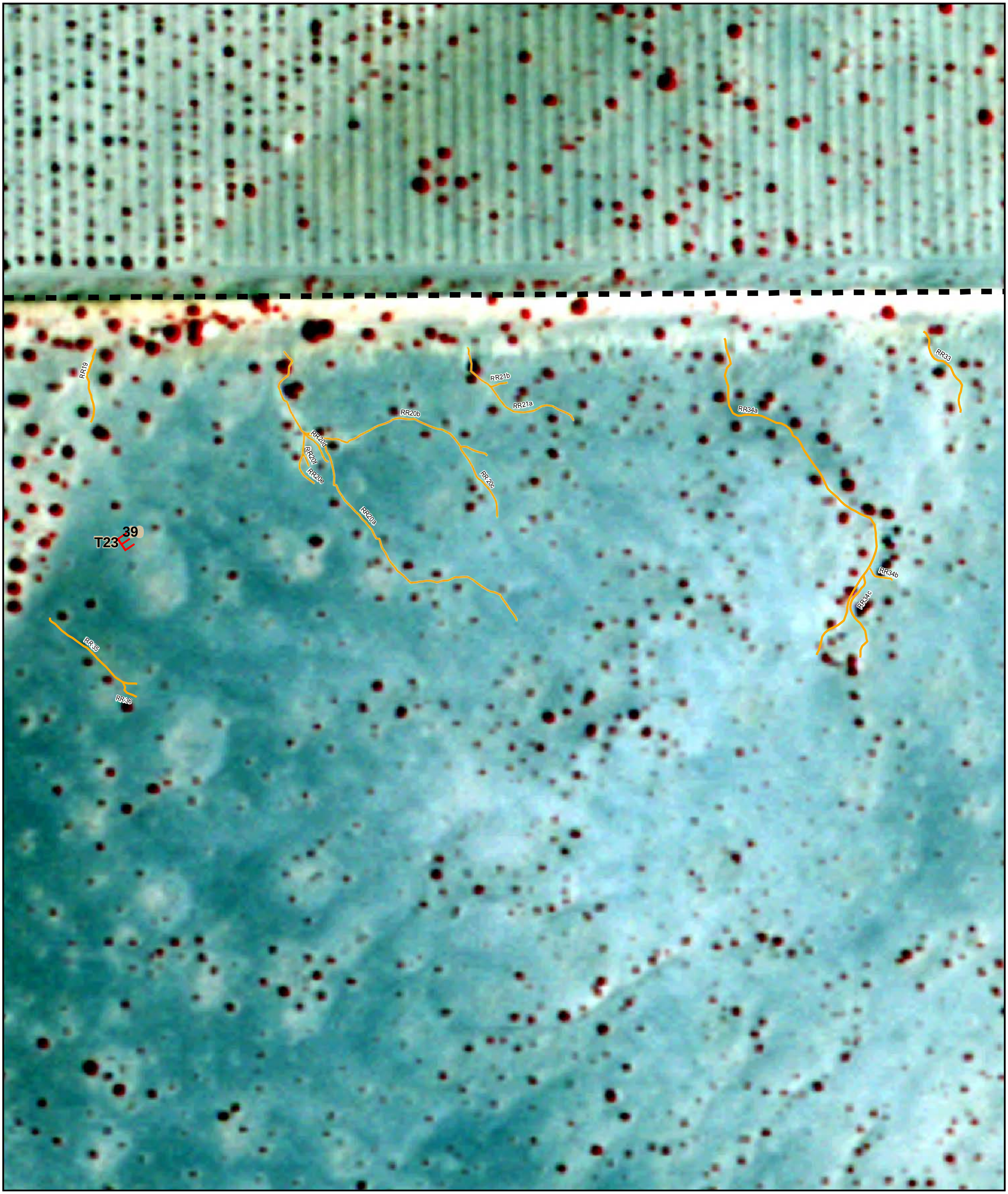

RR6
Abandoned Farmed Field
Surrounded by Earthen Levee
See Sheet 11b
(detail map)
See Sheet 11c
(detail map)
See Sheet 11d
(detail map)
RR19
RR20b
RR21b
RR21a
RR20c
RR20a
RR20e
RR35
RR36
RR34a
RR34b
RR34c
RR33
RR32
RR31
RR30b
RR29
RR28a
RR28b
RR24c
RR24a
RR24d
RR24e
RR23
RR22
RR40
RR9
RR10
RR11
RR12
RR15
RR16
RR18
PP 24
Study Area (300 ft. Buffer from Potential Project Development Areas)
Dirt Roadway (intercepts surface water flow)
Earthen Levee
32
Photo Point Location
Areas Potentially Subject to CDFW Regulation
Active Channel
Dormant Channel
Watercourse (Active)
Areas Potentially Not Subject to CDFW Regulation
Abandoned Channel (Hydrologically Disconnected)
E
0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix E. Representative Photo Point Locations, Sheet 11

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California


RR19
RR21b
RR21a
RR20b
RR20d
RR20f
RR20e
RR20c
RR20a
RR34a
RR33
RR34b
RR34c
T23
39
RR35
RR36

🟥 Study Area (300 ft. Buffer from Potential Project Development Areas)

Dirt Roadway (intercepts surface water flow)

Earthen Levee

Photo Point Location

Areas Potentially Subject to CDFW Regulation

Active Channel

Dormant Channel

▭ Watercourse (Active)

Areas Potentially Not Subject to CDFW Regulation

Abandoned Channel (Hydrologically Disconnected)

Aerial Photography: NAIP 2012

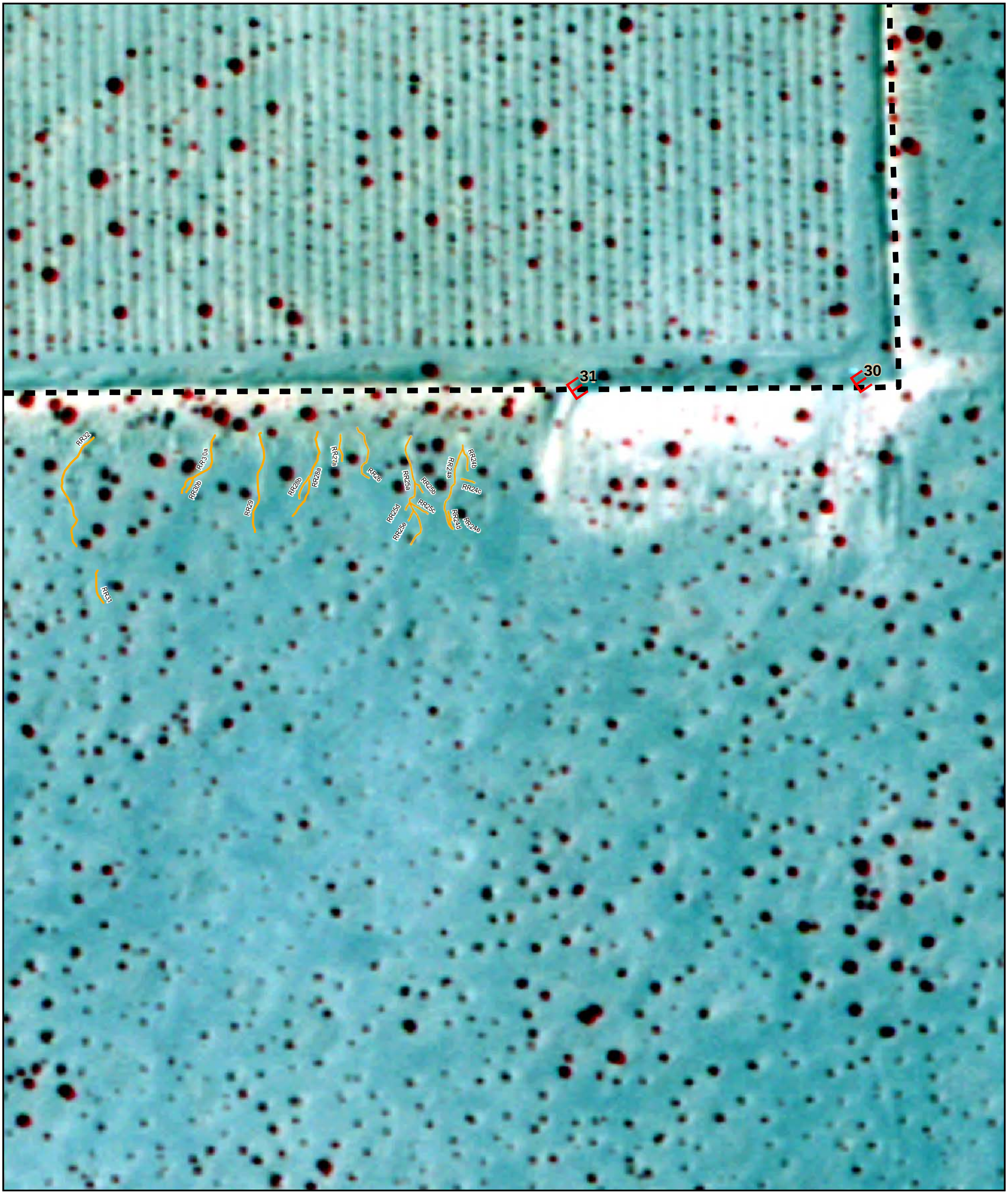
E

0 50 100 150 Feet

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix E. Representative Photo Point Locations, Sheet 11b

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California


31
30
RR32
RR30a
RR30b
RR29
RR28b
RR28a
RR27a
RR26
RR25a
RR25b
RR25c
RR25d
RR25e
RR24a
RR24b
RR24c
RR24d
RR24e
RR31

🟥 Study Area (300 ft. Buffer from Potential Project Development Areas)
Dirt Roadway (intercepts surface water flow)
Earthen Levee
Photo Point Location

Areas Potentially Subject to CDFW Regulation
Active Channel
Dormant Channel
▭ Watercourse (Active)

Areas Potentially Not Subject to CDFW Regulation
Abandoned Channel (Hydrologically Disconnected)

E

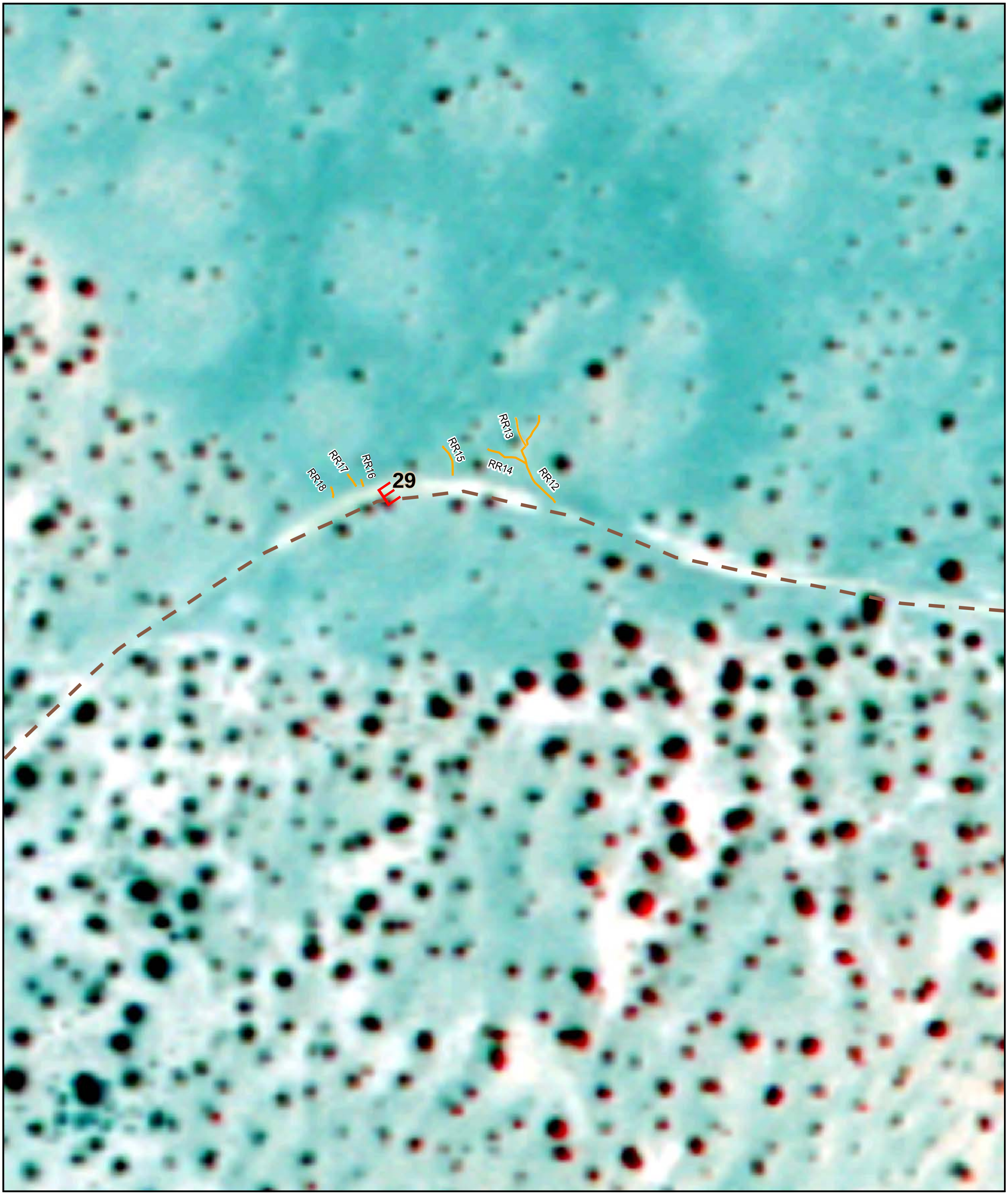
0 50 100 150 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix E. Representative Photo Point Locations, Sheet 11c

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California



▭ Study Area (300 ft. Buffer from Potential Project Development Areas)

Dirt Roadway (intercepts surface water flow)

E Earthen Levee

Areas Potentially Subject to CDFW Regulation

Active Channel

Dormant Channel

▭ Watercourse (Active)

Areas Potentially Not Subject to CDFW Regulation

Abandoned Channel (Hydrologically Disconnected)

E

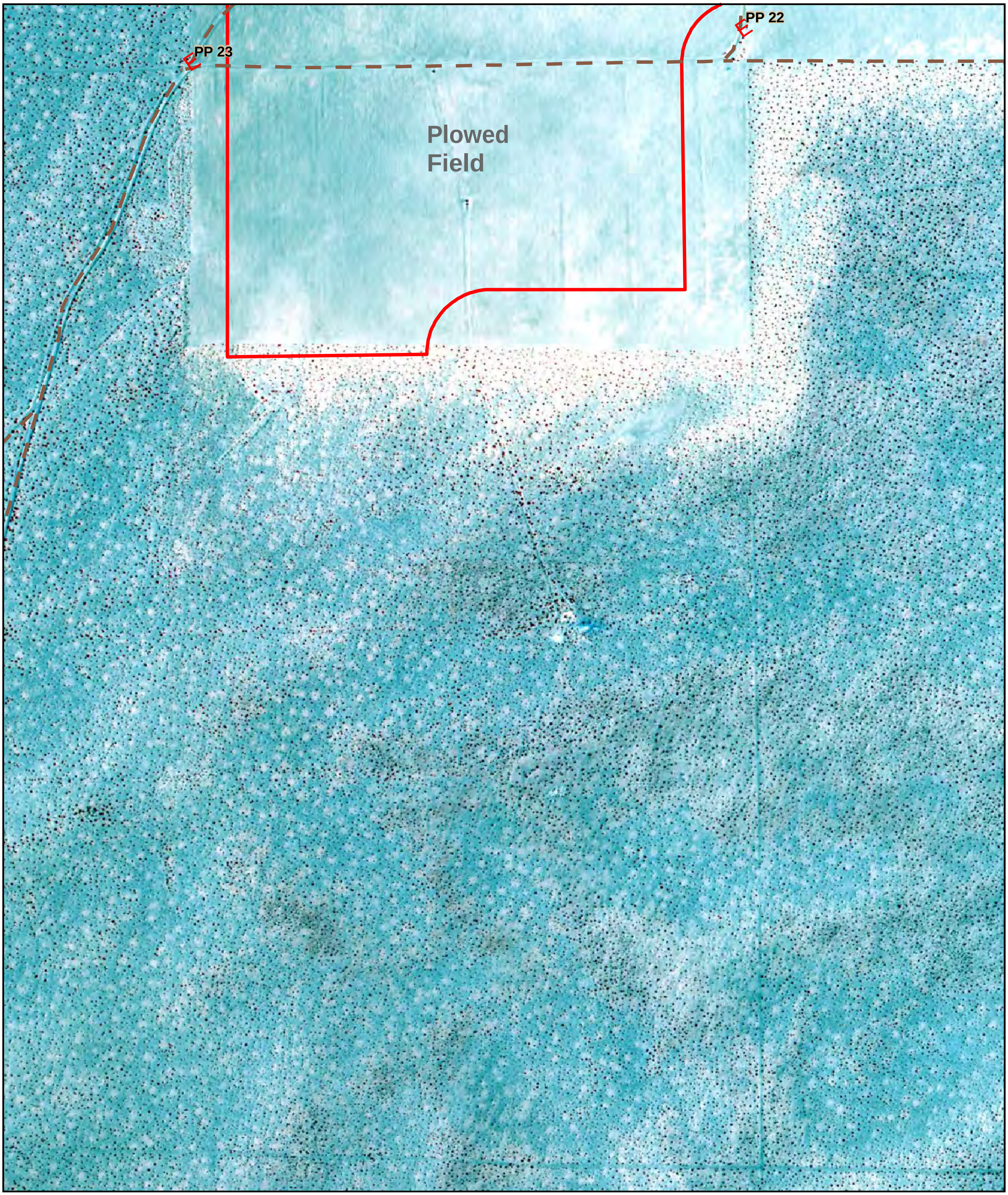
0 25 50 75 Feet

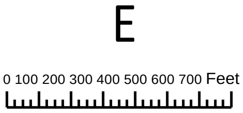
Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix E. Representative Photo Point Locations, Sheet 11d

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California


PP 23
PP 22
Plowed Field

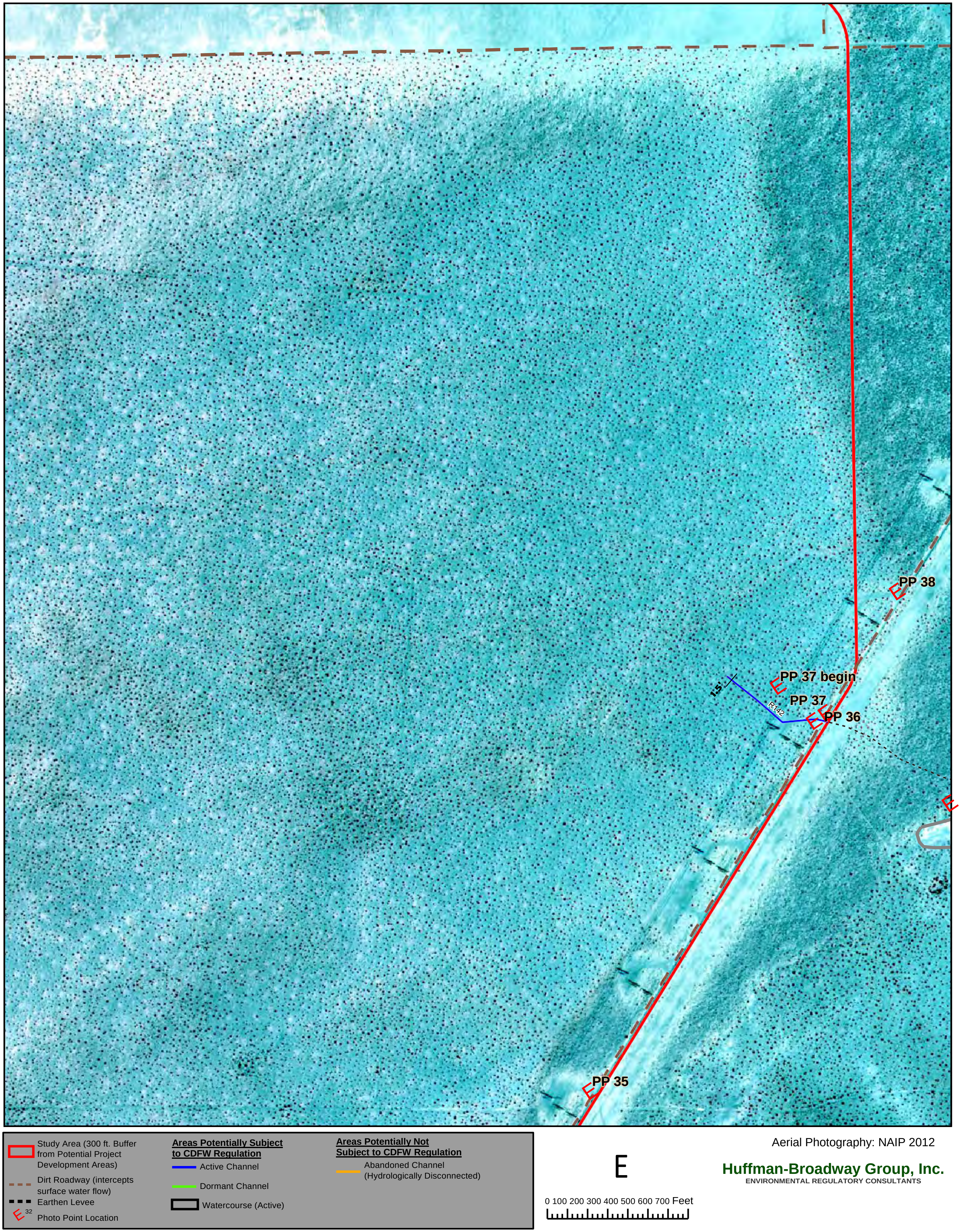

E
0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

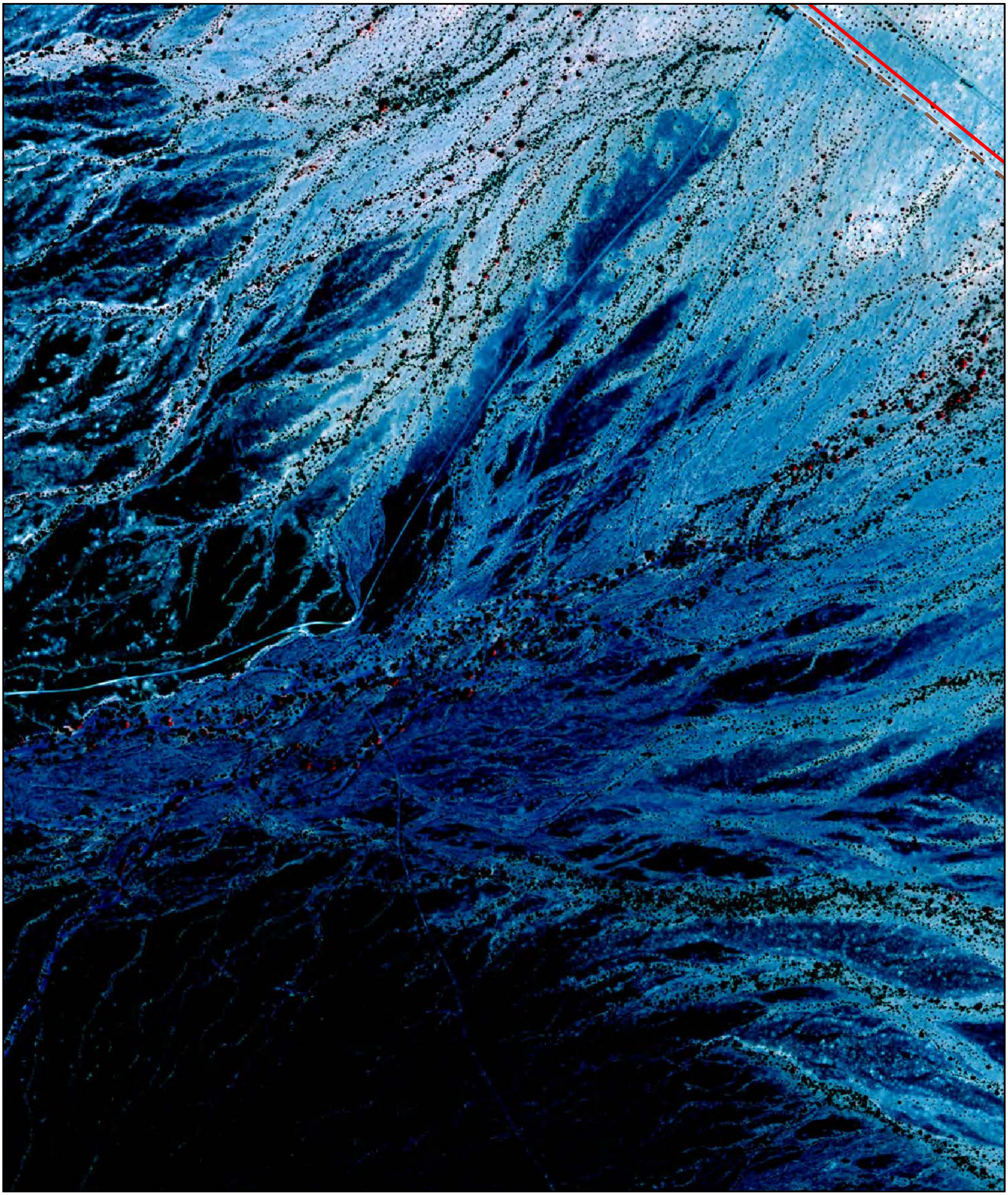
Appendix E. Representative Photo Point Locations, Sheet 12

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California

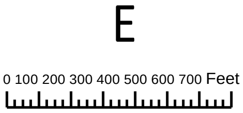

PP 38
15'
PP 37 begin
R142
PP 37
PP 36
PP 35
Study Area (300 ft. Buffer from Potential Project Development Areas)
Dirt Roadway (intercepts surface water flow)
Earthen Levee
32
Photo Point Location
Areas Potentially Subject to CDFW Regulation
Active Channel
Dormant Channel
Watercourse (Active)
Areas Potentially Not Subject to CDFW Regulation
Abandoned Channel (Hydrologically Disconnected)
E
0 100 200 300 400 500 600 700 Feet
Aerial Photography: NAIP 2012
Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix E. Representative Photo Point Locations, Sheet 13

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California



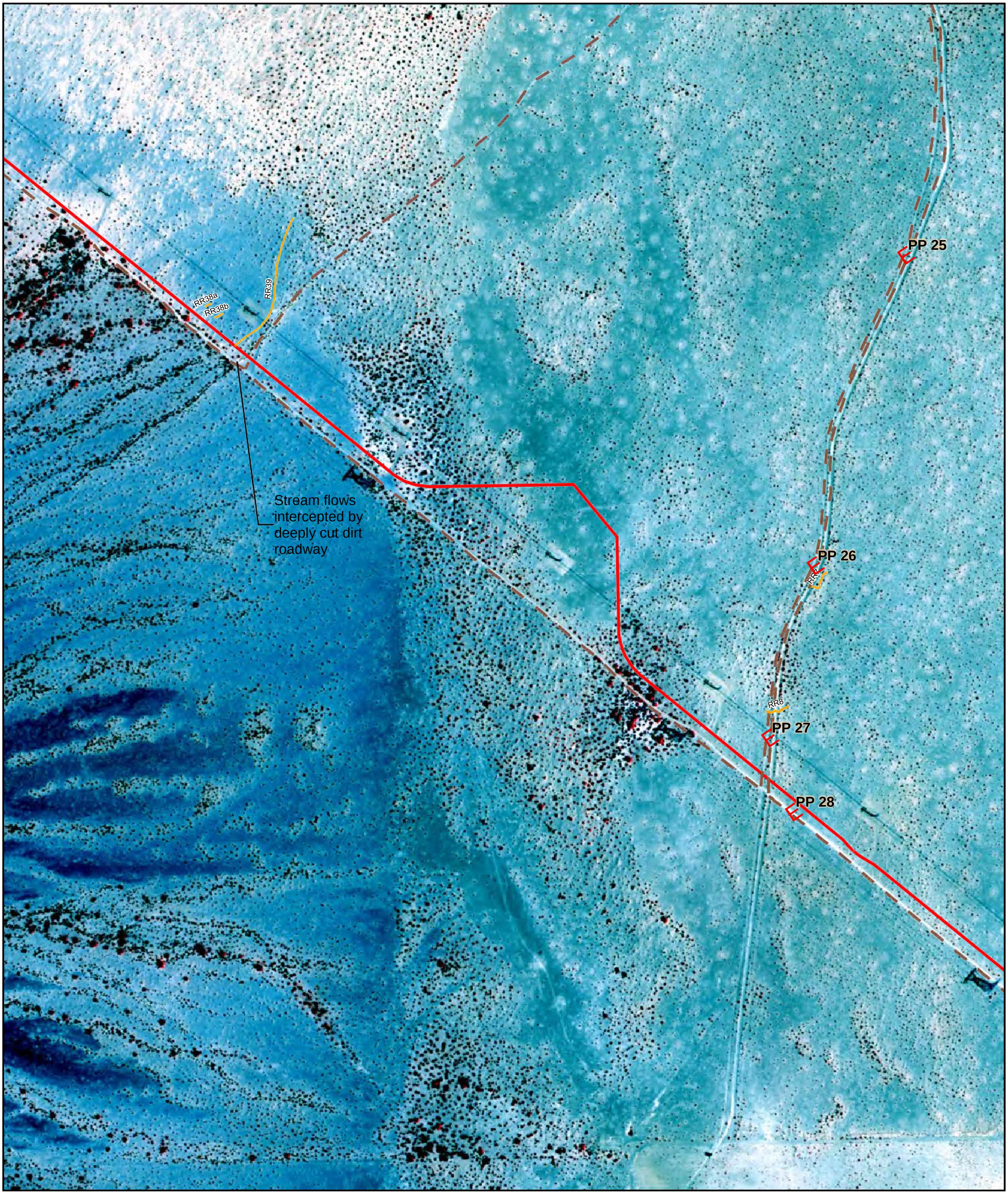
Aerial Photography: NAIP 2012


E
0 100 200 300 400 500 600 700 Feet

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix E. Representative Photo Point Locations, Sheet 14

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California


PP 25
RR39
RR38a
RR38b
Stream flows intercepted by deeply cut dirt roadway
PP 26
RR7
RR8
PP 27
PP 28

E

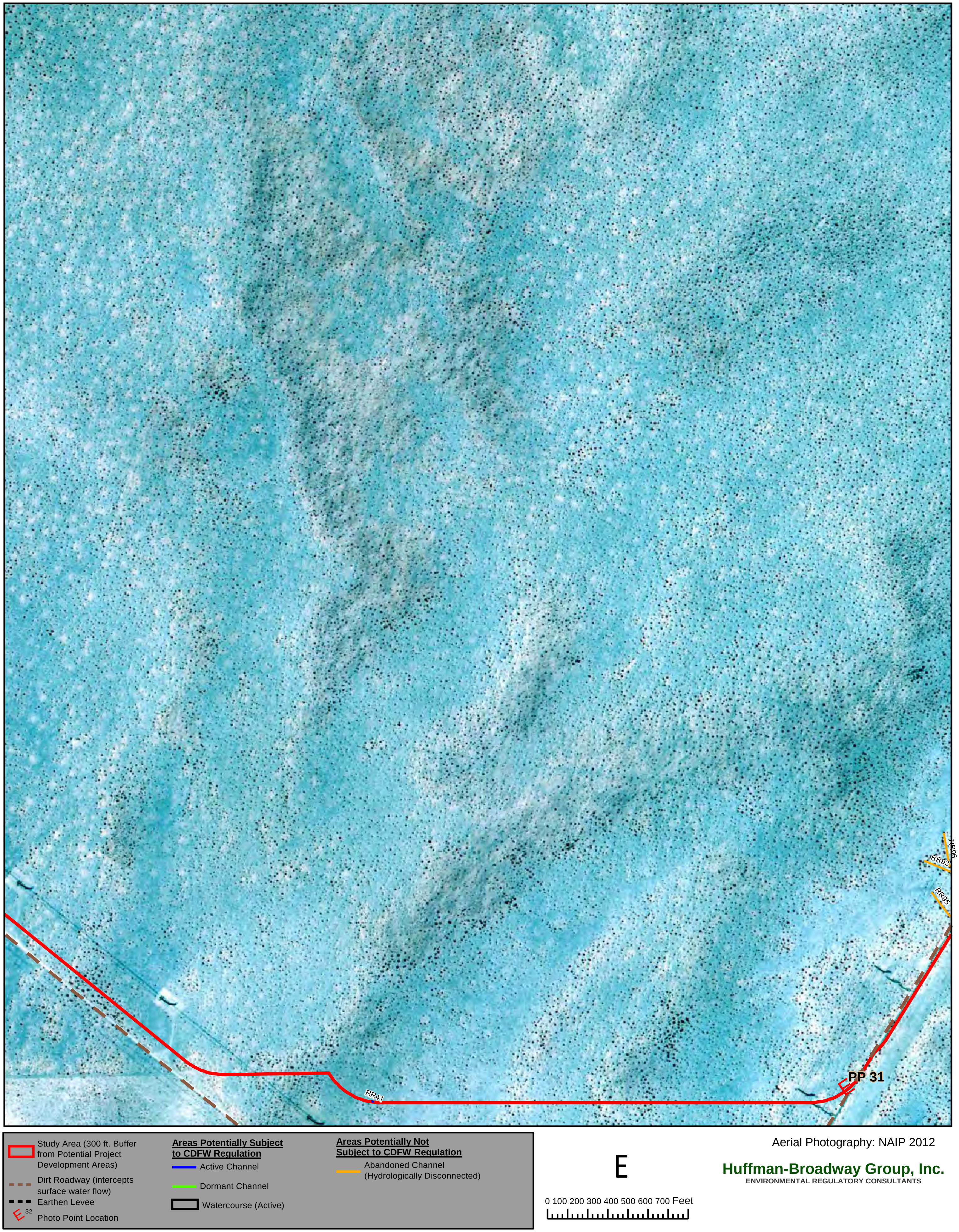
0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix E. Representative Photo Point Locations, Sheet 15

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California

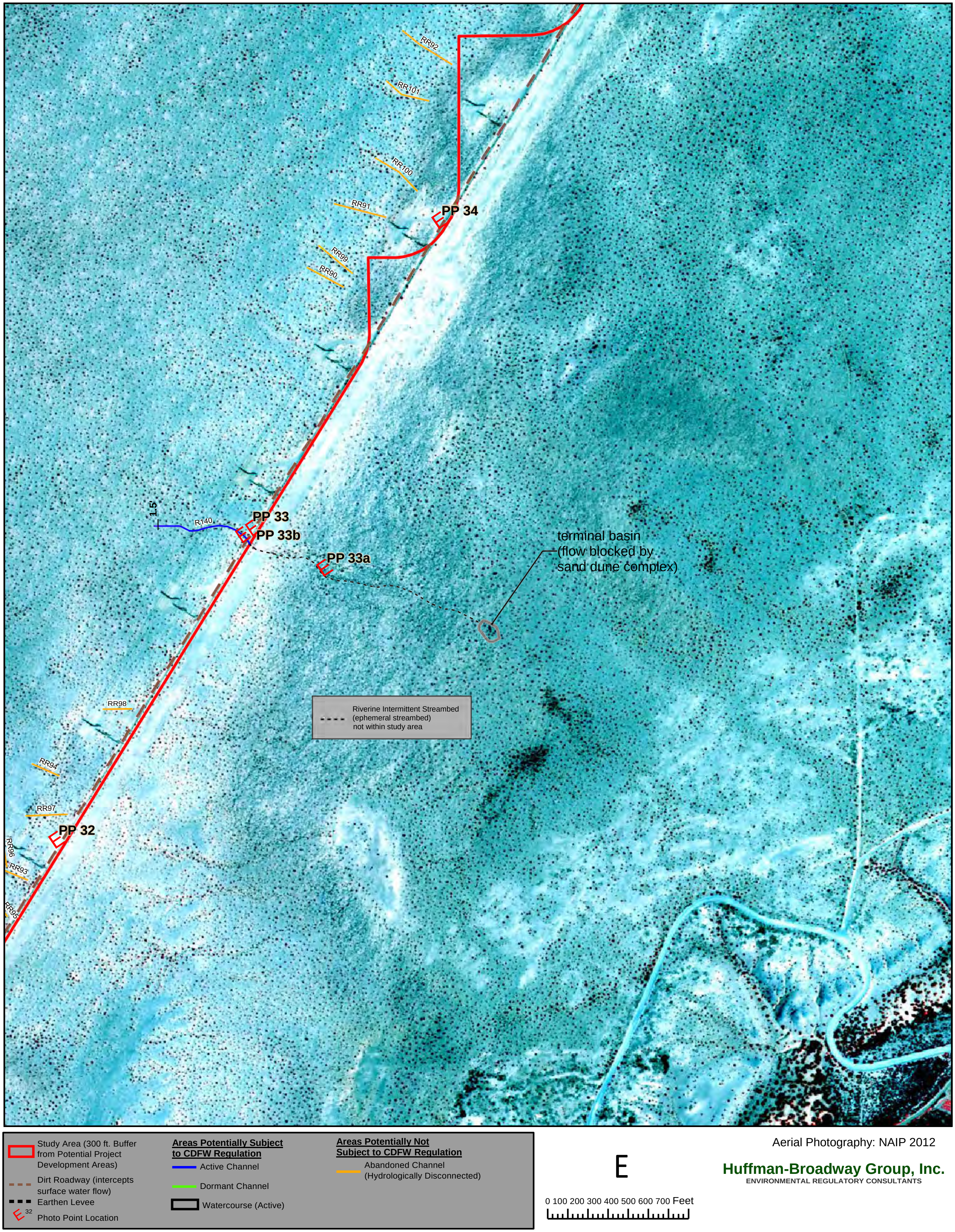

RR96
RR93
RR95
PP 31
RR41
Study Area (300 ft. Buffer from Potential Project Development Areas)
Dirt Roadway (intercepts surface water flow)
Earthen Levee
32
Photo Point Location
Areas Potentially Subject to CDFW Regulation
Active Channel
Dormant Channel
Watercourse (Active)
Areas Potentially Not Subject to CDFW Regulation
Abandoned Channel (Hydrologically Disconnected)
E
0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix E. Representative Photo Point Locations, Sheet 16

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California


RR92
RR101
RR100
RR91
PP 34
RR99
RR90
1.5'
R140
PP 33
PP 33b
PP 33a
terminal basin
(flow blocked by
sand dune complex)
Riverine Intermittent Streambed
(ephemeral streambed)
not within study area
RR98
RR94
RR97
PP 32
RR96
RR93
RR95
Study Area (300 ft. Buffer from Potential Project Development Areas)
Dirt Roadway (intercepts surface water flow)
Earthen Levee
32
Photo Point Location
Areas Potentially Subject to CDFW Regulation
Active Channel
Dormant Channel
Watercourse (Active)
Areas Potentially Not Subject to CDFW Regulation
Abandoned Channel (Hydrologically Disconnected)
E
0 100 200 300 400 500 600 700 Feet

Aerial Photography: NAIP 2012

Huffman-Broadway Group, Inc.
ENVIRONMENTAL REGULATORY CONSULTANTS

Appendix E. Representative Photo Point Locations, Sheet 17

Desert Quartzite LLC Solar Farm Project, Town of Blythe, Riverside County, California

Appendix F
Computations for Delineated Areas

APPENDIX F. CALCULATIONS FOR DELINEATED WATERCOURSE AREAS

Watercourse ID	Jurisdictional Category	Flow Regime Characteristics	Geomorphological Characteristics	Hydrological Characteristics	Width (ft)	Length (ft)	Area (ft^2) (length x width)	Area (acres)	Latitude	Longitude	Comments
Active Stream Channel											
R54a	Active Channel	Eposodic	Fluvial: Floodplain Watercourse on Fan Remnant	Active	2.0	352	704	0.02	33.588788 N	114.753445 W	Has Recent fluvial indicators
R54b	Active Channel	Eposodic	Fluvial: Floodplain Watercourse on Fan Remnant	Active	2.0	1141	2282	0.05	33.588386 N	114.751368 W	Has Recent fluvial indicators
R54c	Active Channel	Eposodic	Fluvial: Floodplain Watercourse on Fan Remnant	Active	2.0	442	884	0.02	33.588387 N	114.748842 W	Has Recent fluvial indicators
R140	Active Channel	Eposodic	Fan Remnant	Active	1.5	522	783	0.02	33.552176 N	114.737683 W	Has Recent fluvial
R142	Active Channel	Eposodic	Fluvial: Floodplain Watercourse on Fan Remnant	Active	1.5	590	885	0.02	33.564858 N	114.728189 W	Has Recent fluvial indicators
RR41	Active Channel	Eposodic	Fluvial: Floodplain Watercourse on Fan Remnant	Active	1.6	12	19	0.00	33.544510 N	114.750381 W	Has Recent fluvial indicators
RR105	Active Channel	Eposodic	Fluvial: Floodplain Watercourse on Fan Remnant	Active	1.1	70	77	0.00	33.588619 N	114.759489 W	Has Recent fluvial indicators
RR107	Active Channel	Eposodic	Fluvial: Floodplain Watercourse on Fan Remnant	Active	2.2	50	110	0.00	33.589334 N	114.753514 W	Has Recent fluvial indicators
Total Active Stream Channel							**5744**	**0.13**			
Dormant Stream Channel											
RR61	Dormant Channel	Eposodic	Fluvial: Floodplain Watercourse on Fan Remnant	Dormant	1.1	673	740	0.02	33.565194 N	114.778972 W	Lack recent fluvial indicators like active channels, but has past flow indicators and hydrologically flow has not been cut off upgradient and has potential to become active again.
RR62	Dormant Channel	Eposodic	Fluvial: Floodplain Watercourse on Fan Remnant	Dormant	0.5	602	301	0.01	33.564882 N	114.778959 W	Same comment as above
RR63	Dormant Channel	Eposodic	Fluvial: Floodplain Watercourse on Fan Remnant	Dormant	0.8	501	401	0.01	33.564404 N	114.779125 W	Same comment as above
RR64	Dormant Channel	Eposodic	Fluvial: Floodplain Watercourse on Fan Remnant	Dormant	0.9	673	606	0.01	33.563766 N	114.778880 W	Same comment as above
RR65	Dormant Channel	Eposodic	Fluvial: Floodplain Watercourse on Fan Remnant	Dormant	1.6	477	763	0.02	33.564054 N	114.779161 W	Same comment as above
RR78	Dormant Channel	Eposodic	Fluvial: Floodplain Watercourse on Fan Remnant	Dormant	1.5	1668	2502	0.06	33.585094 N	114.745360 W	Same comment as above
RR79	Dormant Channel	Eposodic	Fluvial: Floodplain Watercourse on Fan Remnant	Dormant	1.3	788	1024	0.02	33.584233 N	114.744903 W	Same comment as above
RR89	Dormant Channel	Eposodic	Fluvial: Floodplain Watercourse on Fan Remnant	Dormant	0.7	630	441	0.01	33.565414 N	114.779065 W	Same comment as above
Total Dormant Stream Channel							**6778**	**0.16**			
Abandoned Stream Channel											
RR1	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	2.2	14	31	0.00	33.580885 N	114.744389 W	Hydrologically Disconnected
RR2	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.8	13	10	0.00	33.580737 N	114.744381 W	Hydrologically Disconnected
RR3	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.2	122	146	0.00	33.580766 N	114.744523 W	Hydrologically Disconnected
RR6	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.7	475	808	0.02	33.574551 N	114.761380 W	Hydrologically Disconnected
RR7	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.7	135	95	0.00	33.552155 N	114.759019 W	Hydrologically Disconnected
RR8	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.9	147	132	0.00	33.550483 N	114.759731 W	Hydrologically Disconnected
RR9	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.3	357	464	0.01	33.564053 N	114.762843 W	Hydrologically Disconnected
RR10	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.7	43	30	0.00	33.563770 N	114.762954 W	Hydrologically Disconnected
RR11	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.6	32	19	0.00	33.563751 N	114.762987 W	Hydrologically Disconnected
RR12	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.0	54	54	0.00	33.562516 N	114.765488 W	Hydrologically Disconnected
RR13	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.5	14	21	0.00	33.562560 N	114.765500 W	Hydrologically Disconnected
RR14	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.2	22	26	0.00	33.562522 N	114.765520 W	Hydrologically Disconnected
RR15	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.9	17	15	0.00	33.562520 N	114.765613 W	Hydrologically Disconnected
RR16	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.5	4	2	0.00	33.562489 N	114.765764 W	Hydrologically Disconnected
RR17	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.4	8	11	0.00	33.562493 N	114.765781 W	Hydrologically Disconnected
RR18	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.7	6	4	0.00	33.562476 N	114.765814 W	Hydrologically Disconnected
RR19	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.7	61	43	0.00	33.566532 N	114.766772 W	Hydrologically Disconnected

APPENDIX F. CALCULATIONS FOR DELINEATED WATERCOURSE AREAS

Watercourse ID	Jurisdictional Category	Flow Regime Characteristics	Geomorphological Characteristics	Hydrological Characteristics	Width (ft)	Length (ft)	Area (ft^2) (length x width)	Area (acres)	Latitude	Longitude	Comments
RR20a	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.9	333	300	0.01	33.566241 N	114.766070 W	Hydrologically Disconnected
RR20b	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.2	160	192	0.00	33.566444 N	114.765988 W	Hydrologically Disconnected
RR20c	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.8	66	53	0.00	33.566313 N	114.765753 W	Hydrologically Disconnected
RR20d	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.9	30	27	0.00	33.566390 N	114.766172 W	Hydrologically Disconnected
RR20e	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.5	46	69	0.00	33.566370 N	114.766216 W	Hydrologically Disconnected
RR20f	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.0	11	11	0.00	33.566362 N	114.766205 W	Hydrologically Disconnected
RR21a	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.9	120	108	0.00	33.566491 N	114.765701 W	Hydrologically Disconnected
RR21b	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.4	15	21	0.00	33.566522 N	114.765700 W	Hydrologically Disconnected
RR22	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.1	38	42	0.00	33.568484 N	114.757016 W	Hydrologically Disconnected
RR23	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	2.0	31	62	0.00	33.568416 N	114.757081 W	Hydrologically Disconnected
RR24a	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.7	74	52	0.00	33.566491 N	114.762953 W	Hydrologically Disconnected
RR24b	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.9	18	16	0.00	33.566546 N	114.762913 W	Hydrologically Disconnected
RR24c	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.3	13	17	0.00	33.566502 N	114.762912 W	Hydrologically Disconnected
RR24d	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.1	16	18	0.00	33.566418 N	114.762962 W	Hydrologically Disconnected
RR24e	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	2.2	9	20	0.00	33.566417 N	114.762954 W	Hydrologically Disconnected
RR25a	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.4	97	136	0.00	33.566483 N	114.763052 W	Hydrologically Disconnected
RR25b	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.0	11	11	0.00	33.566488 N	114.763038 W	Hydrologically Disconnected
RR25c	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.3	17	22	0.00	33.566443 N	114.763041 W	Hydrologically Disconnected
RR25d	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.7	7	5	0.00	33.566447 N	114.763073 W	Hydrologically Disconnected
RR25e	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.3	10	13	0.00	33.566426 N	114.763064 W	Hydrologically Disconnected
RR26	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.0	49	49	0.00	33.566565 N	114.763173 W	Hydrologically Disconnected
RR27a	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	2.3	23	53	0.00	33.566575 N	114.763248 W	Hydrologically Disconnected
RR27b	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.9	13	12	0.00	33.566561 N	114.763261 W	Hydrologically Disconnected
RR28a	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.1	76	84	0.00	33.566516 N	114.763326 W	Hydrologically Disconnected
RR28b	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.9	20	18	0.00	33.566494 N	114.763346 W	Hydrologically Disconnected
RR29	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.3	84	109	0.00	33.566504 N	114.763463 W	Hydrologically Disconnected
RR30a	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	2.1	61	128	0.00	33.566528 N	114.763607 W	Hydrologically Disconnected
RR30b	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.7	14	10	0.00	33.566498 N	114.763639 W	Hydrologically Disconnected
RR31	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.5	29	15	0.00	33.566281 N	114.763888 W	Hydrologically Disconnected
RR32	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.3	104	135	0.00	33.566475 N	114.763958 W	Hydrologically Disconnected
RR33	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.0	79	79	0.00	33.566550 N	114.764523 W	Hydrologically Disconnected
RR34a	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.9	337	303	0.01	33.566294 N	114.764850 W	Hydrologically Disconnected

APPENDIX F. CALCULATIONS FOR DELINEATED WATERCOURSE AREAS

Watercourse ID	Jurisdictional Category	Flow Regime Characteristics	Geomorphological Characteristics	Hydrological Characteristics	Width (ft)	Length (ft)	Area (ft^2) (length x width)	Area (acres)	Latitude	Longitude	Comments
RR34b	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.7	22	15	0.00	33.566087 N	114.764708 W	Hydrologically Disconnected
RR34c	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	2.3	74	170	0.00	33.565995 N	114.764774 W	Hydrologically Disconnected
RR35	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.1	91	100	0.00	33.565948 N	114.766775 W	Hydrologically Disconnected
RR36	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.4	18	25	0.00	33.565857 N	114.766679 W	Hydrologically Disconnected
RR37	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	2.0	23	46	0.00	33.561294 N	114.776518 W	Hydrologically Disconnected
RR38a	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.9	39	35	0.00	33.555839 N	114.768408 W	Hydrologically Disconnected
RR38b	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.3	53	69	0.00	33.555692 N	114.768243 W	Hydrologically Disconnected
RR39	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.0	696	696	0.02	33.556192 N	114.767345 W	Hydrologically Disconnected
RR40	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.9	278	250	0.01	33.564722 N	114.760142 W	Hydrologically Disconnected
RR42	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.9	644	580	0.01	33.573812 N	114.787043 W	Hydrologically Disconnected
RR43	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.7	37	26	0.00	33.574042 N	114.787896 W	Hydrologically Disconnected
RR44	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.6	601	962	0.02	33.573586 N	114.786825 W	Hydrologically Disconnected
RR45	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.0	60	60	0.00	33.573736 N	114.787008 W	Hydrologically Disconnected
RR46	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.9	196	176	0.00	33.573883 N	114.787655 W	Hydrologically Disconnected
RR47a	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.7	1861	1303	0.03	33.570636 N	114.777024 W	Hydrologically Disconnected
RR47b	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.7	591	414	0.01	33.570034 N	114.773243 W	Hydrologically Disconnected
RR48	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	2.0	1743	3486	0.08	33.570368 N	114.777397 W	Hydrologically Disconnected
RR49	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.6	270	432	0.01	33.569975 N	114.776295 W	Hydrologically Disconnected
RR50	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.5	358	537	0.01	33.570972 N	114.779241 W	Hydrologically Disconnected
RR51	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.9	1184	1066	0.02	33.570264 N	114.778089 W	Hydrologically Disconnected
RR52	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.6	1209	725	0.02	33.569863 N	114.778093 W	Hydrologically Disconnected
RR53	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.1	216	238	0.01	33.570394 N	114.779504 W	Hydrologically Disconnected
RR55	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.8	1788	1430	0.03	33.568751 N	114.777906 W	Hydrologically Disconnected
RR56	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.6	713	428	0.01	33.567220 N	114.777093 W	Hydrologically Disconnected
RR57	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.3	597	776	0.02	33.569419 N	114.778708 W	Hydrologically Disconnected
RR58	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	2.2	758	1668	0.04	33.566147 N	114.779108 W	Hydrologically Disconnected
RR60	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.2	191	229	0.01	33.565005 N	114.778072 W	Hydrologically Disconnected
RR66	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.5	3145	4718	0.11	33.583109 N	114.776297 W	Hydrologically Disconnected
RR67	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	2.1	499	1048	0.02	33.581439 N	114.787648 W	Hydrologically Disconnected
RR68	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	2.0	286	572	0.01	33.581048 N	114.787612 W	Hydrologically Disconnected
RR69	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.3	661	859	0.02	33.572484 N	114.779111 W	Hydrologically Disconnected
RR70	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.9	345	311	0.01	33.572143 N	114.779430 W	Hydrologically Disconnected

APPENDIX F. CALCULATIONS FOR DELINEATED WATERCOURSE AREAS

Watercourse ID	Jurisdictional Category	Flow Regime Characteristics	Geomorphological Characteristics	Hydrological Characteristics	Width (ft)	Length (ft)	Area (ft^2) (length x width)	Area (acres)	Latitude	Longitude	Comments
RR71	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.8	268	214	0.00	33.570852 N	114.777936 W	Hydrologically Disconnected
RR72	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.2	213	256	0.01	33.570163 N	114.779147 W	Hydrologically Disconnected
RR73	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.1	1327	1460	0.03	33.574105 N	114.783761 W	Hydrologically Disconnected
RR74	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.8	558	446	0.01	33.569067 N	114.773996 W	Hydrologically Disconnected
RR75	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.7	257	180	0.00	33.569617 N	114.775541 W	Hydrologically Disconnected
RR76	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.7	225	158	0.00	33.570723 N	114.778388 W	Hydrologically Disconnected
RR77	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.2	275	330	0.01	33.584178 N	114.737494 W	Hydrologically Disconnected
RR80	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	2.0	1182	2363	0.05	33.586554 N	114.741993 W	Hydrologically Disconnected
RR81	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.6	751	1202	0.03	33.578681 N	114.773637 W	Hydrologically Disconnected
RR82	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.2	554	665	0.02	33.578689 N	114.772993 W	Hydrologically Disconnected
RR83	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.5	1048	1572	0.04	33.574606 N	114.786354 W	Hydrologically Disconnected
RR84	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.7	1045	732	0.02	33.569144 N	114.777545 W	Hydrologically Disconnected
RR85	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.7	1144	801	0.02	33.571100 N	114.777307 W	Hydrologically Disconnected
RR86	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.0	474	474	0.01	33.570511 N	114.777332 W	Hydrologically Disconnected
RR87	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.1	187	206	0.00	33.571117 N	114.779227 W	Hydrologically Disconnected
RR88	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	2.0	535	1070	0.02	33.566074 N	114.779236 W	Hydrologically Disconnected
RR90	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.1	211	232	0.01	33.555597 N	114.735583 W	Hydrologically Disconnected
RR91	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.9	271	244	0.01	33.556500 N	114.735003 W	Hydrologically Disconnected
RR92	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	2.2	305	671	0.02	33.558701 N	114.733879 W	Hydrologically Disconnected
RR93	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.5	249	374	0.01	33.547558 N	114.740945 W	Hydrologically Disconnected
RR94	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Abandoned	1.1	152	167	0.00	33.548926 N	114.740258 W	Hydrologically Disconnected
RR95	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.9	154	139	0.00	33.547093 N	114.741063 W	Hydrologically Disconnected
RR96	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.3	171	222	0.01	33.547835 N	114.740955 W	Hydrologically Disconnected
RR97	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.5	216	324	0.01	33.548309 N	114.740252 W	Hydrologically Disconnected
RR98	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.3	150	195	0.00	33.549740 N	114.739072 W	Hydrologically Disconnected
RR99	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.8	222	178	0.00	33.555840 N	114.735408 W	Hydrologically Disconnected
RR100	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.2	272	326	0.01	33.557027 N	114.734369 W	Hydrologically Disconnected
RR101	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.6	247	395	0.01	33.558060 N	114.734215 W	Hydrologically Disconnected
RR102	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	2.0	103	206	0.00	33.571701 N	114.779655 W	Hydrologically Disconnected
RR103	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	0.9	790	711	0.02	33.573836 N	114.786816 W	Hydrologically Disconnected
RR104	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.2	800	960	0.02	33.565500 N	114.779087 W	Hydrologically Disconnected
RR106	Abandoned Channel	Upland	Fluvial: Floodplain Watercourse on Fan Remnant	Inactive Channel (Hydrologically Disconnected)	1.1	152	167	0.00	33.589362 N	114.753859 W	Hydrologically Disconnected
Total Abandoned Stream Channel							45189	1.04			
Active Watercourse											

APPENDIX F. CALCULATIONS FOR DELINEATED WATERCOURSE AREAS

Watercourse ID	Jurisdictional Category	Flow Regime Characteristics	Geomorphological Characteristics	Hydrological Characteristics	Width (ft)	Length (ft)	Area (ft^2) (lengthx width)	Area (acres)	Latitude	Longitude	Comments
FP1	Active Watercourse	Active Floodplain	Fluvial: Floodplain Watercourse on Fan Remnant	Active	0.0	0	0	34.14	33.586918 N	114.750806 W	Has Recent fluvial indicators
FP2	Active Watercourse	Active Floodplain	Fluvial: Floodplain Watercourse on Fan Remnant	Active	0.0	0	0	32.32	33.563878 N	114.777083 W	Has Recent fluvial indicators
FP3	Active Watercourse	Active Floodplain	Fluvial: Floodplain Watercourse on Fan Remnant	Active	0.0	0	0	0.51	33.588349 N	114.759466 W	Lack recent fluvial indicators like active channels, but has past flow indicators and hydrologically flow has not been cut off and has potential to become active again.
Total Active Watercourse							**0**	**66.98**			

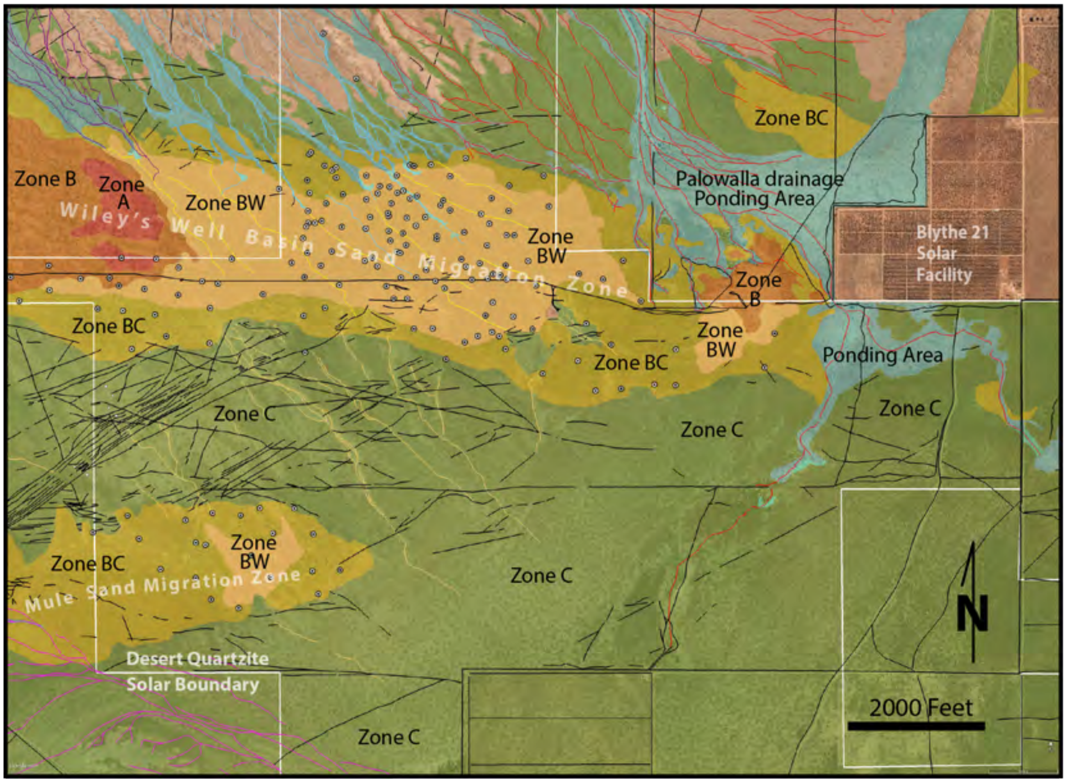
APPENDIX O

GEOMORPHIC, STRATIGRAPHIC & GEOLOGIC EOLIAN EVALUATION REPORT

Geomorphic and stratigraphic evaluation of the stable early to mid-Holocene eolian (wind-blown) dune systems for proposed Desert Quartzite Solar Project, eastern Chuckwalla Valley and Palo Verde Mesa area, Riverside County, California

PREPARED FOR:

James F. Cook
DESERT QUARTZITE LLC
Director, Business Development
135 Main Street, 6th Floor,
San Francisco, CA 94105


Zone BC
Zone B
Zone A
Zone BW
Wiley's Well Basin Sand Migration Zone
Palowalla drainage Ponding Area
Blythe 21 Solar Facility
Zone BW
Zone B
Zone BC
Zone BW
Zone BC
Ponding Area
Zone C
Zone C
Zone C
Zone BW
Zone BC
Mule Sand Migration Zone
Zone C
N
Desert Quartzite Solar Boundary
2000 Feet
Zone C

PREPARED BY:

Miles D. Kenney, PhD, PG
Kenney GeoScience
Oceanside, CA 92058
Cell: 760-845-9596
Email: miles.kenney@yahoo.com

Job Number: 721-11

Date: September 22, 2017

Report Date: September 22, 2017

To: James F. Cook
DESERT QUARTZITE LLC
Director, Business Development
135 Main Street, 6th Floor,
San Francisco, CA 94105

From Miles D. Kenney PhD, PG
Kenney GeoScience
Consulting Geologist & Geomorphologist
Oceanside, CA 92058
C: 760.845.9596
E: miles.kenney@yahoo.com

Report Title:

Geomorphic and stratigraphic evaluation of the stable early to mid-Holocene eolian (wind-blown) dune systems for the proposed Desert Quartzite Solar Project, eastern Chuckwalla Valley and Palo Verde Mesa area, Riverside County, California

Dear Mr. Cook:

Kenney GeoScience (KGS) is pleased to provide you this geomorphic and stratigraphic evaluation regarding eolian (wind blown) systems in the region of the proposed Desert Quartzite Solar Project (DQSP) located west of Blythe California and south of Interstate Highway 10 on the Palo Verde Mesa. From our understanding, the primary motivation for this study is to determine the value of the dune system(s) habitat in the vicinity of the DQSP to support analysis of the project impacts under the National Environmental Policy Act ("NEPA) and the California Environmental Quality Act ("CEQA"). This exercise is important because the dune deposits provide habitat for the Mojave fringe-toad lizard (MFTL).

To address these questions, KGS has evaluated the geologic history near DQSP since the early Pliocene, eolian sand sources (many of which are newly proposed), eolian sand pathways, proposed regional sand migration corridors throughout southeastern California, eolian sand source changes since the Latest Pleistocene associated with variations in climate, and hydrologic systems that provide stabilizing moisture and eolian sand sources. KGS further evaluated potential impacts to the dunes from anthropogenic activities such as global climate change and diversion of flood waters from construction activities.

This study contributes not just to the understanding of the DQSP site, but also to other dune systems throughout southeastern California. Few regional studies of dune systems exist for this region, however there is much literature regarding aspects of individual dune systems and sand migration corridors. Before now, these studies had not been evaluated comprehensively. The findings of this report are also consistent with previous KGS dune studies supporting the strong importance of evaluating surface water hydrology as it plays a critical role regarding eolian sand sources and dune stability over time. These findings greatly assist in the evaluation of local dune systems whether they are similar or substantially dissimilar to regional dune systems across the southeastern California region.

Miles D. Kenney PhD, PG
Kenney GeoScience
State of California Professional Geologist 8246

MILES D. KENNEY
No. 8246

TABLE OF CONTENTS

EXECUTIVE SUMMARY

ES 1.0 STUDY PURPOSE *(Page ES-i)*
ES 2.0 STUDY ELEMENTS *(Page ES-i)*
ES 3.0 STUDY KEY FINDINGS *(Page ES-i)*

- *Sand migration zones are local not regional*
- *Regional and local dunes are stable and degrading*
- *Future dune activity not to expected to change existing mapping for at least a thousand*

ES 4.0 DISCUSSION OF STUDY APPROACH AND RESULTS *(Page ES-iii)*

ES 4.1 Findings and Limitations of Previous Dune Studies

ES 4.2 Study Approach

ES 4.3 Discussion of Study Results

ES 4.3.1 Age of Alluvial and Eolian Sand Deposits
ES 4.3.2 Sand Corridor Continuity
ES 4.3.3 Dune System Stability
ES 4.3.4 Factors Affecting Dune Activity
ES 4.3.5 DQSP Area Dune Activity
ES 4.3.6 Affects of Vegetation
ES 4.3.7 Potential Future Impacts

ES 5.0 CONCLUSIONS *(Page ES-xiii)*

EXECUTIVE SUMMARY ATTACHMENTS

PLATES ES-1 through ES-6

REPORT

1.0 SITE LOCATION, PROPOSED DEVELOPMENT AND TOPOGRAPHIC RELIEF *(Page 1)*

- **1.1 Site Location of the Desert Quartzite Solar Project**
- **1.2 Proposed development**
- **1.3 Site topographic relief**

2.0 GEOLOGIC TIME SCALE PERTINENT TO INVESTIGATION *(Page 3)*

3.0 PURPOSE OF STUDY *(Page 4)*

4.0 APPROACH OF STUDY – FROM REGIONAL TO LOCAL *(Page 5)*

- **4.1 Regional dune systems and proposed regional sand migration corridors via mapping in Google earth and scientific literature**
- **4.2 Current and past geologic conditions of local dune system via an onsite geomorphic, geologic, and soil stratigraphic field investigation (mapping)**
- **4.3 Geologic history of the project area since the Early Pliocene**
- **4.4 Long-term behavior of desert geologic processes – pluvial and playa lakes, alluvial fans, eolian systems, climate changes via scientific publications**
- **4.5 Drainage surface water flow analysis– Eolian sand sources and dune stability**
- **4.6 Comparison of local and regional dune systems**
- **4.7 Potential impacts and future changes to the local dune system associated with the proposed development, climate change and historical anthropogenic activities**

5.0 DUNE DEVELOPMENT AND STABILITY PARAMETERS *(Page 13)*

- **5.1 Prevailing wind directions**
- **5.2 Geologic history – Placing dune development in context**
- **5.3 Surface and near surface soil and sedimentary stratigraphic evaluation**
  - *5.3.1 Local Formational stratigraphic section*
  - *5.3.2 Subdivide Quaternary Alluvium (Qal) and Quaternary Older Alluvium (Qoaf) utilizing surface and near surface (buried) soil profile stratigraphy*
  - *5.3.3 Alluvial vs. eolian soil parent materials (Original depositional environment)*
  - *5.3.4 Sediment source evaluation*

5.4 Geomorphic evaluation during field mapping (Surface mapping)
- *5.4.1 Fluvial vs. eolian Geomorphology (qualitative)*
- *5.4.2 Evaluation of the extent and type of active vs. eroding-stabilized dunes (qualitative)*
- *5.4.3 Relative sand migration zone rates (qualitative)*
- *5.4.4 Local topography across eolian dune systems*

5.5 Eolian sand sources
- *5.5.1 Washes*
- *5.5.2 Granitic rocks in the mountains*
- *5.5.3 Playa and pluvial lakes*
- *5.5.4 Ponding areas*
- *5.5.5 Washes and alluvial fan aggredational events*
- *5.5.6 Alluvial fan trenching (down-cutting)*
- *5.5.7 Exposed and eroding older sedimentary units*
- *5.5.8 Alluvial fan depositional areas*

5.6 Dune vegetation - Dune stabilization and sand migration rates

5.7 Types of dune forms (Sand Sheets, Coppice, Mounds, Linear, Transverse, Star Dunes - Complex)

5.8 Surface water hydrology – Eolian sand source and dune stability
- *5.8.1 Drainage analysis*
- *5.8.2 Local watershed areas*
- *5.8.3 Bar and swale relief - Braided vs channelized*
- *5.8.4 Ponding areas*
- *5.8.5 Extent to which water infiltrates (reaches) dunes – Anthropogenic effects*

6.0 DESIGNATIONS FOR RELATIVE SAND MIGRATION RATE ZONES, SOIL STRATIGRAPHY, AND GEOLOGIC UNITS FOR EOLIAN SYSTEMS *(Page 29)*

6.1 Relative sand migration rate zones designations

6.2 Soil stratigraphy

6.3 Geomorphic-Geologic eolian unit designations for eolian systems

7.0 GEOLOGY AND GEOLOGIC HISTORY SINCE THE EARLY PLIOCENE *(Page 39)*

7.1 Geologic History from the Late Miocene to Early Pliocene

7.2 Geologic History during the Pleistocene

7.3 Geologic History during the Holocene

7.4 Geologic History in Historical Times

8.0 REGIONAL EOLIAN SAND MIGRATION CORRIDORS IN SOUTHEASTERN CALIFORNIA *(Page 47)*

8.1 Published work regarding regional sand migration corridors (transport pathways)

8.2 Latest Pleistocene to present activity of regional sand migration corridors

8.3 Published eolian sand sources for regional sand migration corridors

8.4 New hypothesis regarding eolian sand sources along the regional sand migration corridors

9.0 CHUCKWALLA VALLEY DUNE SYSTEMS - SAND MIGRATION ZONES AND STABILITY *(Page 54)*

9.1 Identified local sand migration zones

9.1.1 Palen Lake Sand Migration Zone

9.1.2 East Palen Lake Sand Migration Zone

9.1.3 Palen Lake-Western Ford Lake Sand Migration Zone

9.1.4 East Palen Mountains Sand Migration Zone

9.1.5 East Ford Lake Sand Migration Zone

9.1.6 Palen Valley Sand Migration Zone

9.1.7 Ironwood Sand Migration Zone

9.1.8 Wiley's Well Basin Sand Migration Zone

9.1.9 North Wiley's Well Basin Sand Migration Zone (anthropogenic)

9.1.10 Palowalla Sand Migration Zone (Anthropogenic)

9.1.11 Mule Sand Migration Zone

9.1.12 Highway 10 Sand Migration Zones (Anthropogenic)

9.1.13 Powerline Sand Migration Zone

9.2 Mid to Late Holocene dune connectivity of local sand migration zones

9.3 Correlation of watershed size and drainage flow type (tributary vs. distributary) with sand migration zones

9.4 Prevailing winds and effects on sand migration zones

10.0 AGE OF DUNE SYSTEMS IN EASTERN CHUCKWALLA VALLEY AND PALO VERDE MESA AREA *(Page 66)*

11.0 LOCAL VEGETATION DENSITY AND MIGRATION RATES *(Page 71)*

12.0 LOCAL HISTORIC VS. PRE-HISTORIC SURFACE WATER FLOW *(Page 75)*

13.0 EOLIAN RESPONSE TO GLOBAL AND LOCAL CLIMATE *(Page 76)*

14.0 POTENTIAL FUTURE IMPACTS *(Page 82)*

15.0 CONCLUSIONS *(Page 83)*

LIST OF FIGURES IN THE REPORT

Figure 1: Regional Desert Quartzite Solar Project site location and Geographic map. PDL is Palen Dry Lake, and FDL is Ford Dry Lake. *(Page 1)*

Figure 2: Site map showing general siting of proposed Desert Quartzite Solar Project development. The red dashed line delineates the boundary of the property. Blue cross hatched regions delineate the proposed footprint of the solar array. *(Page 2)*

Figure 3: Proposed regional sand migration corridors in the southeastern California region by Muhs et al. (2003). Note that this map implies that eolian sands are migrating great distances along the proposed sand migration corridors suggesting that local eolian sand sources along their mapped lengths contribute relatively minor eolian sands. *(Page 9)*

Figure 4: Resultant Drift Potential (RDP) Data from Blythe and the Algodones regions from Muhs et al. (2003). The Algodones dune field is located at the south end of the Salton Trough. These data indicate that the Pacific Cell winter weather fronts in combination with topographic (mountains and valleys) dominate the orientation of the RDP. *(Page 14)*

Figure 5: Images from Lancaster et al. (1998) evaluating the relationship of vegetation densities and eolian sand migration rates on Owens Lake, California. *(Page 25)*

Figure 6A: Descriptions of Relative Sand Migration Rate Zones from the strongest to weakest – Zone A, Zone AB and Zone B. *(Page 30)*

Figure 6B: Descriptions of Relative Sand Migration Rate Zones from the strongest to weakest – Zone BW, Zone BC, Zone C, and Zone D. Note that Zone D is not mapped on the plates and figures within this report is for the most part assumed to occur outside of the mapped regions of the other relative sand migration rate zones. *(Page 31)*

Figure 7A: Designated soils for the region of the project S0, S1, S2, S3a, and S3b. *(Page 33)*

Figure 7B: Designated soils for the region of the project S4, S5, S6, and S7. *(Page 34)*

Figure 8A: Geomorphic-Geologic eolian unit designations to assist in described not only the type of geologic units are exposed at the surface, but also about the geomorphic dynamics as well. *(Page 36)*

Figure 8B: Geomorphic-Geologic alluvial unit designations to assist in described not only the type of geologic units are exposed at the surface, but also about the geomorphic dynamics as well. *(Page 37)*

Figure 8C: Geologic unit descriptions for Qoaf and Tmw (Soil S7). *(Page 38)*

Figure 8D: Geologic unit description for Tmm (Soil S7). *(Page 39)*

Figure 9: Modified Geologic map of the study region by Stone (2006). *(Page 45)*

Figure 10: Eolian Geologic map by Lancaster (2014). *(Page 46)*

Figure 11: Eolian Geomorphic & Relative Sand Migration Zone map of the eastern Chuckwalla Valley and Palo Verde Mesa area. *(Page 61)*

Figure 12: Relative Geomorphic sand migration zone map of the eastern Wiley's Well Basin and Mule Sand Migration Zones in the DQSP. Locations of identified Mojave fringe-toad lizard from an AECOM biological report for the DQSP (circles with enclosed black dot) are shown which correlate well with the mapped limits of Sand Migration Zones A, B, BW and BC. *(Page 67)*

Figure 13: Soil stratigraphic map of the Desert Quartzite Solar Project (DQSP) indicating the soil designations, estimated minimum ages of the surface, and parent sediments to surface soils that indicate what type of deposits (alluvial vs. eolian) the soils developed in. *(Page 68)*

Figure 14: Soil stratigraphic map of the Desert Quartzite Solar Project (DQSP) focusing on site dune systems that indicate soil designations, estimated minimum ages of the surface, and parent sediments to surface soils that indicate what type of deposits (alluvial vs. eolian) the soils developed in. *(Page 69)*

Figure 15: Aerial image map obtained from Google Earth Pro with a date of 2005.04.04 showing generalized regions where the surficial sediments are either eolian or alluvial. Pedogenic soils developed in these sediments and the mapping of these soils with their corresponding age and parent sediments are shown on Figure 13 and Figure 14. *(Page 70)*

Figure 16: Aerial images from Google Earth Pro from 2012.10.25. The upper image shows the northern portion of the DQSP. The green inset box in the upper image is the enlarged area shown in the lower image. The vegetation density shown in the lower image is typical of Zone BW in the site during a typical year not experiencing higher vegetation densities associated with a have precipitation year or a Sahara Mustard bloom. The minimum vegetation density is 5 to 6% based on a crude photoshop pixel evaluation, but is likely at least 10 percent. *(Page 72)*

Figure 17a: Geomorphic relative sand migration zone map of the northern DQSP. The location of the vegetation pictures shown in Figure 16 identified as the green rectangular box. The site of field photograph at geomorphic site 53 shown in Figure 17b is also identified. *(Page 73)*

Figure 17b: Field photograph of geomorphic field Site 53 (map location shown on Figure 17a). The photograph was taken on April 4th, 2011 and several months after a Sahara Mustard bloom. In this image, the Sahara Mustard plants, have died but remain emplaced in the ground. During and for many months to over a year of a Sahara Mustard bloom, the vegetation density increases to nearly 100% which essentially shuts down sand migration. *(Page 74)*

Figure 18a: Average annual precipitation in the southwestern United States. The area of the site (DQSP) and the regional sand migration corridors correlate well with low elevation regions experiencing <4 inches/years, which are areas that receive the least amount of rain in the southeastern California region. The bounding mountain areas are experiencing between 4 to 8 inches/year. *(Page 78)*

Figure 18b: Regional climate data for the southwestern United States showing: A) Upper-Figure – areas receiving significant "far west/high country" winter Pacific storm precipitation and the mean monthly precipitation per month; B) Middle-Figure – areas receiving significant desert monsoonal "thunderstorm" precipitation and the mean monthly precipitation per month; and C) Lower-Figure – average wind speed for various times of the year measured in Blythe, California located approximately 20 miles east of the project site. *(Page 79)*

ATTACHMENTS

APPENDIX A **REFERENCES**

APPENDIX B **GLOSSARY OF TERMS**

APPENDIX C **SAND MIGRATION ZONE DESIGNATION PHOTOGRAPHS**

APPENDIX D **SOIL DESIGNATION PHOTOGRAPHS**

APPENDIX E **REPORT PLATES**

PLATES 1 through 8C

EXECUTIVE SUMMARY

This study provides an evaluation of the processes, geologic history and current characteristics of wind-blown (eolian) sand transport and deposition in the eastern Chuckwalla Valley. The study was conducted to provide a site-specific assessment of existing dune systems in the vicinity of the proposed Desert Quartzite Solar Project (DQSP), a proposed 450 MW photovoltaic solar power plant to be located on federal and private land in southeastern California. The proposed DQSP is located on the Palo Verde Mesa, east of the east end of the approximately 50-mile long, east-west trending Chuckwalla Valley (Figure ES-1).

ES 1.0 STUDY PURPOSE

The purpose of this study is to provide a more refined and site specific understanding of sand transport and dune systems in the DQSP area for use in evaluating current and potential future characteristics of the sand transport and dune systems as they relate to proposed DQSP development and biological resource habitats in the DQSP vicinity. To achieve this, the study evaluates existing dune systems within and near the proposed DQSP site to define the current aerial extent of the dune deposits and characterize the dynamic nature of the current dune system (i.e. active, stable, eroding), as well as how the dune system may evolve in the future. In addition, this study evaluates regional dune systems to evaluate whether typical eolian conditions occur at the site or if something unusual may be occurring.

ES 2.0 STUDY ELEMENTS

Evaluation of the dune systems was accomplished using the following study elements: 1) a literature review of pertinent published geologic studies; 2) geologic mapping comprised of geologic and geomorphic parameters, soil stratigraphy (age) and topographic components; 3) development of geomorphic, soil pedon and sand migration zone designations to assist in evaluating eolian geomorphology, age of geologic events, and eolian activity; 4) analysis of eolian systems to identify parameters and their importance in understanding the development of eolian systems; and 5) consideration of anthropogenic effects on dune systems including infrastructure development and climate change.

ES 3.0 STUDY KEY FINDINGS

The study evaluated numerous issues (parameters) related to dune formation, sand migration rates and dune stability in the DQSP vicinity. A more detailed discussion of the study results is provided in Section ES.4; however, the key findings most relevant to characterization of the dune systems at the DQSP site are briefly presented below.

- *Sand migration zones are local not regional*

  The DSQP site is located on the Palo Verde Mesa, just beyond the eastern terminus of the Chuckwalla Valley. The study findings indicate that the dune systems within the DSQP area are dominantly derived from and influenced by local eolian sand sources and the topographic sill that exists to the west of the DSQP site. The primary source of eolian sand deposits in the DQSP area are the Wiley's Well Basin and the Mule Mountains. These sources supply three of the four sand migration zones (SMZs) identified in the DQSP vicinity including: the Wiley's Well SMZ, the Mule SMZ and the Power Line SMZ, as shown in Figure ES-1. There is also relatively minor sand contribution from the McCoy Mountains to the north, supplying sand to the small Palowalla SMZ at the north end of the DQSP site and to the western end of the Wiley's Well SMZ due to flow into northern portion of the Wiley's Well Basin. This local sand source finding is contrary to the concept that regional sand migration corridors represent a continuous zone of sand movement where sand can travel from sources many miles upwind.

- *Regional and local dunes are stable and degrading*

  Soil profiles indicate that most of the eolian deposits in terms of total volume in the eastern Wiley's Well and Mule SMZs, including portions of the DQSP site, were deposited in the early- to mid-Holocene (12 to 4 kya, kya = thousands of years ago) until about 5 to 3 kya at which time sand migration rates decreased markedly. Since that time, the dunes in this area have been dominantly stable and in places, degrading. This geologic history for the local DQSP dune systems is very similar to the history of dunes across the southeastern California region. The dunes reached their maximum aerial extend sometime between 5 to 3 kya (i.e. limits of sand migration Zone BC).

  During historical times (~100 to 150 years past), the dune systems in the DQSP have experienced relatively minor changes other than a continuation of dune degradation typical of the late Holocene. However, some subtle changes in isolated areas of limited aerial extent have occurred associated with both an increase and decrease in stream flow to various areas which led to a relatively minor increase in eolian sand source and degradation of dunes, respectively.

  The density of vegetation in dune deposit areas can be an important parameter in terms of dune stability and sand migration rates. Other studies have found that a 10% aerial coverage of plants that are less than one foot tall decreases eolian sand migration rates by 90%, indicating that minor vegetation densities essentially decrease eolian sand migration rates exponentially. The dunes immediately north of the north boundary of the DQSP site exhibit vegetation densities at a minimum of 10 to 15% and that is during times of essentially no Sahara Mustard plant presence. During Sahara Mustard bloom years and for the following year or two once the plants have died, vegetation density across dune deposit areas are visually nearly 100%.

- *Future dune activity not to expected to change existing mapping for at least a thousand years*

  Factors affecting dune systems - Dune systems appear to experience aggradation (increase in dune deposit mass) during times when pluvial and playa lakes are drying up and/or experiencing repeated lake fluctuations, when alluvial fans are experiencing aggradational events (abundant fan deposition), when monsoonal storms are more frequent and with higher intensity and/or when older exposed sand bearing deposits upslope such as alluvial fans, lacustrine, or older river deposits are eroded into which results in washes transporting a larger volume of eolian size grains per flow and more frequently than typical washes emanating from bedrock regions of most regional mountain ranges. Dunes can experience variations in activity based on the additive nature of the parameter wavelengths when they collectively "add up" (aggradational events) or cancel each other out (times of stability).

Climate change - The arid-semi arid climate conditions since the mid-Holocene across southeastern California have resulted in a geomorphic condition where slight changes in regional climate (i.e., monsoonal storm activity) is sufficient to result in local re-activation of dune systems, but not sufficient to produce a robust eolian system where sand migration corridors are continuous. Global climate affecting Pacific Storm strength and frequency and local monsoonal strength, frequency and magnitude can be reflected in changes in dune behavior on a cyclic scale. There is a strong correlation from prehistoric times with increased monsoonal extreme storm frequency and magnitude with increased alluvial fan and eolian activity (aggradational events) and/or with periods of time exhibiting a warmer global climate. Dune systems appear to react to this type of climate change on the order of less than 1000 years.

If the frequency and magnitude of cool winter Pacific storms decrease (decreases vegetation density) and warm summer monsoonal storms increase (extreme events causing erosion and abundant wash sand transport), then this can lead to an increase in eolian sand generation in the valley axis area. Based on the rate of past dune aggradational events indicated in the soil record for the SMZs in the DQSP area, it is likely that if dune parameter conditions changed that encouraged dune growth (i.e., a future dune aggradational event), the existing mapped areas of dunes would be able to “absorb” the additional dune sands for at least a thousand years prior to expanding beyond the current mapped footprint (outer boundary of Zone BC). Moreover, if current vegetative conditions persist, such as the presence of invasive Sahara Mustard, this could stabilize the dunes and even further hinder dune expansion in the future.

ES 4.0 DISCUSSION OF STUDY APPROACH AND RESULTS

The key elements of the study were implemented to develop a better understanding of the extent, nature and mechanisms controlling sand migration and dune systems in the DQSP vicinity. Important aspects of the study results that provide the basis for the above key findings are discussed below.

ES 4.1 Findings and Limitations of Previous Dune Studies

Previous regional dune studies in southeastern California have proposed the existence of numerous Sand Migration Corridors occurring in valley axes and crossing over some mountain passes. Zimbelman et al. (1995) was the first to propose the possible existence of regional sand migration corridors in southeastern California, implying that eolian sand essentially migrated tens of miles from west to east, southeast down valley axis and over some mountain passes (sand ramps). Lancaster and Tchakerian (1996) evaluated numerous eolian sand ramps occurring where wind-blown sand was deposited in obstructing mountain passes or leeward side of mountains and assumed the existence of the regional sand migration corridors proposed by Zimbelman et al. (1995). Muhs et al. (2003), the most referenced scientific publication evaluating proposed regional sand migration corridors, perpetuated these beliefs, and since that time, the existence of the regional sand migration corridors has been assumed to exist, and in a sense, to have remained active throughout the Holocene.

Missing from the literature, however, was an evaluation that more accurately mapped the local sand migration corridors, local eolian source contributions, and that further took into account a wide field of studies to determine the current state and past activity and/or stability of the regional sand migration corridors. Indeed, the California Geological Survey (CSG) February 5, 2015 comments on the DRECP (see Short and Lancaster, 2015) observed that prior to the previous "Eolian System Mapping Report" prepared by CGS (Aug. 4, 2014, see Lancaster, 2014), it was "a misstatement to call [wide swaths of the desert] 'Sand Transport Corridors.' Using this term implies that the mapping describes where the sand is coming from and where it is moving to (or source areas, zones of transport and zones of deposition)." The prior mapping efforts did not have enough specific detail to define how sand was moving within these corridors nor whether eolian sand sources were dominantly from tens of miles upwind or derived from more local sources along the length of the mapped sand migration corridors. The Lancaster (2014) report did not provide sufficient information from the findings of many existing publications regarding the inactivity and lack of connectivity of eolian systems within the proposed regional sand migration zones during the late Holocene.

To address the shortcomings of previous dune studies, the analysis provided by this study considers whether local sources of eolian sand (from alluvial washes and fans) have created local deposits during current times and the past. In addition, this study included a regional evaluation that more accurately mapped the proposed regional sand migration corridors and compiled published data to determine the current state of activity and/or stability of the regional sand migration corridors.

ES 4.2 Study Approach

This study utilized a multi-disciplinary approach to evaluate the various factors that affect dune formation, stability and migration, including a thorough review of existing literature, evaluation of regional dune systems, geomorphic mapping, evaluation of the effect of long-term geologic processes and surface water flow on dune system dynamics, erosion of older sedimentary deposits as a source for dune aggradation and the potential effect of natural and anthropogenic changes on dune systems.

During the research phase of this project (and other eolian investigations by the author), it became clear that many fundamentally important aspects of the development of dune systems have not been sufficiently studied regionally to enable site-specific dunes studies. This report attempts to address these aspects of dune systems to better understand the dune dynamics in the DQSP vicinity.

An early step in this study was to complete an evaluation of regional dune systems throughout southeastern California to compare to the local dune development characteristics. Regional dune systems outside of Chuckwalla Valley were evaluated utilizing existing scientific publications referenced in Appendix A, and via mapping in Google Earth Pro, using current and historic imagery. This type of mapping was also conducted in Chuckwalla Valley in addition to utilizing the data and findings obtained during past studies (Plate ES-1 and ES-2).

This analysis provided a framework in which to compare regional verses local sand systems according to characteristics including, but not limited to, general trends of the regional dunes in terms of when they developed, had aggradational events, their relative eolian sand sources, their connectivity along the path of the proposed sand migration zones, and when they became stabilized. This analysis also provided supportive evidence regarding the relative importance of various eolian sand sources and identified some new eolian sand sources. The evaluation of regional dune systems also identified some dunes areas that had not been previously mapped based on the literature reviewed in this study (one example includes the east Pinto Valley dune system). A regional analysis of eolian dune systems was essential to understanding how typical or unique a local dune system is, due to local variations in dune parameters.

Geomorphic mapping was conducted of the local and regional eolian dune systems utilizing a series of relative sand migration rate zone designations. These designations sequentially describe progressively decreasing dune activity, which is suggested to correlate with relative eolian sand migration rates (Figure ES-2). Hence, this system provides a method for mapping a dune region showing variations in both dune geomorphology and relative migration of wind-blown sand.

Long-term geologic processes that impact the dynamic nature, development and sustainability of eolian dune systems were evaluated. Pluvial and playa lakes are considered a primary source for eolian sands where they occur. Eolian sands emanate from pluvial and playa lakes soon after they desiccate or experience repeated lake level fluctuations (intermittent lake levels) allowing for sand bearing wind abrasion to erode the lake surfaces and provide pathways for sand transport. This study evaluated the timing of pluvial and playa lake filling and receding periods in the southeastern California region to look for correlations with eolian dune aggradational and stability events.

The timing of alluvial fan aggradational events and fan-trenching (down cutting) are identified as periods of time when eolian dune systems undergo aggradational events. Washes are relatively one of the largest contributors of eolian sands in desert landscapes. This study also evaluated the relative importance of extreme storm events (monsoonal type climate), and the analysis shows that alluvial fans and eolian systems both experience aggradational events during periods of relatively more frequent and strong extreme monsoonal storm events causing erosion and relatively large magnitudes of sand transport to valley axis, and relatively weaker Pacific Storms that result in long duration precipitation leading to increased vegetation densities.

The effect of water on dune systems was evaluated because maintaining dune internal moisture is critical for their stability. Although dunes may be considered "dry" systems, in fact, it is the moisture regime in the area that plays a very critical role in their development. This is the case not only for eolian sand sources, but also dune stability. Sand dunes often develop in areas not only because there is a sufficient eolian sand source, but also because there is sufficient infiltrating moisture to allow for the internal core of the dunes to remain moist which greatly decreases the potential for sand bearing wind abrasion (Kenney, 2012; Schaaf and Kenney, 2016). In addition, dunes that remain moist also have a higher likelihood of becoming stabilized via vegetation. A drainage and watershed analysis was conducted because washes are the primary mode of sand transport from upslope to the valley axis where most dune systems exist (areas of strongest prevailing winds). The drainage and watershed analysis provides critical information because washes with larger watershed aerial extent flow more frequently and more often to the valley axis. The wash analysis also mapped the areas exhibiting distributary vs tributary drainage networks as it was discovered that braided wash systems common on alluvial fans do not result in significant eolian sand production in the valley axis, whereas tributary drainages that have collected flow from abundant washes upslope flow relatively frequently and sufficiently strong to reach the valley axis than braided systems.

This study also considered potential future changes on existing dune systems associated with climate change. An assessment of the effect of the decrease in magnitude and frequency of cool-moist Pacific Storms and an increase in warm-moist monsoonal storms on regional dune development since the latest Pleistocene that led to preferable conditions for dune systems, provides insights regarding potential changes in dune systems associated with global warming in the decades to come. However, an understanding regarding whether monsoonal storm systems (North American Monsoon system) will increase or decrease in the future is currently very poorly understood (Garfin et al., 2012). The southwestern United States is believed to become drier throughout this century which would lead to drier soil conditions (Garfin et al., 2012).

Historical anthropogenic factors associated with changes to the surface of the earth (i.e., flood control berms, borrow pits, etc.) that potentially could affect local dune systems were also evaluated. This analysis is important primarily due to the understanding of the importance of surface water flow for eolian sand sources and stabilizing moisture.

This comprehensive, multi-disciplinary approach led to many new insights regarding the history of dune systems across southeastern California since the late Pleistocene, the relative importance of local versus far field eolian sand sources, the identification of new eolian sand sources, the importance of dune hydrology to dune stability, the timing of dune aggradational events, the nature of the proposed regional sand migration zones, the long-term behavior of dune systems and whether dramatic changes to the dune system may occur in the future.

ES 4.3 Discussion of Study Results

ES 4.3.1 Age of Alluvial and Eolian Sand Deposits

It is important to understand the geologic history not only of the dune system itself, but also of the area bounding the dunes. A study of the geologic history allows for the understanding of what occurred in the area prior to the development of the dunes, which leads to understanding when the dunes began to be deposited in the area. For example, in the study area, the evaluation of the alluvial fan stratigraphy utilizing soil profiles that bound the DQSP dune system, allowed for the correlation of some of these deposits occurring beneath the dunes, which indicates that the local dunes must have begun their development after deposition of the underlying alluvial deposits. Hence, the creation of the local soil stratigraphic section with estimated minimum soil ages allows for an age estimate of the time in which the dunes encroached into the area.

Local mapping of older formational units such as those associated with the ancient Colorado River system when it had encroached (inundated) into Chuckwalla Valley and across the Palo Verde Mesa area provides insights regarding the age and rates of geologic processes in the area. Ancient Colorado River deposits estimated to be early Pliocene in age occur either at the surface or within 1 to 6 feet of the surface across most of the DQSP area. This indicates that geologic depositional rates have been remarkably slow for well over 3 million years and that the area is geomorphically stable.

Soil profiles develop when deposits are exposed to the surface of the earth and secondary soil processes occur such as development of soil horizons (A, B and C). Hence, designated soil profiles (i.e., S1, S2, S3a, etc. – Plate ES-3) developed in whatever sediments were exposed on the surface of the earth, whether it was alluvial or eolian.

It is important to determine what the parent material is during stratigraphic mapping of an area because it allows for the evaluation regarding where older eolian verses alluvial deposits occur. For example, if a S1 surface soil estimated to have a minimum age of 5 to 3 thousand years old (age of the surface) developed in eolian deposits and adjacent alluvial deposits, then this indicates that the alluvial and dune depositional contact has been stable for the past 5 to 3 kya (kya = 1,000 years) in that area. In other words, it shows strong evidence that approximately 5 to 3 kya that active eolian sands were depositing adjacent to active alluvial systems but that this system became dominantly inactive since that time (stable). This is exactly what has been identified in the DQSP area (Plate ES-3).

It can be important to evaluate the source of the parent material in alluvial deposits. For example, on the Palo Verde Mesa region, certain sediments exhibited a pinkish red color. The source of this coloration is the pinkish red parent soil sediments identified as the ancient Colorado River deposits Bullhead Alluvium that had eroded along the flanks of the local mountain ranges (McCoy and Mule mountains). The reddish hue parent sediments initially suggest that soil profiles may be older than they actually are because soils over time typically exhibit an increase in reddening over time. However, because the original sediments that deposited prior to soil development exhibited a reddish hue, this could lead to over estimating the soils age. Hence, other soil parameters were primarily utilized to estimate the age of soils younger than Soil S4. The erosion of the local exposures of the Bullhead Alluvium is proposed to be a very significant source of eolian sand for three of the four Sand Migration Zones in the DQSP area (Wiley's Well Basin SMZ, Mule SMZ and Power Line SMZ).

Soil stratigraphy designations and estimated soil ages are shown in Figure ES-3. The eolian sands in the eastern Wiley's Well Basin sand migration zone (Figure ES-1) are typically deposited upon alluvial soil unit S4 (35 to 70 kya) and only rarely on top of poorly developed soils of unit S3a (5 to 8 kya). This infers that when the sediments associated with soil units S3a and S3b were deposited, eolian sands were depositing in the eastern Wiley's Well Basin sand migration within the DQSP. The eolian deposits in the eastern Wiley's Well Basin sand migration zone exhibit S2 soils indicating that these eolian sands had deposited until about 5 to 3 kya. Hence, the eolian dune deposits in the eastern Wiley's Well Basin sand migration zone along the Gen-tie corridor and northern DQSP encroached into the area from the west and migrated eastward, and were relatively robust during the early Holocene. It also indicates that sand migration rates (and net dune deposition) decreased markedly by 5 to 3 kya, which marks the end of the early to mid-Holocene aggradational event. Since that time, the dunes in this area have been dominantly stable and in places, particularly in areas mapped as Zone BW, degrading.

The Mule sand migration zone (Figure ES-1) has a similar geologic history as that of the Wiley's Well Basin sand migration described above. The only exception is that the eastern region of the Mule sand migration zone took longer to migrate into the DQSP site area. The existing data suggests that the eolian deposits associated with the eastern Mule sand migration zone may not have encroached into the DQSP until the mid-Holocene (8 to 4 kya), and again, sand migration rates decreased markedly by 5 to 3 kya.

During much of the latter part of the late Holocene, the region of the DQSP was stable with minor alluvial or eolian deposition and the dune systems retracted and degraded. Hence, the dune systems stabilized and eastern areas of the dunes began to degrade in the area mapped as Zone BW (Plate ES-5).

During Historical times (~100 to 150 years), the dune systems in the DQSP have experienced relatively minor changes due to both an increase and decrease in stream flow to various areas which led to a relatively minor increase in eolian sand source and degradation of dunes respectively.

ES 4.3.2 Sand Corridor Continuity

The proposal of regional sand migration corridors, which can easily be mapped on small scale maps covering relatively large regions, provides a simple model to conceptualize wind-blown sand migration in southeastern California. However, when the regional sand migration corridors are mapped as a continuous zone extending for tens of miles, it has the potential to imply that sand grains may have the ability to migrate along the entire mapped length of the regional sand migration corridor not only during current times, but continuously since its time of development. This subsequently may lead to the assumption that eolian sand sources along the regional sand migration corridor may be many miles upwind and not local. This is clearly not the case for most of the proposed regional sand migration corridors.

Pease and Tchakerian (2003), based on a geochemistry analysis of sand grains along the path of the proposed sand migration corridors in southeastern California, suggest that the corridors do not represent a continuous “river of sand.” This finding is consistent with the conclusions in this report. Plate ES-1 is a map of Sand Migration Zones (SMZs) and Plate ES-2 is a geomorphic map of various dune deposits and stability (relative migration rates), along the Chuckwalla Valley, as identified by this study. As explained in more detail below, the conditions in southeastern California are more accurately described as a collection of SMZs.

Regional mapping of the Dale Lake to eastern Chuckwalla Valley for this study identified areas where the sand migration pathway is essentially shut down. Specifically, historical Google Earth Pro imagery of the region of Dale Lake to the Eagle CoxComb Pass shows that this area is essentially shut down for through going eolian sand transport (Plate ES-4). In addition, this section exhibits very weak dune geomorphology in an area dominated by alluvial systems indicating it may not have ever been a significant eolian sand pathway (Plate ES-2). Instead, this report concludes that the Dale Lake sand system for the most part terminates near the Clarks Pass sand ramp (Figure ES-2) and that the abundant eolian sands occurring at the eastern end of the Pinto Basin (herein named the Pinto Basin Dunes) are derived primarily from the west to east flowing drainage system within the basin.

It appears based on review of all the data and research conducted by the author that during periods of strong eolian activity (dune aggradational events), eolian sands travel large distances when the regional sand migration corridors provide a more continuous pathway, and that these sands would be able to mix with the continuously provided local eolian sources. These conditions occur when vegetation densities are low at lower elevations, more readily allowing for sand movement, and relatively frequent monsoonal storms occur during dry periods of the year, providing for increased alluvial and dune aggradation. During times of dune stability, the regional sand migration corridors become discontinuous and local sources primarily associated with playa lake beds and alluvial systems dominate. In addition, during periods of dune stability when the older dunes become relict, they begin to cannibalize the older dunes associated with wind abrasion (eolian deposits re-working) and this provides an additional source for active eolian sands (Lancaster, 1995). This is the current condition throughout much of Chuckwalla Valley. Within the DQSP and many other areas in the Chuckwalla Valley, erosion of older relict dune deposits are a primary source for the minimal active eolian sands occurring within dune systems poorly fed by a playa lake (or ponding area) and alluvial systems (Kenney, 2010a, 2010b and 2010e). The findings of this report indicate that a period of dune stabilization and associated dune abrasion (cannibalization) has been occurring in many dune systems in the Chuckwalla Valley during the late Holocene. Some small localized dune areas have remained relatively more active as a result of increased eolian sand source due to water diversions (Palowalla SMZ), and/or a relatively strong eolian source remains such as the near Wiley's Well Basin (Plate ES-5).

Consistent with earlier work by Kenney (2010a and 2011) identifying local independent sand migration zones (SMZ) in the Chuckwalla Valley (i.e., Palen Valley SMZ and Mule SMZ on Plate ES-1), the more detailed mapping conducted during this study led to the identification of numerous semi-local and local independent sand migration zones in the area (Plate ES-1). One criteria for a dune system to be designated as an independent sand migration zone is that a dune system receives a significant source of sand from a local source that is independent from sources upwind associated with the regional valley axis sand migration corridor.

ES 4.3.3 Dune System Stability

The map shows that regions of Qe-a exhibiting the most active eolian areas are isolated, only occurring in the Palen Dry Lake and eastern most Chuckwalla Valley areas (Plate ES-2). Areas exhibiting significant erosion in areas dominated by relict dunes (unit Qs-de) occur at numerous localities along the regional Chuckwalla Valley sand migration corridor suggesting that sand migration rates along the system have significantly decreased since the older more robust dune forms were originally deposited. Regions where older "more robust" relict dunes no longer receive sufficient sand to maintain their form and instead are dominated by active sand sheets with minor internal erosion (unit Qe-ds) also occur at numerous locations in the valley. These geomorphic observations provide strong evidence of a decrease in sand migration rates since the deposition of the original more robust relict dunes were deposited. However, regions mapped as Qe-ds do allow for eolian sand transport through the system.

ES 4.3.4 Factors Affecting Dune Activity

Dune systems appear to experience aggradation (increase in size and magnitude of eolian sand production and movement) during times when pluvial and playa lakes are drying up and/or experiencing repeated lake fluctuations, when alluvial fans are experiencing aggradational events (abundant fan deposition), when monsoonal storms are more frequent and with higher intensity, and/or when older sedimentary deposits bearing considerable amounts of sand grains are eroded into (downcutting, fan trenching). It turns out that during the Holocene it is common that one of these parameters allowing for dunes to be more active is occurring at any particular time. Hence, dune system aggradational events do not appear to correlate to a single geologic parameter consistently throughout the Holocene, but instead, responding to numerous parameters each of which vary over time. Dunes can experience variations in activity based on the additive nature of the parameter wavelengths when they collectively "add up" (aggradational events) or cancel each other out (times of stability).

The combination of a decrease in vegetation density at lower elevations associated with a decrease in cold/wet winter pacific storms intensity and frequency, an increase in monsoonal storms with relatively higher frequency and strength (extreme storm events), abundant available sediment in the mountains and its transport to distal fan areas (see Wells and Dohrenwend, 1985; Nichols et al., 2007), and pluvial and playa lakes experiencing fluctuating levels, all contributed to a regional strong dune aggradational event between 14 and 8 kya. In addition, periods of relatively strong monsoonal storm frequency and strength since the mid-Holocene have resulted in smaller scale dune aggradational and re-activation events. Dune systems appear to react to this type of climate change on the order of less than 1,000 years.

Relatively strong alluvial fan aggradational events correlate with periods of stronger and more frequent monsoonal storm strength (thunderstorm-extreme events; Reheis et al., 1996; Harvey et al., 1999; Reheis et al., 1996; McDonald et al., 2003; Miller et al., 2010). Hence, eolian system activity levels correlate well with that of alluvial fan systems. During periods of relatively intense monsoonal climate conditions, many of the playa and pluvial lakes can fill and desiccate which increases eolian sediment supply substantially. In contrast, the relatively wet period in the southwestern United States associated with the global Neo-Glacial from 4.5 to 2.5 kya that led to increased vegetation density at lower elevations assisted in stabilizing most eolian dune systems in the study region and decreasing the ability for eolian sand to migrate.

The arid-semi arid climate conditions since the mid-Holocene have resulted in a geomorphic condition where slight changes in regional climate (i.e., monsoonal storm activity) are sufficient to result in local re-activation of dune systems, but not sufficient to produce a robust eolian system where sand migration corridors are continuous. Dune systems across the study region have been relatively stable since the mid Neo-Glacial period approximately 4.0 to 3.5 kya. However, the semi-arid climate occurring in the study region for much of the Holocene is near a critical threshold condition where small changes in dune parameters such as global climate affecting Pacific Storm strength and frequency and local monsoonal strength frequency and magnitude can be reflected in changes in dune behavior on a cyclic scale of approximately 1,000 to 500 years. There is a strong correlation with increased monsoonal extreme storm frequency and magnitude with increased eolian activity (aggradational events), and/or with periods of time exhibiting a warmer global climate).

Anthropogenic activities such as those that affect surface water flow can also affect dune dynamics; however, the flood control measures for construction of Highway 10 and older roads in the DQSP area have existed for decades and have only led to subtle changes in the local dune systems.

ES 4.3.5 DQSP Area Dune Activity

There are four SMZs located in the DQSP area. These include the Wiley's Well Basin SMZ, the Mule SMZ, as well as the much smaller Palowalla and Power Line SMZs (Figure ES-1). The Palowalla SMZ occurs near the eastern limit of the Wiley's Well Basin SMZ and is designated as a separate SMZ simply due to the interpretation that it has received a slight increase in eolian sand due to man-induced water diversions and ponding.

The dune deposits in the Wiley's Well Basin SMZ are less than 5 feet thick typically, and gradually get thinner toward the east, where some areas mapped as Zone BC and Zone BW are less than 3 feet thick. In areas mapped as Zone BC, older alluvium of Soil S4 occur at depths of only a few inches within interdune depressions and the dune deposits represent relict dune mounds that vary from full connectivity to scattered connectivity. Eolian deposits are generally thinner for progressively less active geomorphic eolian sand migration zone designations. In addition, the eolian deposits associated with Zone BC, which bounds the limits of eolian dominated areas (geomorphically), gradually thin toward its contact with mapped Zone C where eolian deposits are essentially less than a few inches thick near the Zone

BC/C contact. Hence, in contrast to Lancaster (2014) eolian mapping for this project was not based on dune deposit thickness, but instead, on observed eolian geomorphology on the surface.

The Wiley's Well Basin SMZ gradually narrows from a width proportional to that of the Wiley's Well Basin (~3.5 miles), to approximately 0.5 mile within the DQSP. The dunes activity also decreases toward the east with the eastern portion of the Wiley's Well Basin SMZ receiving very little sand flux input from the west within the DQSP. The primary cause for the decrease in width of the sand migration zone is the Palo Verde Topographic Sill, which is the geographic/geomorphic boundary between the eastern Chuckwalla Valley and the Western Palo Verde Mesa (Figure ES-3). The Palo Verde Topographic Sill is located approximately in the middle region of the Wiley's Well SMZ, in the vicinity of the SCE Colorado River Substation. The Palo Verde Topographic Sill consists of rise from an elevation of ~438 feet in the Wiley's Well Basin in the west, to the sill itself at an elevation of ~488 feet (high point), and then back down to an elevation of ~400 feet near the Palowalla SMZ to the east. Hence, eolian sands migrating eastward from the Wiley's Well Basin move uphill approximately 50 feet in relief, and this rise causes eolian sands to deposit. On the downwind leeward side of the topographic sill, eolian sands are also encouraged to deposit as wind speeds decrease. The sill has likely allowed for relatively more eolian sands to be deposited on the western side, crest and immediate eastern side than would have deposited if the topographic sill did not exist. In other words, the topographic sill has created a local eolian sand sink allowing for relatively increased eolian sand deposition to the west and east of the sill. Hence, the amount of wind-blown sand reaching the eastern most area of the Wiley's Well Basin SMZ is dramatically decreased because most of the eastward migrating sand is encouraged to deposit near the topographic sill. Most of the active eolian sands in Zone BW (Plate ES-5) are produced by the erosion (cannibalization) of older relict (dormant) dune deposits.

The watershed area for the drainage system producing the eolian sands for the Mule SMZ is relatively small and believed to be too small to be able to produce the magnitude of eolian sands identified in the zone if this drainage system was a typical wash system emanating from a local Mojave Desert mountain range. However, the washes of watershed have eroded into exposures of the ancient Colorado River deposits (unit Tmm, Bullhead Alluvium, Soil S7a; Plate ES-6) indicating that the washes carry a larger bedload of eolian size grains during flood events compared to typical desert washes emanating from bedrock regions and through typical alluvial fan terrains. In addition, the relatively wide tributary wash system that feeds the Mule SMZ assists in eolian sand production as it flows parallel to prevailing winds, and all the precipitation in the small watershed is focused essentially into this one wash system allowing it to more frequently flow to lower elevations. In fact, it is proposed that the Mule SMZ may not even exist if it were not for the robust sand transport of the local washes carrying eroded older sediments from unit Tmm and positive wash parameters.

The most robust dune form in the Mule SMZ is active sand sheets in a small region on the leeward (downwind) side of a topographic high associated with remnants of an ancient shoreline berm of the receding Colorado River in Pliocene (unit Tmw, Soil S7, Plate ES-6). Most of the Mule SMZ exhibits relict dune mounds with active eolian sands representing sand sheets and small coppice.

The Powerline SMZ is a small and weak eolian system that developed naturally, but may be slightly affected by minor water diversions and surface disturbances along the graded (dirt) powerline road to the southwest (Plate ES-1). The dune system receives eolian sands from wash flow in the west and ponding areas to the northwest and southeast. The area exhibits thin, relict and subdued dune mounds with active eolian sands consisting of scattered sand sheets and small coppice. The eolian deposits are less than one foot thick.

The Palowalla SMZ is a small system that occurs at the eastern end of the Wiley's Well SMZ and is designated as a separate zone based on anthropogenic factors. These include water flow diversions associated with the construction of Highway 10 to the north and creation of ponding areas due to construction of the Blythe 21 Solar Facility cut off water flow in a wash that historically ran through the facility site resulting in creation of, or increase in, ponding adjacent to the facility (Plate ES-3). This region has experienced an increase in drainage flow due to diversion of water flow associated with the construction of Interstate 10.

The eastern Wiley's Well Basin SMZ experienced essentially one dune aggradational event, likely occurring in the early to end of the mid-Holocene, and then by the late mid-Holocene began to retract. Since the cessation of the dune aggradational event, the dune areas exhibiting S2 dune soils (Plate ES-3) have degraded. Based on the rate of past dune aggradation indicated in the soil record for the Wiley's Well Basin and Mule SMZ, it is likely that if dune parameter conditions changed that encouraged dune growth (i.e., a future dune aggradational event) that the existing mapped areas of dunes would be able to accommodate the additional dune sands for at least a thousand years prior to expanding beyond its current mapped footprint. This finding assumes that current drainage flows acknowledging current anthropogenic diversions, remain relatively constant to provide critical stabilizing moisture to the dunes.

The Mule SMZ in the southwestern region of the DQSP experienced a similar history in the sense that the dune deposits are primarily relict dunes that experienced a dune aggradational event during the early Holocene and then became stable by the late mid-Holocene. Therefore, this region also experienced a decrease in relative sand migration rates during near the end of the mid-Holocene. Eolian activity in the DQSP site is therefore consistent with other dune systems across southeastern California in that they experienced strong eolian deposition in the early to mid-Holocene, which has decreased substantially since that time.

ES 4.3.6 Affects of Vegetation

The density of vegetation in dune deposit areas is a very important parameter in terms of dune stability and sand migration rates. Lancaster et al. (1998) conducted a significant, well controlled study evaluating the relationship between plant aerial coverage density and sand migration rates on a playa lake bed. Their results indicate that just a 10% aerial coverage of plants that are less than one foot tall decreases eolian sand migration rates by 90%. This result is quite astounding and indicates that minor vegetation densities essentially decrease eolian sand migration rates exponentially.

The dunes immediately north of the north boundary of the DQSP exhibit vegetation densities at minimum of 10 to 15%, during years of essentially no growth of the invasive species "Sahara Mustard" (Brassica tournefortii). This normal vegetation alone could impede sand migration by 90% or more, and the amount of non-native and invasive Sahara Mustard coverage can increase to well over 50% in a single season following a year of strong growth. Field mapping in December of 2010 indicated that a Sahara Mustard bloom had recently occurred, and mapping in April 2011 revealed that abundant dead Sahara Mustard plants remained across the dune fields still vertically in the place they had grown. Hence, once the Sahara Mustard plant dies, it remains "planted" in the ground and this was observed to remain the case for many months to possibly over a year from when the plant died. The dead plant stems break free and blow in the wind piling up on nearby dunes and coppice dunes, which means the plant continues to impede eolian sand transport after it has died and been uprooted. Hence, once there is a Sahara Mustard bloom, eolian sand migration rates are greatly diminished not only for the year of the bloom, but for a minimum of the next year, and most likely into a third year.

Dense populations of Sahara Mustard plants were identified extending within the dune system east of Wiley Well Road to DQSP. During strong Sahara Mustard growth, eolian sand migration and internal dune erosion, is nearly completely shut down.

ES 4.3.7 Potential Future Impacts

The dune systems in the area and within the DQSP have been stable for a minimum of several thousand years since the end of their mid-Holocene aggradational event. Flow within the watershed of the Wiley's Well Wash has not been altered significantly in Historical times and should result in similar eolian sand production as it did in pre-Historical times if climate remains similar. The watershed and drainage system feeding the Mule sand migration zone has not been altered in Historical times and is evaluated to remain stable. The Mule sand migration zone has been stable for at least several thousand years, similar to the Wiley's Well Basin sand migration zone to the north.

Dune parameters that could lead to changes in the dune system in the future include a continuation of surface water flow diversions that has led some areas, particularly along the northern portion of the Wiley's Well Basin dune system, to be dryer and wetter. This has already led to an increase in eolian sand source in areas receiving more water, and drying out of dunes in areas receiving less water that has led to minor dune degradation and increased sand transport rates locally. The flood control measures for construction of Highway 10 and older roads in this area have existed for decades and have also resulted in subtle changes in the local dune systems. But especially with the advent of the invasion of Sahara Mustard, which has dramatically slowed down sand migration rates from their eolian sources, the slight increase in eolian sand generation in the wetter source area associated with the Palowalla Ditch-Wash will likely continue to deposit in the area mapped as sand migration Zone B, Zone BW and Zone BC (Plate ES-5).

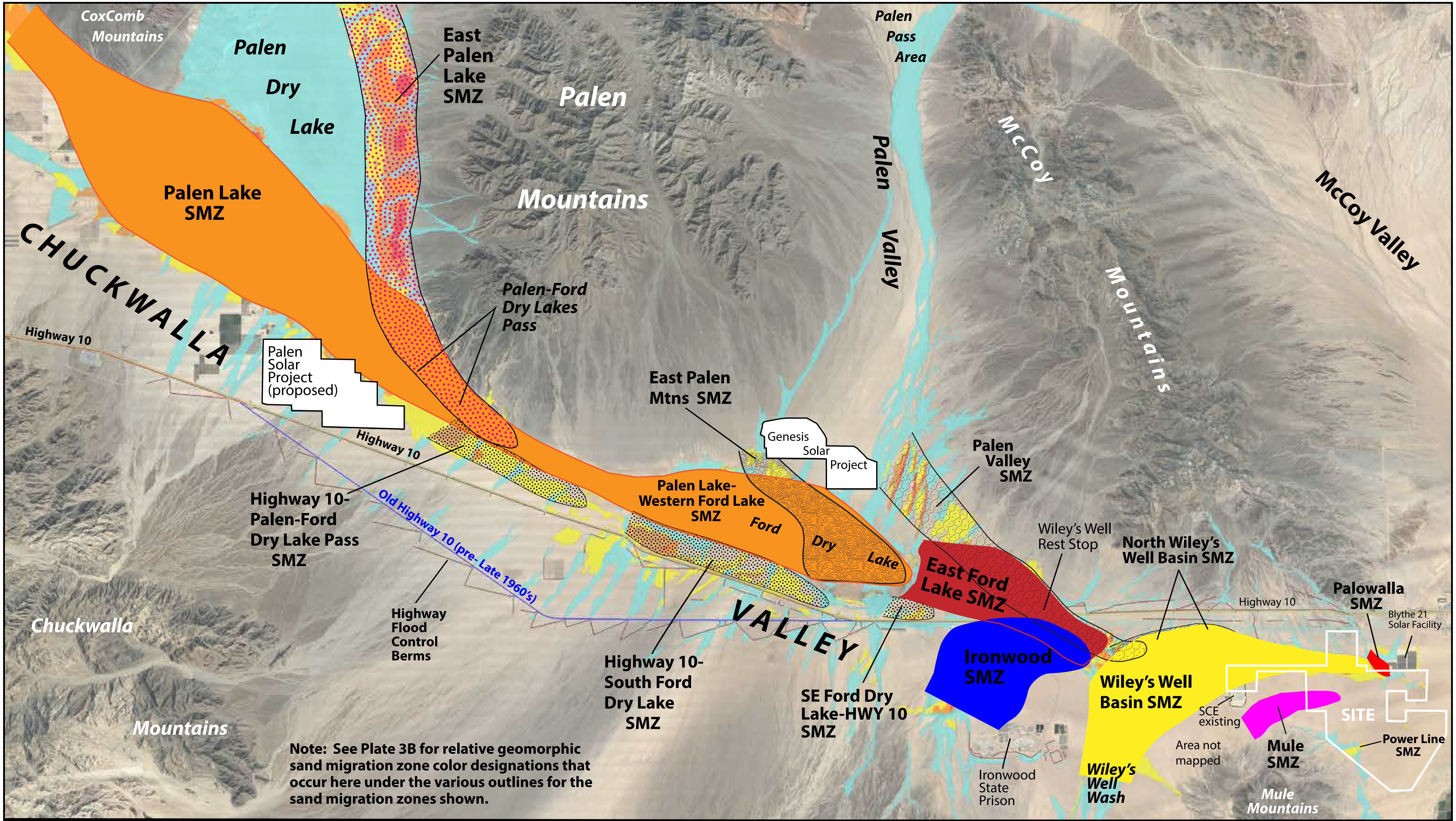
If the frequency of magnitude of cool winter Pacific storms decrease and warm summer monsoonal storms increase, this could lead to an increase in eolian sand generation and migration in the valley axis area. However, consistent with the observations noted above, the existing dune systems in the DQSP are degrading (internally eroding mostly) and thus can "absorb" newly derived eolian sands for at least a thousand years without expanding outside of the mapped dune areas, based on past dune aggradation rates.

ES 5.0 CONCLUSIONS

Global and local climatic conditions and their secondary effects during the Holocene has been beneficial for dune growth at various periods of time and near a geomorphic threshold condition where relatively subtle changes in climate can lead to dune re-activation. However, dune systems across the southeastern California region have been dominantly stable since the mid-Holocene and the sand migration corridors have essentially shut down since that time. Eolian sand sources during times of dune aggradational events since mid-Holocene have primarily been local sources.

Similarly, dune systems in the area of the DQSP site have received most of their eolian sands from local sources throughout the Holocene. The dunes encroached into the DQSP during the late-early Holocene and continued to grow until the later mid-Holocene. Since the later mid-Holocene, existing dune systems across the southeastern California region have been degrading, as they rely on the erosion of older dune deposits for new eolian sands. This is certainly the case for the dune areas in and around the DQSP. Additionally, sand migration into the DQSP from the east has been impeded by a topographic sill east of the DQSP.

If there is an increase in eolian sand production due to climate change via a decrease in Pacific storms and increase in monsoonal storms frequency and magnitude, then these newly derived sands will be deposited for at least a thousand years within the existing mapped dune system area. The incursion of the invasive Sahara Mustard plant that blooms relatively frequently (possibly 2 to 3 times per decade) has decreased sand migration rates by over an order of magnitude where it occurs. This will also cause newly derived eolian sands to deposit closer to their sources and within mapped eolian dune systems. Although their dune forms and thickness will be altered, these features are not expected to expand significantly.


CoxComb Mountains
Palen Dry Lake
East Palen Lake SMZ
Palen Mountains
Palen Pass Area
Palen Valley
McCoy Mountains
McCoy Valley
Palen Lake SMZ
CHUCKWALLA VALLEY
Highway 10
Palen Solar Project (proposed)
Palen-Ford Dry Lakes Pass
East Palen Mtns SMZ
Genesis Solar Project
Palen Valley SMZ
Highway 10
Highway 10-Palen-Ford Dry Lake Pass SMZ
Old Highway 10 (pre- Late 1960's)
Palen Lake-Western Ford Lake SMZ
Ford Dry Lake
East Ford Lake SMZ
Wiley's Well Rest Stop
North Wiley's Well Basin SMZ
Highway 10
Palowalla SMZ
Blythe 21 Solar Facility
Chuckwalla Mountains
Highway Flood Control Berms
Highway 10-South Ford Dry Lake SMZ
SE Ford Dry Lake-HWY 10 SMZ
Ironwood SMZ
Wiley's Well Basin SMZ
SCE existing
SITE
Power Line SMZ
Area not mapped
Mule SMZ
Ironwood State Prison
Wiley's Well Wash
Mule Mountains

Note: See Plate 3B for relative geomorphic sand migration zone color designations that occur here under the various outlines for the sand migration zones shown.

N

~ 2 Miles

Kenney GeoScience

CLIENT:
FIRST SOLAR ENERGY

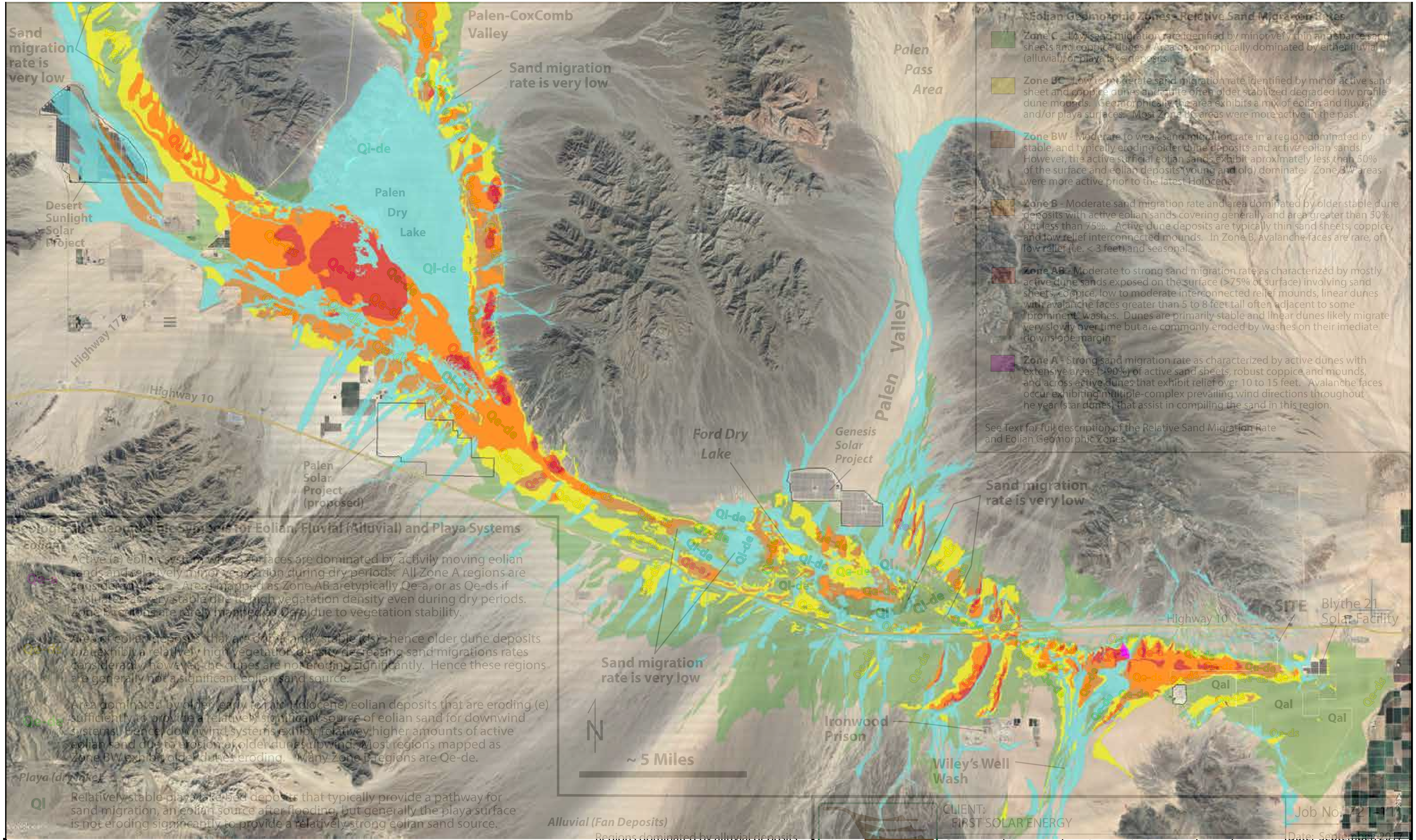
PROJECT (SITE):
DESERT QUARTZITE SOLAR

Local Geomorphic Eolian Sand Migration Zones
along the Chuckwalla Valley Eolian System

Job No. 721-11

Date: September, 2017
Drafted by: MDK

PLATE ES-1



Eolian Geomorphic Zones - Relative Sand Migration Rates

🟩	**Zone C** - Low sand migration rate idenified by minor very thin and sparce sand sheets and coppice dunes. Area geomorphically dominated by either fluvial (alluvial), or playa lake deposits.
🟨	**Zone BC** - Low to moderate sand migration rate identified by minor active sand sheet and coppice dunes and quite often older stabilized degraded low profile dune mounds. Geomorphically the area exhibits a mix of eolian and fluvial and/or playa surfaces. Most Zone BC areas were more active in the past.
🟫	**Zone BW** - Moderate to weak sand migration rate in a region dominated by stable, and typically eroding older dune deposits and active eolian sands. However, the active surficial eolian sands exhibit aproximately less than 50% of the surface and eolian deposits (young and old) dominate. Zone BW areas were more active prior to the latest Holocene.
🟧	**Zone B** - Moderate sand migration rate and area dominated by older stable dune deposits with active eolian sands covering generally and area greater than 50% but less than 75%. Active dune deposits are typically thin sand sheets, coppice, and low relief interconnected mounds. In Zone B, avalanche faces are rare, of low relief (i.e. < 3 feet),and seasonal.
🟥	**Zone AB** - Moderate to strong sand migration rate as characterized by mostly active dune sands exposed on the surface (>75% of surface) involving sand sheets, coppice, low to moderate interconnected relief mounds, linear dunes with avalanche faces greater than 5 to 8 feet tall often adjacent to some "prominent" washes. Dunes are primarily stable and linear dunes likely migrate very slowly over time but are commonly eroded by washes on their imediate downslope margin.
🟪	**Zone A** - Strong sand migration rate as characterized by active dunes with extensive areas (>90%) of active sand sheets, robust coppice and mounds, and across active dunes that exhibit relief over 10 to 15 feet. Avalanche faces occur exhibiting multiple-complex prevailing wind directions throughout he year (star dunes) that assist in compiling the sand in this region.

See Text for full description of the Relative Sand Migration Rate and Eolian Geomorphic Zones

Geologic and Geomorphic Symbols for Eolian, Fluvial (Alluvial) and Playa Systems

Eolian

Qe-a	Active (a) eolian system where surfaces are dominated by activily moving eolian sands and relatively minor vegetation during dry periods. All Zone A regions are considered Qe-a. Areas mapped as Zone AB aretypically Qe-a, or as Qe-ds if evaluated as very stable due to high vegatation density even during dry periods. Zone B regions are rarely mapped as Qe-a due to vegetation stability.
Qe-ds	Area of eolian deposits that are dominantly stable (ds) - hence older dune deposits that exhibit a relatively high vegetation density decreasing sand migrations rates considerably, however, the dunes are not eroding significantly. Hence these regions are generally not a significant eolian sand source.
Qe-de	Area dominated by older (early to mid Holocene) eolian deposits that are eroding (e) sufficiently to provide a relatively significant source of eolian sand for downwind systems. Hence, downwind systems exhibit relativey higher amounts of active eolian sand due to erosion of older dunes upwind. Most regions mapped as Zone BW exhibit older dunes eroding. Many Zone B regions are Qe-de.

Playa (dry lake)

Ql	Relatively stable playa lake bed deposits that typically provide a pathway for sand migration, an eolian source after flooding, but generally the playa surface is not eroding significantly to provide a relatively strong eolian sand source.
Ql-de	Playa lake bed deposits that are evaluated as eroding; hence, providing a source for eolian sand deposits for downwind (toward the southeast) dune systems. These surfaces also provide eolian sands after flooding.

Alluvial (Fan Deposits)

Qal	Regions dominated by alluvial deposits shown only within the proposed Desert Quartzite Solar Project

Kenney GeoScience

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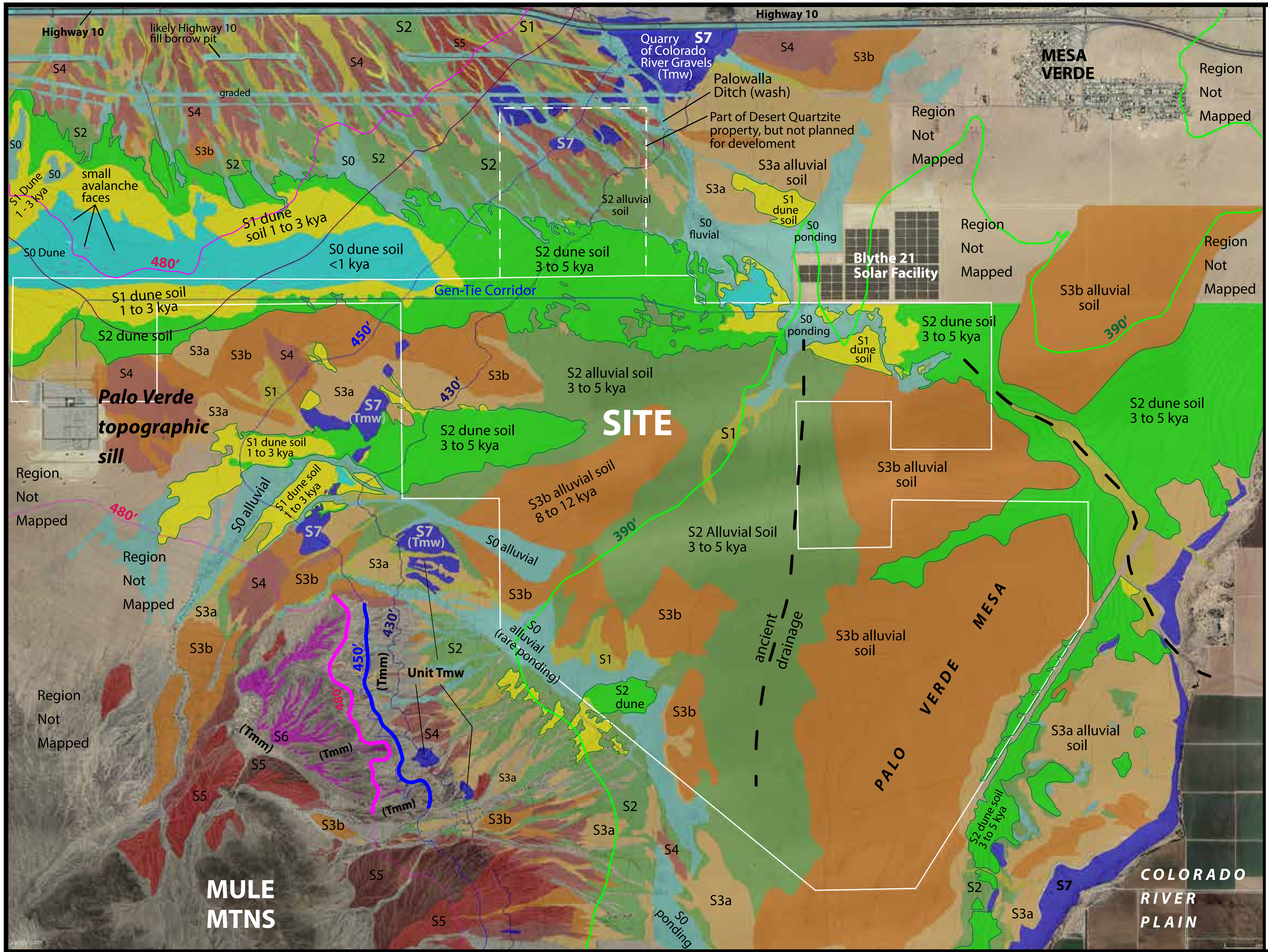
FIRST SOLAR ENERGY

Geomorphic map showing variations in dune deposit activity and stability along the Chuckwalla Valley eolian sand system

Job No. 721-11
Date: September, 2017
Drafted by: MDK

PLATE ES-2


Highway 10
likely Highway 10 fill borrow pit
graded
S2
S1
S5
S4
Quarry S7 of Colorado River Gravels (Tmw)
Highway 10
S3b
MESA VERDE
Region Not Mapped
Palowalla Ditch (wash)
Part of Desert Quartzite property, but not planned for develoment
S7
S2
S0
S1 Dune 1 - 3 kya
S0
small avalanche faces
S3b
S1 dune soil 1 to 3 kya
S0 Dune
480'
S0 dune soil <1 kya
S2 dune soil 3 to 5 kya
S2 alluvial soil
S3a alluvial soil
S3a
S1 dune soil
S0 fluvial
S0 ponding
Blythe 21 Solar Facility
Region Not Mapped
Gen-Tie Corridor
S1 dune soil 1 to 3 kya
S2 dune soil
S3a
S3b
S4
450'
S0 ponding
S1 dune soil
S2 dune soil 3 to 5 kya
S3b alluvial soil
390'
S4
Palo Verde topographic sill
S1
S3a
S7 (Tmw)
430'
S3b
S2 alluvial soil 3 to 5 kya
S2 dune soil 3 to 5 kya
SITE
S1
S2 dune soil 3 to 5 kya
S1 dune soil 1 to 3 kya
Region Not Mapped
480'
S0 alluvial
S1 dune soil 1 to 3 kya
S3b alluvial soil 8 to 12 kya
S3b alluvial soil
S7
S7 (Tmw)
S0 alluvial
390'
S2 Alluvial Soil 3 to 5 kya
Region Not Mapped
S3a
S4
S3b
S3b
S3a
430'
S3b
ancient drainage
S3b alluvial soil
MESA
VERDE
PALO
S3b
450'
(Tmm)
Unit Tmw
S2
S0 alluvial (rare ponding)
S1
S2 dune
S3b
480'
S6
(Tmm)
S4
S3a alluvial soil
Region Not Mapped
S5
(Tmm)
S3a
S5
(Tmm)
S3b
S3b
S2
S3a
S2 dune soil 3 to 5 kya
S4
S2
S7
S5
COLORADO RIVER PLAIN
S3a
S0 ponding
S3a
MULE MTNS
S5

Soil (Pedon) Stratigraphy

Alluvial (fluvial) Parent Material (minimum ages)

🟦 **S0 -** < 1000 years old (fluvial and ponding areas)

🟨 **S1-** 1 to 3 kya (late Holocene)

🟩 **S2 -** 3 to 5 kya (mid to late Holocene)

🟫 **S3a -** 5 to 8 kya (early to mid Holocene)

🟧 **S3b -** 8 to 12 kya (latest Pleistocene to early Holocene)

🟥 **S4 -** 35 to 65 kya (late Pleistocene)

🟥 **S5a -** > 100 kya (early Pleistocene)

🟥 **S5b -** > 100 kya (early Pleistocene)

🟪 **S6 -** < 3.5 Ma Early Pleistocene or possibly late Pliocene Older alluvium with strongly developed soil profile resting unconformably on top of Bullhead Alluvium Colorado River deposits.

🟦 **S7 -** 3.5 to 4.5 Ma (early Pliocene). Bullhead Alluvium - Colorado River Gravels - exotic rounded cobbles with channel cross bedding (Unit Tmw) and the older member deposited to elevations of >1000 ft. throughout Chuckwalla Valley (Unit Tmm)

Eolian (Dune) Parent Material (minimum ages)

🟦 **S0 -** < 1000 years old

🟨 **S1-** 1 to 3 kya (late Holocene)

🟩 **S2 -** 3 to 5 kya (mid to late Holocene)

Note Regarding Soil Ages: All soil ages are considered minimum values, indicating that these surfaces are likley not younger than the ages provided.

Geologic Contact - Dune Soil to Alluvial Soil Contacts

〰 Geologic contact between eolian dune soils and alluvial soils. Contacts are gradations within eolian systems.

Topographic Contours - Colorado River Pliocene Levels

480' Topographic escarpment in Pliocene Bullhead Alluvium along the flanks of the northeastern Mule Mountains at approximate elevation 480 feet above sea level. Highest water elevation in the Pliocene associated with the Colorado River based on regional mapping was likely over 1,100 feet.

450' Topographic escarpment in the Pliocene Bullhead Alluvium along the flanks of the northeastern Mule Mountains at approximate elevation 450 feet above sea level. This escarpment is not as pronounced as the 480-foot elevation contour escarpment.

Topographic contours are from the USGS,
5-foot contour interval

Mapping conducted by M. Kenney via Google Earth Pro utilzing various years of their Hisorical Imagery. Image created with Google Earth Pro (10.2016).

N

~4000 Feet

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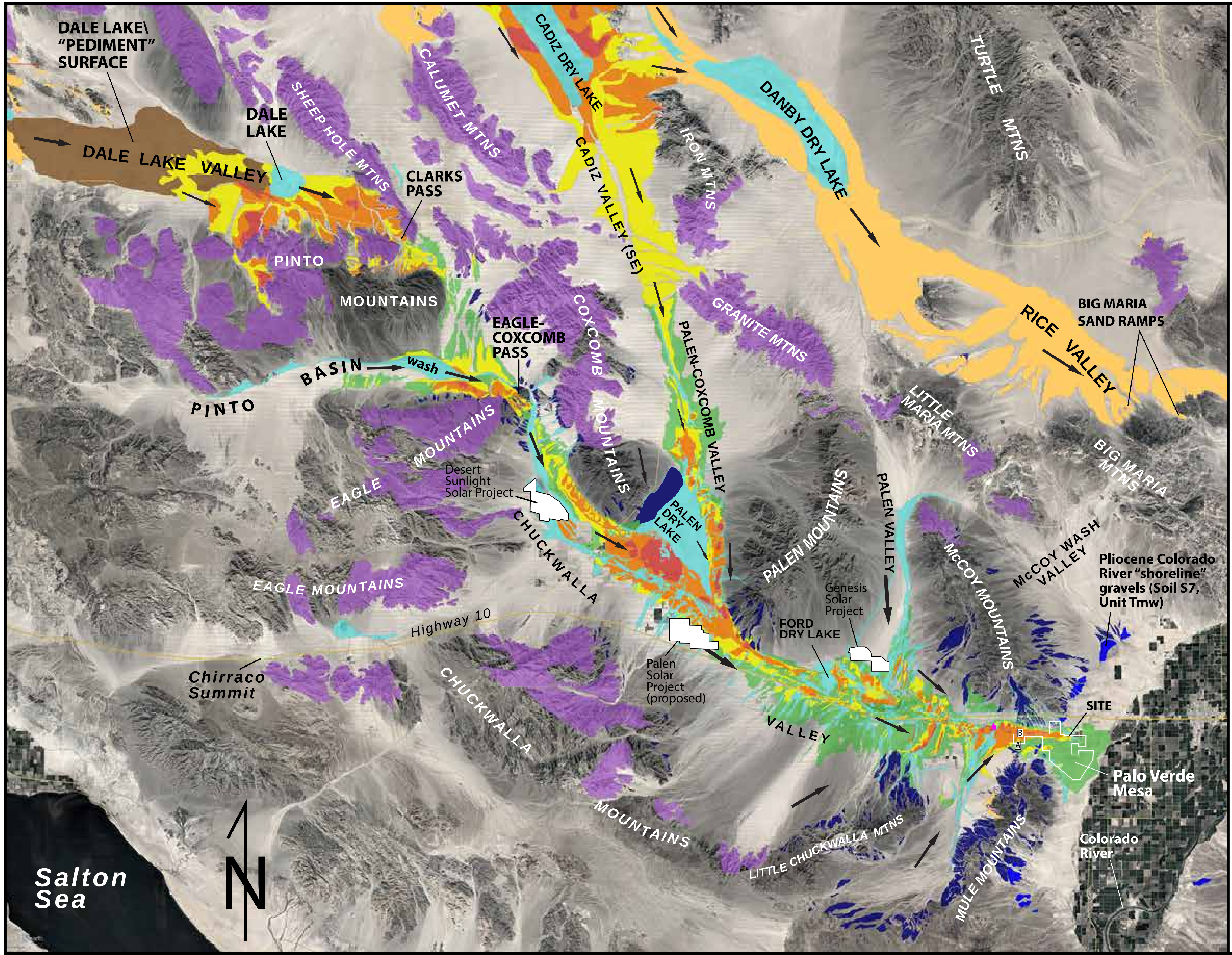
Soil (Pedon) Stratigraphy Map of Alluvial vs Eolian Soil Parent Deposits, Desert Quartzite Proposed Solar Project area

Job No. 721-11

Date: September, 2017
Drafted by: MDK

PLATE ES-3


DALE LAKE\
"PEDIMENT"
SURFACE
DALE LAKE VALLEY
DALE
LAKE
SHEEP HOLE MTNS
CALUMET MTNS
CADIZ DRY LAKE
CADIZ VALLEY (SE)
IRON MTNS
DANBY DRY LAKE
TURTLE MTNS
CLARKS
PASS
PINTO
MOUNTAINS
EAGLE-
COXCOMB
PASS
COXCOMB MOUNTAINS
GRANITE MTNS
PALEN-COXCOMB VALLEY
RICE VALLEY
BIG MARIA
SAND RAMPS
PINTO BASIN wash
MOUNTAINS
EAGLE
Desert
Sunlight
Solar Project
PALEN
DRY
LAKE
LITTLE
MARIA MTNS
BIG MARIA
MTNS
PALEN MOUNTAINS
PALEN VALLEY
McCOY WASH
VALLEY
Pliocene Colorado
River "shoreline"
gravels (Soil S7,
Unit Tmw)
CHUCKWALLA
EAGLE MOUNTAINS
Genesis
Solar
Project
FORD
DRY LAKE
McCOY MOUNTAINS
Highway 10
Chirraco
Summit
Palen
Solar
Project
(proposed)
CHUCKWALLA
VALLEY
SITE
B
A
Palo Verde
Mesa
MOUNTAINS
LITTLE CHUCKWALLA MTNS
MULE MOUNTAINS
Colorado
River
N
Salton
Sea

Eolian Geomorphic Zones Dominated by Dune Geomorphology

🟥 *Zone A and Zone AB*

🟧 *Zone B and Zone BW (weak)*

Eolian Geomorphic Zones Exhibiting Mixed Eolian and Fluvial Geomorphology

🟨 *Zone BC*

🟩 *Zone C (fluvially dominated)*

Generalized Eolian Deposits (where not mapped via Eolian Zones below)

🟨 Eolian deposits mapped in regions outside of the Dale Lake-Palo Verde Mesa, and Cadiz Dry Lake to Rice Valley sand migration zones

Eolian Sand Sources

🟦 Generalized unit representing active playa lake surfaces (Lacustrine), active washes, and ponding areas. These areas are important for eolian systems as a sand source, sand transport and stabilizing moisture.

🟦 Fluvial, ancient playa-lake, and Colorado River Deposits that produce relatively abundant eolian sands upon erosion. Unit primarily correlates with the Bullhead Alluvium of Howard et al. (2015), unit QTmm of Stone (2006), possibly some Bouse Formation of Spencer (2008), and Unit B of Metzger et al.(1973). Mapped as unit Tmm (Soil S7) in this study.

🟪 Granitic rocks in the region mapped by CGS (1964 & 1967). Identified as regional and local eolian sand source upon erosion and trasonport via local washes by Muhs et al. (2003).

General Prevailing Wind Direction

→ Generalized direction of "prevailing" winds most of which are altered by local valley-mountain topography

B A Location of the existing Sothern California Edison substation [A] and initially proposed Southern California Edison substaion [B] (Kenney, 2010d and 2010e).

Job No. 721-11

Mapping conducted by M. Kenney via Google Earth Pro utilzing various years of their Hisorical Imagery.Image created with Google Earth Pro (10.2016).

~ 5 Miles

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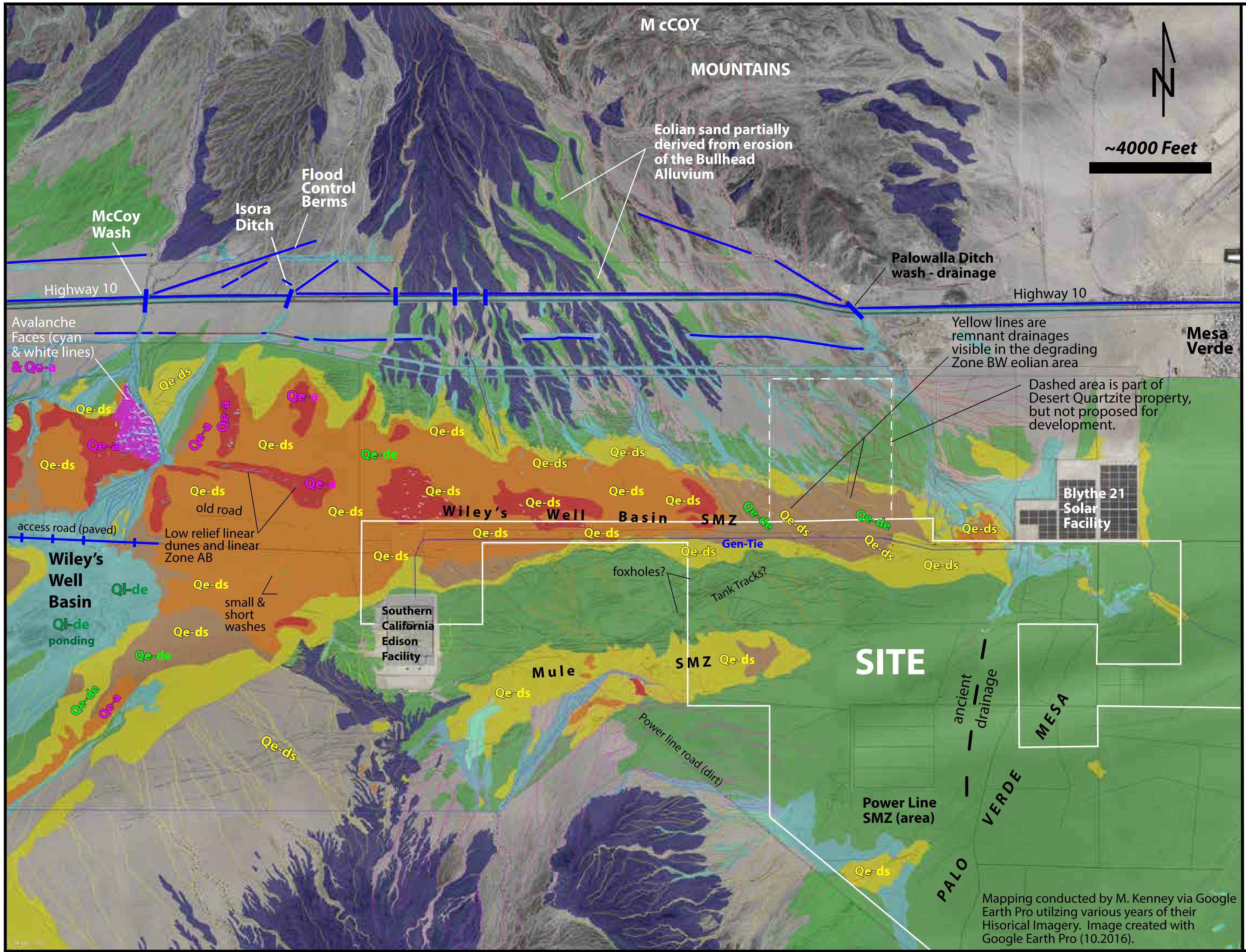
PROJECT:
DESERT QUARTZITE SOLAR PROJECT,
NEAR BLYTHE, CA

Eolian geomorphic, dune & sand source map in Southeastern California

Date: September, 2017
Drafted by: MDK

PLATE ES-4



M cCOY
MOUNTAINS
Eolian sand partially derived from erosion of the Bullhead Alluvium
Flood Control Berms
Isora Ditch
McCoy Wash
Highway 10
Palowalla Ditch wash - drainage
Highway 10
N
~4000 Feet
Mesa Verde
Avalanche Faces (cyan & white lines) & Qe-a
Yellow lines are characterized by remnant drainages visible in the degrading Zone BW eolian area
Dashed area is part of Desert Quartzite property, but not proposed for development.
Qe-ds
Qe-a
Qe-de
Blythe 21 Solar Facility
Wiley's Well Basin SMZ
old road
access road (paved)
Low relief linear dunes and linear Zone AB
Wiley's Well Basin
Ql-de
ponding
small & short washes
Gen-Tie
foxholes?
Tank Tracks?
Southern California Edison Facility
Mule SMZ
SITE
ancient drainage
MESA
VERDE
PALO
Power line road (dirt)
Power Line SMZ (area)

Mapping conducted by M. Kenney via Google Earth Pro utlizing various years of their Hisorical Imagery. Image created with Google Earth Pro (10.2016).

Eolian Geomorphic - Relative Sand Migration Zones

🟩 **Zone C** - Low sand migration rate and area dominated either by fluvial (alluvial), or alluvial ponding areas

🟨 **Zone BC** - Low to moderate sand migration rate, and geomorphically the area exhibits a mix of eolian and fluvial and/or playa surfaces. Dune deposits are also generally a mix of older stable, some eroding dunes, and active surficial loose eolian sands (sand sheets).

🟫 **Zone BW** - Moderate to weak sand migration rate, and area dominated by stable (vegetated), and typically eroding older dune deposits (geomorphology). Active eolian sands cover generally less than 50% of the surface area. Ponding (gravel lag surfaces) interdune depressions common.

🟧 **Zone B** - Moderate sand migration rate and area dominated by older stable dune deposits with active eolian sands covering generally greater than 50% of the area. Active eolian sands are typically sand sheets, coppice, and low reliefmounds. Avalanche faces are very rare and only seasonal in Zone B.

🟥 **Zone AB** - Moderate to strong sand migration rate and area characterized by mostly active dune sands exposed on the surface involving sand sheets, coppice, low relief mounds, and linear dunes with occassional seasonal avalanche faces.

🟪 **Zone A** - Strong sand migration rate and area characterized by extensive areas of active sand sheets across active dunes that exhibit relief over 10 to 15 feet. Avalanche faces occur exhibiting multiple-complex prevailing wind directions throughout the year leading to the development of star dunes. Zone A only occurs in one map area location near the termination of the Wiley's Well Wash in the herein named Wiley's Well Basin.

Eolian Source Geologic Deposits - Formations

🟦 Generalized unit representing ponding areas at the termination area of drainages and active washes. These areas are critically important for eolian systems as a sand source and stabilizing moisture for dune systems.

⬛ Sediments associated with the Colorado River when it inundated this region to an upper elevation of possibly 1,200 feet 4.3 to 3.5 Ma. These sediments produce a strong eolian sand source upon erosion. Unit correlates with the Bullhead Alluvium of Howard et al. (2015) estimated to be deposited between 4.5 to 3.5 Ma (Pliocene) and unit Tmm of this report (Soil 7).

Geologic and Geomorphic Symbols for Eolian and Playa Systems (see Plate 3A for full legend details)

Eolian

Qe-a	Active dune area, however, dunes are not migrating
Qe-ds	Strongly stabilized dune area
Qe-de	Strongly stabilized dune area that is eroding producing eolian sand source for downwind systems

Playa (dry lake) and other smaller Ponding areas

Ql-de	Ponding area that floods frequently providing an eolian sand source for downwind (toward the east and northeast) dune systems

Subdrains and flood control berms. Thin blue lines are flood control berms and thicker orthogonal lines are subdrains allow flow to pass.

Mapped dirt roads. Many of the dirt roads in close proximity and within the Site are surmised to have been produced during General Pattons tank war excersises in the early 1940's. These roads provide evidence supporting eolian geomorphic zones stability on a decadal scale, particularly for Zone BC, and Zone C, and lesser extent Zone BW, where many of these roads remain partially preserved on the landscape.

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DESERT QUARTZITE SOLAR

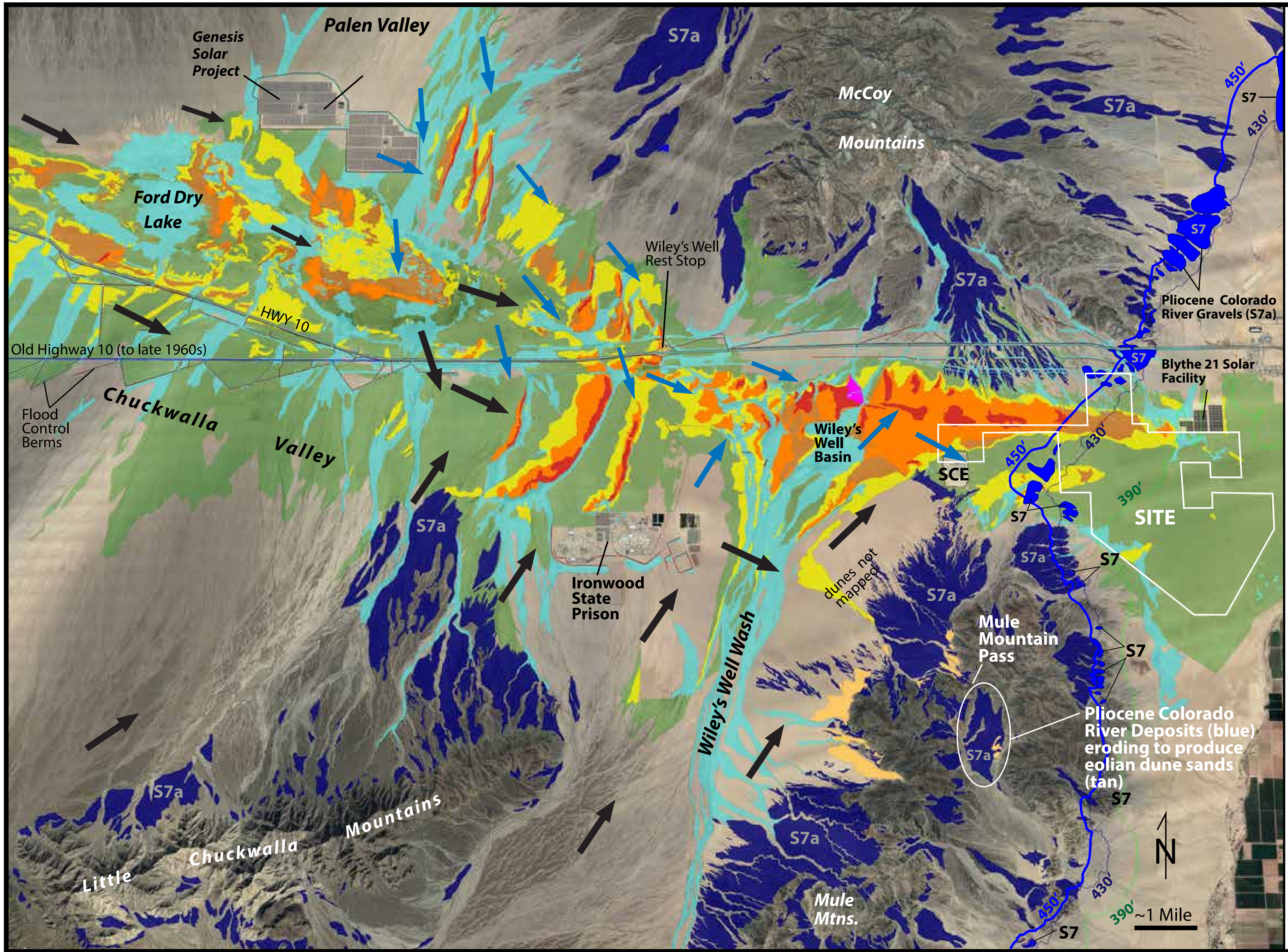
Eolian Geomorphic Zone Map and Drainage Map of the Wiley's Well Basin and Mule Sand Migrations Zones (SMZ), Desert Quartzite Proposed Solar Project area

Job No. 721-11

Date: September, 2017

Drafted by: MDK

PLATE ES-5



Eolian Geomorphic - Relative Sand Migration Zones

🟩	**Zone C** - Low sand migration rate idenified by minor very thin and sparce sand sheets and coppice dunes. Area geomorphically dominated by either fluvial (alluvial), or playa lake deposits.
🟨	**Zone BC** - Low to moderate sand migration rate identified by minor active sand sheet and coppice dunes and quite often older stabilized degraded low profile dune mounds. Geomorphically the area exhibits a mix of eolian and fluvial
🟫	**Zone BW** - Moderate to weak sand migration rate in a region dominated by stable, and typically eroding older dune deposits and active eolian sands. However, the active surficial eolian sands exhibit aproximately less than 50% of the surface and eolian deposits (young and old) dominate. Zone BW areas were more active prior to the latest Holocene.
🟧	**Zone B** - Moderate sand migration rate and area dominated by older stable dunedeposits with active eolian sands covering generally and area greater than 50% but less than 75%. Active dune deposits are typically thin sand sheets, coppice, and low relief interconnected mounds. In Zone B, avalanche faces are rare, of low relief (i.e. < 3 feet), and seasonal.
🟥	**Zone AB** - Moderate to strong sand migration rate as characterized by mostly active dune sands exposed on the surface (>75% of surface) involving sand sheets, coppice, low to moderate interconnected relief mounds, linear dunes with avalanche faces greater than 5 to 8 feet tall often adjacent to some "prominent" washes. Dunes are primarily stable and linear dunes likely migrate very slowly over time but are commonly eroded by washes on their imediate downslope margin.
🟪	**Zone A** - Strong sand migration rate as characterized by active dunes with extensive areas (>90%) of active sand sheets, robust coppice and mounds, and across active dunes that exhibit relief over 10 to 15 feet. Avalanche faces occur exhibiting multiple-complex prevailing wind directions throughout the year (star dunes) that assist in compiling the sand in this region.

Eolian Source Geologic Deposits - Formations

▨	Generalized unit representing active playa lake surfaces (Lacustrine), active washes, and ponding areas. These areas are important for eolian systems as a sand source, sand transport and stabilizing moisture.
🟦 **S7** **Tmw**	Fluvial Colorado River Gravels associated with an ancient "shoreline-river edge) near elevavation 430 to 450 feet above sea level (msl, blue lines). This unit is correlated stratigraphically to unit QTmw of Stone (2006), Unit B (Quarry Gravels) of Metzger et al. (1973), and member of the **Bullhead Alluvium** of Howard et al. (2015). Units are early Pliocene in age (Bullhead Alluvium - 4.5 to 3.5 Ma; Howard et al., 2015).
■ **S7a** **Tmm**	Fluvial, ancient playa-lake, and Colorado River Deposits that producerelatively abundant eolian sands upon erosion. Unit primarily correlates with the **Bullhead Alluvium** of Howard et al. (2015), unit QTmm of Stone (2006), possibly some Bouse Formation of Spencer (2008), and Unit B of Metzger et al.(1973). Units are early Pliocene in age (Bullhead Alluvium - 4.5 to 3.5 Ma; Howard et al., 2015). Petrified wood bearing uper slope member extending to elevations over 850 feet.

Eolian Deposits - General in Mule Mountains

▧	Generalized area of dune deposits typically exhibiting Zones A, AB and B (see above) along the flanks, and within upper valleys of the Mule Mountains.

Mapping conducted by M. Kenney via Google Earth Pro utlizing various years of their Historical Imagery.Image created with Google Earth Pro (2016). Sand migration rates varied considerably across Ford Dry Lake and near the site due to large magnitude changes in vegetation density (wet vs dry years). Mapping was conducted where possible that exhibited the strongest sand migration rates that corresponded to relatively low vegetation densities.

"Prevailing" Wind Directions Influencing Eolian Systems

Generalized direction of pertinent "prevailing" wind directions resulting in eolian sand movement as observed in the field during strong wind events and eolian dune structures. These wind directions are controlled by local valley-mountain topography and seasonal storm track dominant movement directions. These occur from the SW along Wiley's Well Wash, from the west (W) down the Chuckwalla Valley, and from the NNW down Palen Valley. The SW to NE winds have commonly been observed to flow over the Chuckwalla Mountains. Blue arrows were observed and measured and the field, gray arrows are generalized based on field experience and dune forms.

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CLIENT:
FIRST SOLAR ENERGY

PROJECT:
DESERT QUARTZITE SOLAR PROJECT,
NEAR BLYTHE, CA

Geomorphic Eolian Zone Map & Geologic Map of the Eastern Chuckwalla Valley

Job No. 721-11

Date: September, 2017

Drafted by: MDK

PLATE ES-6

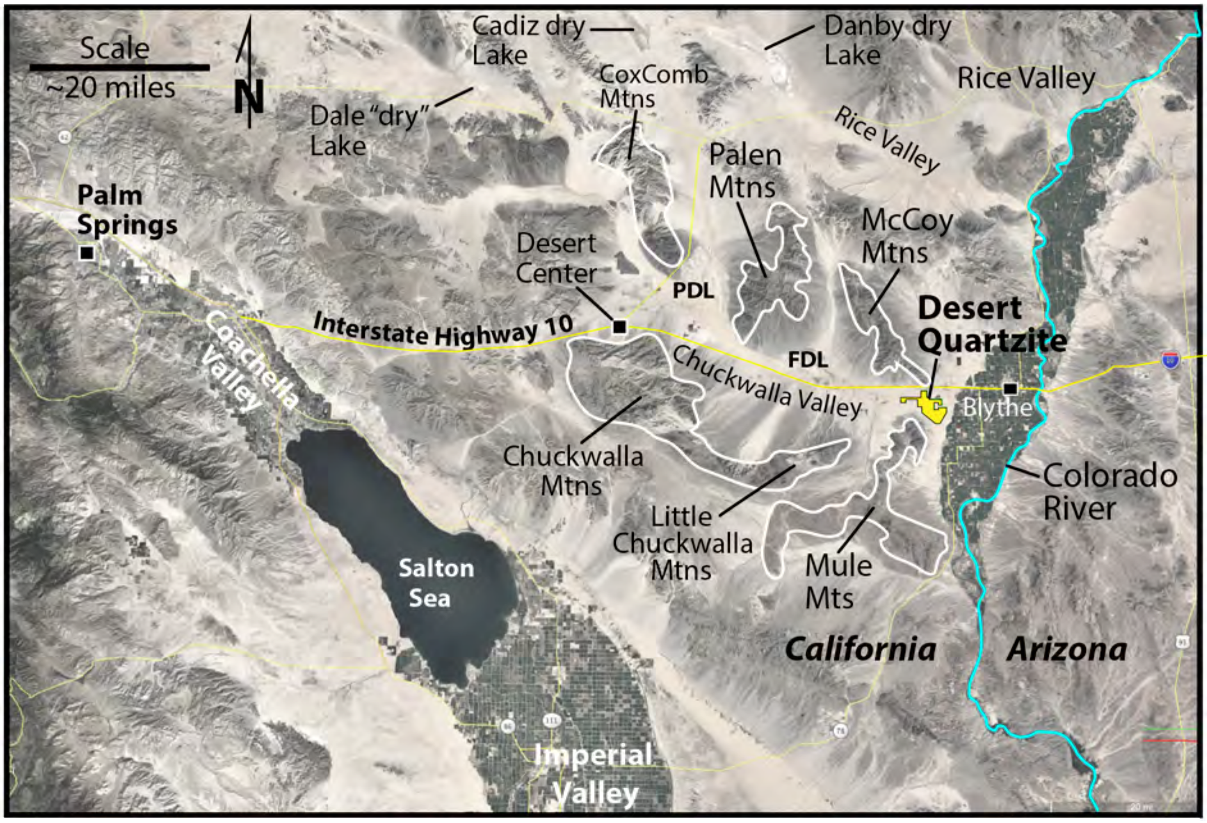
REPORT

1.0 SITE LOCATION, PROPOSED DEVELOPMENT AND TOPOGRAPHIC RELIEF

1.1 Site Location of the Desert Quartzite Solar Project

The Desert Quartzite Solar Project (DQSP) located in eastern California at the east end of the approximately 50-mile long, east-west trending Chuckwalla Valley, in southeastern California (Figure 1 and Figure 2). Palen Dry Lake (PDL) and Ford Dry Lake (FDL) occur at the western and eastern central areas respectively within the valley axis of the Chuckwalla Valley. Pertinent mountain ranges occur to the north and south of the Chuckwalla Valley that include the Palen and McCoy Mountains to the north, and the Chuckwalla, Little Chuckwalla and Mule Mountains to the south.

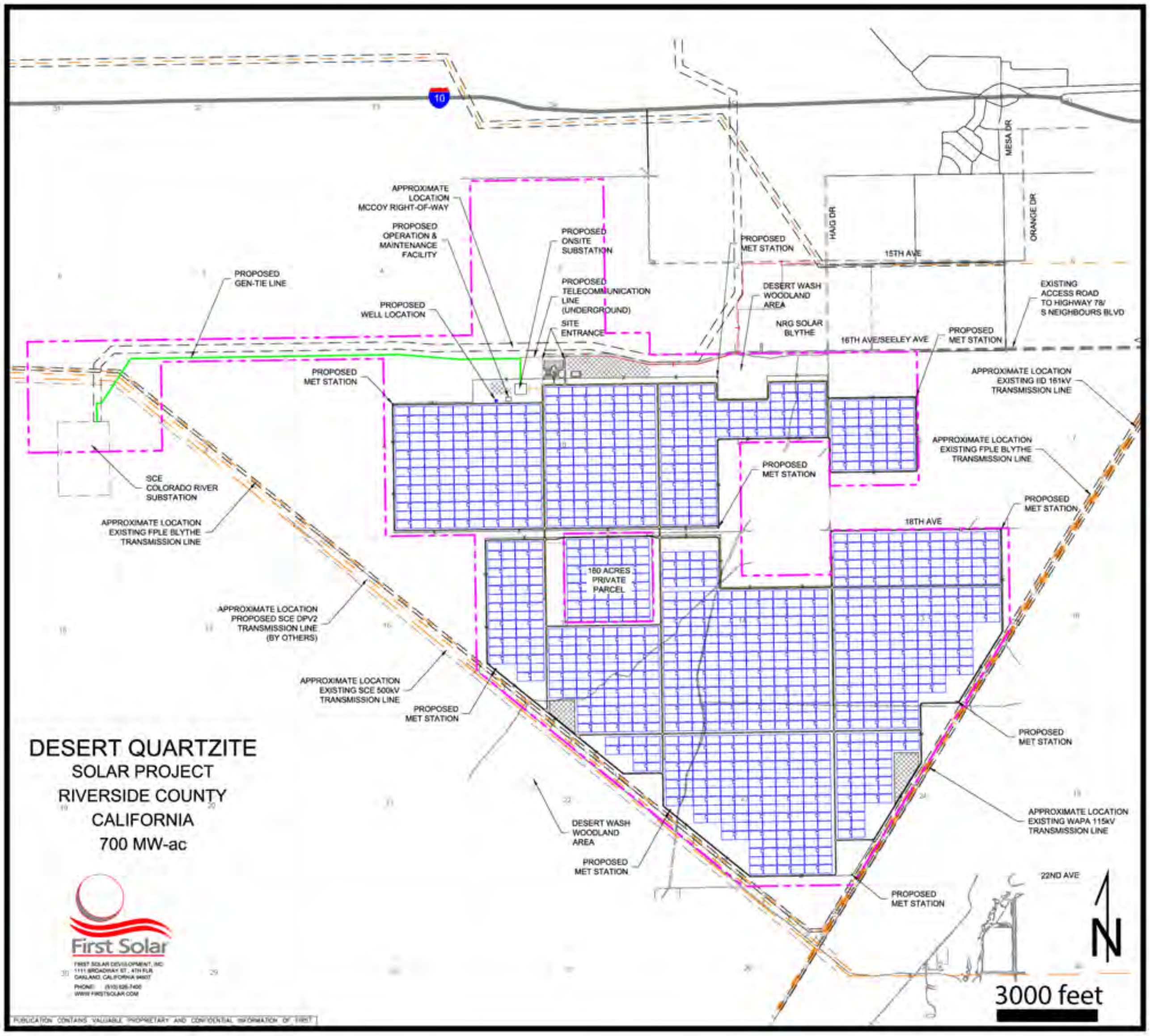
Figure 1: Regional Desert Quartzite Solar Project site location and Geographic map. PDL is Palen Dry Lake, and FDL is Ford Dry Lake.


Scale
~20 miles
N
Cadiz dry Lake
Danby dry Lake
Rice Valley
CoxComb Mtns
Dale "dry" Lake
Rice Valley
Palen Mtns
Palm Springs
McCoy Mtns
Desert Center
PDL
Desert Quartzite
Interstate Highway 10
FDL
Coachella Valley
Chuckwalla Valley
Blythe
Chuckwalla Mtns
Colorado River
Little Chuckwalla Mtns
Salton Sea
Mule Mts
California
Arizona
Imperial Valley

1.2 Proposed Development

The application area for DQSP is approximately 8.2 square miles; however, an approximately 1.7 square mile northern portion of DQSP located toward the west along the Gen-Tie Corridor, and a northern parcel of the property, are not proposed for development. Hence, these regions are not part of the solar field array constructional footprint (Figure 2).

Figure 2: Site map showing general siting of proposed Desert Quartzite Solar Project development. The red dashed line delineates the boundary of the property. Blue cross hatched regions delineate the proposed footprint of the solar array.


10
APPROXIMATE LOCATION MCCOY RIGHT-OF-WAY
PROPOSED OPERATION & MAINTENANCE FACILITY
PROPOSED ONSITE SUBSTATION
PROPOSED TELECOMMUNICATION LINE (UNDERGROUND)
SITE ENTRANCE
PROPOSED GEN-TIE LINE
PROPOSED WELL LOCATION
PROPOSED MET STATION
MESA DR
HAIG DR
ORANGE DR
15TH AVE
DESERT WASH WOODLAND AREA
NRG SOLAR BLYTHE
16TH AVE/SEELEY AVE
EXISTING ACCESS ROAD TO HIGHWAY 78/ S NEIGHBOURS BLVD
APPROXIMATE LOCATION EXISTING IID 161kV TRANSMISSION LINE
APPROXIMATE LOCATION EXISTING FPLE BLYTHE TRANSMISSION LINE
SCE COLORADO RIVER SUBSTATION
18TH AVE
180 ACRES PRIVATE PARCEL
APPROXIMATE LOCATION PROPOSED SCE DPV2 TRANSMISSION LINE (BY OTHERS)
APPROXIMATE LOCATION EXISTING SCE 500kV TRANSMISSION LINE
APPROXIMATE LOCATION EXISTING WAPA 115kV TRANSMISSION LINE
22ND AVE
DESERT QUARTZITE
SOLAR PROJECT
RIVERSIDE COUNTY
CALIFORNIA
700 MW-ac
First Solar
N
3000 feet
PUBLICATION CONTAINS VALUABLE PROPRIETARY AND CONFIDENTIAL INFORMATION OF FIRST

1.3 Site topographic relief

Elevations across the region of the proposed solar field footprint range from approximately 450 foot above mean sea level (msl) in the northwest corner, to approximately 375 foot above msl in the southeastern corner. This represents an approximate total relief of 75 feet.

2.0 GEOLOGIC TIME SCALE (PERTINENT TO INVESTIGATION)

The age of most geologic events discussed in this report occurred during the Neogene and Quaternary Periods. The Neogene Period is subdivided into the Pliocene and Miocene Epochs and the Quaternary Period is subdivided into the Holocene and Pleistocene Epochs. The name and associated time interval designations utilized in this report include (kya = thousand years ago; Ma = million years ago).

PERIOD	**EPOCH**	**TIME PERIOD**
QUATERNARY	HOLOCENE	TIME PERIOD
	Latest Holocene (Historical)	~past 200 to 150 years
	Late Holocene	4 kya to 200 years ago
	Mid- Holocene	8 to 4 kya
	Early Holocene	12 to 8 kya
	PLEISTOCENE	
	Latest Pleistocene	~15 to 12 kya
	Late Pleistocene	125 to 20 kya
	Middle Pleistocene	670 to 125 kya
	Early Pleistocene	~2.6 Ma to 670 kya
NEOGENE	PLIOCENE	
	Late Pliocene	3.6 to 2.6 Ma
	Early Pliocene	5.3 to 3.6 Ma
	MIOCENE	
	Late Miocene	11.6 to 5.3 Ma
	Middle Miocene	16 to 11.6 Ma
	Early Miocene	23 to 16 Ma

Although not of critical importance to this study, it should be pointed out that the time of the boundary between the Pliocene and Pleistocene varies considerably in the literature. This dilemma has resulted from the definition of the boundary of the Pliocene/Pleistocene, which is supposed to coincide with the onset of the first northern hemisphere glaciation. The Pleistocene is the Epoch characterized as the "ice age", hence experiencing period of major glaciations and interglacial periods of time. The date of the beginning of the Pleistocene has changed as new studies refine the age of the initiation of the beginning of the ice ages and disagreements within the scientific community. Age ranges "accepted" for the beginning of the Pleistocene (and Quaternary) vary from 2.6 to 1.6 Ma. There is also disagreement regarding the end of the Pleistocene as it was a gradual transition from about 12 to 10 kya. However, the California Geological Survey utilizing primarily findings from Walker et. al (2009) adopted 11.7 kya as the “official” definition of the Holocene based on a proposal to the International Stratigraphic Commission reflecting a change in Oxygen isotopic ($O^{18/16}$) composition of an ice core from Greenland. For the purposes of this study, the end of the Pleistocene is simply rounded to 12 kya.

The Holocene Epoch is subdivided into four time intervals in this report that are not based on an internationally accepted time periods, but instead defined within this report to assist in presenting the findings. However, unintentionally, the Holocene Epoch time period subdivisions created for this report based on variations of geomorphic processes are strikingly similar to those of Bull (1991).

3.0 PURPOSE OF STUDY

The primary purpose for this study is to geologically evaluate existing dune systems within and near the proposed DQSP to understand the current aerial extent of the dune deposits, and the potential regarding how dynamic or non-dynamic the current dune system is (i.e. active, stable, eroding). This exercise has been undertaken to supplement a report prepared by the California Geological Survey, which evaluated wind-blown (eolian) resources that serve as habitat for desert species within the Desert Renewable Energy Conservation Plan (“DRECP”) area, including, without limitation, the Mojave fringe-toed lizard (Uma scoparia) and North American warm desert dunes and sand flats. The author is not a professional Biologist, however, the results of this study can be utilized by Biologists to evaluate potential direct impacts on MFTL habitat associated with DQSP. Moreover, the analysis is warranted in its own right, as the CGS report, although comprehensive, was not detailed or specific to the project site. It recognized that “Study area maps, developed at an interpretive scale of 1 inch equals 24,000 inches, are regional in nature and should not be used as a substitute for detailed studies in any specific area.”

During the research phase of this project (and other recent eolian investigations by the author), it became clear that many fundamentally important aspects of the development of dune systems have not been sufficiently studied regionally to enable site-specific dunes studies. These aspects include:

- Variations in dune behavior over the course of thousands of years;
- Variety in local and regional sources of eolian sands;
- Relationship of dunes to the local geology, including alluvial fans and playa lakes;
- Several aspects of local hydrology, including availability of stabilizing moisture, watershed sizes, orientation of washes to prevailing winds, water flow diversions, and regions of ponding;
- When/whether upstream erosion of older sedimentary units results in some washes transporting increased volumes of eolian sands
- Correlation of global and local variations in climate since the late Pleistocene
- Soil stratigraphy data of near surface fluvial and eolian deposits that provide evidence of the geologic history of the dune systems (When did the dunes develop? Have the dunes advanced, stayed in the same region, or retracted during the Holocene?)

- The geologic history of the area with a focus on when the dunes may have developed.
- The continuation by Kenney GeoScience to create geomorphic unit designations that provide criteria for subtle but significant variations in dunes geomorphology and for relative sand migration rates.

4.0 APPROACH OF STUDY – FROM REGIONAL TO LOCAL

Over the course of two years, the author took several steps to ensure that this resulting report would be the premier authority regarding eolian geology and geomorphology within and around DQSP. These steps include:

- Review of previous studies that include mapping:
    - Utilization of the eolian geomorphic data, analysis and findings from numerous other eolian and playa lake studies conducted by the author in Chuckwalla Valley. These include, from west to east, the Starlight, Palen, and Genesis solar projects, Southern California Edison transfer station, and 2011 work at the Desert Quartzite Solar Project.
    - Evaluation of scientific publications on many relevant topics, particularly the timing and magnitude of regional dune aggradational events, global and regional climatic variations, and periods of dune stability across southwestern north America, timing of alluvial fan deposition and trenching, among others. Appendix A lists the references read and analyzed for this report.
- Project specific mapping including the following elements:
    - Local geologic and geomorphic mapping involving the evaluation and documentation of 320 geomorphic sites conducted since 2011. Work included geomorphic description, visual estimate of aerial vegetation density, taking photographs, excavation and evaluation of soil pits at some sites, and applying a geologic description designations and relative sand migration zone designation at every site.
    - Utilization and evaluation of 1-foot topographic contours of most of the project area in addition to evaluation of 5-foot contours of eastern Chuckwalla Valley.
    - The first detailed evaluation of the proposed Dale Lake to eastern Chuckwalla Valley Sand Migration Corridor including the region of the Ford Dry Lake to Palo Verde section. Other regional proposed sand migration corridors in southeastern California were also mapped in detail via Historical Imagery on Google Earth Pro, and scientific publications.
    - Evaluation of the local soil stratigraphy and associated minimum ages of the local dunes and alluvial deposits, which provides an understanding of the geologic development of the current landscape since the late Pleistocene.
    - Compiling field mapping data into Google Earth Pro for analysis.

  - Producing relative Sand Migration Rate Zone and Soil Stratigraphy maps in Google Earth Pro.
  - Analysis of regional dune systems and proposed regional sand migration zones (corridors) across southeastern California to compare to local dune systems. Regionally, much of this mapping was conducted utilizing various years of Historical imagery in Google Earth Pro and scientific publications. Mapping of some dune systems previously not mapped on acquired geologic maps and literature. The evaluation of local geologic history of the area extending back to the early Pliocene. This assists in placing the geologic history of the dune systems identified at the surface into context over geologic time.

- Continued evolution of new geomorphic designations to assist in evaluating eolian geomorphology including sand migration rates. This is brand new work. To the knowledge of the author and a noted expert in the field (personal communication, N. Lancaster), no formal or published recommendations exist regarding how to map desert geomorphology, particularly eolian systems. The method devised in this report builds on numerous eolian reports in the southwestern United States and develops geomorphic criteria designations for three categories:
  - **Relative Sand Migration Zones**

    (Zone A, Zone AB, Zone B, Zone BW, Zone BC and Zone C)
  - **Relative soil profile (horizon) development** minimum ages for near surface soils

    (S0, S1, S2, S3a, S3b, S4, S5, S6 and S7)
  - **Geologic unit designations** for eolian vs fluvially dominated geomorphic areas.

    (Qe units vs. Qal units)

- Analyses of eolian systems, to identify parameters and their relative importance in understanding eolian systems, focused on evaluation of:
  - Eolian sand sources of the regional and local dune systems, which revealed the relative importance of various eolian sand sources currently and over time.
  - Alluvial fan aggradational events, areas of deposition, and timing of alluvial fan-head trenching.
  - Herein newly proposed eolian sand sources such as eroded older dissected fluvial-alluvial deposits (fan head trenching), erosion of Pliocene Colorado River deposits, and erosion of exposed older valley fill deposits.
  - The relative magnitude of eolian sand production from washes depending on the width and inset depth (local relief – bar and swale) of the wash system, orientation of the wash relative to local prevailing winds, and whether the wash may carry relatively more eolian size sand grains depending on what sediments/deposits the wash has eroded during flow upstream.
  - Watershed regions and mapping of areas of distributary and tributary drainages systems. These parameters are important regarding their potential to generate eolian sands for local

  dune systems and whether these local drainages may in fact result in creating their own "mini" sand migration zones.

  - Previously proposed eolian sand sources such as playa lake surfaces, granitic rock exposures in the local mountains, and washes.
  - Erosional surfaces exposed across valley floors (some are pediment surfaces) exposing older sediments rich in eolian size grains. Where these sediments erode, they provide another source for eolian sand for downwind dune systems.
  - Various proposed sand migration corridors in southeastern California, their sand sources, timing of development and whether the sand corridors continue to remain continuous sand migration corridors since the mid-Holocene.
  - Variations in timing and magnitude, and the relative importance of Pacific "northwestern" winter storm events (global climate variations) verses monsoonal extreme storm events (regional climatic variations) in the development of not only alluvial fans, but also their newly proposed contribution to the development of eolian dune systems in the region.
  - Vegetation density at the site that provide insights on sand migration rates and dune stability. Includes discussion regarding the invasive Sahara Mustard plant that has and will, unless mitigated, greatly decrease sand migration rates in existing dune systems.

- Consideration of anthropogenic effects on dune systems:
  - Evaluate potential impacts human activity such as water diversions associated with road/highway construction involving water flow diversions from the highway itself, flood control berms upslope from the highway and soil burrow pits may affect existing dune systems.
  - Evaluate how susceptible dune systems may be to climatic in the future, which involved evaluating climate data for the southwestern United States since the latest Pleistocene.
  - Discussion regarding sand migration rates and stability associated with the invasion of the invasive Sahara Mustard plant.

This comprehensive, multi-disciplinary approach provided many new insights regarding the history of dune systems across southeastern California since the late Pleistocene, the relative importance of local versus far field eolian sand sources, the identification of new eolian sand sources, the importance of dune hydrology to dune stability, timing of dune aggradational events, the nature of the proposed regional sand migration zones, the long-term behavior of dune systems, and potential changes to the dune system in the future due to natural (climate change) or anthropogenic influences.

A regional analysis of eolian dune systems was essential to understanding how typical or unique a local dune system is, due to local variations in dune parameters. These aspects are discussed in more detail in the following sections. In addition, this study provides its results primarily via a series of Plates that comprise maps and tables (Plates 1 through 8C).

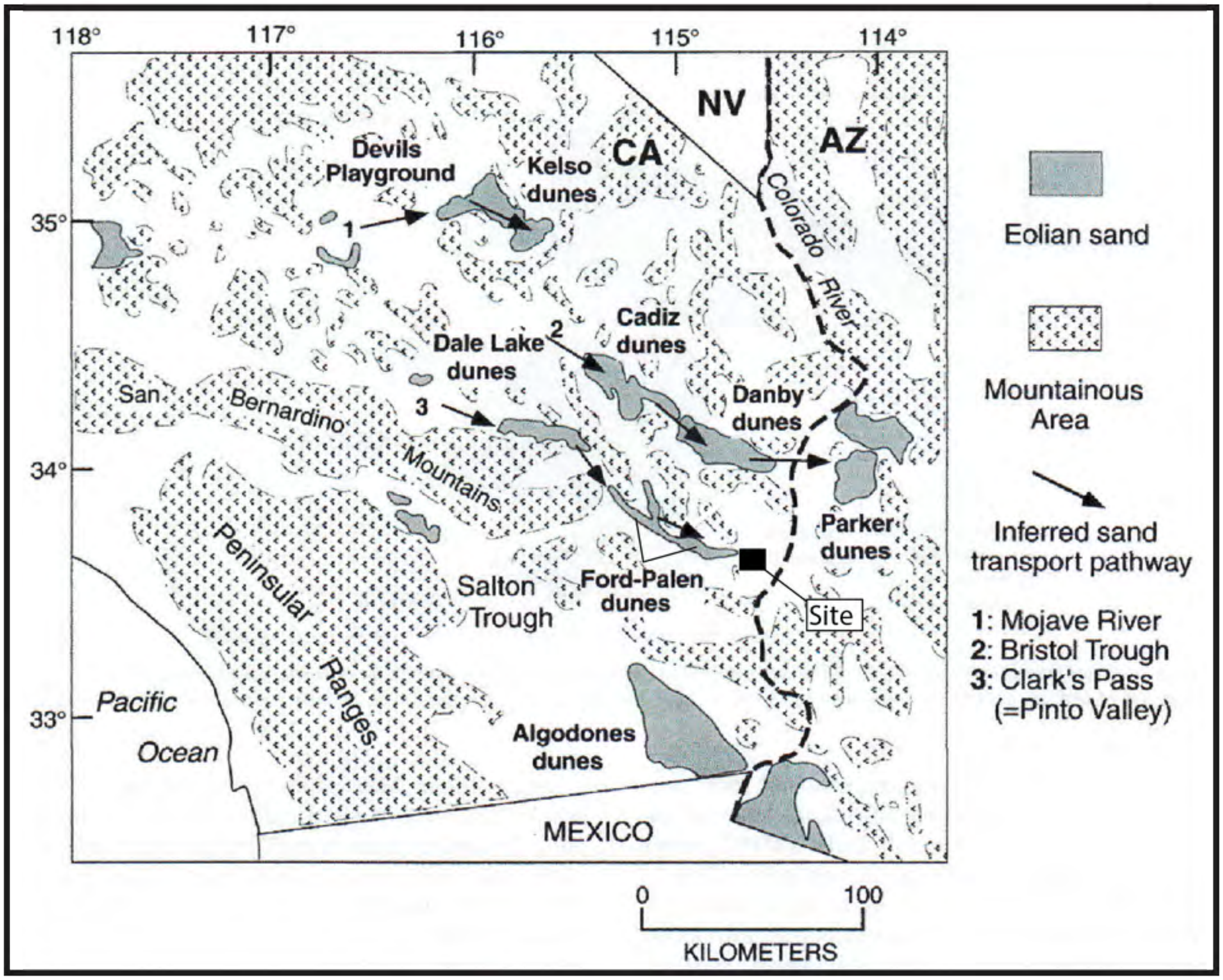
4.1 Regional dune systems and proposed regional sand migration corridors via mapping in Google earth and scientific literature

This study began with an evaluation of regional dune systems throughout southeastern California, allowing comparison to the local dunes to determine if some aspect of dune development and stability may have occurred locally that could be considered “out of the ordinary”, or if the local dunes near and within the project should be considered “normal”. Regional dune systems were evaluated utilizing existing scientific publications referenced in Appendix A, and via mapping in Google Earth Pro (utilizing the “historical imagery” in the region).

Previous regional dune studies in southeastern California have proposed the existence of numerous Sand Migration Corridors occurring in valley axes and crossing over some mountain passes. Zimbelman et al. (1995) was the first to propose the possible existence of through going regional sand migration corridors in southeastern California, implying that eolian sand essentially migrated to tens of kilometers from west to east, southeast down valley axis and over some mountain passes (sand ramps). Lancaster and Tchakerian (1996) evaluated numerous eolian sand ramps occurring where wind-blown sand was deposited in obstructing mountain passes or leeward side of mountains and assumed the existence of the regional sand migration corridors proposed by Zimbelman et al. (1995). Muhs et al. (2003), the most referenced scientific publication evaluating proposed regional sand migration corridors (Figure 3), perpetuated these beliefs, and since that time, the existence of the regional sand migration corridors has been assumed to exist, and in a sense, to have remained active throughout the Holocene.

Missing from the literature, however, was an evaluation that more accurately mapped the local sand migration corridors, local eolian source contributions, and that further took into account a wide field of studies to determine the current state and past activity and/or stability of the regional sand migration corridors. Indeed, the CGS February 5, 2015 comments on the DRECP (see Short and Lancaster, 2015) observed that prior to the aforementioned “Eolian System Mapping Report prepared by CGS (Aug. 4, 2014, see Lancaster, 2014), it was “a misstatement to call [wide swaths of the desert] ‘Sand Transport Corridors.’ Using this term implies that the mapping describes where the sand is coming from and where it is moving to (or source areas, zones of transport, and zones of deposition).” The prior mapping efforts did not have this granular level of detail to draw this conclusion. The Lancaster (2014) report did not provide sufficient information from the findings of many existing publications regarding the inactivity and lack of connectivity of eolian systems within the proposed regional sand migration zones during the late Holocene. The analysis in this report, however, considers whether local sources of eolian sand (from alluvial washes and fans) have created local deposits during current times and the past. In addition, this study performed a regional evaluation that more accurately mapped the proposed regional sand migration corridors, compiled published data from a wide field of studies to determine the current state of activity and/or stability of the regional sand migration corridors.

Figure 3: Proposed regional sand migration corridors in the southeastern California region by Muhs et al. (2003). Note that this map implies that eolian sands are migrating great distances along the proposed sand migration corridors suggesting that local eolian sand sources along their mapped lengths contribute relatively minor eolian sands.


118°
117°
116°
115°
114°
35°
34°
33°
NV
CA
AZ
Colorado River
Devils Playground
Kelso dunes
1
Cadiz dunes
2
Dale Lake dunes
3
Danby dunes
San Bernardino Mountains
Parker dunes
Peninsular Ranges
Salton Trough
Ford-Palen dunes
Site
Pacific Ocean
Algodones dunes
MEXICO
0
100
KILOMETERS
Eolian sand
Mountainous Area
Inferred sand transport pathway
1: Mojave River
2: Bristol Trough
3: Clark's Pass (=Pinto Valley)

4.2 Current and past geologic conditions of local dune system via an onsite geomorphic, geologic, and soil stratigraphic field investigation (mapping)

Geomorphic mapping, which is the evaluation of types of processes and deposits that occur at the surface, and the evaluation of relative ages of the near surface sediments via soil profile stratigraphy was conducted during this study. Geomorphic and soil stratigraphic mapping included the evaluation and documentation of 320 "geomorphic sites" where the local geomorphology and stratigraphy was evaluated and documented and including a GPS latitude and longitude location via a Garmin GPSmap 60Cx. The 320 geomorphic sites include 149 for the KGS Southern California Edison facility eolian report (Kenney, 2010d) located west to southwest of the DQSP, and 171 from this study. These geomorphic sites occur within and outside of the

DQSP project boundary, extending westward to near Wiley's Well Road. Geomorphic field sites qualitatively documenting current geomorphic and vegetation densities were conducted from 2010 to 2016 and at various times of the year. Field work was conducted during or soon after strong wind storms exhibiting variations in local prevailing winds, soon after a bloom of invasive Sahara Mustard, after prolonged cool Pacific storm rains, and after summer monsoonal storm flooding events that infiltrated the dunes.

In addition, geomorphic and geologic data was also utilized for this report from numerous other KGS eolian projects in the Chuckwalla Valley that include the Genesis (Kenney, 2010a and 2013), Palen (Kenney, 2010b) and Desert Sunlight (Kenney, 2010c) solar projects, and the Southern California Edison – Colorado River Substation (Kenney, 2010d and 2010e; Plate 2 and Plate 3A).

4.3 Geologic history of the project area since the Early Pliocene

Review of existing scientific literature including published geologic and eolian maps (i.e. Stone, 2006; Lancaster, 2014), and geologic mapping during the project allowed for an assessment of the geologic history of the site since the early Pliocene (i.e. ~4.5 million years ago). Regional stratigraphic reports for older formational units (Pliocene) exposed in the study area were utilized that described and regionally mapped Pliocene age sediments associated with the ancient Colorado River in the Chuckwalla Valley (Metzger et al., 1973; House et al., 2008; Spencer et al., 2008, Fenton and Pelletier, 2013, and Howard et al., 2015).

The analysis of these studies and their incorporation into the mapping and evaluation for this study assisted in understanding both the long term geologic history of the study area, and potential sediment sources for the local dune and alluvial systems. In addition, some of the publications provided stratigraphic-formational numerical ages for some of the ancient Colorado River deposits in the Chuckwalla Valley that clearly occurred prior to the development of the local dune systems.

4.4 Long-term behavior of desert geologic processes – pluvial and playa lakes, alluvial fans, eolian systems, climate changes via scientific publications

The dynamic nature, development and sustainability of eolian dune systems is closely associated with many geologic and climatic processes occurring both locally and regionally. Hence, dune development and long term behavior is directly connected to many parameters occurring outside their actual areas of deposition.

Pluvial and playa lakes are considered a primary source for eolian sands worldwide, and many reports provided in the references (Appendix A) substantiate this. Eolian sands emanate from pluvial and playa lakes soon after the desiccate allowing for sand bearing wind abrasion to erode the lake surfaces and provide pathways for sand transport. This study evaluated publications regarding the timing of pluvial and playa lake filling and receding periods in the southeastern California region to look for correlations with eolian dune aggradational and stability events.

Numerous secondary factors also effect dune development as well. Some of these include the timing of alluvial fan aggradational events and fan-trenching (down cutting) that are considered periods of time herein when eolian dune systems also undergo aggradational events. During times of alluvial fan aggradational events, washes typically flow with increased relative frequency and magnitude. It is evident that washes are one of the largest contributors of eolian sands in desert landscapes. In turn, these analyses led to the evaluation of the relative importance of periods of time of increased frequency and magnitude of cool and moist Pacific Northwest storms, and warm and moist monsoonal storms that represent local extreme storm events. The analysis shows that alluvial fans and eolian systems both experience aggradational events during periods of relatively more frequent and strong extreme monsoonal storm events and relatively weaker longer duration Pacific Storms. This has been the general case for the southeastern California region during the Holocene, but the data also indicates that the climate is near a critical geomorphic threshold point where a slight variation in the relative strength and frequency of Pacific verses monsoonal storm events can trigger increased or decreased alluvial and eolian activity.

4.5 Drainage surface waters flow analysis – Eolian sand sources and dune stability

Not only does surface flow water, from washes and into basins (pluvial lakes, playa lakes, and ponding areas), provide surface instabilities that lead to increased eolian sand supply, but surface flow waters also provide critical stabilizing moisture to dune systems. Sand dunes often develop in areas not only because there is a sufficient eolian sand source, but also because there is sufficient infiltrating moisture to allow for the internal core of the dunes to remain moist which greatly decreases the potential for sand bearing wind abrasion (Kenney, 2012). In addition, dunes that remain moist also have a higher likelihood of becoming stabilized via vegetation.

The evaluation of surface water flow is also critically important regarding the size of the watersheds for local wash systems. Larger water shed drainage systems have a higher probability of experiencing sufficient flow strength to reach valley axis regions. This report provides evidence showing that there is a general correlation with the size of the local watershed and the amount of eolian sands that emanate from that wash at the local base level area.

Hence, although dune systems may be considered “dry” systems, in fact, it is the moisture regime in the area that plays a very critical role in their development. This is the case not only for eolian sand sources, but also dune stability. This was shown to be the case for the Keeler Dunes in the eastern Owens Lake region where water flow across a medial to distal portion of the alluvial fan was diverted by flood control berms for over 50 years away from the downslope playa edge dune system causing the dunes to deeply abrade by sand bearing winds (Kenney, 2012).

The drainage analysis is also very important because as identified in this report, typical distributary drainage systems developing on active alluvial fans flow infrequently in distal fan areas, and therefore do not provide significant eolian sand to valley axis systems. However, it is proposed herein that tributary drainages systems that represent additive flow from many upslope contributing drainages tend to flow more frequently and stronger in addition to typically providing a relatively wide braided flow area downslope, contributing significantly more eolian sands than their distributary counterparts.

4.6 Comparison of local and regional dune systems

Regional dune systems across southeastern California were evaluated both via existing publications and extensive aerial mapping via Historical imagery provided on Google Earth Pro. Some areas in the Chuckwalla Valley had previously been mapped by the author for other projects. This analysis provided a framework in which to compare regional verses local sand systems, such as general trends of the regional dunes in terms of when they developed, had aggradational events, their relative eolian sand sources, and when they became stabilized, among others characteristics. This analysis also provided supportive evidence regarding the relative importance of various eolian sand sources and identified some previously undocumented eolian sand sources. The evaluation of regional dune systems also identified some dunes areas that had not been previously mapped based on the literature reviewed in this study (i.e. the East Pinto Basin Dunes; Plate 2; Appendix A). The regional mapping of dune systems across southeastern California provided supportive evidence that the proposed regional sand migration corridors are essentially shut down during the late Holocene and were more active-robust during the early to mid-Holocene. In addition, it provided evidence that local eolian sand sources for the proposed regional sand migration corridors are the dominant eolian sand source for portions of the sand migration corridors that are relatively more active in the late Holocene than other areas.

4.7 Potential impacts and future changes to the local dune system associated with the proposed development, climate change and historical anthropogenic activities

The geomorphic and soil stratigraphic mapping conducted in this study provide data to assist in evaluating potential impacts to existing dune systems associated with the footprint of the proposed development. However, with future climate change, the question arises regarding how the dunes may change over time and if the dunes may grow beyond their current aerial extent. However, the development of dune systems as a function of climate had to this time not been fully evaluated and is poorly understood. Dune systems across the study region of southeastern California did experience a growth period at the end of the last ice age when pluvial and playa lakes desiccated, but this does not explain intermittent dune development in the region extending through the mid-Holocene.

The review of climate related publications allowed for a better understanding of the relationship of what leads to dune system activity and stability. Namely, this review allowed for an assessment of the effect of the increase in magnitude and frequency of cool-moist Pacific Storms and warm-moist monsoonal storms on regional dune development since the latest Pleistocene. This question is addressed in this report and provides insights regarding potential changes in dune systems associated with global warming in the decades to come.

Historical anthropogenic factors associated with changes to the surface of the earth (i.e. flood control berms, borrow pits, etc.) that potentially could affect local dune systems were also evaluated. This analysis is important primarily due to the understanding of the importance of surface water flow for eolian sand sources and stabilizing moisture.

5.0 DUNE DEVELOPMENT AND STABILITY PARAMETERS

5.1 Prevailing wind directions

The prevailing wind direction is considered the direction in which wind has sufficient energy to cause both soil erosion and sand transport. One method to analyze annual wind data to determine potential sand entrainment and migration direction is the evaluation of the Resultant Drift Potential (RDD). Tsoar, (2004) indicates that a better index for wind erosion is the drift potential (DP) of the wind.

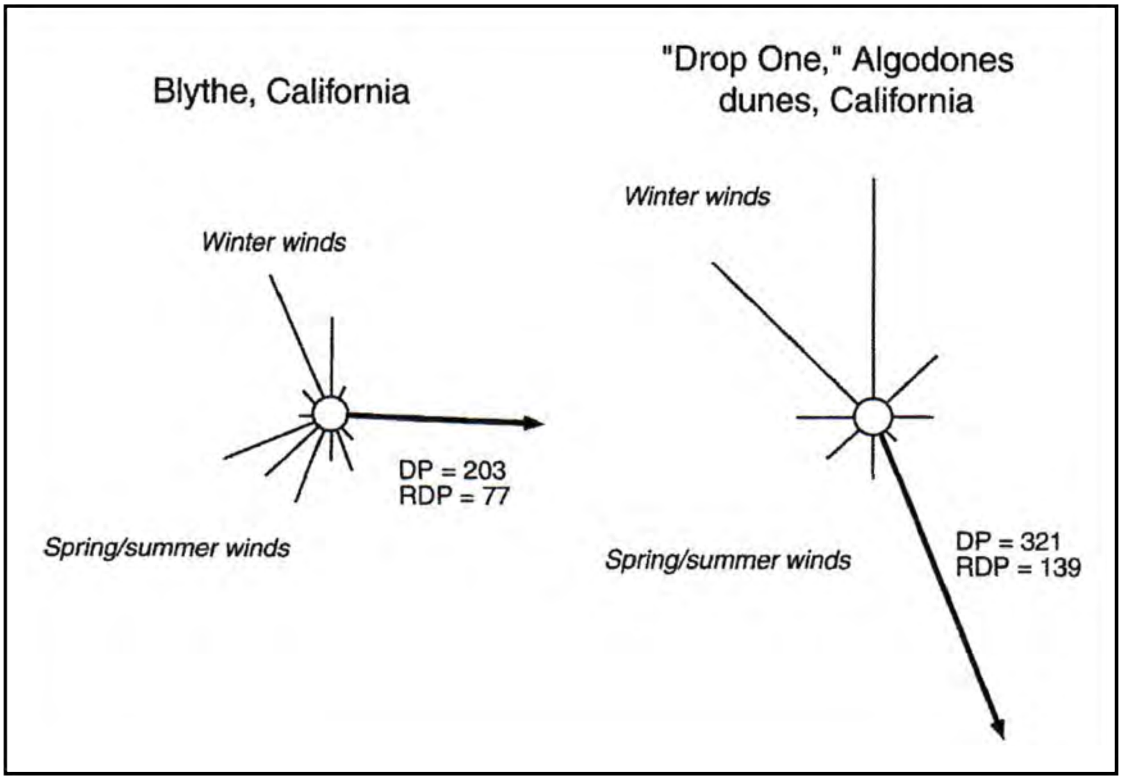
The Drift Potential (DP) = $\sum \boldsymbol{q} = \mathbf{U}^2(\mathbf{U}\text{-}\mathbf{U_t})/100 * \mathbf{t}$

U is the wind velocity (in knots), measured at a height of 10 m, $\mathbf{U_t}$ is the threshold wind velocity (=12 knots), and **t** is equal to the degree of "windiness" expressed as the annual percentage of days experiencing winds above the threshold velocity for sand movement. Essentially, **t** is the time the wind blew above the threshold velocity in percent. Dividing from 100 is for reducing the result to a smaller number (Tsoar, 2004).

q is calculated separately for each wind direction which is experiencing wind above the threshold velocity ($\mathbf{U_t}$) and its value is know as a vector unit. All vector units from all the wind directions form a sand rose diagram. DP, the total annual q for all wind directions, is a parameter of the potential maximum amount of sand that could be eroded by the wind during a year for all wind directions. Hence, DP is a measure of the potential wind power in a sandy area (Tsoar, 2004). The vector units from different directions can be resolved into a single resultant known as the resultant drift potential (RDP; Tsoar, 2004).

This method requires temporal velocity wind data from throughout the year measuring how fast the wind moved and for how long. To determine the RDD, the Drift Potential (DP) vector for each wind that occurred during the year exceeding the threshold wind velocity (~12 knots or ~14 mph) is evaluated; the DP vector is proportional to the length of time the wind blew greater than the threshold wind velocity (Tsoar, 2004). Thus, an individual DP value and vector is determined for each wind direction that blew greater than the wind threshold velocity. The DP values are proportional to how much stronger it was relative to the threshold wind velocity and how long it blew at those speeds. Adding all the DP vector unit values provides a resulting vector called the Resultant Drift Potential (RDP). The RDP vector provides a measure of the primary direction of sand transport if there is one. Adding up all the DP values provides a parameter of the potential maximum amount of sand that could be eroded by the wind during a year for all wind directions (Tsoar, 2004).

Figure 4: Resultant Drift Potential (RDP) Data from Blythe and the Algodones regions from Muhs et al. (2003). The Algodones dune field is located at the south end of the Salton Trough. These data indicate that the Pacific Cell winter weather fronts in combination with topographic (mountains and valleys) dominate the orientation of the RDP.



Annual and seasonal wind rose diagrams data from Blythe (ASOS data), which is located approximately 35 miles east of the Project site at the eastern most end of the Chuckwalla Valley near Blythe (Plate 1), indicate two dominant wind directions during typical years. During the Spring and Summer months, the strongest winds are from the south associated with monsoonal storm events. During the Fall and Winter, the strongest winds are from the north-north west associated with Pacific Ocean derived weather fronts. Determining the primary wind direction responsible for sand migration can be evaluated by geomorphic mapping of dune types, orientations, and locations, which is described later in the report, and by determining the RDP from appropriate wind data (Toar, 2004).

Muhs, et. al. (1995) determined the RDP for the Chuckwalla Valley to Blythe region for wind data collected at the Blythe Airport. Muhs, et. al., (1995) determined a RDP for the Blythe Airport that points nearly due east, parallel to the Chuckwalla Valley (left diagram) and for the Algondones dunes in the Imperial Valley region (Salton Trough) of southern California (Figure 4).

It can be seen in Figure 4 that the RDP, and thus the primary direction of migrating sand, is from the west for the Blythe area. This indicates that the Pacific Cell winter storms provide the dominant wind systems in terms of long term sand migration in the region. In addition, the nearly due east resultant vector RDP for the

Blythe airport located near the eastern outlet of the Chuckwalla Valley (Palo Verde Mesa) is very consistent with geomorphic field mapping data in the region regarding the dominant direction of migrating sand (including long term field indicators such as ventifacts and dune alignment) in the Chuckwalla Valley axis corridor. However, it is also evident based on seasonal switching of avalanche face directions, and complex dune forms observed in the region in both Winter and early Fall, that the southwesterly winds play an important role on local dune morphology. This was also observed to be the case in the dune field within Palen Dry Lake during KGS mapping in October 9, 2010

Although wind data for areas of the region indicate that strong summer monsoonal winds from the south occur, they apparently do not play a large role in terms of large long term sand transport in the region of the Project. This is also the case for other dune systems throughout southern California including the Mojave Desert (Muhs, et al., 2003; Lancaster and Tchakerian, 2003). Geomorphic evidence for this is provided by the form of the dunes. For example, well developed transverse dunes (some of which are barchan) within Palen Dry Lake clearly indicate that the dominant wind transporting directions responsible for the majority of eolian sand transport ranges from the north-northwest to northwest within the Chuckwalla Valley. In addition, a discussion with Cal-Trans workers responsible for removing sand from the Wiley Well rest area (Plate 4) near the east end of Ford Dry Lake indicated that without question the vast majority of sand moved from the north down the Palen Pass associated with winter and early spring wind events and not from the south. One of the two Cal-Trans employees had been performing the sand clean up at Wiley Well rest area for over ten years.

Additional evidence that two prevailing wind directions (SW and W) are significant in the Chuckwalla Valley is provided by work conducted by Tsoar (2004). His work indicates that vegetation densities on dunes increase when the area experiences competing prevailing wind directions. Tsoar (2004) identified that vegetated dunes and unvegetated dune occurrences could be explained via the relationship of dividing the resultant drift potential by the drift potential (RDP/DP). The RDP/DP provides a measure of the variability of the wind where values close to one indicate a narrow unidirectional drift potential, and values close to zero indicate a wide multidirectional drift potential. Tsoar (2004) indicates based on utilizing data from 43 sand dunes sites from all over the world, that unvegetated dunes exhibit a high RDP/DP (they may nearly equal each other) due to most wind power being exerted on the same dune faces, and vegetated dunes exhibit low RDP/DP (RDP << DP) exhibit wind power exerted on multiple dune faces allowing the vegetation a better opportunity to grow.

In other words, when there are competing prevailing winds, vegetation has a higher likelihood of establishment on the dunes, thus causing them to become more stabilized. Dune systems in the Chuckwalla Valley support this finding. In the central Palen Dry Lake area exhibiting mobile barchan dunes, a dominantly west prevailing wind is evident based on field mapping in the area at various times of the year. However, the dunes in the eastern Palen Lake area are much more stabilized and this region exhibits “prevailing winds” from both the west and from the north-northwest where the East Palen Lake and Palen Lake sand migration zones merge. In the eastern Chuckwalla Valley near and within the DQSP site, the linear dunes are very stabilized via vegetation where there is clear geomorphic evidence from field mapping of competing prevailing winds that also support the development of linear dunes.

5.2 Geologic history – Placing dune development in context

It is important to understand the geologic history not only of the dune system itself, but also of the area bounding the dunes. Understanding the geologic history allows for the understanding of what occurred in the area prior to the development of the dunes which leads to understanding when the dunes began to be deposited in the area. For example, in the study area, the evaluation of the alluvial fan stratigraphy utilizing soil profiles (i.e. S0 through S7) that bound the DQSP dune system allowed for the correlation of some of these deposits occurring beneath the dunes, which indicates that the local dunes must have begun their development after deposition of the underlying alluvial deposits. Hence, the creation of the local soil stratigraphic section with estimated minimum soil ages allows for an age estimate of the time in which the dunes encroached into the area (see next section).

Local mapping of older formational units such as those associated with the ancient Colorado River system when it had encroached (inundated) into Chuckwalla Valley and across the Palo Verde Mesa area provides insights regarding the age and rates of geologic processes in the area. For example, ancient Colorado River deposits estimated to be early Pliocene in age occur either at the surface or within 1 to 6 feet of the surface across most of the DQSP area. This indicates that geologic depositional rates have been remarkably slow for well over 3 million years and that the area is Geomorphically stable. Knowledge of the exposure area of these units as well provides insights regarding their contribution to eolian dune and alluvial systems as a sediment source.

5.3 Surface and near surface soil and sedimentary stratigraphic evaluation

An “area specific” stratigraphic section needs to be developed for dune studies of the dune and alluvial deposits to provide a temporal and special context for the local deposits. This can be conducted by the construction of a soil profile stratigraphic section that consists of various soil profiles and their associated age of development, in addition to identifying the parent materials of the sediments prior to the development of the soil profile.

5.3.1 Local Formational stratigraphic section

Designated Formational depositional units typically comprise those that are named and described in published geologic maps and reports which extend over a regional area. Hence, the formational units typically occur not only within the study area, but also regionally which is generally the criteria to justify the formal “formational” name. For dune studies, the identification of formations such as the early Pliocene, Bullhead Alluvium, is important as it provides a structural-stratigraphic marker where exposed across the eastern Chuckwalla Valley, but also because it provided a relatively strong eolian sand source upon erosion along the flanks of the local mountain ranges.

Formational units identified in the study area have been assigned various names although some are the same geologic depositional unit. In addition, mapping during this study identified new exposures of some regionally mapped formational units which assists in understanding the local geologic history.

5.3.2 Subdivide Quaternary Alluvium (Qal) and Quaternary Older Alluvium (Qoaf) utilizing surface and near surface (buried) soil profile stratigraphy

On most published geologic maps, alluvium is quite often simply subdivided into younger versus older alluvial units of Quaternary age (i.e. past 2.6 million years). Consequently, a few members of the relatively younger Quaternary Alluvium (Qal) and relatively older Quaternary Older Alluvium Fan (Qoaf) are identified, which are too poorly defined to be useful for eolian dune studies. Hence, a local alluvial stratigraphic section typically needs to be constructed specifically for a project such as the DQSP. Because many dune studies are most interested in the relatively recent geologic past (Holocene), it is prudent to identify numerous alluvial soil stratigraphic members that developed since the latest Pleistocene. This is important to understand when the dune encroached into the region, which is accomplished by evaluating minimum soil ages for the various alluvial deposits. This can usually be accomplished because alluvial fans have been depositing somewhat consistently since the latest Pleistocene across southeastern California, and particularly in distal fan areas. This is not the case necessarily for older alluvial deposits where a hiatus of alluvial fan deposition occurs between approximately 45 kya to the latest Pleistocene across much of southeastern California. This hiatus of deposition is observed at the site by examining the estimated minimum soil ages of Soil S4 of >35 kya and the next younger Soil S3b estimated to be ~12 to 8 kya (Figure 7A).

Alluvial deposits can be subdivided in most cases based on the evaluation of alluvial terraces that exhibit particular soil profiles (soil horizons). In this way, a stratigraphic section of alluvial deposits can be developed based on the age of the soil and its stratigraphic position. The characteristics of each designated soil profile (i.e. S1, S2, S3a, S3b, S4, etc) are described in places where that soil occurs at the surface and has not been buried. In this way it maximizes the development of that soil. However, during the study, these designated soil profiles are typically identified buried beneath younger soils. This is a powerful tool for the evaluation of alluvial fans and dune systems.

5.3.3 Alluvial vs. eolian soil parent materials (Original depositional environment)

Soil profiles develop when deposits are exposed to the surface of the earth and secondary soil processes occur such as development of soil horizons (A, B and C). Hence, designated soil profiles (i.e. S1, S2, S3a, etc.) developed in whatever sediments were exposed on the surface of the earth whether it was alluvial or eolian. The origin of the original sediments in which a soil profile develops is referred to as the “parent materials”. It is important to determine what the parent material is during stratigraphic mapping of an area because it allows for the evaluation regarding where older eolian verses alluvial deposits occur. For example, if a S1 surface soil estimated to have a minimum age of 5,000 to 3,000 years old (age of the surface) developed in eolian deposits and adjacent alluvial deposits, then this indicates that the alluvial and dune depositional contact has been stable for the past 5 to 3 kya (kya = 1000 years) in that area. In other words, it shows strong evidence that approximately 5 to 3 thousand years ago that active eolian sands were depositing adjacent to active alluvial systems but that this system became dominantly inactive since that time (stable). As discussed in later sections, this is exactly what has been identified in the DQSP area.

5.3.4 Sediment source evaluation

It can be important to evaluate the source of the parent material in alluvial deposits as well. For example, on the Palo Verde Mesa region, the soil profiles (secondary soil properties) were relatively juvenile (young) relative to the ubiquitous pinkish red color that the sediments exhibited. Typically, soils exhibiting pinkish reddish colors are generally interpreted as being older as the reddish hues are assumed to develop over time. However, it is likely that the near surface alluvial deposits across the Palo Verde Mesa area exhibited a reddish hue at the time of their deposition because the parent sediments themselves were slightly reddish in color. The source for the pinkish red parent soil sediments was identified as the Bullhead Alluvium that had eroded along the flanks of the local mountain ranges (McCoy and Mule mountains).

5.4 Geomorphic evaluation during field mapping (Surface mapping)

A Geomorphic evaluation is one that involves identifying geologic features on the surface of the Earth that indicate the genesis of that environment and for dune deposits, the relative activity-stability of the dune areas.

5.4.1 Fluvial vs. eolian Geomorphology (qualitative)

Mapping for an eolian dune study requires identifying specific areas that are dominated by fluvial or eolian geomorphic features. This can simply be done qualitatively by estimating in the field or aerial photographs if a region exhibits predominantly fluvial or eolian characteristics. For example, bar and swale topography indicates that washes (fluvial processes) dominant an area. In contrast, a hummocky, non-draining region exhibiting internal basins (interdune basins) indicate that the landscape is dominated by eolian processes and/or older dune deposits. These data provide important criteria for mapping the contacts between eolian vs. alluvial depositional areas (i.e. the extent of dune deposits). Hence, dune systems are quite complex and bounding areas of relatively thicker dune deposits typically exhibit a gradual change from an eolian dominated area to a fluvial dominated area. To add to the complexities, in some areas of relatively “active” and robust dune systems, surface hydrology such as on occasional ponding in playa lakes and ponding areas in addition to infiltrating washes occur that are critical in providing eolian sand source and stabilizing moisture.

5.4.2 Evaluation of the extent and type of active vs. eroding-stabilized dunes (qualitative)

Within dune systems, an assessment (either quantitative or qualitative) of the relative activity of the dunes needs to be determined. For example, are older dune sands eroding and providing an internal eolian sand source for downwind dunes? What is the type of active eolian sands migrating within the system – new eolian deposits compared to possibly older dune forms that once were active and are now eroding? Answers to these questions provide very important information regarding the current “health” of the dunes and about the history of the dunes. For example, if the only active eolian sands (migrating via the wind) are sand sheets and small coppice dunes, and relatively larger dune mounds or linear dunes are eroding away and degrading, then this indicates that the dune system was more robust in the past than it is today. This is the case for most dune systems across the southeastern California region. These criteria are described later in this report utilizing the Geomorphic Unit Designations. In this study, a qualitative assessment of the extent and type of active vs. eroding-stabilized dunes was conducted.

5.4.3 *Relative sand migration zone rates (qualitative)*

In dune systems, sand migration rates vary considerably. This is evident by the types of active eolian sands (i.e. sand sheets, coppice, dune mounds, linear dunes, transverse dunes, etc.) that occur in an area, and of course, sand migration rates decrease remarkably near the edges of the dune system. Evaluating dunes systems utilizing relative sand migration zone rate designations based on dune geomorphology and types of active dune forms is very useful in that it provides data that can be mapped allowing for a relatively quick assessment within a dune system regarding where the fastest and slowest sand migration zones occur. Combining the relative sand migration rate zones with the Geomorphic Unit Designations indicating which areas are active, stable or eroding provides a system where once mapped, the geomorphology of an area can be more readily interpreted and assessed.

5.4.4 *Local topography across eolian dune systems*

An evaluation of the local topography and even subtle variations in topographic relief results in variations in wind speed which leads to areas of relatively increased or decreased eolian deposition and/or erosion of older dune deposits (abrasion). For example, if the wind is forced to rise as it encounters an upward slope, it can increase in velocity which increases its potential to carry more eolian sand and its ability to erode previously deposited “relict” dunes; however, as the wind moves over the topographic high, the wind speed will lower, which decreases its ability to transport eolian sands leading potentially to an increase in eolian deposition on the leeward site. As shown in this study at the topographic sill associated with the eastern termination of Chuckwalla Valley and the western boundary of the Palo Verde Mesa, a subtle topographic rise has affected the depositional areas and lateral extent of the relatively weak eolian dune systems.

5.5 Eolian sand sources

The evaluation of eolian sand sources was a large component to this study. Sand dunes have had a sense of mystery about them regarding why they occur in some places, and not in others, or why some dune systems appear to be more robust than would likely seem to be the case. Some of this mystery however is answered by more fully investigating eolian sand sources and combining that with established (documented) eolian sand sources. In terms of “dune mitigation and conservation”, it is critical to understand the origin of the eolian sands and particularly whether the sand was derived from near-field source (local) or far-field sources (regional). Over the course of the Holocene, it is likely that eolian sands within a dune system are both from near-field and potential relative far-field sources. Indeed, Pease and Tchakerian (2003) indicate that eolian sand sources can vary between fluvial and playa sources, but also suggest that these sources were “local”. Ramsey et al. (1999) evaluating the Kelso Dunes indicate that eolian sands derived from local and far-field sources fluctuated over time and both played an important role during the development of the large Kelso Dune system. Based on the findings of this report, it is likely that most newly generated eolian sands (late Holocene) across most of southeastern California are dominantly generated from local sources and particularly in the DQSP.

5.5.1 Washes

Washes that flow from the desert mountains to local base level along the valley axis provide a significant source for eolian sands. Numerous publications indicate that washes are a very important if not dominant source of eolian sands in the southeastern California region (Lancaster, 1997; Muhs et al., 2003; Pease and Tchakerian, 2003). Washes are also important as they transport sand to pluvial, playa lakes and ponding areas. Blackwelder (1931) indicated that playa lake beds in the southwestern United States are a strong eolian sand source due to his observation of deep abrasion across their surfaces.

Drainage system flow transports eroded eolian size sand grains to a region where the sands can be picked up by the topographically controlled prevailing winds commonly occurring within the valley axis. It is easily observed in the field, that fresh eolian sands emanate from a wash soon after it flows once a sufficiently strong wind is available to mobilize the sand. This is observed not only for relatively large washes that are hundreds of feet across but also washes as small as 3 feet across and less than one foot bar and swale (or terrace) relief. Within hours to a couple of days of strong winds occurring after a flow, a surface capping layer of gravel size clasts develop on the surface. Once the capping protective layer forms, eolian sand production from the wash via entrainment by the wind dramatically decreases. Hence, washes that flow more often will produce more eolian sands, and washes associated with larger drainage areas (watershed aerial extent) tend to flow more frequently to the valley axis than smaller ones. In contrast to washes that primarily produce eolian sand soon after flow, pluvial and playa lake beds can continue to abrade resulting in ongoing eolian sand production for years once dry, or the abrasion continues until moist sediments are exposed.

There are numerous parameters regarding how much eolian sand washes will produce. Important eolian sand generating parameters to consider regarding drainage systems is their local relief (bar and swale), its style of flow (tributary vs. distributary), size of their water shed, its orientation to prevailing winds, and volume of eolian size grains being transported due to upstream erosion of older sandy deposits (i.e. older alluvium, ancient Colorado River or older fan deposits). Relatively low bar and swale relief between the wash and channel wall elevation allows stream wash derived eolian sands to migrate outside of the wash system.

Distributary drainage systems associated with active alluvial fan areas generally do not result in relatively strong eolian sand generation. In addition, distributary drainage systems occurring in the distal portion of the fan do not flow frequently as the channel flow continues to decrease as the channels bifurcate. Tributary drainage systems where flow is progressively concentrated downslope from the merging of upslope washes (either from tributary or distributary systems) can produce relatively large volumes of sediment that can produce eolian sand, particularly when they reach the valley axis. Tributary drainages systems due to concentrating flow from a large area flow more frequently and with larger water volumes. This allows these robust washes the ability to reach the valley axis more often resulting in more abundant eolian sand production. In addition, if the tributary flow near the valley axis consists of a braided wash system with relatively low bar and swale relief, it results in relatively strong eolian sand generation. The orientation of washes is also important. Wash systems that flow sub-parallel to the prevailing wind direction and/or in the region of the valley axis are observed to produce more eolian sands than washes that flow perpendicular to the prevailing wind.

5.5.2 *Granitic rocks in the mountains*

Granitic rocks erode mechanically to “decomposed granite” which are predominantly sand size grains. Hence, when granitic rocks erode, they generally produce a relatively large component of eolian size sand grains to be potentially transported by local washes. Numerous publications indicate or suggest the importance of granitic rocks as a source for eolian sands in southeastern California (Ramsey et al., 1999; Zimbelman and Williams, 2002; Pease and Tchakerian, 2003). It is observed that dune systems across southeastern California that occur downstream from abundant granitic rocks are generally more robust than would be the case if the granitic rocks did not occur. Granitic rocks are exposed throughout the study area and typically, relatively robust eolian systems do occur in valleys and sand ramps (passes) adjacent to mountains exhibiting large exposures of granitic rocks (Plate 1 and Plate 2). The granitic rocks shown on Plates 1 and 2 are considered relatively significant local sources for eolian sands for valley dune systems.

5.5.3 *Playa and pluvial lakes*

Playa and pluvial lakes are lacustrine areas considered to possibly be the most important source of eolian sands for dune systems across southeastern California, or it may be that strong eolian aggradational events or re-activation periods simply correlate with when pluvial lakes dry up and their contribution to eolian systems may be approximately equal with that of washes. Pluvial lakes are those that filled with water and remain relatively full for thousands of years during the major glaciation events. Playa lakes, or also referred to as “dry lakes” are basins that are believed to have not filled up for thousands of years during glaciation periods but did fill and recede regularly during those times. Pluvial lakes provide eolian sands during the relatively warmer inter-glacial periods when they have dried up but oddly, also result in robust eolian production during times of intermittent fluctuating lake levels as discussed later. Numerous publications indicate that lacustrine surfaces are an important source of eolian sands or simply surfaces that can erode by abrasion suggesting an eolian source via the production of dust storms (Blackwelder, 1909; Ward and Greeley, 1984; Tchakerian, 1991; Gill and Cahill, 1992; Zimbelman, et al., 1995; Cahill, et al., 1996; Gill, 1996; Lancaster, 1997; Lancaster and Tchakerian, 1996; Rendell and Sheffer, 1996; Pease and Tchakerian, 2003; Orme, 2004; Reynolds et al., 2009; Whitney et al., 2015). The studies provide very strong evidence that lacustrine environments (playas and pluvial lake beds) provide large magnitudes of eolian sand for dune systems on the lake beds and downwind.

Many moderate to major dune systems in southeastern California emanate from relatively large lake basins exhibiting pluvial and playa lake areas. These include Lake Manix (pluvial lake for Coyote, Troy and Afton basins/lakes), Lake Mojave (pluvial lake Soda and Silver lake basins), Salt, Bristal, Cadiz, Danby, Dale, Palen and Ford dry lakes (Plate 1). Bristal, Cadiz and Danby lakes (basins) may have experienced lake levels for sufficiently long enough periods of time during glacial maximums to be considered pluvial lakes (Enzel et al., 2003). Lake Manix is interesting in that it was a “pluvial lake” up until approximately 19 kya (Miller, 2005) when it may have drained relatively quickly through Afton Canyon, but did fill to lower levels periodically as sub-lakes (including Soda Lake) up to about 13 kya. However, Enzel et al. (2003) and Wells et al. (2003) believe that Afton Canyon eroded via time transgressive incision lasting over a few thousands of years, but indicate that this is also a geologically rapid event. Lake Manix was part of a pluvial lake system including Silver Lake and Soda Lake appears to have dried up by approximately 13 kya (Plate 1).

Lake Manix is believed to have fed the Silver and Soda lake basins sufficiently to result in the development of the pluvial Lake Mojave (Enzel et al, 2003; Wells et al., 2003). The data indicates periods of intermittent lake levels where Lake Mojave filled and receded numerous times for more than several thousand years and periods of time where the lake remained relatively full. These are important data for the evaluation of eolian systems because as discussed in Kenney (2012) and Schaaf and Kenney (2016), dune systems immediately just outside the playa area receive a “pulse” of new eolian sands soon after lake levels recede, such as in the case of Keeler Dunes at Owens Lake, California. This is because soon after lake levels drop, the lake bed is fully exposed allowing for high wind-blown sand mobility (low vegetation) and the recent lacustrine deposits are also easily mobilized. In addition, washes flowing over the newly exposed lacustrine deposits produce more eolian sands compared to them flowing on a lake surface that had been exposed for longer periods of time. Eolian systems adjacent and downwind from playa and pluvial lakes receive an order of magnitude more eolian sand during times when the lakes are “intermittent” with multiple rising and falling water levels compared to more stable lake level. For example, it is proposed that this is the case for Kelso Dune aggradational events that correlate temporally with the intermittent lake levels documented for Lake Mojave by Enzel et al, (2003; Plate 8A, Plate 8B and Plate 8C).

Playa lake beds, like pluvial lake beds, as a source of eolian sand are complex as some are considered wet, and others dry, which plays a role in the type and magnitude of eolian sands emanating from their surfaces (see Reynolds et al., 2007). Dune systems can form downwind from salt-pan surfaces associated with “wet” playa and pluvial lakes that result in the development of clay and lunette dunes as described by Bowler (1973) and Thomas et al. (1993) respectively. Groundwater levels across the lakebed surface is also a critical factor. Sand bearing wind abrasion of lakebed sediments will occur rapidly but will decrease in rate exponentially once the abrasion depth reaches moist sediments. Other factors include the composition of the lakebed sediments, for example, their relative factions of clay, silt and sand and of course, variations of wind speeds across the lake bed surfaces.

It is important to point out that two playa lakes (Ford and Palen) and ponding areas (Wiley’s Well Basin and the Palowalla ponding area) occur in the Chuckwalla Valley that produce their own eolian sand source locally when they fill and dry periodically. These areas also receive new eolian sand-sized sediment from local washes in the sense that more eolian sand is generated in regions of the playas where wash systems flow onto the playa that both transport new sand to the playa and the washes themselves generate fluvially derived eolian sands. These are Palen and Ford dry lakes in the western and eastern Chuckwalla Valley respectively. As a side note, it has been observed by the author in the Chuckwalla Valley, that relatively heavy rain landing on playa surfaces are sufficient to cause minor wash flow on the subtle drainage system on the lakes and result in the production of new eolian sands once sufficiently strong winds occur. For cool Pacific storms, strong but dry prevailing winds commonly occur within a week after the passing of the storm. Heavier flooding and associated erosion from warmer dry-season summer monsoonal storms disturb playa surfaces and erode into existing playa lake bed dunes providing new eolian sands to be mobilized during the next prevailing wind.

5.5.4 Ponding areas

Ponding areas and playa lakes described above are similar in that they are areas that flood and dry out relatively frequently. The only difference and defined herein, is that “ponding areas” are not sufficiently large enough to be mapped as a playa lake bed. The term “ponding areas” is utilized herein because these smaller scale “lake beds” are locally significant for dune systems but can be overlooked as an area behaving as a playa surface. For example, most of the eolian sands in the eastern Chuckwalla Valley and Palo Verde Mesa are derived from local ponding areas and their associated washes. These include the Wiley’s Well Basin west of the site (Plate 4), the Palowalla Wash ponding area immediately west of the Blythe 21 solar facility (Figure 12), and a ponding area in the southwestern region of the site.

5.5.5 Washes and Alluvial fan aggradational events

Based on the review of alluvial fan aggradational events in southeastern California since the late Pleistocene (discussed later in the report), it is evident that eolian systems receive more eolian sand during relatively strong alluvial fan aggradational events. Hence, there is a positive correlation with alluvial fan and eolian dune system deposition (See Plate 8A, Plate 8B and Plate 8C). Publications such as Harvey et al. (1999) and Miller et al. (2010) indicate that alluvial fan aggradational events occurred during periods of time when cool/wet Pacific storm systems subsided and warm Monsoonal (thunderstorm) storm frequency of events increased across the southwestern United States. Leeder et al. (1998) identified that alluvial fans in the southwestern United States received reduced sediment supply, despite increased runoff (i.e. precipitation) evident from local lake (lacustrine) levels. They indicate that these periods of times occurred during glacial maximum climates and were characterized by higher effective moisture (presumably from Pacific storm systems) and the spread of woods and forests to lower elevations. Hence, the findings by Leeder et al. (1998) indicate that alluvial fans likely did not undergo aggradational events during times of stronger Pacific Storm systems. Therefore, alluvial fans likely aggraded under different climatic conditions, which occurred during periods of increased monsoonal storm activity.

It is proposed that similar conditions for alluvial fan aggradational events proposed by Harvey et al. (1999) and Miller et al. (2010) also lead to eolian aggradational and re-activation events.

5.5.6 Alluvial fan trenching (down-cutting)

Lancaster (1997) observed that eolian systems may be closely tied to geomorphic instability and channel cutting. This led to the evaluation of the timing of alluvial fan trenching in the upper reaches of alluvial fans across southeastern California and that may correlate with eolian aggradational or re-activation events due to an increase in eolian sand generation. The results of this analysis are consistent with that of Lancaster (1997) indicating that channel cutting (alluvial fan trenching) is an important parameter in re-activation and/or small dune aggradational events since the end of the early Holocene (i.e. past ~8,000 years). It is evident that if washes are eroding into older alluvial fan deposits that contain a relatively high concentration of eolian size sand grains, that those washes would contribute more eolian sands than if the washes simply flowed from the mountains to base level without erosion of the older fan deposits.

Miller et al. (2010) indicate that cool-season (winter) Pacific frontal storms cause river flow, ephemeral lakes, and alluvial fan incision, whereas periods of intense warm-season storms (monsoonal) cause hillslope erosion and alluvial fan aggradation. These conclusions indicate that washes even during periods of increased cool Pacific storm systems (i.e. frequency and magnitude at latitudes of the study region) likely transport a significant amount of eolian sands that potentially could increase eolian source. This potential increase in eolian sand generation during this type of climate could occur during times of decreased monsoonal storm frequency and strength. However, the increase in vegetation density at lower elevations where dune systems reside may inhibit eolian sand migration, and it is possible that during periods of more intense Pacific storm systems and associated fan-trenching that eolian sands are stored up near fluvial base levels. These sediments could then re-mobilized to contribute to eolian systems when Pacific storms subside and monsoonal storm systems increase spatially and temporally.

5.5.7 Exposed and eroding older sedimentary units

In the Chuckwalla Valley, and other valleys as well across southeastern California, older relatively fine grained sediments are exposed within the valleys and flanks of the mountain ranges that can erode easily by sand bearing wind abrasion and channel down cutting. Hence, where exposed and eroded, these older sediments can provide a strong source of eolian sands. This significant source of eolian sands was identified during this study by observing increased and sometimes isolated areas of eolian sands in regions of exposed Bullhead Alluvium along the edges of the Chuckwalla Valley. For example, exposures of Bullhead Alluvium which deposited during the early Pliocene when the Colorado River engulfed the Chuckwalla Valley, occurs along the flanks and within the valleys of the Mule Mountains. It is evident that where this formation is exposed and eroding, that it produces significant volumes of locally derived eolian sands. In some places, older and abandoned pluvial and playa lake deposits also produce abundant eolian sands. An example of this is west of Dale Lake (Plate 1). The same process of the erosion of sandy older sediments contributing significant eolian sand to local dunes occurs east of the Colorado River in the Parker Dunes (Plate 1). In this area, older Colorado River system deposits are exposed and commonly occur along the flanks and beneath the dune deposits which are eroding resulting in the production of eolian sands.

5.5.8 Alluvial fan depositional areas

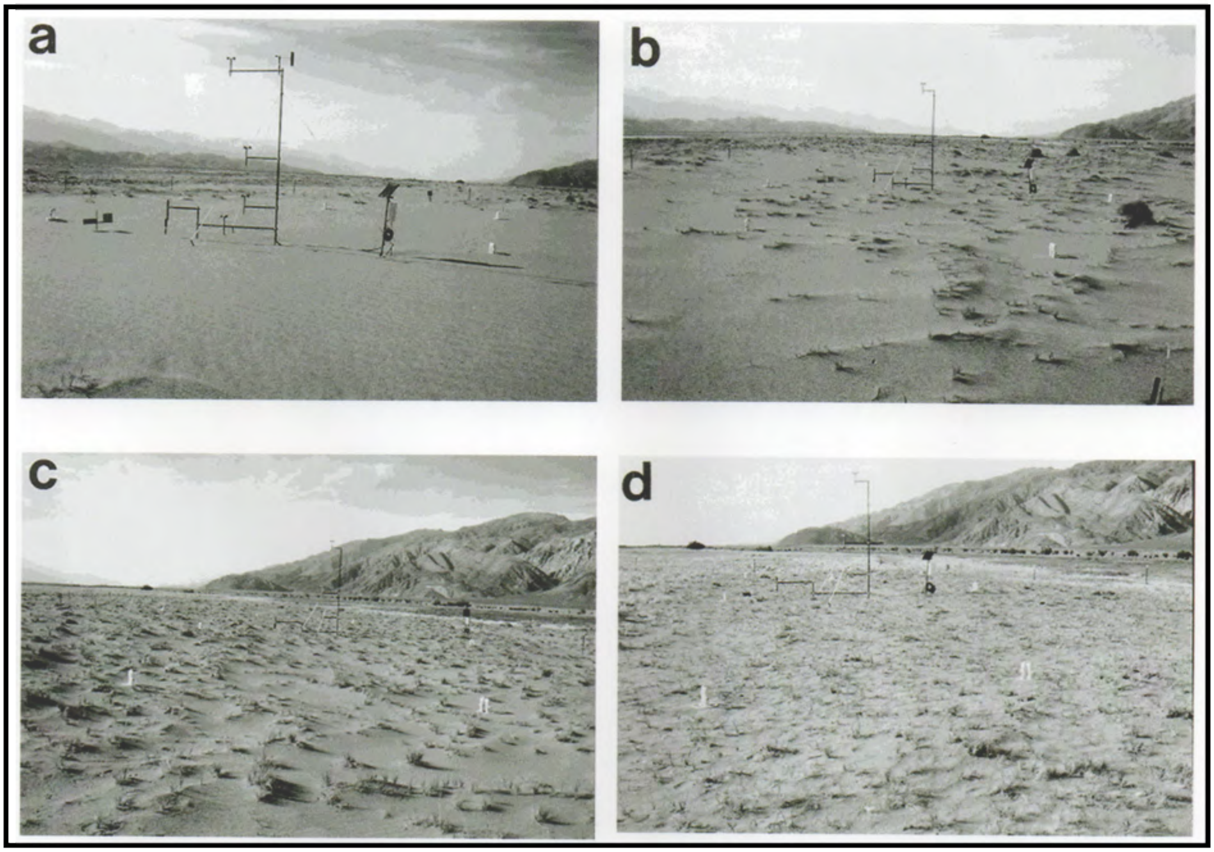
Alluvial fan processes likely contribute relatively more eolian sand to valley axis dune systems if the alluvial fans are aggrading in the distal fan portion of the fan system which typically occurs near the valley axis. During these times, sediment transport by the washes carries the sediment all the way to the valley axis where the sand is then deposited. Wells and Dohrenwend (1985) indicate that it was during the latest Pleistocene to mid Holocene that alluvial fans in the southwestern United States region primarily deposited in the distal portions of the fan and not near the mountain front as they had done previously (periods of glaciation). This is an important aspect of fan deposition in terms of eolian systems because most dune systems exhibited aggradational events during the same time period that Wells and Dohrenwend (1985) indicated that alluvial fans were also aggrading near the valley axis. This time period from the late Pleistocene to early Holocene also coincides with sporadic alluvial fan head trenching (proximal area of the fan) which is proposed to result in washes transporting relatively more sand size grains to the valley axis region. These processes lead to an increase in eolian sand production.

5.6 Dune vegetation - Dune stabilization and sand migration rates

The density of vegetation in dune deposit areas is a very important parameter in terms of dune stability and sand migration rates. Lancaster et al. (1998) conducted a significant well controlled study evaluating the relationship between plant aerial coverage density and sand migration rates on a playa lake bed (Figure 5). Their results indicate that just a 10% aerial coverage of plants that are less than one foot tall decreases eolian sand migration rates by 90%. This result is quite astounding and indicates that minor vegetation densities essentially decrease eolian sand migration rates exponentially.

The dunes immediately north of the north boundary of the DQSP exhibit vegetation densities a minimum of 10 to 15%, during years of essentially no growth of the invasive species “Sahara Mustard” (*Brassica tournefortii)*, but can increase to well over 50% during a season and following year of strong Sahara Mustard growth. Field mapping in December of 2010 and April 2011 identified a dense population of non-native and invasive Sahara Mustard (*Brassica tournefortii)* extending within the dune system east of Wiley Well Road to DQSP. During strong Sahara Mustard growth, eolian sand migration, and internal dune erosion, is nearly completely shut down.

Figure 5: Images from Lancaster et al. (1998) evaluating the relationship of vegetation densities and eolian sand migration rates on Owens Lake, California.



5.7 Types of dune forms (Sand Sheets, Coppice, Mounds, Linear, Transverse, Star Dunes - Complex)

Various types of eolian dune deposits occur in the Chuckwalla Valley and each provides evidence regarding prevailing wind directions and relative sand migration rates. Sand sheets are active sand moving across relatively planar surfaces. Ripple marks are quite common on active sand sheet deposits. If the amount of active eolian sands present are very low, sand sheets will be the only active type of active dune deposits identified.

Coppice dunes form at the base of a single plant and can be a few inches tall to over 4 feet. If moderate amounts of eolian sand are migrating through the system, active dune sands will be in the form of sand sheets and small coppice dunes. Dune mounds can be large coppice dunes but at the base of multiple plants, or simply a relatively wide mound of dune sands that do not exhibit any avalanche faces. They appear to form in areas of relatively dense vegetation where the active sand sheets are attempting to navigate through the system.

Linear dunes develop at moderate angles to the prevailing wind and in areas with competing prevailing winds. Linear dunes occur along the Gen-Tie corridor north of the Colorado River Substation and the eastern Chuckwalla Valley-western Palo Verde topographic sill (Plate 5). It is believed that the linear dunes west of the DQSP result from the competing southwesterly and westerly prevailing winds. The high vegetation density of the dunes and star dunes (described below) in the area support this conclusion. Linear dunes when robust typically migrate via extending in the direction of the prevailing wind and parallel to sub-parallel to their dune axis. However, the linear dunes in the Wiley’s Well Basin dune system are strongly stabilized and only exhibit seasonal, scattered, and less than 2 feet tall avalanche faces.

Transverse dunes form at high angles to the prevailing winds and generally exhibit avalanche faces when active. They can be as small as just a foot tall, but in some places in the study area are over 8 feet tall (i.e. west of Wiley’s Well Road).

Star dunes form locally when competing prevailing winds occur in the area and there is a relatively robust amount of eolian sand in the system. For this reason, star dunes are also sometimes called complex dunes. These types of dunes occur in the northeastern region of the herein named Wiley’s Well Basin where the basin itself is a ponding area providing a relatively robust amount of eolian sand locally.

In many places in the study area, and observed across southeastern California, dune types that require relatively more eolian sands migrating through the system (i.e. star dunes, transverse, linear, mounds, and even coppice in some places) are eroding away, and the only active eolian sands are associated with sand sheets. This indicates that most eolian dune systems across southeastern California were more robust in terms of the magnitude of eolian sand migration than they have been during the latest Holocene.

5.8 Surface water hydrology – Eolian sand source and dune stability

The evaluation of surface water hydrology in terms of the location of drainages, types of drainage systems, drainage system watersheds aerial extent, and potential erosion into older sedimentary units greatly assists in understanding local sources of eolian sand for local dune systems. Hence, this analysis provides evidence and an avenue to recognize “micro” sand migration zones.

5.8.1 Drainage Analysis

A drainage analysis consisting of mapping individual drainages from its base level to its head waters provides valuable information regarding dune development, eolian sand sources, and dune stability. Washes transport at one time most of the eolian sand that ends up within dune systems whether to playa, pluvial or ponding areas, or from eolian sands being entrained directly from the wash itself. Drainages are evaluated to determine areas dominated by distributary or tributary systems. Wash systems that display an overall tributary flow system to the valley axis are identified as resulting in an increase of eolian sand production. In other words, tributary drainage systems near the valley axis that provide flow from nearly the entire watershed area will flow more frequently, stronger, and will more often flow to the valley axis (base level) which leads to production of more eolian sand to dune systems in this area. Regional and local mapping of wash and dune systems across the study region (southeastern California) shows strong evidence that the terminal tributary wash systems that drain most of the watershed area provide relatively abundant eolian sands compared to distributary drainage systems across active alluvial fan surfaces. It is interesting to note that mapping by the author has observed that “blue line” ephemeral drainages shown on USGS topographic maps in the region of dune systems across southeastern California quite often are sufficient to provide a significant source of eolian sand to the local dunes.

A drainage analysis will allow for an understanding of relative magnitudes of sand the drainages are transporting. For example, mapping can identify drainages eroding into older sediments (i.e. alluvial fan trenching or erosion into local Pliocene sediments) consisting of abundant eolian size grains to be transported to dune systems downslope.

5.8.2 Local watershed areas

Evaluation of the watershed area for various local drainage systems in this study indicates that there is a correlation between the size of the water shed, and the relative amount of sediment produced by that drainage system and hence the volume of eolian sand that can be produced from these sediments. Hence, identifying the aerial extent of the watershed to relatively major terminal drainage systems provides supportive evidence regarding the eolian sand contribution that wash system can provide to valley axis dune systems. Cloud bursts from thunderstorms quite often downpour heavy rains in relatively small areas. Hence, if the watershed is larger, the likelihood of that drainage system experiencing heavy flow sufficient to reach the valley axis (base level) increases accordingly.

5.8.3 Bar and swale relief – braided vs. channelized

Field work indicates that eolian sand is transported out of a wash area to enter eolian systems if the topographic relief of the washes (bar and swale relief) is relatively low. If the channel walls are over 3 to 4 feet tall, eolian sands are often produced in the wash between storms, but quite often these eolian sands remain within the drainage system and are unable to escape to enter an eolian system beyond its banks. Bar and swale relief generally decreases downslope to coincide with area near the valley axis where prevailing winds are strongest.

5.8.4 Ponding areas

Ponding areas are where surface flow waters stop flowing and pond within a relatively small basin, but not large enough to be considered or previously mapped as a playa lake. Some ponding areas are natural which locally include the Wiley’s Well Basin in the eastern Chuckwalla Valley and along the southwestern region of the DQSP (Plate 3A). However, some ponding areas are man-made which include numerous borrow pits associated with the construction of Interstate Highway 10, portions of the north side of Highway 10, and a ponding area west and south of the Blythe 21 Solar Facility. Ponding areas, and particularly those associated with flow from numerous and/or large watershed drainage systems are an important source for eolian sands. This is because they are frequently flooded and this dynamic nature of its surface (disturbed frequently) allows for eolian sands to be blown out of the ponding area. Ponding areas are mapped as Soil S0 as well as the washes in this report.

5.8.5 Extent to which water infiltrates (reaches) dunes – Anthropogenic effects

A local drainage analysis evaluating drainages from their headwaters (entire watershed) to the base level typically near the valley axis where most dunes and ponding areas occur is an important parameter to evaluate during dune studies. This evaluation allows for not only providing insights regarding a qualitative assessment of how significant a wash and ponding area may be in terms of providing as a source of eolian sand for dune systems (discussed earlier), but also in terms of providing stabilizing moisture to the dunes. For many dune systems across southeastern California, overland wash flow reaches the dunes and ponds up either along the edge of the dune depositional area, or flow slowly through the dune system to pond within interdune depressions. This allows for infiltration of the water into the dune systems and increase their stability.

Dune systems, which may be naively assumed to develop in “dry environments” and thought to not require moisture for their stability, do in fact require moisture for their long-term stability. Wind abrasion within dune systems can erode older dune deposits quite rapidly if the dune sediments are dry, but the rate of erosion decreases exponentially to very low rates once the abrasion encounters moist dune sands. In addition, the dune systems vegetation which increases dune stability have also developed over time due to receiving moisture from natural drainage flow. Dune systems can react quickly (decadal scale) to a decrease in moisture allowing for older dune deposits to erode. This was proposed by Kenney (2012; also see Shaaf and Kenney, 2016) that documented abrasion rates into older relict dunes was initiated and continued to increase over the course of over three decades in the Keeler Dunes of eastern Owens Lake associated with water flow diversion berms constructed upslope in the 1940s and associated drying the dunes. Hence, dune systems can adjust relatively quickly (i.e. faster than alluvial fan systems) to variations in moisture either due to anthropogenic or climate variations. Changes in the overland flow waters received or not received by a dune system can thus lead to relatively fast changes in dune stability and dynamics.

6.0 DESIGNATIONS FOR RELATIVE SAND MIGRATION RATE ZONES, SOIL STRATIGRAPHY, AND GEOLOGIC UNITS FOR EOLIAN SYSTEMS

The approach of this study is consistent with previous geomorphic and stratigraphic evaluations of eolian systems written by the author that define various relative sand migration zone designations and soil profile stratigraphy designations (Kenney, 2010a, 2010b, 2010c, 2010d, 2010e, and 2011). The approach of establishing a series of geomorphic and soil stratigraphic designation greatly assists in the ability to map areas utilizing the designations, and processing the vast data into coherent maps that can be relatively easy to interpret. Hence, they assist in the ability to map and characterize variations in the alluvial and dune geomorphology, activity and age. In addition, new Geologic unit designations are utilized to allow for communication of the geomorphic eolian activity and/or stability of various regions. Hence, the sand migration zone designations provide an understanding of the general eolian activity level, the soil profile stratigraphy provides information on the sediments age, history, and parent material, and the Geologic unit designations indicate if a region is dominated by eolian vs. fluvial systems, and if the eolian dominated area is stable or exhibiting net erosion.

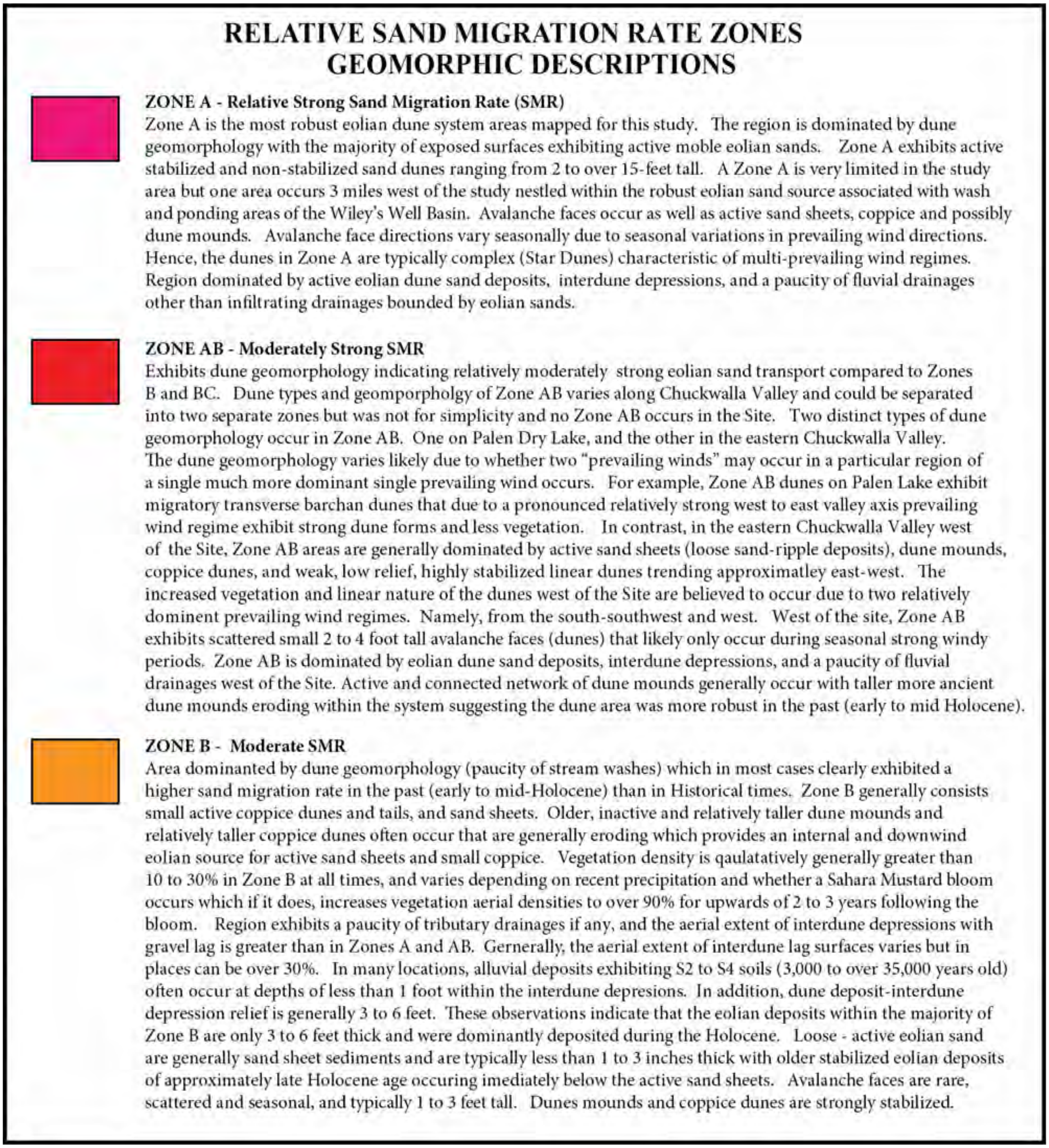
6.1 Relative Sand Migration Rate Zones designations

Geomorphic mapping was conducted of the local and regional eolian dune systems utilizing a series of relative sand migration rate zone designations that sequentially describe progressively decreasing dune activity which is suggested to correlate with relative eolian sand migration rates. Hence, this system provides a method for mapping a dune region showing variations in both dune geomorphology and relative sand migration of wind-blown sand. The method also allows for mapping areas dominated by fluvial verses eolian geomorphology. For example, Zones A, AB, B, and BW are dominated by eolian geomorphology. Zone BC typically exhibits a mixture of fluvial and eolian geomorphology but in most instances, exhibits over 50% in aerial extent eolian geomorphology. Areas mapped as Zone C are dominated by fluvial geomorphology however, minor eolian sands do migrate in these areas but not sufficiently strong to allow for significant eolian deposits.

One advantage to this method of mapping compared to Lancaster (2014) is that even regions where the eolian deposits may be less than 1-foot thick, if the area exhibits actively moving sands, and the area is dominated by eolian geomorphology, the region will likely be mapped as a dune deposit area. Lancaster (2014) defines actives dunes a being at least 1.5 meters thick. It has been observed that even in areas dominated by relict (dormant) eolian deposits that no longer receive sufficient eolian sands to maintain the older more “robust” dune forms, will be mapped in this system as a dune area because even within older dune systems, there is nearly always some active sand sheet and coppice dunes. The definitions of the various zones also reflect the very common occurrence of the older more robust dune system that is no longer “active” and instead is overprinted by eolian deposits and activity that require considerably less migrating sand.

Photographs of the various relative sand migration rate zones within the DQSP are provided in Appendix C.

Figure 6A: Descriptions of Relative Sand Migration Rate Zones from the strongest to weakest – Zone A, Zone AB and Zone B.



RELATIVE SAND MIGRATION RATE ZONES
GEOMORPHIC DESCRIPTIONS

🟪 **ZONE A - Relative Strong Sand Migration Rate (SMR)**

Zone A is the most robust eolian dune system areas mapped for this study. The region is dominated by dune geomorphology with the majority of exposed surfaces exhibiting active moble eolian sands. Zone A exhibits active stabilized and non-stabilized sand dunes ranging from 2 to over 15-feet tall. A Zone A is very limited in the study area but one area occurs 3 miles west of the study nestled within the robust eolian sand source associated with wash and ponding areas of the Wiley's Well Basin. Avalanche faces occur as well as active sand sheets, coppice and possibly dune mounds. Avalanche face directions vary seasonally due to seasonal variations in prevailing wind directions. Hence, the dunes in Zone A are typically complex (Star Dunes) characteristic of multi-prevailing wind regimes. Region dominated by active eolian dune sand deposits, interdune depressions, and a paucity of fluvial drainages other than infiltrating drainages bounded by eolian sands.

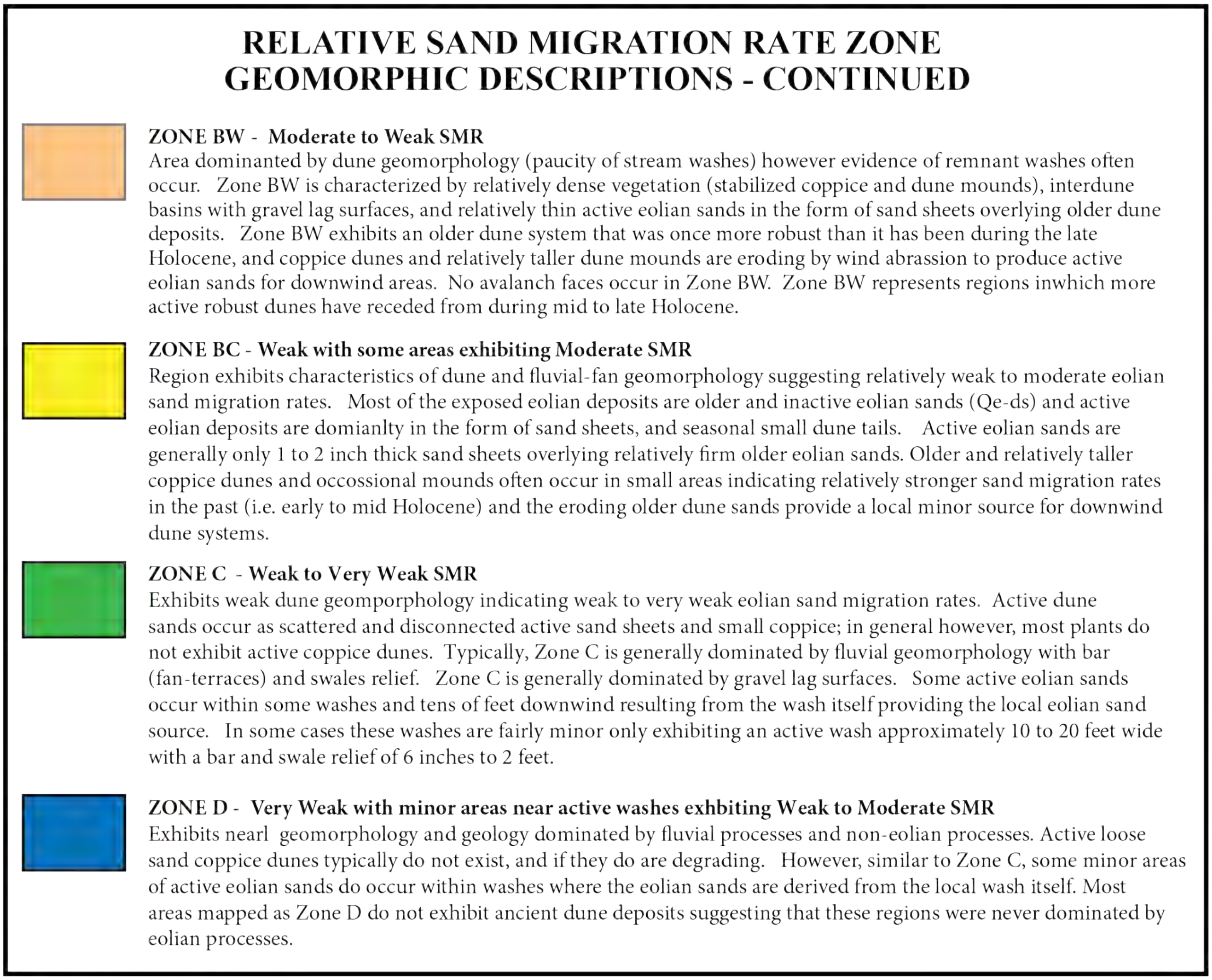
🟥 **ZONE AB - Moderately Strong SMR**

Exhibits dune geomorphology indicating relatively moderately strong eolian sand transport compared to Zones B and BC. Dune types and geomporpholgy of Zone AB varies along Chuckwalla Valley and could be separated into two separate zones but was not for simplicity and no Zone AB occurs in the Site. Two distinct types of dune geomorphology occur in Zone AB. One on Palen Dry Lake, and the other in the eastern Chuckwalla Valley. The dune geomorphology varies likely due to whether two "prevailing winds" may occur in a particular region of a single much more dominant single prevailing wind occurs. For example, Zone AB dunes on Palen Lake exhibit migratory transverse barchan dunes that due to a pronounced relatively strong west to east valley axis prevailing wind regime exhibit strong dune forms and less vegetation. In contrast, in the eastern Chuckwalla Valley west of the Site, Zone AB areas are generally dominated by active sand sheets (loose sand-ripple deposits), dune mounds, coppice dunes, and weak, low relief, highly stabilized linear dunes trending approximatley east-west. The increased vegetation and linear nature of the dunes west of the Site are believed to occur due to two relatively dominent prevailing wind regimes. Namely, from the south-southwest and west. West of the site, Zone AB exhibits scattered small 2 to 4 foot tall avalanche faces (dunes) that likely only occur during seasonal strong windy periods. Zone AB is dominated by eolian dune sand deposits, interdune depressions, and a paucity of fluvial drainages west of the Site. Active and connected network of dune mounds generally occur with taller more ancient dune mounds eroding within the system suggesting the dune area was more robust in the past (early to mid Holocene).

🟧 **ZONE B - Moderate SMR**

Area dominanted by dune geomorphology (paucity of stream washes) which in most cases clearly exhibited a higher sand migration rate in the past (early to mid-Holocene) than in Historical times. Zone B generally consists small active coppice dunes and tails, and sand sheets. Older, inactive and relatively taller dune mounds and relatively taller coppice dunes often occur that are generally eroding which provides an internal and downwind eolian source for active sand sheets and small coppice. Vegetation density is qaulatatively generally greater than 10 to 30% in Zone B at all times, and varies depending on recent precipitation and whether a Sahara Mustard bloom occurs which if it does, increases vegetation aerial densities to over 90% for upwards of 2 to 3 years following the bloom. Region exhibits a paucity of tributary drainages if any, and the aerial extent of interdune depressions with gravel lag is greater than in Zones A and AB. Gernerally, the aerial extent of interdune lag surfaces varies but in places can be over 30%. In many locations, alluvial deposits exhibiting S2 to S4 soils (3,000 to over 35,000 years old) often occur at depths of less than 1 foot within the interdune depresions. In addition, dune deposit-interdune depression relief is generally 3 to 6 feet. These observations indicate that the eolian deposits within the majority of Zone B are only 3 to 6 feet thick and were dominantly deposited during the Holocene. Loose - active eolian sand are generally sand sheet sediments and are typically less than 1 to 3 inches thick with older stabilized eolian deposits of approximately late Holocene age occuring imediately below the active sand sheets. Avalanche faces are rare, scattered and seasonal, and typically 1 to 3 feet tall. Dunes mounds and coppice dunes are strongly stabilized.

Figure 6B: Descriptions of Relative Sand Migration Rate Zones from the strongest to weakest – Zone BW, Zone BC, Zone C, and Zone D. Note that Zone D is not mapped on the plates and figures within this report is for the most part assumed to occur outside of the mapped regions of the other relative sand migration rate zones.



RELATIVE SAND MIGRATION RATE ZONE GEOMORPHIC DESCRIPTIONS - CONTINUED

🟧 **ZONE BW - Moderate to Weak SMR**
Area dominanted by dune geomorphology (paucity of stream washes) however evidence of remnant washes often occur. Zone BW is characterized by relatively dense vegetation (stabilized coppice and dune mounds), interdune basins with gravel lag surfaces, and relatively thin active eolian sands in the form of sand sheets overlying older dune deposits. Zone BW exhibits an older dune system that was once more robust than it has been during the late Holocene, and coppice dunes and relatively taller dune mounds are eroding by wind abrassion to produce active eolian sands for downwind areas. No avalanch faces occur in Zone BW. Zone BW represents regions inwhich more active robust dunes have receded from during mid to late Holocene.

🟨 **ZONE BC - Weak with some areas exhibiting Moderate SMR**
Region exhibits characteristics of dune and fluvial-fan geomorphology suggesting relatively weak to moderate eolian sand migration rates. Most of the exposed eolian deposits are older and inactive eolian sands (Qe-ds) and active eolian deposits are domianlty in the form of sand sheets, and seasonal small dune tails. Active eolian sands are generally only 1 to 2 inch thick sand sheets overlying relatively firm older eolian sands. Older and relatively taller coppice dunes and occossional mounds often occur in small areas indicating relatively stronger sand migration rates in the past (i.e. early to mid Holocene) and the eroding older dune sands provide a local minor source for downwind dune systems.

🟩 **ZONE C - Weak to Very Weak SMR**
Exhibits weak dune geomporphology indicating weak to very weak eolian sand migration rates. Active dune sands occur as scattered and disconnected active sand sheets and small coppice; in general however, most plants do not exhibit active coppice dunes. Typically, Zone C is generally dominated by fluvial geomorphology with bar (fan-terraces) and swales relief. Zone C is generally dominated by gravel lag surfaces. Some active eolian sands occur within some washes and tens of feet downwind resulting from the wash itself providing the local eolian sand source. In some cases these washes are fairly minor only exhibiting an active wash approximately 10 to 20 feet wide with a bar and swale relief of 6 inches to 2 feet.

🟦 **ZONE D - Very Weak with minor areas near active washes exhbiting Weak to Moderate SMR**
Exhibits nearl geomorphology and geology dominated by fluvial processes and non-eolian processes. Active loose sand coppice dunes typically do not exist, and if they do are degrading. However, similar to Zone C, some minor areas of active eolian sands do occur within washes where the eolian sands are derived from the local wash itself. Most areas mapped as Zone D do not exhibit ancient dune deposits suggesting that these regions were never dominated by eolian processes.

6.2 Soil stratigraphy

A soil stratigraphic evaluation of an area is the identification of various members in terms of relative and numerical ages. Minimum numerical ages for the alluvial fan and eolian deposits are estimated based on the soil development of surficially exposed portions of each unit on an abandoned fan terrace and within near surface eolian deposits respectively. Relative ages of the stratigraphic units are determined by observing older units buried by younger units.

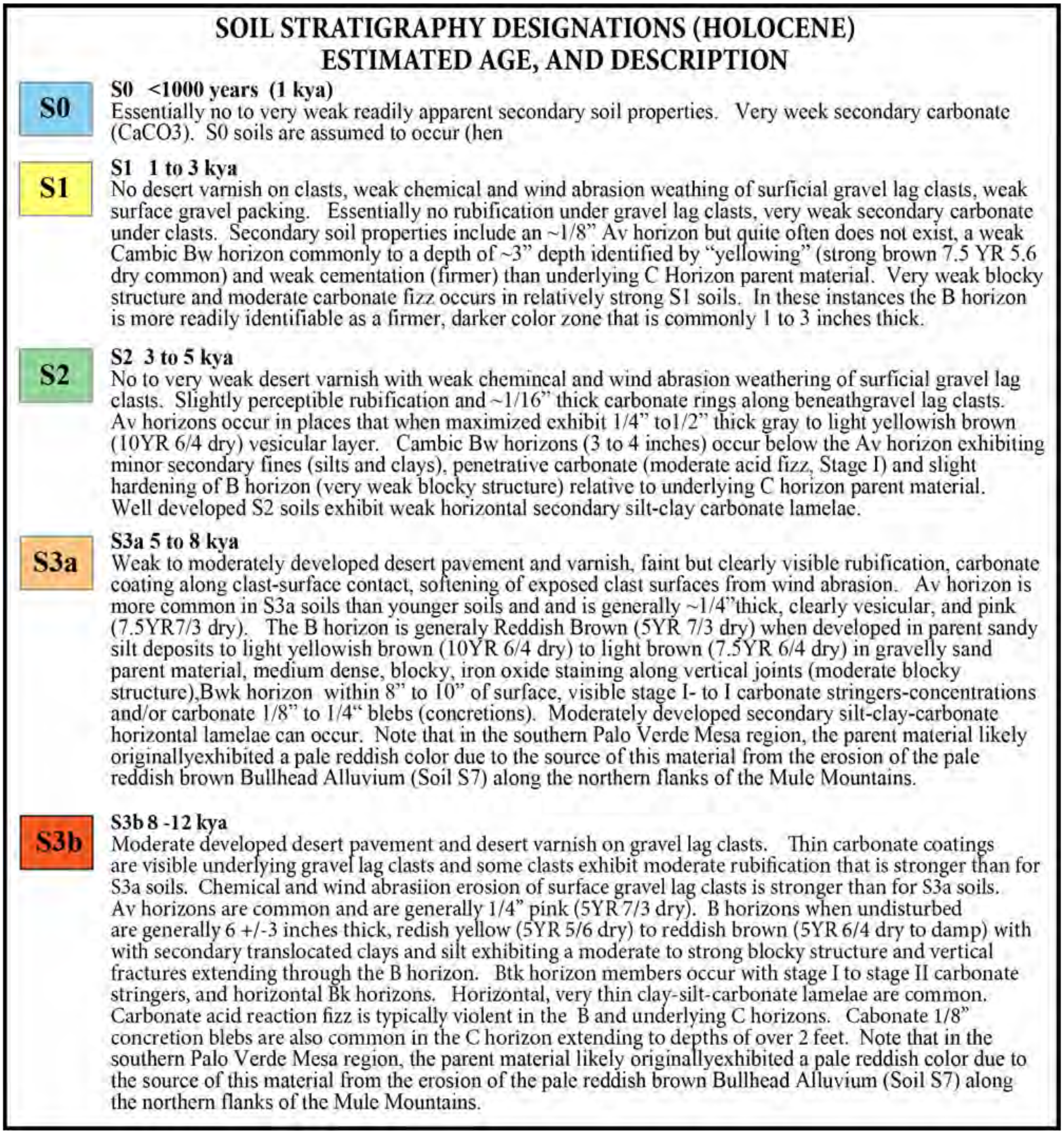
Soil profiles develop in sediments (or even rocks) when they are exposed to mechanical and chemical weathering processes, and wind-blown dust accumulates in surficial deposits. Over time, soil profiles exhibiting a more yellowish brown to reddish color develops, and increases in secondary silt, clay and carbonate. Soil profiles, and particularly their B horizons tend to get denser with secondary minerals such as silt, clay and carbonate in addition to exhibiting a blocky structure. On the surface, desert pavement, desert varnish, and rubification (reddening under clasts) all generally increase over time if the surface is not disturbed. In desert environments, the A horizon is commonly a vesicular Av horizon that if not disturbed can locally attain thicknesses of a little over an inch for the older soils (i.e. Soil S3b and older, Figure 7a). In many local soil profiles, due to the location of the project within a valley axis that exhibits dune systems, the relative amount of wind-blown dust and even sand in alluvial soils is higher than in other environments.

A very important aspect to the soil stratigraphic evaluation herein was identifying the type of parent materials that the soils developed in. This was critical because it allowed for more detailed mapping of contacts between older alluvium and eolian deposits in the study area. In other words, it allowed for the construction of soil maps that also delineate areas of eolian vs alluvial deposits. However, because the eolian dune systems are youthful in the study area (mid-Holocene), the lateral limits of eolian deposits mapped via soil stratigraphy (parent material) are similar with the those of relative geomorphic sand migration Zone BC, which is essentially the edge of mapped dune deposits in this study.

For alluvial deposits, the best soil descriptions for each soil unit are those obtained in test pits on the preserved fan terraces where that designated soil has remained exposed to surficial dynamic soil forming processes for the longest time. For example, from the time of cessation of deposition to current times. These exposures are considered the “type location and description” for each designated soil. The soil descriptions provided in Figure 7A and Figure 7B are from type location descriptions. However, once type location descriptions are obtained, the same soils units are also identified as buried soils where younger sediments have deposited over them. This assists in further developing the relative soil stratigraphy and cumulative ages for the various units. For example, older alluvium members are generally exposed on preserved, elevated and abandoned fan terraces progressively further up the fan, but become buried by younger alluvial deposits at progressively lower reaches of the fan. This relationship of older vs younger alluvial fan units is referred to as their morphostratigraphic relationship.

Eolian depositional areas are more complex typically compared to alluvial fan systems due to the dynamic nature of dunes in terms of not necessarily being deposited in horizontal layers, hummocky terrain with interdune basins, and that abrasion and deposition within dune systems is common (re-mobilization of dune sands over time). However, mapping in the dune system clearly identified in most areas, older soil profiles developed in eolian deposits, located within less than 6 inches to a foot of the surface if not exposed on the surface, representing a hiatus in deposition between the older alluvium and the younger eolian deposits.

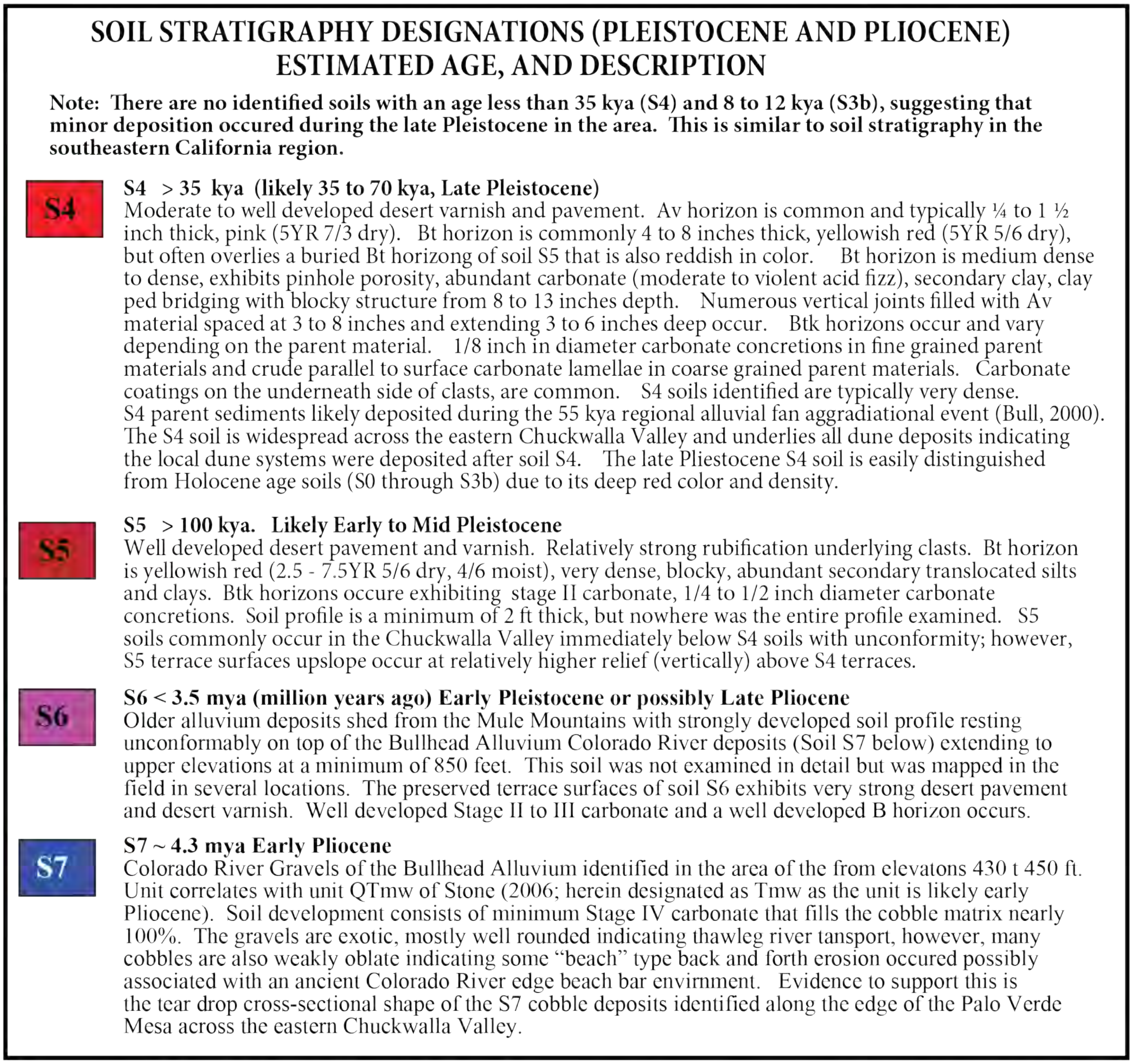
Figure 7A: Designated soils for the region of the project S0, S1, S2, S3a, and S3b.



SOIL STRATIGRAPHY DESIGNATIONS (HOLOCENE) ESTIMATED AGE, AND DESCRIPTION

S0	**S0 <1000 years (1 kya)** Essentially no to very weak readily apparent secondary soil properties. Very week secondary carbonate (CaCO3). S0 soils are assumed to occur (hen
S1	**S1 1 to 3 kya** No desert varnish on clasts, weak chemical and wind abrasion weathing of surficial gravel lag clasts, weak surface gravel packing. Essentially no rubification under gravel lag clasts, very weak secondary carbonate under clasts. Secondary soil properties include an ~1/8" Av horizon but quite often does not exist, a weak Cambic Bw horizon commonly to a depth of ~3" depth identified by "yellowing" (strong brown 7.5 YR 5.6 dry common) and weak cementation (firmer) than underlying C Horizon parent material. Very weak blocky structure and moderate carbonate fizz occurs in relatively strong S1 soils. In these instances the B horizon is more readily identifiable as a firmer, darker color zone that is commonly 1 to 3 inches thick.
S2	**S2 3 to 5 kya** No to very weak desert varnish with weak cheminical and wind abrasion weathering of surficial gravel lag clasts. Slightly perceptible rubification and ~1/16" thick carbonate rings along beneathgravel lag clasts. Av horizons occur in places that when maximized exhibit 1/4" to1/2" thick gray to light yellowish brown (10YR 6/4 dry) vesicular layer. Cambic Bw horizons (3 to 4 inches) occur below the Av horizon exhibiting minor secondary fines (silts and clays), penetrative carbonate (moderate acid fizz, Stage I) and slight hardening of B horizon (very weak blocky structure) relative to underlying C horizon parent material. Well developed S2 soils exhibit weak horizontal secondary silt-clay carbonate lamelae.
S3a	**S3a 5 to 8 kya** Weak to moderately developed desert pavement and varnish, faint but clearly visible rubification, carbonate coating along clast-surface contact, softening of exposed clast surfaces from wind abrasion. Av horizon is more common in S3a soils than younger soils and and is generally ~1/4"thick, clearly vesicular, and pink (7.5YR7/3 dry). The B horizon is generaly Reddish Brown (5YR 7/3 dry) when developed in parent sandy silt deposits to light yellowish brown (10YR 6/4 dry) to light brown (7.5YR 6/4 dry) in gravelly sand parent material, medium dense, blocky, iron oxide staining along vertical joints (moderate blocky structure),Bwk horizon within 8" to 10" of surface, visible stage I- to I carbonate stringers-concentrations and/or carbonate 1/8" to 1/4" blebs (concretions). Moderately developed secondary silt-clay-carbonate horizontal lamelae can occur. Note that in the southern Palo Verde Mesa region, the parent material likely originallyexhibited a pale reddish color due to the source of this material from the erosion of the pale reddish brown Bullhead Alluvium (Soil S7) along the northern flanks of the Mule Mountains.
S3b	**S3b 8 -12 kya** Moderate developed desert pavement and desert varnish on gravel lag clasts. Thin carbonate coatings are visible underlying gravel lag clasts and some clasts exhibit moderate rubification that is stronger than for S3a soils. Chemical and wind abrasiion erosion of surface gravel lag clasts is stronger than for S3a soils. Av horizons are common and are generally 1/4" pink (5YR 7/3 dry). B horizons when undisturbed are generally 6 +/-3 inches thick, redish yellow (5YR 5/6 dry) to reddish brown (5YR 6/4 dry to damp) with with secondary translocated clays and silt exhibiting a moderate to strong blocky structure and vertical fractures extending through the B horizon. Btk horizon members occur with stage I to stage II carbonate stringers, and horizontal Bk horizons. Horizontal, very thin clay-silt-carbonate lamelae are common. Carbonate acid reaction fizz is typically violent in the B and underlying C horizons. Cabonate 1/8" concretion blebs are also common in the C horizon extending to depths of over 2 feet. Note that in the southern Palo Verde Mesa region, the parent material likely originallyexhibited a pale reddish color due to the source of this material from the erosion of the pale reddish brown Bullhead Alluvium (Soil S7) along the northern flanks of the Mule Mountains.

Figure 7B: Designated soils for the region of the project S4, S5, S6, and S7.



SOIL STRATIGRAPHY DESIGNATIONS (PLEISTOCENE AND PLIOCENE) ESTIMATED AGE, AND DESCRIPTION

Note: There are no identified soils with an age less than 35 kya (S4) and 8 to 12 kya (S3b), suggesting that minor deposition occured during the late Pleistocene in the area. This is similar to soil stratigraphy in the southeastern California region.

S4

S4 > 35 kya (likely 35 to 70 kya, Late Pleistocene)
Moderate to well developed desert varnish and pavement. Av horizon is common and typically ¼ to 1 ½ inch thick, pink (5YR 7/3 dry). Bt horizon is commonly 4 to 8 inches thick, yellowish red (5YR 5/6 dry), but often overlies a buried Bt horizong of soil S5 that is also reddish in color. Bt horizon is medium dense to dense, exhibits pinhole porosity, abundant carbonate (moderate to violent acid fizz), secondary clay, clay ped bridging with blocky structure from 8 to 13 inches depth. Numerous vertical joints filled with Av material spaced at 3 to 8 inches and extending 3 to 6 inches deep occur. Btk horizons occur and vary depending on the parent material. 1/8 inch in diameter carbonate concretions in fine grained parent materials and crude parallel to surface carbonate lamellae in coarse grained parent materials. Carbonate coatings on the underneath side of clasts, are common. S4 soils identified are typically very dense. S4 parent sediments likely deposited during the 55 kya regional alluvial fan aggradiational event (Bull, 2000). The S4 soil is widespread across the eastern Chuckwalla Valley and underlies all dune deposits indicating the local dune systems were deposited after soil S4. The late Pliestocene S4 soil is easily distinguished from Holocene age soils (S0 through S3b) due to its deep red color and density.

S5

S5 > 100 kya. Likely Early to Mid Pleistocene
Well developed desert pavement and varnish. Relatively strong rubification underlying clasts. Bt horizon is yellowish red (2.5 - 7.5YR 5/6 dry, 4/6 moist), very dense, blocky, abundant secondary translocated silts and clays. Btk horizons occure exhibiting stage II carbonate, 1/4 to 1/2 inch diameter carbonate concretions. Soil profile is a minimum of 2 ft thick, but nowhere was the entire profile examined. S5 soils commonly occur in the Chuckwalla Valley immediately below S4 soils with unconformity; however, S5 terrace surfaces upslope occur at relatively higher relief (vertically) above S4 terraces.

S6

S6 < 3.5 mya (million years ago) Early Pleistocene or possibly Late Pliocene
Older alluvium deposits shed from the Mule Mountains with strongly developed soil profile resting unconformably on top of the Bullhead Alluvium Colorado River deposits (Soil S7 below) extending to upper elevations at a minimum of 850 feet. This soil was not examined in detail but was mapped in the field in several locations. The preserved terrace surfaces of soil S6 exhibits very strong desert pavement and desert varnish. Well developed Stage II to III carbonate and a well developed B horizon occurs.

S7

S7 ~ 4.3 mya Early Pliocene
Colorado River Gravels of the Bullhead Alluvium identified in the area of the from elevatons 430 t 450 ft. Unit correlates with unit QTmw of Stone (2006; herein designated as Tmw as the unit is likely early Pliocene). Soil development consists of minimum Stage IV carbonate that fills the cobble matrix nearly 100%. The gravels are exotic, mostly well rounded indicating thawleg river tansport, however, many cobbles are also weakly oblate indicating some "beach" type back and forth erosion occured possibly associated with an ancient Colorado River edge beach bar envirnment. Evidence to support this is the tear drop cross-sectional shape of the S7 cobble deposits identified along the edge of the Palo Verde Mesa across the eastern Chuckwalla Valley.

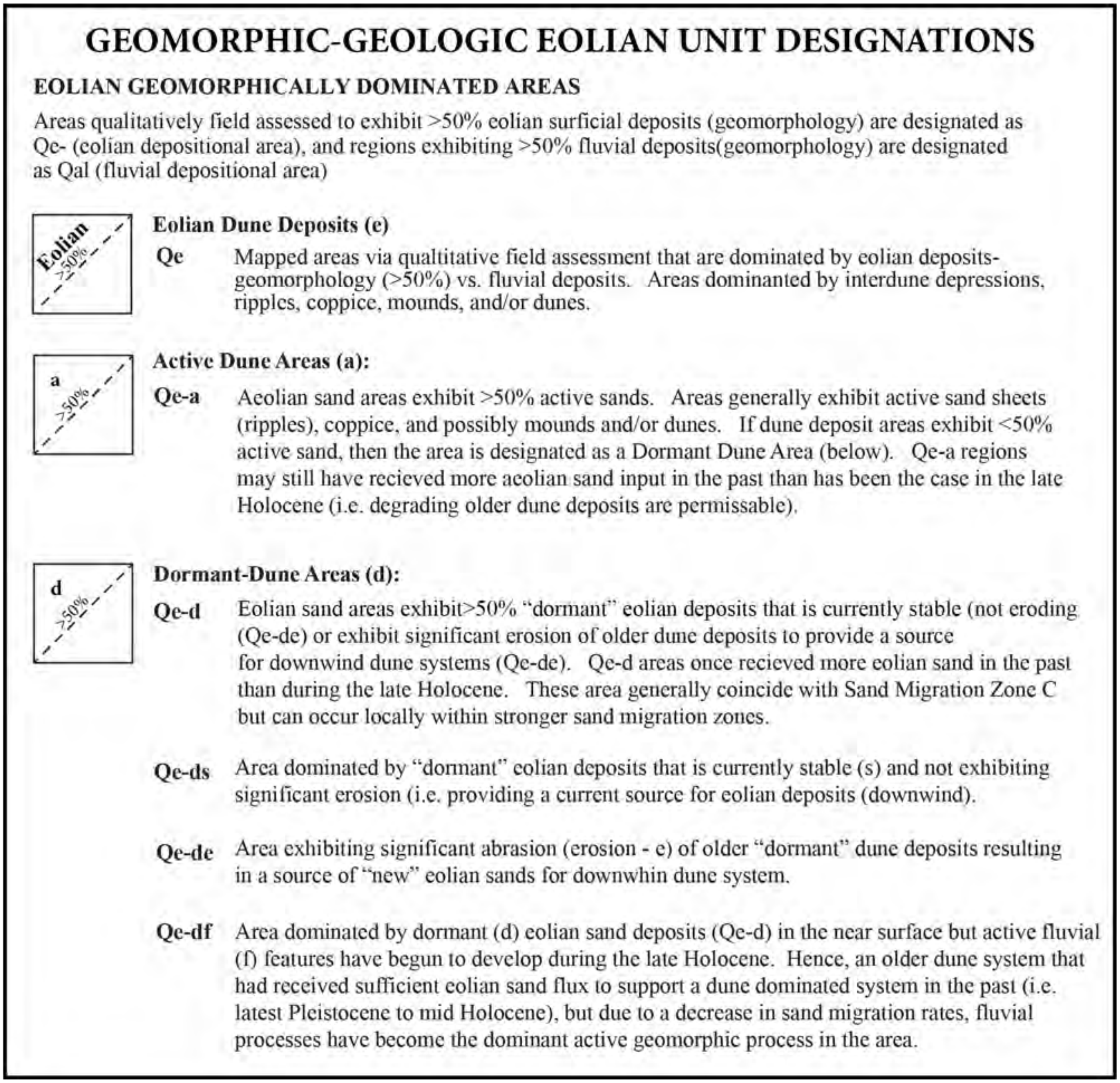
The soil stratigraphy developed during this study was conducted for the purposes of evaluating the Holocene and latest Pleistocene in more detail than the early to late Pleistocene and the Pliocene. This is because the eolian dune deposits exposed at the surface clearly overlie late Pleistocene older alluvial deposits (Soil S4) that are widespread across the Chuckwalla Valley, and across the southeastern California region. It is acknowledged that a detailed stratigraphic study of the early to mid-Pleistocene alluvial deposits would generate many more soil units. For example, on Plate 6B, two Soil S5 surfaces (deposits) were identified which likely reside somewhere in the age range of early to mid-Pleistocene. However, a distinctive capping cut-terrace locally derived alluvial deposit that overlies the Bullhead Alluvium on the northeastern flanks of the Mule Mountains was assigned Soil S6 and is clearly stratigraphically older than Soil S5. Soil S6 was likely during recession of the ancient Colorado River from Chuckwalla Valley as it appears to be cut-off at lower slopes along Colorado River shorelines (wave cut benches; Plate 6B). Designated Soil S7 was assigned to all ancient Colorado River deposits in the study area as this simple designation proves useful in geologic discussion. The units of the ancient Colorado River deposits assigned to Soil S7 are discussed in the next section.

Example photographs of the various designated soils exhibiting both alluvial and eolian parent materials are provided in Appendix D.

6.3 Geomorphic-Geologic eolian unit designations for eolian systems

Performing a Geomorphic and Geologic evaluation of an area, and particularly regions as dynamic as eolian and active wash systems, led to the development of terms that describe both the geologic unit, and its geomorphology. That is the motivation for the Geomorphic-Geologic terms provided in Figure 8A and Figure 8B. The root terms of Qe and Qal describe whether an area is dominated by eolian processes, or alluvial-fluvial processes respectively. These terms are then modified to describe various geomorphic parameters. For example, the following terms are used to describe eolian areas (Figure 8A): “-a” for active eolian area, “-d” for dormant, “-ds” for stable dormant eolian sands, “-de” for dormant eolian sands that are eroding, and “-df” for an area dominated by older dormant eolian sands with a component of fluvial geomorphology. A similar approach was taken for alluvial depositional areas shown in Figure 8B.

Figure 8A: Geomorphic-Geologic eolian unit designations to assist in described not only the type of geologic units are exposed at the surface, but also about the geomorphic dynamics as well.


Eolian
>50%
a
>50%
d
>50%

GEOMORPHIC-GEOLOGIC EOLIAN UNIT DESIGNATIONS

EOLIAN GEOMORPHICALLY DOMINATED AREAS

Areas qualitatively field assessed to exhibit >50% eolian surficial deposits (geomorphology) are designated as Qe- (eolian depositional area), and regions exhibiting >50% fluvial deposits(geomorphology) are designated as Qal (fluvial depositional area)

Eolian Dune Deposits (e)

Qe Mapped areas via qualtitative field assessment that are dominated by eolian deposits-geomorphology (>50%) vs. fluvial deposits. Areas dominanted by interdune depressions, ripples, coppice, mounds, and/or dunes.

Active Dune Areas (a):

Qe-a Aeolian sand areas exhibit >50% active sands. Areas generally exhibit active sand sheets (ripples), coppice, and possibly mounds and/or dunes. If dune deposit areas exhibit <50% active sand, then the area is designated as a Dormant Dune Area (below). Qe-a regions may still have recieved more aeolian sand input in the past than has been the case in the late Holocene (i.e. degrading older dune deposits are permissable).

Dormant-Dune Areas (d):

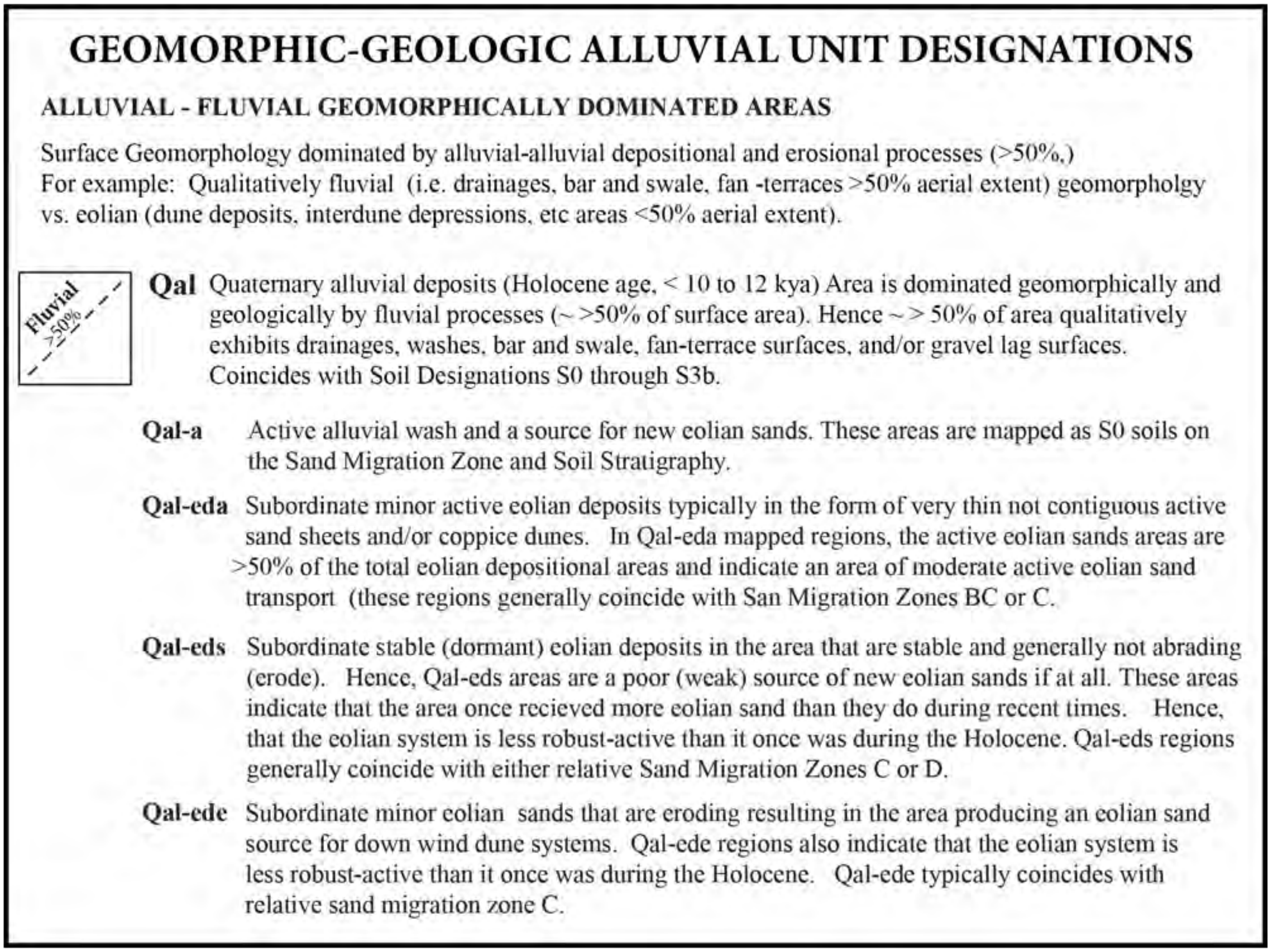
Qe-d Eolian sand areas exhibit>50% "dormant" eolian deposits that is currently stable (not eroding (Qe-de) or exhibit significant erosion of older dune deposits to provide a source for downwind dune systems (Qe-de). Qe-d areas once recieved more eolian sand in the past than during the late Holocene. These area generally coincide with Sand Migration Zone C but can occur locally within stronger sand migration zones.

Qe-ds Area dominated by "dormant" eolian deposits that is currently stable (s) and not exhibiting significant erosion (i.e. providing a current source for eolian deposits (downwind).

Qe-de Area exhibiting significant abrasion (erosion - e) of older "dormant" dune deposits resulting in a source of "new" eolian sands for downwhin dune system.

Qe-df Area dominated by dormant (d) eolian sand deposits (Qe-d) in the near surface but active fluvial (f) features have begun to develop during the late Holocene. Hence, an older dune system that had received sufficient eolian sand flux to support a dune dominated system in the past (i.e. latest Pleistocene to mid Holocene), but due to a decrease in sand migration rates, fluvial processes have become the dominant active geomorphic process in the area.

Figure 8B: Geomorphic-Geologic alluvial unit designations to assist in described not only the type of geologic units are exposed at the surface, but also about the geomorphic dynamics as well.



GEOMORPHIC-GEOLOGIC ALLUVIAL UNIT DESIGNATIONS

ALLUVIAL - FLUVIAL GEOMORPHICALLY DOMINATED AREAS

Surface Geomorphology dominated by alluvial-alluvial depositional and erosional processes (>50%.)
For example: Qualitatively fluvial (i.e. drainages, bar and swale, fan -terraces >50% aerial extent) geomorpholgy vs. eolian (dune deposits, interdune depressions, etc areas <50% aerial extent).

Fluvial >50%

Qal Quaternary alluvial deposits (Holocene age, < 10 to 12 kya) Area is dominated geomorphically and geologically by fluvial processes (~ >50% of surface area). Hence ~ > 50% of area qualitatively exhibits drainages, washes, bar and swale, fan-terrace surfaces, and/or gravel lag surfaces. Coincides with Soil Designations S0 through S3b.

Qal-a Active alluvial wash and a source for new eolian sands. These areas are mapped as S0 soils on the Sand Migration Zone and Soil Stratigraphy.

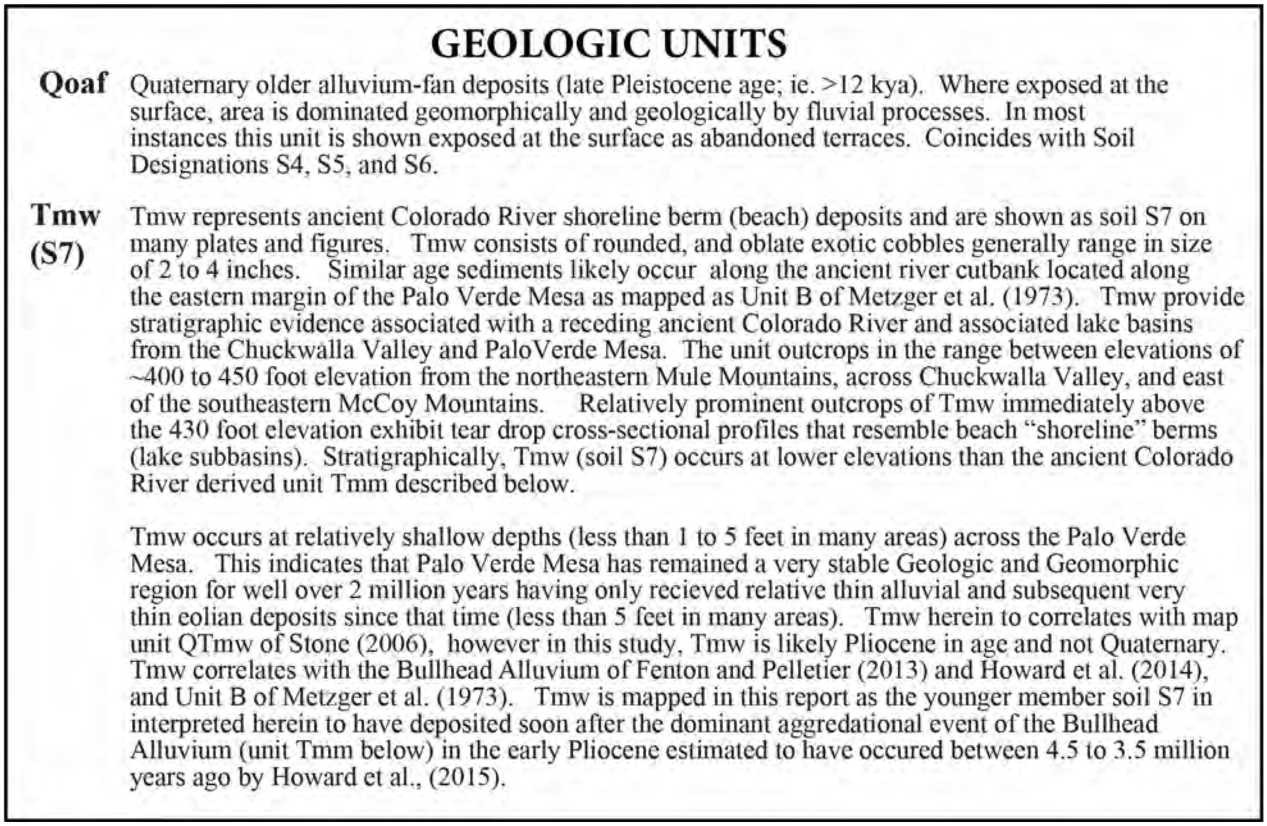
Qal-eda Subordinate minor active eolian deposits typically in the form of very thin not contiguous active sand sheets and/or coppice dunes. In Qal-eda mapped regions, the active eolian sands areas are >50% of the total eolian depositional areas and indicate an area of moderate active eolian sand transport (these regions generally coincide with San Migration Zones BC or C.

Qal-eds Subordinate stable (dormant) eolian deposits in the area that are stable and generally not abrading (erode). Hence, Qal-eds areas are a poor (weak) source of new eolian sands if at all. These areas indicate that the area once recieved more eolian sand than they do during recent times. Hence, that the eolian system is less robust-active than it once was during the Holocene. Qal-eds regions generally coincide with either relative Sand Migration Zones C or D.

Qal-ede Subordinate minor eolian sands that are eroding resulting in the area producing an eolian sand source for down wind dune systems. Qal-ede regions also indicate that the eolian system is less robust-active than it once was during the Holocene. Qal-ede typically coincides with relative sand migration zone C.

Quaternary Older Alluvial Fan deposits (Qoaf) represent alluvial sediments that were deposited primarily during the Pleistocene (Figure 8C). These deposits represent soil units S4, S5 and S6 described in Figure 7B. Two older units designated as Tmw and Tmm (derived from Stone, et al., 2006 units QTmw and QTmm, Figure 9) are also utilized in this report. These formations are described in more detail in report section 8.1 below, but are important for this study because understanding their age of late Miocene to early Pliocene indicates that most geologic actively in the study area has been quite minimal since their deposition, and because the erosion of these units provided an important source for eolian sands and alluvial deposits locally.

Figure 8C: Geologic unit descriptions for Qoaf and Tmw (Soil S7).



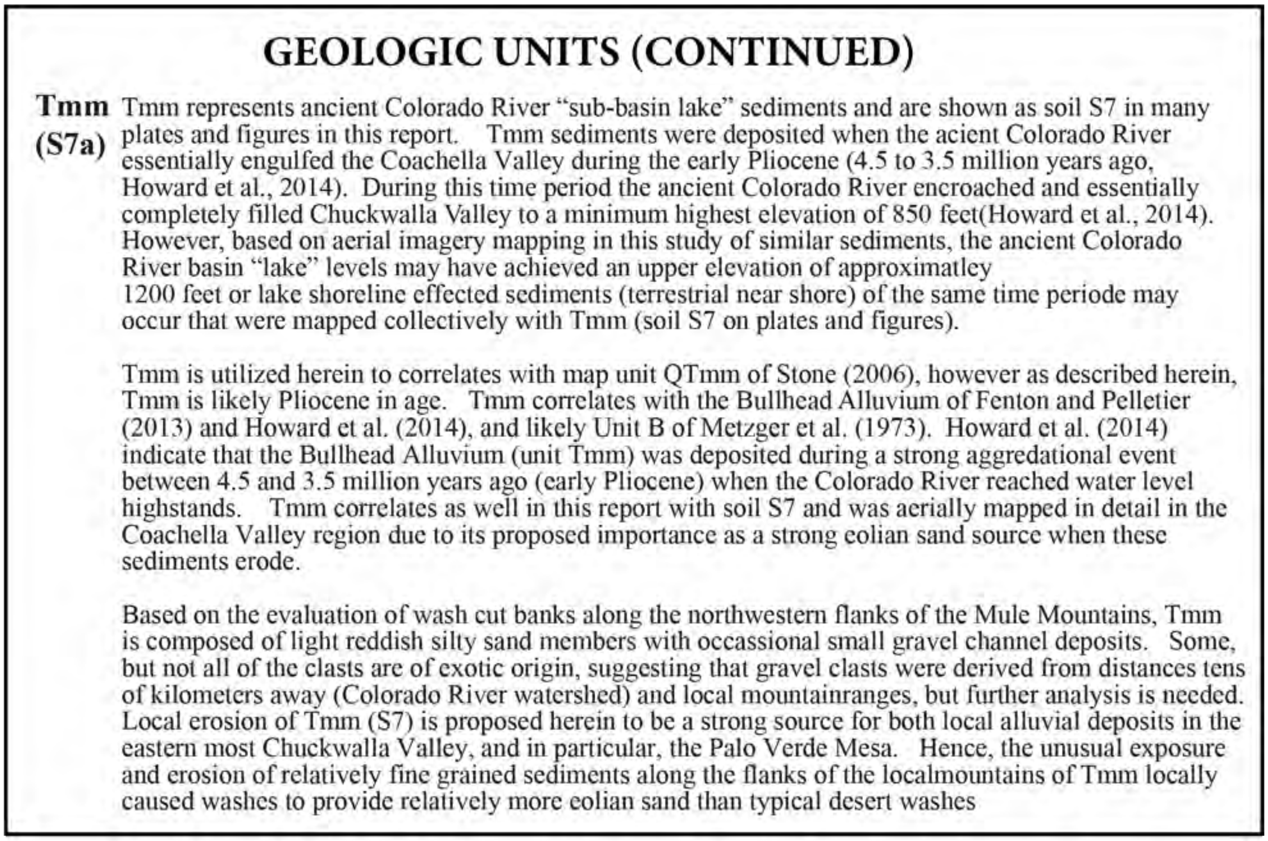
GEOLOGIC UNITS

Qoaf Quaternary older alluvium-fan deposits (late Pleistocene age; ie. >12 kya). Where exposed at the surface, area is dominated geomorphically and geologically by fluvial processes. In most instances this unit is shown exposed at the surface as abandoned terraces. Coincides with Soil Designations S4, S5, and S6.

Tmw (S7) Tmw represents ancient Colorado River shoreline berm (beach) deposits and are shown as soil S7 on many plates and figures. Tmw consists of rounded, and oblate exotic cobbles generally range in size of 2 to 4 inches. Similar age sediments likely occur along the ancient river cutbank located along the eastern margin of the Palo Verde Mesa as mapped as Unit B of Metzger et al. (1973). Tmw provide stratigraphic evidence associated with a receding ancient Colorado River and associated lake basins from the Chuckwalla Valley and PaloVerde Mesa. The unit outcrops in the range between elevations of ~400 to 450 foot elevation from the northeastern Mule Mountains, across Chuckwalla Valley, and east of the southeastern McCoy Mountains. Relatively prominent outcrops of Tmw immediately above the 430 foot elevation exhibit tear drop cross-sectional profiles that resemble beach "shoreline" berms (lake subbasins). Stratigraphically, Tmw (soil S7) occurs at lower elevations than the ancient Colorado River derived unit Tmm described below.

Tmw occurs at relatively shallow depths (less than 1 to 5 feet in many areas) across the Palo Verde Mesa. This indicates that Palo Verde Mesa has remained a very stable Geologic and Geomorphic region for well over 2 million years having only recieved relative thin alluvial and subsequent very thin eolian deposits since that time (less than 5 feet in many areas). Tmw herein to correlates with map unit QTmw of Stone (2006), however in this study, Tmw is likely Pliocene in age and not Quaternary. Tmw correlates with the Bullhead Alluvium of Fenton and Pelletier (2013) and Howard et al. (2014), and Unit B of Metzger et al. (1973). Tmw is mapped in this report as the younger member soil S7 in interpreted herein to have deposited soon after the dominant aggredational event of the Bullhead Alluvium (unit Tmm below) in the early Pliocene estimated to have occured between 4.5 to 3.5 million years ago by Howard et al., (2015).

Figure 8D: Geologic unit description for Tmm (Soil S7).



GEOLOGIC UNITS (CONTINUED)

Tmm (S7a) Tmm represents ancient Colorado River "sub-basin lake" sediments and are shown as soil S7 in many plates and figures in this report. Tmm sediments were deposited when the acient Colorado River essentially engulfed the Coachella Valley during the early Pliocene (4.5 to 3.5 million years ago, Howard et al., 2014). During this time period the ancient Colorado River encroached and essentially completely filled Chuckwalla Valley to a minimum highest elevation of 850 feet(Howard et al., 2014). However, based on aerial imagery mapping in this study of similar sediments, the ancient Colorado River basin "lake" levels may have achieved an upper elevation of approximatley 1200 feet or lake shoreline effected sediments (terrestrial near shore) of the same time periode may occur that were mapped collectively with Tmm (soil S7 on plates and figures).

Tmm is utilized herein to correlates with map unit QTmm of Stone (2006), however as described herein, Tmm is likely Pliocene in age. Tmm correlates with the Bullhead Alluvium of Fenton and Pelletier (2013) and Howard et al. (2014), and likely Unit B of Metzger et al. (1973). Howard et al. (2014) indicate that the Bullhead Alluvium (unit Tmm) was deposited during a strong aggredational event between 4.5 and 3.5 million years ago (early Pliocene) when the Colorado River reached water level highstands. Tmm correlates as well in this report with soil S7 and was aerially mapped in detail in the Coachella Valley region due to its proposed importance as a strong eolian sand source when these sediments erode.

Based on the evaluation of wash cut banks along the northwestern flanks of the Mule Mountains, Tmm is composed of light reddish silty sand members with occassional small gravel channel deposits. Some, but not all of the clasts are of exotic origin, suggesting that gravel clasts were derived from distances tens of kilometers away (Colorado River watershed) and local mountainranges, but further analysis is needed. Local erosion of Tmm (S7) is proposed herein to be a strong source for both local alluvial deposits in the eastern most Chuckwalla Valley, and in particular, the Palo Verde Mesa. Hence, the unusual exposure and erosion of relatively fine grained sediments along the flanks of the localmountains of Tmm locally caused washes to provide relatively more eolian sand than typical desert washes

7.0 GEOLOGY AND GEOLOGIC HISTORY SINCE THE EARLY PLIOCENE

Understanding the geologic history of an area prior to the development of the surficial eolian dune system places the development of the dunes in temporal and spatial context. For example, the findings of this report indicate that the landscape of the eastern Chuckwalla Valley and Palo Verde Mesa has experienced on average about 5 to 6 feet of alluvial deposition in many areas during the entire Quaternary (i.e. past 1.7 million years) and since the late Pliocene. Hence, most of the general topography in the study area was already in place by the end of the Pliocene, and has changed very little since that time.

The simplified Geologic History of the region of the DQSP in the eastern Chuckwalla Valley and Palo Verde Mesa area includes:

- Deposition of sedimentary deposits in Late Miocene through Early Pliocene associated with large water bodies of the ancient Colorado River up to elevations of over 1,200 feet. These deposits occur along the flanks and nestled within the local mountain ranges and at depths of several feet across the DQSP (units Tmw – Soil S7 and Tmm, Soil S7a). Note that Tmw is younger than unit Tmm and represents a recessional shoreline of the ancient Colorado River system. Soil (older alluvium) unit S6 may be contemporaneous or close in age with Soil S7 (unit Tmw).

- Deposition of coarse grained older alluvium (Soil S6) on top of unit Tmm in unconformity along the northeastern flanks of the Mule Mountains during recession of the ancient Colorado River inundation of the Chuckwalla Valley. May be close in age with the ancient Colorado River shoreline berm deposits of unit Tmw (Soil S7).

- Deposition of older alluvial unit S5 along the flanks of the local mountains during the Early to mid-Pleistocene. These units were not identified in the valley axis nor the Palo Verde Mesa and were possibly eroded away as soils S3b and S4 were observed to be deposited directly on top of the Pliocene age unit Tmw (Soil S7) in several localities on the Palo Verde Mesa area.

- Deposition of a series of older alluvial fans in the Pleistocene, the most significant member being a 65 to 35 kya deposit (Soil S4) that extended across Chuckwalla Valley and under the local dune systems.

- Deposition of a series of alluvial fan deposits in the latest Pleistocene and early Holocene that were deposited across Chuckwalla Valley and the Palo Verde Mesa region including under the local dune systems indicating that the local dune deposits had not yet encroached into the DQSP area by early Holocene. This includes primarily soil S3b which weak versions of S3b sediments were identified under the eastern most Wiley’s Well Basin sand migration zone.

- Initiation of deposition of eolian deposits that migrated eastward during the late early Holocene to mid-Holocene in the region of the DQSP. Encroachment of eolian sands into the eastern most Wiley’s Well Basin sand migration zone may have occurred as early as 10 to 8 kya. Alluvial fan deposits of unit S3a continued to deposit along the flanks of portions of the eolian dune sediments and many washes flowed through the dune systems. Washes continued to flow across the DQSP dune systems (not yet impeded).

- During the mid-Holocene, the dune deposits in the DQSP area were sufficiently thick and laterally extensive (>5 feet) to impede wash flow across their entire width. Hence, it was at this time that the geomorphology of the eastern Wiley’s Well Basin sand migration zone was dominated by eolian processes. Washes continued to flow into the northern portions of these dunes and ponded within the dunes which increased their stability. Alluvial soil unit S3a deposits along the flanks of the dune system while the DQSP dune systems are nearing the end of their aggradational event. The most robust dune forms in the eastern Wiley’s Well Basin sand migration zone (area mapped as Zone BW, Figure 11 and Figure 12) are interconnected dune mounds that developed by the growth of earlier formed coppice dunes. Dunes likely experienced this aggradational event during the warming period from 10 to 9 kya followed by the Holocene climate Optimum from 8 to 6 kya (Plate 8A). This was a period of warm and dry climate and reactivation of dunes.

- Near the mid-Holocene – Late Holocene boundary (~5 to 3 kya), alluvial soil unit S2 ceases deposition south of the DQSP solar project and soil profile S2 begins to form. The DQSP dune system is stabilizing quickly as sand migrations rates have slowed down, and the eolian soil S2 begins to develop (Figure 13 and Figure 14). Active sand sheets and coppice dunes continue to occur.

- During much of the latter part of the late Holocene, alluvial soil unit S1 deposits, and then ceases deposition to begin development of the soil we see today. The DQSP dune system has stabilized and eastern areas of the dunes begin to degrade in the area mapped as Zone BW (Figure 13 and Figure 14).

- During Historical times (~100 to 150 years), the dune systems in the DQSP have experienced relatively minor changes due to both an increase and decrease in stream flow to various areas which led to a relatively minor increase in eolian sand source and degradation of dunes respectively. The invasive Sahara Mustard plant encroached into the region at least by 2010, which has dramatically decreased sand migration rates in the DQSP dune systems. Hence, the Sahara Mustard plant has led to an increase in dune stability and decrease in dune dynamics.

The next few sections describe the geologic history of the eastern Chuckwalla Valley and Palo Verde Mesa region in more detail.

7.1 Geologic History from the Late Miocene to Early Pliocene

The oldest pertinent geologic units in the region of the DQSP are associated with relatively quiet and large water bodies that engulfed the Chuckwalla Valley during the latest Miocene to early Pliocene. The oldest of these deposits include the Late Miocene to earliest Pliocene Bouse Formation, which was deposited in quiet waters similar to lake conditions that inundated basins up to an elevation of ~1,100 to 1,800 feet along the course of the lower Colorado River (House et al., 2008). In the Chuckwalla Valley, the Bouse Formation was deposited to at least 1,130-foot elevation (House et al., 2008; Spencer at al., 2008). This water body filled the Bristol, Cadiz, Dandby, Rice, Palen, and Ford dry lakes (Plate 1; House et al., 2008; Spencer et al., 2008). It is unknown how many outcrops of the Bouse Formation may occur in the Chuckwalla Valley area as the unit is not shown on published maps, but some outcrops of this unit may be mapped via Google Earth Pro historical imagery during this study as unit Tmm (also soil S7; Plate 1).

During the early Pliocene, the Bullhead Alluvium was deposited along the lower Colorado River and represents a strong alluvial aggredational event occurring between 4.5 to 3.5 million years ago (Ma; Howard, et al., 2015). The Bullhead Alluvium was deposited on top of an erosional surface into the Bouse Formation and was deposited as part of the lower Colorado River system when it inundated Chuckwalla Valley up to elevations of 850 feet (Howard et al., 2015). The Bullhead Alluvium in many places is deposited on top of the Bouse Formation but because the Bouse Formation was deposited to elevations of 1,130 feet and the Bullhead Alluvium to an elevation of 850 feet, the Bouse Formation can occur at elevations higher than the Bullhead Alluvium. A distinctive quality of the Bullhead Alluvium is the presence of petrified wood (Howard et al., 2015), which was identified in outcrops south of the SCE Colorado River Substation (Plate 4).

The Bullhead Alluvium is mapped in this report as two members. These include unit Tmm (soil S7a) which was deposited between 4.5 to 3.5 Ma up to elevations of 850 feet if not higher, and unit Tmw (soil S7) which is proposed to represent recessional river edge bars that were likely deposited soon after 3.5 Ma (Figure 8C., Figure 8D and Plate 4). Unit Tmw occurs in the region of elevations of 430 to 450 feet and the occurrence of oblate exotic clasts indicates beach erosional processes as well as having been transported a great distance respectively.

Stone (2006) designates two units in the area that he described primarily as alluvial deposits that include QTmm and QTmw (Figure 9). Unit QTmw of Stone (2006) mapped southwest of the McCoy Mountains (Figure 9) as composed rounded gravels occurring at elevations above Palo Verde Mesa but did not indicate that these deposits were directly related to deposition associated with the ancient Colorado River. This unit is the same as the Bullhead Alluvium described by Howard et al. (2015). It is also a member of Unit B of Metzger et al. (1973) who indicates that it is exposed in the cobble rock quarry north of the Blythe 21 solar facility (Plate 5) and along the Colorado River cut bank along the eastern margin of Palo Verde Mesa (Plate 4 and Plate 6B). The findings of this report provide for the first time the identification of unit Tmw across the eastern Chuckwalla Valley along one of the lower elevation wave cut benches in the northeastern Mule Mountains near elevation 450 feet where unit Tmw cuts into unit Tmm (Plate 4 and Plate 6B). Another wave cut bench occurs at the higher elevation of 480 feet (Plate 6B). Hence, river edge cut banks occur into the older Tmm (Bullhead Alluvium), and unit Tmw (also Bullhead Alluvium) represents deposits along one of the lower elevation river cut banks in the elevation range of 420 to 450 feet (Plate 6B).

Stone (2006) mapped unit QTmm as an older alluvium unit in and along the flanks of the northern Mule Mountains (Figure 9). Based on the findings of this report and review of scientific literature, it is likely that units QTmm and QTmw of Stone (2006) correlate with the Bullhead Alluvium of Pliocene age. Because of this, within this report these units are labeled as Tmm and Tmw (also as soil S7 in this report) as they are likely not deposited during the Quaternary (i.e. Pleistocene). Additional description of these units is provided in Figure 8C and Figure 8D.

In many places, older Pleistocene age alluvium is deposited on the Bullhead Alluvium across an erosional unconformity. This is the case in the northeastern Mule Mountains where the older alluvium of soil S6 is deposited on top of the Bullhead Alluvium (Plate 6B and Figure 13). This relationship is described by Stone (2006), who mapped the unit as QTmm, and not as the Bullhead Alluvium. It is proposed that unit S6 may have deposited near the time of deposition of unit S7 (Tmw), hence, was deposited as the ancient Colorado River inundation of Chuckwalla Valley still occurred but had receded from its high stand of approximately 850 feet associated with unit Tmm (soil S7a, Bullhead Alluvium).

Geologic formational units Tmw (soil S7) and Tmm (soil S7a) are important regarding the eolian evaluation in the DQSP area. It is useful that the Bullhead Alluvium has been identified across the eastern Chuckwalla Valley and its age has been well documented to be early Pliocene. Hence, it is the oldest positively identified unit across the valley which provides essentially a beginning point for a pertinent Geologic history for the site. Unit Tmw of the Bullhead Alluvium was identified at depths of 1 to 6 feet at numerous localities in the DQSP and at the surface indicating that the total depth of Pleistocene to Holocene age alluvium across the Palo Verde Mesa is relatively thin (i.e. 1 to 6 feet). However, relatively significant erosion of Bullhead Alluvium (unit Tmm – soil S7a) occurring prior to deposition of unit Tmw cannot be ruled out in the valley axis sill and the Palo Verde Mesa (Plate 6B). Lastly, erosion of unit Tmm provided an important local source for the Quaternary alluvium and eolian systems in the region of the DQSP. In fact, the erosion of unit Tmm may have been the primary source for the eolian sands in the local dune systems.

7.2 Geologic History during the Pleistocene

The approximate time interval of the Pleistocene occurred between 2.6 Ma to 11 kya. In the Chuckwalla Valley and Palo Verde Mesa area, geologic events occurring during the Pleistocene consisted of deposition of alluvial fans along the flanks of the local mountains (proximal and medial fan areas – soils S4 and S5), but minor net deposition within the valley axis and Palo Verde Mesa area. Soil unit S4 has been identified along all alluvial fan aprons bounding the Palo Verde Mesa, but also along the edges or slightly extending into the Palo Verde Mesa. Soil S4 is estimated to have a minimum age of 35 kya, and may be as old as 65 kya. In the latest Pleistocene, soil unit S3b was deposited across most of the Palo Verde Mesa. Hence, it is the last depositional unit in the site to occur during the Pleistocene. Soil S3b is observed at the surface or very close to the surface across most of the Palo Verde Mesa, which indicates that this area has been Geomorphically stable since the early Holocene.

7.3 Geologic History in the Holocene

During the Holocene in Chuckwalla Valley, sediments were deposited via alluvial fan, playa lake, and eolian processes, and alluvial deposition dominated across Palo Verde Mesa. Near and within the site, alluvial deposition has occurred throughout the Holocene but with two periods of increased deposition (aggradation events). These occurred in the early Holocene during deposition of soil unit S3b and extending into S3a, and the second associated with deposition of soil unit S2.

The eolian sands in the eastern Wiley's Well Basin sand migration zone (Figure 1) are typically deposited upon alluvial soil unit S4 and only rarely on top of poorly developed soils of S3a age (Plate 6B, Figure 13 and Figure 14). This infers that during the early Holocene the first eolian sands migrated eastward encroaching into the DQSP, and deposited on top of older alluvial units exhibiting S4 soils and some alluvial sediments continued to be deposited within interdune areas. Over time, the amount of eolian sands and their aerial extent coverage increased by the mid-Holocene depositing on top of some early Holocene age alluvial deposits.

The eolian deposits in the eastern Wiley's Well Basin sand migration zone exhibit S2 soils indicating that these eolian sands had deposited until about 5 to 3 kya. Hence, the eolian dune deposits in the eastern Wiley's Well Basin sand migration zone along the Gen-tie corridor and northern DQSP encroached into the area and were relatively robust during the early Holocene, but then sand migration rates decreased markedly by 5 to 3 kya. Since that time, the dunes in this area have been dominantly stable and in places, particularly in areas mapped as Zone BW, degrading.

The Mule sand migration zone (Figure 11) has a similar geologic history as that of the Wiley's Well Basin sand migration described above (Plate 6b, Figure 13 and Figure 14). The only exception is that the eastern region of the Mule sand migration zone took longer to migrate into the DQSP site area as early Holocene age soils underlie the eolian deposits more extensively than identified in the eastern Wiley's Well Basin sand migration zone. Although more data is required, the existing data suggests that the eolian deposits associated with the eastern Mule sand migration zone may not have encroached into the DQSP site until the early mid-Holocene.

A Geologic map of the eastern Chuckwalla by Stone (2006) identifies scattered, non-connected eolian sand depositional areas (Qs on Figure 9). In fact, Stone (2006) shows no dune deposits between central Ford Dry Lake and just west of the Welly's Well Basin (Figure 9). Stone (2006) indicates that these deposits were mapped primarily from aerial imagery, and it may have been difficult to identify relatively weaker dune depositional areas based on the resolution of the imagery utilized.

Lancaster (2014) published an eolian geologic map that emphasized mapping of eolian dune systems (Figure 10). This map references the author of this report and much of the mapped limits of dune deposits shown in Lancaster (2014) are somewhat consistent with reports published by the author. However, the Lancaster (2014) map "active windblown deposits consisting primarily of dunes and sand sheets" in a much larger and extensive area than is likely the case. Additional eolian dune name designations would have allowed for a more detailed and accurate depiction of the level of dune stability and activity. For example, Lancaster (2014) identification of his unit Qe shows active dune and sand sheets occurring all the way across the northern section of the DQSP. This is clearly not the case based on the findings of this report.

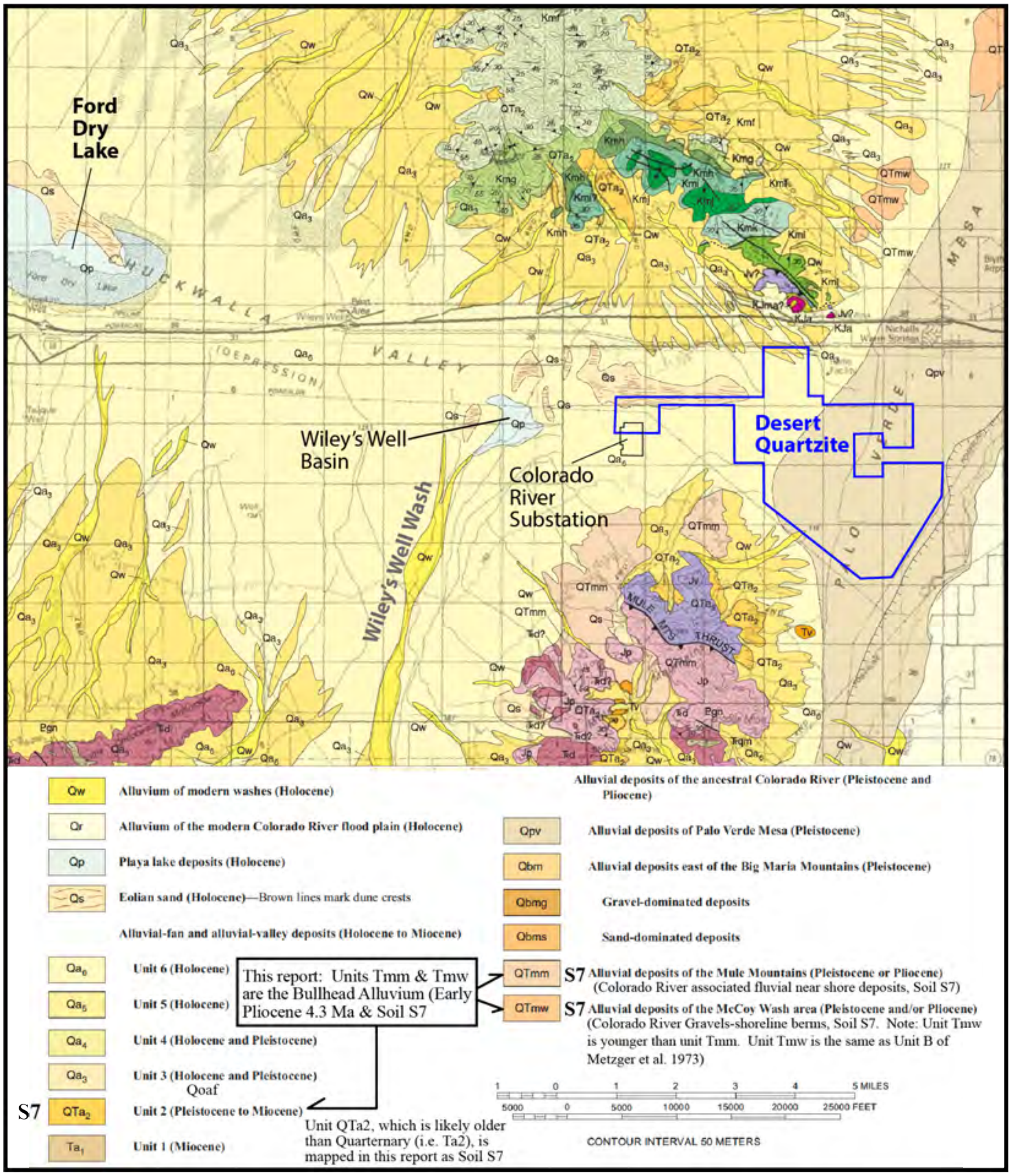
Lancaster (2014) inconsistently mapped regions of scattered eolian deposits across the surface of ponding areas and dry lake beds that leads the reader to believe that the dune systems are more extensive, more connected, and active than is the case. This is supported by comparing Figure 10 (Lancaster, 2014) with the mapping conducted in this study (Plate 3B, Plate 4 and Plate 5). Lancaster (2014) does indicate a lack of conductivity of the eolian sand system in Ford Dry lake with the dune systems south of Highway 10 and southeast of the Wiley's Well Rest stop (Figure 10). However, Lancaster (2014) does not clearly indicate that because segments of the local sand migration zones have shut down that this implies that the more regional sand migration zones (corridors) have also shut down.

Lancaster (2014) does not indicate the timing regarding when the segments demonstrating much less eolian activity along the regional sand migration corridors occurred other than implying it took place after the end of the early Holocene dune aggredational event. Lancaster (2014) indicates that dune systems were more robust during the eolian aggredational event during the latest Pleistocene to early Holocene, but does not discuss many of the ramifications regarding weaker eolian systems consisting primarily of active sand sheets and coppice since that time occurring over eolian geomorphic landscapes exhibiting ancient-dormant more robust dune forms (large dune mounds, degraded linear and transverse dunes, etc.).

Another issue with the Lancaster (2014) report is their definition of active dune systems exhibiting a stratigraphic thickness of at least 1.5 meters (m). This is misleading for many reasons. First, active sand sheet and coppice dune dominated regions and particularly in the DQSP, are less than 1.5 m thick. This is particularly the case as well along the fringes of dunes systems where dune deposits gradually get thinner as they approach an alluvially dominated geomorphic landscape. This is one reason that in this study, geomorphic mapping criteria was done dependent on whether an area was dominated by eolian or alluvial-fluvial geomorphology regardless of the thickness of the eolian deposits. Because Kenney, M (author herein) is referenced in the Lancaster (2014) map shown in Figure 10, it should be made clear that the findings of Lancaster (2014) are not considered consistent with the findings of eolian deposits provided in this report.

The findings in this report based on the eolian geomorphic and soil stratigraphic analysis conducted herein indicate that the eolian dune deposits associated with the Wiley's Well Basin and Mule sand migration zones occurring in the DQSP were initially deposited during the early to mid-Holocene. Most of the dunes are relict eolian sediments that were deposited a minimum of 3 to 2 kya. Hence, because soil profiles provide minimum ages for their parent sediments, it is likely that the eolian deposits occurring within the DQSP were deposited prior to 3 to 2 kya. In some places, eolian deposits were identified exhibiting S3a soils, indicating that they were deposited during the mid-Holocene. Since that time, the relict but more robust dune forms have degraded and not grown. Soil stratigraphy and geomorphic mapping for this project is discussed in more detail later in the report.

Figure 9: Modified Geologic map of the study region by Stone (2006).


Ford Dry Lake
CHUCKWALLA
(DEPRESSION)
VALLEY
Wiley's Well Basin
Colorado River Substation
Desert Quartzite
Wiley's Well Wash
MULE MTS THRUST
PALO VERDE MESA
Qw
Qr
Qp
Qs
Qa6
Qa5
Qa4
Qa3
QTa2
Ta1
Qpv
Qbm
Qbmg
Qbms
QTmm
QTmw
Kmf
Kmg
Kmh
Kmi
Kmj
Kml
Jp
Tid
Tv
Pgn
Alluvium of modern washes (Holocene)
Alluvium of the modern Colorado River flood plain (Holocene)
Playa lake deposits (Holocene)
Eolian sand (Holocene)—Brown lines mark dune crests
Alluvial-fan and alluvial-valley deposits (Holocene to Miocene)
Unit 6 (Holocene)
Unit 5 (Holocene)
Unit 4 (Holocene and Pleistocene)
Unit 3 (Holocene and Pleistocene)
Qoaf
S7
Unit 2 (Pleistocene to Miocene)
Unit 1 (Miocene)
Alluvial deposits of the ancestral Colorado River (Pleistocene and Pliocene)
Alluvial deposits of Palo Verde Mesa (Pleistocene)
Alluvial deposits east of the Big Maria Mountains (Pleistocene)
Gravel-dominated deposits
Sand-dominated deposits
S7
Alluvial deposits of the Mule Mountains (Pleistocene or Pliocene)
S7
Alluvial deposits of the McCoy Wash area (Pleistocene and/or Pliocene)
1 0 1 2 3 4 5 MILES
5000 0 5000 10000 15000 20000 25000 FEET
CONTOUR INTERVAL 50 METERS

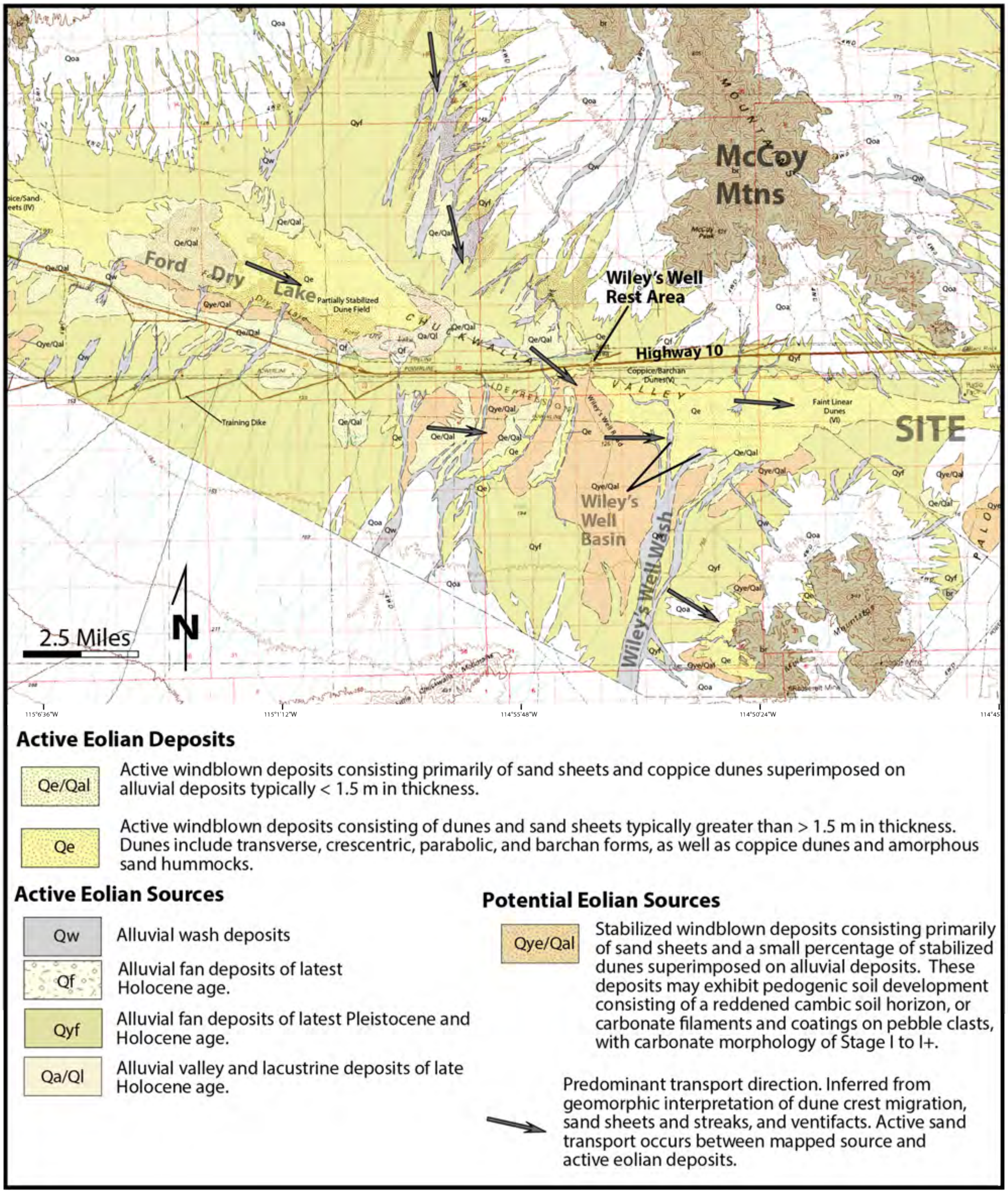
This report: Units Tmm & Tmw are the Bullhead Alluvium (Early Pliocene 4.3 Ma & Soil S7

(Colorado River associated fluvial near shore deposits, Soil S7)

(Colorado River Gravels-shoreline berms, Soil S7. Note: Unit Tmw is younger than unit Tmm. Unit Tmw is the same as Unit B of Metzger et al. 1973)

Unit QTa2, which is likely older than Quarternary (i.e. Ta2), is mapped in this report as Soil S7

Figure 10: Eolian Geologic map by Lancaster (2014).


McCoy Mtns
Ford Dry Lake
Partially Stabilized Dune Field
Wiley's Well Rest Area
Highway 10
Coppice/Barchan Dunes(V)
CHUCKWALLA VALLEY
Training Dike
Faint Linear Dunes (VI)
SITE
Wiley's Well Basin
Wiley's Well Wash
2.5 Miles
N
Qoa
Qyf
Qw
Qe
Qe/Qal
Qye/Qal
Qf
Qa/Ql
115°6'36"W
115°1'12"W
114°55'48"W
114°50'24"W
Active Eolian Deposits
Qe/Qal
Active windblown deposits consisting primarily of sand sheets and coppice dunes superimposed on alluvial deposits typically < 1.5 m in thickness.
Qe
Active windblown deposits consisting of dunes and sand sheets typically greater than > 1.5 m in thickness. Dunes include transverse, crescentric, parabolic, and barchan forms, as well as coppice dunes and amorphous sand hummocks.
Active Eolian Sources
Qw
Alluvial wash deposits
Qf
Alluvial fan deposits of latest Holocene age.
Qyf
Alluvial fan deposits of latest Pleistocene and Holocene age.
Qa/Ql
Alluvial valley and lacustrine deposits of late Holocene age.
Potential Eolian Sources
Qye/Qal
Stabilized windblown deposits consisting primarily of sand sheets and a small percentage of stabilized dunes superimposed on alluvial deposits. These deposits may exhibit pedogenic soil development consisting of a reddened cambic soil horizon, or carbonate filaments and coatings on pebble clasts, with carbonate morphology of Stage I to I+.
Predominant transport direction. Inferred from geomorphic interpretation of dune crest migration, sand sheets and streaks, and ventifacts. Active sand transport occurs between mapped source and active eolian deposits.

7.4 Geologic History in Historical Times

The primary variation in the local geology during Historical times of approximately the past 100 to 150 years is related to the effects on the dunes from human activity. Namely, the diversion of surface water flow via construction activities and the invasive Sahara Mustard plant. Changes in surface water flow has caused some dune and alluvial areas to receive either an increase or decrease in water flow compared to pre-Historical times. Most of these changes are associated with the construction of Interstate Highway 10 and older major roadways in the same general location since the mid-20th Century. The water flow diversions have allowed for additional water to reach some dune areas, and a bit less in others. This is discussed in more detail later in the report, but the net result within the DQSP is that changes associated with anthropogenic water diversions are quite minimal.

Likely the largest impact to dune systems in the study area and possibly regionally, during Historical times and likely into the future is the invasion of the non-indigenous Sahara Mustard plant. This species experiences dense bloom episodes across eolian dominated depositional areas that may occur approximately every 4 to 7 years based on limited field work data by the author. If this plant persists, it will slow down sand migration rates likely more than an order of magnitude and lead to dune sands depositing closer to their sources.

8.0 REGIONAL EOLIAN SAND MIGRATION CORRIDORS IN SOUTHEASTERN CALIFORNIA

Regional sand migration corridors (sand pathways) have been proposed in southeastern California (Zimbelman et al., 1995). These sand migration corridors are proposed to allow eolian sands to migrate east to southeastward within valleys, and even navigating over mountain passes associated with sand ramps in some instances. The proposed regional sand migration pathways occur in regions where the wind-blown sand is transported over various geomorphic landscapes including playa lakes, alluvial fans, and mountain terrains. However, based on mapping provided in this report, the proposed sand migration corridors consist of a series of individual eolian systems that align via connectivity associated with topographically controlled prevailing winds. In terms of sand source, alluvial fans (washes), playa lakes, and migrating wind-blown sand are concurrently active geologic processes which impart their respective geomorphology to the landscape and occur along the length of the proposed sand migration corridors. Lacustrine (playa and pluvial lake beds) and alluvial fan processes are believed to provide the largest source of eolian sand systems. Hence, sand migration corridors receive substantial eolian sands from local sources along their mapped lengths and the proposed regional sand migration corridors were likely originally mapped as such due to connecting a series of relatively distinct dune systems.

The proposal of regional sand migration corridors, which can easily be mapped on small scale maps covering relatively large regions provide a simple model to conceptualize wind-blown sand migration in southeastern California. However, when the regional sand migration corridors are mapped as a continuous zone extending for tens of miles, it has the potential to imply that sand grains may have the ability to migrate along the entire mapped length of the regional sand migration corridor not only during current times, but continuously since its time of development. This subsequently may lead to the assumption that eolian sand sources along the regional sand migration corridor may be many miles upwind and not local. This possible assumption therefore infers that each proposed sand migration corridor has a "Lake Victoria to the Nile River" (source of the Nile River) type source at the northwestern beginning of the regional sand transport zone. This is clearly not the case for most of the proposed regional sand migration corridors.

Since the proposal by Zimbelman et al. (1995) of the regional sand migration corridors in southeastern California, considerable research has been conducted to better understand when the regional eolian systems essentially began to develop, dune activity variations over time, and what are the primary eolian sand sources. However, to the author's knowledge, there is not a publication that attempts to integrate these publications collectively.

8.1 Published work regarding regional sand migration corridors (transport pathways)

Numerous geologic, geomorphic and stratigraphic studies have adopted the existence of regional sand transport pathways (sand migration zones) throughout southeastern California (Figure 1, Plate 1 and Plate 2). The initial eolian research in southeastern California that may have provided the concept of regional sand migration corridors was the Sharp (1966) study of the Kelso Dunes. His findings indicate that sand grains migrated 35 miles from their source at Afton Canyon (Lake Manix; Plate 1) toward the east to the Kelso Basin that is bounded by obstructing mountains to the east. Sharp (1966) indicated that the westerly winds transporting the dune sands were topographically controlled by connectivity of local valleys and adjacent mountain ranges.

Based on regional mapping of dune systems in southeastern California, Zimbelman et al. (1995) expanded the findings by Sharp (1966) for the Lake Manix-Afton Canyon to Kelso Dune sand transport zone, that two other regional sand transport pathways occur in southeastern California (Mojave Desert). These include one extending from Bristol Playa through the Cadiz and Danby playa lakes and Rice Valley to the Colorado River, and the other from Dale Lake, across the eastern Pinto Basin, and then continuously down Chuckwalla Valley (Palen and Ford playa lakes) to terminate near the Mule Mountains west of the Colorado River (Plate 1 and Plate 2). Zimbelman et al. (1995) proposed that previously identified eolian dune depositional areas in their proposed regional sand migration pathways are interconnected via a series of wind-blown sand migration zones and intermittent eolian sand source areas.

Lancaster and Tchakerian (1996) evaluated the geomorphology and sediments of sand ramps that occur along the flanks of mountains and mountain passes in the region and indicate that they occur next to regional and local sand transport corridors. These findings indicate that sand ramps, which in a sense exhibit a topographic obstruction to eolian sand migration did allow for continuous connectivity of their respective sand transport pathway.

Muhs et al. (2003) adopted the regional eolian sand transport pathways proposed by Zimbelman et al. (1995) and evaluated whether the eolian sands from the eastern end of these sand transport corridors crossed over the Colorado River in northwestern Arizona as proposed by Zimbelman et al. (1995). Their findings indicate that eolian sands from the eastern end Bristol Lake to eastern Rice Valley sand migration zone were unable to migrate across the Colorado River. Zimbelman and Williams (2002) indicate that the eolian sands east of the Colorado River in the Parker Dunes are chemically indistinguishable from the Colorado River Sands.

This provides strong evidence that eolian sands from the eastern Rice Valley have not been able to migrate across the Colorado River system.

Pease and Tchakerian (2003), based on a geochemistry analysis of sand grains along the path of the proposed sand migration corridors in southeastern California, suggest that the corridors do not represent a continuous "river of sand". Hence, suggesting that eolian sands are likely unable to migrate the entire lengths of the proposed regional sand corridors at any time, but particularly not since the mid-Holocene.

Lancaster (2014) conducted eolian mapping of some of these dune systems and adopted the proposed regional sand migration pathways (corridors). Work conducted by the author (Kenney, 2010a, 2010b and 2010c) for solar energy projects adopted the regional sand migration transport corridors showing a continuous transport pathway along eastern Chuckwalla Valley. Mapping by Lancaster (2015) adopted the regional sand migration corridor model associated with his geomorphic mapping of dune systems in Chuckwalla Valley.

The hypothesis of the regional sand migration corridors in southeastern California by Zimbelman et al. (1995) appears to have provided the benefit of conceptualizing all the dune systems collectively suggesting that they all likely have many commonalities in terms of age, sand sources, relationships with alluvial fan and playa lake activity, and climate variations. Some local parameters have been studied, and they include the clear importance of playa lakes as a source of eolian sands once the playa lakes desiccate, which in turn indicates a correlation of dune activity and climate. Another is the correlation of increased eolian sand production associated with erosion of granitic rocks in the local mountains. However, few detailed geomorphic studies have been conducted to the authors knowledge that evaluate the potential effect on dune systems of local parameters that may result in variations of eolian behavior along particular sections of the regional sand migration corridors. This study attempted to do this by mapping the regional sand migration corridors in sufficient detail such that subtle variations in the dune systems could be identified with the hope that a cause for the variation could be identified that presumably would also be local. This is very important for geomorphic eolian studies for proposed developments due to their "local" scale.

8.2 Latest Pleistocene to present activity of regional sand migration corridors

Numerous published papers provide evidence regarding the timing of dune development and activity since the late Pleistocene in southeastern California. Most dunes systems are dynamic and typically re-cycle older dune deposits via erosion and re-mobilization, and therefore do not provide a continuous stratigraphic record of their geologic history to evaluate long term behavior. Lancaster and Tchakerian (1996), point out that sand ramps however, located along some of the sand migration corridors provided a relatively complete stratigraphic record alternating between eolian and fluvial dominated periods. As they point out, this relatively complete stratigraphic record occurs because the sand ramps deposit upwards (vertically) over time which minimizes erosion of older dunes.

The findings of Bateman et al. (2012) suggest that the palaeoenvironmental information provided by several southeastern California sand ramps may be more complex and less complete than first believed. Based on their review of existing regional sand ramp data and a focus of the Soldier Mountain sand ramp (Plate 1) near Lake Manix, they determined that these eolian deposits accumulated quickly (< 5ky), probably in a single phase before becoming relict (dormant). They indicate that the dune deposits at Soldier Mountain appear strongly controlled by a “window of opportunity” when the plentiful sand is available and cease to develop when this sediment supply diminishes and/or the accommodation space is filled with the confines of the sand ramp depositional area. Their findings are consistent with those of this report indicating that most of the mass of the DQSP site dune systems were primarily deposited during the early to mid-Holocene and are primarily relict geomorphic terrains since that time.

Age data from numerous sand ramps in southeastern California (i.e. Solder Mountain near Lake Manix, Clark Pass, Iron Mountain, and Big Maria Mountains) indicate that a regional strong eolian aggredational event occurred from the latest Pleistocene till near the end of the early Holocene (i.e. 8 to 7 kya; see Plate 8A, 8B and 8C; Lancaster and Tchakerian, 1996; Rendell and Sheffer, 1996; Pease and Tchakerian, 2001; McDonald et al., 2003; Bateman et al., 2012). Eolian deposit age data across southeastern California also indicate that a regional dune aggredational event (strong sand flux and migration rates) occurred from the latest Pleistocene to about 8 kya (Lancaster, 1997l; Lancaster and Tchakerian, 1991).

Lancaster (1994) provides a summary of eolian systems in arid regions that indicates that many dune fields have accumulated episodically, with changes in sediment supply and dune mobility occurring throughout time and likely driven by climatic change. His findings regarding dune fields around the world indicate that there is abundant evidence that eolian activity has been both more extensive and/or intense than it is at present (latest Holocene). Lancaster (1994) indicates that evidence to support a significant decrease in eolian activity during the later Holocene include dormant and relict dunes and sand sheets that are stabilized by vegetation and soil development among others processes. Pease and Tchakerian (2002) indicate, along with numerous other studies of eolian dune systems across southeastern California (see Plate 8A, Plate 8B and Plate 8C), that the regional sand migration corridors have dramatically slowed down since the mid-Holocene.

Regional mapping of the Dale Lake to eastern Chuckwalla Valley for this study identified areas where the sand migration pathway is essentially shut down. The region of Dale Lake to the Eagle CoxComb Pass was mapped via historical Google Earth Pro imagery and this section appears essentially shut down for through going eolian sand transport (red dashed line on Plate 1). In addition, this section exhibits very weak dune geomorphology in an area dominated by alluvial systems indicating it may not have ever been a significant eolian sand pathway (Plate 1 and Plate 2). Instead, it is proposed that the Dale Lake sand system for the most part terminates near the Clarks Pass sand ramp (Plate 1) and that the abundant eolian sands occurring at the eastern end of the Pinto Basin (herein named the Pinto Basin Dunes) were derived primarily from the west to east flowing drainage system within the basin. Hence, the Pinto Basin Dunes are proposed to have developed not by west to east sand migration from the Dale Lake areas, but instead by the local robust Pinto Basin wash system. This wash produces more eolian sands than typical washes due to numerous factors. The wash occurs in the valley axis and flows parallel to the topographically controlled prevailing winds. The water shed (not mapped) for the Pinto Basin wash is relatively large and extends beyond the limits of the basin and local bounding mountain ranges. The large watershed causes this wash to flow more frequently than washes associated with smaller water sheds. The occurrence of abundant granitic rocks as well in the local mountains also assists the washes to produce a relatively larger magnitude of eolian sand than washes emanating from other types of bedrock.

Aerial image mapping also indicates a fluvial dominated system and that eolian sand migration is hindered over Eagle CoxComb Pass causing the eolian sand migration rate to be relatively slow to the southeast in the eastern Chuckwalla Valley (red dashed line on Plate 1). A series of active dunes along the west flank of the CoxComb Mountains (Plate 2) likely receive abundant eolian sands from the local wash that is proposed to carry more eolian size sand grains than typical desert washes. This wash may carry an order of magnitude more eolian sand size bedload than typical washes emanating from bedrock dominated mountain ranges because it is the eastern extent of the Pinto Basin wash system. Hence, this wash has flowed through the eastern Pinto Basin dune system and entrained abundant eolian sand that had deposited within the wash. In addition, this wash is also provided higher than usual eolian size sand grains due to erosion of older (Pliocene) fluvial sediments (dark blue units on Plate 2) and granitic rocks exposed in the local mountains. The wash then flows to Palen Dry lake and provides eolian sand to that system due to its orientation down the valley axis parallel to prevailing winds and its wide braided drainages with subtle bar and swale geomorphology. Hence, the Pinto Basin wash system has essentially resulted in a series of eolian dunes that connect the Pinto Basin Dunes with those of the northwestern Palen Dry Lake dune system. In this model, sand transport from the Pinto Basin to the northwestern Palen Dry Lake likely includes episodes of fluvial and eolian transport. Episodic forms of transport of eolian size sand grains may very well be the case on playa lake beds.

Eolian Geomorphic mapping via field work and analysis of historical Google Earth Pro imagery between Palen and Ford dry lake bed areas, and in the eastern Ford Dry Lake area indicate that sand migration rates are very low and that older relict dune systems are eroding. Hence, these areas represent eolian sand migration “breaks” essentially along the Chuckwalla Valley sand corridor system. As discussed in other portions of this report, numerous local sources of eolian sand occur in the Ford Dry Lake area.

8.3 Published eolian sand sources for regional sand migration corridors

The southern eolian dune systems collectively occur within a relict landscape that developed during Basin and Range extensional tectonics of the late Miocene through possibly early Pliocene. The extensional tectonics pulled the crust apart resulting in a series of exposed mountain ranges and adjacent valleys. This region is referred to as the Basin and Range geomorphic province due to this phase of deformation and that the valleys are in fact internal continental basins with flow from local and most regional drainages terminating within local valleys. This is important because most of the eolian sands in the regional dune systems originally are created by erosion of the local mountain ranges. The mountain derived eolian sands then migrate downslope, primarily associated with alluvial processes, although some grains are picked up by the wind to become available for the local eolian system.

However, evaluating specific eolian sand sources is complex due to the relatively common mineral composition of most of the rocks exposed in the local mountain ranges. Granitic rocks, which are common in the region (Plate 1 and Plate 2), easily erode to produce a relatively large magnitude of eolian size sand grains compared to other rock types, suggesting that washes emanating from granitic rock exposures may be a relatively larger source of eolian sands than other mountain ranges. This was found to be the case by mapping during this project where a good example of a primarily granitic eolian sand source was identified in the Pinto Mountains (Plate 1).

Many research articles have indicated that the primary source for eolian sand is from playa lake surfaces and alluvial processes (Sharp, 1966; Zimbelman et al., 1995; Lancaster and Tchakerian, 1996; Lancaster, 1997; Ramsey et al., 1999; Pease and Tchakerian, 2002; Zimbelman and Williams, 2002; Pease and Tchakerian, 2003; Muhs et al., 2003)   Playa lake beds result in the production of relatively high volumes of eolian sands once they desiccate, providing not only a pathway for eolian sand but also a sand source from sand baring wind abrasion.   Alluvial processes (fluvial) produce eolian sands quite readily soon after a wash flows and experiences wind speeds sufficient to pick up sand and transport it. This process assists in the supply of new eolian sands to an eolian system outside of the wash where the bar and swale relief of the wash is sufficiently small to allow the eolian sand grains to exit the fluvial system. This is typically the case in the distal portion of fans or where washes flow along valley axis.

Playa lakes occur sporadically, and alluvial washes occur essentially along the entire length of the regional sand migration corridors (Plate 1 and Plate 2). This suggests that local eolian sources are a very important sources, if not the most important source, of eolian sands along the regional sand migration corridors and this is proposed by numerous regional eolian studies referenced previously. For example, Pease and Tchakerian (2003) agree with other work that the local sources along the corridor system provide the primary source of eolian sands (Zimbelman and Williams, 2002; Muhs et al., 2003).   Hence, the regional sand migration corridors clearly receive eolian sands along their path with strong influxes near and downwind from playa lakes and by washes that occur in most valley regions. These findings are consistent with those of this report based on regional eolian mapping shown on Plate 1 and Plate 2. But as explained in more detail below, these conditions are not present in and around the DQSP site.

Ramsey et al. (1999) evaluating the Kelso Dunes provide evidence not only of eolian sands having migrated from the Mojave River-Lake Manix source areas 35 miles to the west, but also from local mountain ranges (alluvial processes) bounding the Kelso Dune themselves.   However, the proposed Lake Mojave that occurs only 20 miles to the west and the final flow destination for the Mojave River-Lake Manix hydrologic system (Enzel et al., 2003 and Wells et al., 2003; Plate 1) also provides substantial eolian sands to the Kelso Dune system.

It appears based on review of all the data and research conducted by the author that during periods of strong eolian activity (dune aggredational events), eolian sands travel large distances when the regional sand migration corridors provide a more continuous pathway, and that these sands would be able to mix with the continuously provided local eolian sources.   These conditions occur when vegetation densities are at lower elevations and relatively frequent monsoonal storms occur during dry periods of the year. During times of dune stability, the regional sand migration corridors become discontinuous and local sources primarily associated with playa lake beds and alluvial systems dominate.   In addition, during periods of dune stability when the older dunes become relict, they begin to cannibalize the older dunes associated with wind abrasion (eolian deposits re-working) that provides an additional source for active eolian sands (Lancaster, 1995). Within the DQSP and many other areas in the Chuckwalla Valley, erosion of older relict dune deposits are a primary source for the minimal active eolian sands occurring within dune systems poorly fed by a playa lake (or ponding area) and alluvial systems (Kenney, 2010a, 2010b, and 2010e).   The findings of this report indicate that a period of dune stabilization and associated dune abrasion (cannibalization) has been occurring in many dune systems in the Chuckwalla Valley during the late Holocene.   As discussed earlier in the report and in the next section, some localized dune areas remain relatively active due to continuous input of new eolian sands from local sources that generally occur near playa lake beds, ponding areas, and strong alluvial systems.

8.4 New hypotheses regarding eolian sand sources along the regional sand migration corridors

As discussed above, playa lake beds and alluvial systems represent the primary sources for newly generated eolian sands. Regional eolian system mapping during this project provided on Plate 1 and Plate 2 provided insights regarding local parameters associated with playa lakes (and ponding areas) and alluvial processes that play a role in newly derived eolian sand. These concepts assist in the understanding of the relative importance of local eolian sources verses far field from upwind areas along the proposed regional sand migration corridors. Some previously unrecognized eolian sand sources have also been recognized.

Playa lakes for example are generally described as a strong eolian source primarily after they have desiccated when the climate changes from wet to drying (i.e. at the end of the last ice age). However, playa lakes in southeastern California region routinely flood to shallow depths that provide surface instabilities resulting in eolian sand production. This is the case for local Palen and Ford dry lake beds that receive significant flow from local drainages. In fact, subdued drainage systems occur across these playas allowing for relatively frequent surface disturbance that greatly increases eolian sand production. The fluids also assist in providing ongoing dune stabilizing moisture. Hence, it is not necessary for playa lakes to fill completely for extended periods of time and then finally desiccate to provide a significant eolian sand source for local dune systems. This locally observed process is likely the case for other playa lake beds in the region.

Another eolian sand source not previously identified or evaluated comes from the erosion of older sedimentary deposits. This local eolian sand source is proposed to be significant to many dune systems along the Dale Lake to eastern Chuckwalla Valley sand migration corridor. In the west, the Dale Lake dune system occurs primarily east (downwind from prevailing winds) of Dale Dry Lake, which based on aerial imagery mapping in Google Earth Pro is only approximately 3 square miles in size. In addition, eolian deposits are identified upwind from Dale Dry Lake across a surface of eroding older sedimentary deposits via a series of tributaries and wind abrasion (brown areas on Plate 1 and Plate 2). The fluvial networks erode into the older sedimentary units that are exposed across a large surface area (i.e. piedmont) resulting in fluvial erosion where the drainages produce loose sediment bearing large quantities of eolian size sand grains that can then be transported by the wind once flow ceases. In addition, sand bearing wind across the sedimentary piedmont surface induces additional erosion of the exposed older sedimentary deposits resulting in the production of additional eolian sands which can be easily transported toward the east to become part of the Dale Dry Lake dune system.

Within the Chuckwalla Valley, erosion of exposures of the mostly Pliocene fluvial and quiet water deposits associated with the Colorado River engulfment of the valley provide a significant source of eolian sands. These deposits are dominantly unit Tmm of this report (also referred to as Soil S7, unit QTmm of Stone, 2006) and are clearly a source of eolian sand based on their isolated exposure in the Mule Mountains where erosion of this unit appears to be the only reasonable source of eolian sands for the local dune system (Plate 4). Erosion of this and other similar units essentially cause local washes eroding into them to provide a larger source of eolian sands than due typical washes emanating from bedrock mountain ranges and across typical alluvial fans. For example, most of the dune systems in the eastern Chuckwalla Valley have received much more eolian sand due to the erosion of the older sedimentary deposits (Tmm) than would typically have been the case for typical Mojave Desert washes which has been an important factor in the development of Ironwood and Wiley Well Basin sand migration zones (Plate 3A). In fact, it is proposed that the Mule sand migration zone in the southeast corner of the DQSP may not even exist if it were not for the robust sand transport of the local washes carrying eroded older sediments from unit Tmm. An important parameter in the evaluation of the significance of eolian sand source from the erosion of older sedimentary units is the size of the drainage water shed, characteristics of the wash system in terms such its orientation, braided geomorphology, and termination conditions (ponding area, playa surface, etc.).

Although alluvial processes are considered a major source of eolian sands for regional dune systems, they have not been evaluated in detail regarding how they may play a role other than as a conduit for wash transport. The observation that erosion of unit Tmm, which is not alluvial fan deposits, was clearly a significant eolian sand source led to the hypothesis that periods of erosion into older alluvial fan deposits (fan trenching) would likely also result in significant increase in eolian sand. This led to the evaluation of the timing and cause of alluvial fan aggredational events, and timing of alluvial fan trenching (down cutting, Plate 8C). This idea was apparently conceptualized by Lancaster (1997) that provides insightful concepts by indicating that eolian deposits are a product of climatic changes that increase sediment supply from fluvial and lacustrine (playa and pluvial lake beds) sources and may, therefore, be closely tied to period of channel cutting and geomorphic instability. This idea is discussed later in the report, but in summary, it was determined that eolian systems across southeastern California exhibited much higher magnitudes of activity (aggredational events) during times of alluvial fan aggredational events, and during times of alluvial fan trenching (Plate 8A, Plate 8B and Plate 8C). The process of alluvial fan trenching may be one parameter that allowed dune systems to be more sporadic over time than alluvial fan aggredational events as the two processes can occur independent of the other. The evaluation also indicates that eolian dunes across southeastern California experienced dune aggredational events during periods of relatively stronger and more frequent monsoonal storms (cloud burst, isolated thunder storms) but colder Pacific storms systems were occurring less frequently. This climate condition occurred during the early Holocene and mid to late Holocene and correlates with periods of time of increased eolian activity (Plate 8B). Increased monsoonal storm activity and decreased Pacific storm activity most strongly occurred in southeastern California, and are recently being discovered to be the driving agent for regional alluvial fan aggredational events.

9.0 CHUCKWALLA VALLEY DUNE SYSTEMS - SAND MIGRATION ZONES AND STABILITY

Detailed geomorphic eolian mapping via field work and aerial imagery (Google Earth Pro) in the Chuckwalla Valley was conducted utilizing the designated relative geomorphic sand migration zones (Appendix C; Plate 2) that have evolved as a method of eolian mapping by the author (2010b, 2010d, 2010e, 2011) In addition, general mapping was conducted for this region utilizing the geologic-geomorphic designations (Report Section 7.3) that have also evolved over time by the author in an attempt to construct terms that describe geomorphic variations within dune systems that to the author's knowledge had not been done previously. For example, the use of eolian map units Qsa, Qsad and Qsr to designate regions dominated by active, active and stable mix, and stable eolian sediments exposed on the surface was new (2010a, 2010b, 2010d, and 2011). The results of this mapping are provided below.

9.1 Identified local sand migration zones

One criteria for a dune system to be designated as an independent sand migration zone is that a dune system receives a significant source of sand from a local source that is independent from sources upwind associated with the regional valley axis sand migration corridor. Consistent with earlier work by Kenney (2010a and 2011) identifying local independent sand migration zones (SMZ) in the Chuckwalla Valley (i.e. Palen Valley SMZ and Mule SMZ on Plate 3A), the more detailed mapping conducted during this study led to the identification of numerous semi-local and local independent sand migration zones in the area of the DQSP. Some of these zones are natural, and others result from anthropogenic activities that are historical in age. More specifically, the sand migration zones are shown on Plate 3A, and include:

9.1.1 *Palen Lake Sand Migration Zone*

The Palen Lake SMZ occurs along the southwestern region of the Palen Dry Lake, more specifically along the alluvial fan and playa lake bed contact (Kenney, 2010b). Hence, most of the dune deposits associated with the Palen Lake SMZ occur on top of playa lake bed deposits (Kenney, 2010b).

Eolian sands migration over time in the Palen Lake SMZ is dominantly from NWW to SWW along the southern portion of Palen Dry Lake in a region, however, each year strong prevailing winds emanating down the Palen-CoxComb Valley from the NNW west causing eolian sands to migrate toward the SSE, which assists in concentrating the Palen Lake SMZ eolian deposits along the southwestern portion of the playa.

The primary source of eolian sands for the Palen Lake SMZ is from the northwest associated with the sand migration system along the western flank of the CoxComb Mountains, but also the wash that flows along the western margin of that dune system. This wash system is connected to Pinto Basin and represents a very large watershed area. Southeast moving water flows along the wash into the southwestern region of the Palen Lake SMZ dune system (Plate 3A and Plate 3B). Most alluvial washes flowing northward from the Chuckwalla Mountains flow through the dunes to reach the playa lake bed and these washes may reach the playa area more frequently compared to historical times due to flood control berms associated with Highway 10 that concentrate and increase channel flow. There is clear evidence of relatively frequent flooding on Palen Dry Lake, indicating that the lake bed itself is a significant eolian sand source. In addition, flood waters are able to penetrate vast areas of the Palen Lake dune system which provides critical stabilizing moisture allowing the dunes to resist sand bearing wind abrasion.

Most of the eolian sands of the Palen Lake SMZ exhibit a distinctive pale orange color and particularly along the southwestern two-thirds of the SMZ (Plate 3A). This is in contrast with the light grayish color of the East Palen Lake SMZ that intersects the Palen Lake SMZ to the southeast. Some of the dunes along the northeastern region of the Palen Lake SMZ exhibit colors that are not distinctly orange nor light gray. This suggests that some eolian sands enter the northeastern region of the Palen Lake SMZ from the north from the erosion of lakebed sediments and/or across the entire exposed playa surface.

The Palen Lake SMZ is the most robust dune system in Chuckwalla Valley and represents an interconnected network of transverse dunes exhibiting seasonal avalanche faces. These areas are mapped as Zone AB on

Plate 3B. Active barchan dunes over 10 feet tall that exhibit avalanche faces occur in this area, indicating a prevailing wind from the NWW to SSE. In some areas the barchan dunes, which develop in areas of relatively low eolian sand input flux, commonly occur in the central Palen Lake area as independent dunes separated by playa lake surfaces. As observed on various years of historical imagery, dune activity levels and stability vary significantly depending on precipitation.

9.1.2 *East Palen Lake Sand Migration Zone*

The East Palen Lake SMZ transports sand southward down the Palen-CoxComb Valley axis and then along the eastern edge of Palen Dry Lake along the contact between the lake bed surface to the west, and alluvial fan deposits to the east. Portions of the East Palen Lake SMZ are deposited on older alluvial fan surfaces and alluvial washes flow through and within the dune system providing additional eolian sand source, dune stabilizing moisture, and destabilization as it reworks eolian sands. The most robust dune form in the area are weak transverse dunes generally less than 5 feet tall that exhibit avalanche faces indicating a north to south prevailing wind.

The East Palen Lake SMZ merges with the Palen Lake SMZ in the easternmost area of the Palen Lake playa lake beds. The East Palen Lake SMZ dunes exhibit light grayish hues similar with the Palen Lake playa surface to the west suggesting that the playa lake beds are a significant eolian sand source. This is supported by the identification of a braided wash system flowing southward across the entire length of the playa west of the East Palen Lake dune system and seasonally variable amounts of migrating eolian sands identified on the lakebed. Toward the north, the primary eolian sand source for the East Palen Lake dune system is from the north associated with eolian deposits along the Palen-CoxComb Valley wash system north of Palen Lake (Plate 2).

9.1.3 Palen Lake-Western Ford Lake Sand Migration Zone

The Palen Lake-Western Ford Lake SMZ occurs in the western region of Ford Dry Lake and receives eolian sands from the Palen Lake and Eastern Palen Lake SMZ’s to the west, erosion of Ford Dry Lake, and erosion of relict dunes. The dune system is very weak and non-continuous, stabilized, and in many areas degrading. The most robust dunes in the area are converging relict strongly stabilized mounds exhibiting active sand sheets. The dune deposits are less than 5 feet thick.

Aerial mapping of various years indicates that many upwind relict dune deposits in the eastern portion of the dune system are eroding via sand bearing wind transported over the lakebed in the west. Numerous low bar and swale washes occur on the Ford Dry lake bed which in terms of aerial coverage represents well over 50% of the region of the Palen Lake-Western Ford Lake SMZ. Ponding also occurs in the central region of the Palen Lake-Western Ford Lake SMZ immediately west of a stabilized, relict, and degrading dune system. These areas are observed on Plate 3B where the ponding area is shown as unit Ql-de (playa erosional area) to the west of unit Qe-ds (stabilized dunes). Hence, in terms of the regional sand migration corridor extending down the Chuckwalla Valley, the exposed playa lake bed in western Ford Dry Lake represents a section where sand migration rates have not been sufficient certainly during the late Holocene, but possibly during the entire Holocene, to allow for the development of a dune depositional area that could geomorphically overcome playa processes. In the central and eastern Ford Dry Lake area the dune and playa processes compete geomorphically in more equal proportions.

9.1.4 East Palen Mountains Sand Migration Zone

The East Palen Mountains SMZ receives eolian sand from a drainage system emanating from the southeastern Palen Mountains west of the Genesis Solar Project (Plate 3A). Eolian sands produced by this wash system immediately north of the playa surface of Ford Dry Lake migrates southeastward to merge with eolian sands migrating eastward in the Palen Lake-Western Ford Lake SMZ (Plate 3A). A region of exposed playa surface that frequently floods occurs between the Palen Lake-Western Ford Lake and East Palen Mountains SMZ. This playa area provides a source for new eolian sands for the southeastern portion of the East Palen Mountains SMZ. The most robust dunes in the area are seasonally active interconnected and non-migrating dune mounds. In many areas activity levels of the dunes decreases outward toward the edges of the system where the relict dune mounds erode providing an internal source of eolian sands.

9.1.5 East Ford Lake Sand Migration Zone

The East Ford Lake SMZ receives eolian sands from the East Palen Mountains SMZ to the west, a ponding and water flow drainage system that flows to the north just west of the western mapped boundary of the East Ford Lake SMZ, and erosion of older relict dune deposits (Plate 3A and Plate 3B). The dune system is stable and in many areas degrading which provides an internal source of eolian sands. The dune system consists of an interconnected dune mound system generally less than 5 feet thick exhibiting a network of ponding areas within interdune depressions many of which are interconnected themselves. The interdune depressions are filled with water relatively frequently allowing for the infiltration of stabilizing moisture for the dune system. In addition, these flooding events, as observed by the author in the field, are sufficient to fill the interdune depression such that they breach from one depression to another which then can develop into internal flood-flow events as one basin drains into another in a cascade fashion. These flood events remobilize relict eolian sand deposits which provide a new eolian sand source.

Eolian sands within the East Ford Lake SMZ migrate ESE (see Windrose Direction in the Glossary, Appendix B) to where it merge with eolian sands migrating toward the SE within the Palen Valley SMZ (Plate 3A). However, sand migration rates in the central portion of the East Ford Lake SMZ are very low (Zone C) and the region primarily consists of exposed playa lake beds as shown on Plate 3B. This indicates that the East Ford Lake SMZ likely contributes minor eolian sand to the Palen Valley SMZ since the mid-Holocene.

9.1.6 Palen Valley Sand Migration Zone

The Palen Valley SMZ occurs on the southeastern region of Palen Valley and receives its eolian sand from a braided channel system that flows from north to south in Palen Valley (Kenney, 2010a). The Palen Valley wash system flows relatively frequently to terminate in Ford Dry Lake. The most robust dune type in the zone are linear dunes that exhibit avalanche faces that are in places over 5 feet tall. Two areas exhibiting linear dunes occur with one in the northern region, fed by eolian sands from the Palen Valley wash system, and the other in the southeast, fed by the combination of the merging of the Palen Valley and East Ford Lake SMZ's. In the two linear dune areas, they are commonly bounded by washes, particularly along their eastern side, and separated by zones of weak sand migration rates over alluvial fan surfaces. Between the two linear dune areas, alluvial fan washes and deposits dominate the geomorphology. These alluvial fan drainages flow toward the SSW across the Palen Valley SMZ to terminate in Ford Dry Lake. Some of these washes emanate from exposures of unit Tmm which upon erosion provide an increased eolian sand input for the Palen Valley SMZ (Plate 4).

Toward the southeast, the more robust Palen Valley SMZ merges with the weaker East Ford Lake SMZ, which as discussed previously, produced in a new set of linear dunes exhibiting avalanche faces which extend all the way to just north of the Wiley's Well Rest Stop (Plate 3A). Geomorphic and soil stratigraphic field mapping immediately south of Highway 10 within the Palen Valley SMZ indicates that sand migration rates in this area have been low for a minimum of the past 3 to 5 thousand years. However, anthropogenic activities have greatly reduced the sand migration rate in the southeastern Palen Valley SMZ. Construction of Highway 10, which consists of two elevated berms over 10 feet tall with a middle depression and associated parallel shallow fill borrow pits, has greatly diminished the ability of eolian sands to migrate to the previous natural termination at the western end of the Wiley's Well Basin dune system (Plate 3A).

9.1.7 Ironwood Sand Migration Zone

The Ironwood SMZ occurs north of the Ironwood State Prison and south of Highway 10 (Plate 3A). The primary source of eolian sand for this zone is from a series of south to north flowing washes emanating from the Little Chuckwalla Mountains (see Plate 7A). These washes transport more eolian size sand than typical Mojave Desert washes due to the erosion upstream of the Pliocene Colorado River deposits unit Tm (see Plate 4). In addition, the erosion of granitic rock exposures in the region between the eastern Chuckwalla Mountains and western Little Chuckwalla Mountains allows these washes to carry a larger magnitude of eolian size sands than typical Mojave Desert washes which also provides a source of eolian sands to the Ironwood SMZ (Plate 7A). A very minor component of eolian sands within the Ironwood SMZ emanate from the regional Chuckwalla Valley Sand Migration Corridor system. In addition, very minor eolian sands migrate east of the Ironwood SMZ to merge with the Wiley's Well Basin eolian system.

The most robust dune type in the Ironwood SMZ are transverse to the linear dunes due to variable prevailing wind regimes. The linear dunes are commonly bounded by active washes on their eastern side and eastward migration of the dunes has resulted in eastward migration of the washes. Between the more robust linear-transverse dune areas are regions dominated by alluvial geomorphology where relative sand migration rates are low.

9.1.8 *Wiley's Well Basin Sand Migration Zone*

The Wiley's Well Basin SMZ dune system occurs in the region of the Wiley's Well Basin and the northern limit of the Wiley's Well Wash in the west, and extends eastward to terminate where it merges with the Polowalla Sand Migration Zone (Plate 3A). The Wiley's Well Basin SMZ extends along the northern most portion of the DQSP site (Figure 11). It is proposed that nearly all eolian sands in the Wiley's Well Basin SMZ system were generated locally not only during the early Holocene regional eolian aggredational event, but also since the mid-Holocene. Eolian sands in the Wiley's Well Basin SMZ are generated from the wide, north flowing Wiley's Well Wash braided wash system, south flowing washes from the southern McCoy Mountains, and Wiley's Well Basin ponding area where all these wash systems terminate. The Wiley's Well Basin floods frequently from monsoonal cloud burst "thunderstorm" events that, based on mapping in the region since 2010, have occurred a minimum of two times. As discussed later in this report, the watershed drainage area for the Wiley's Well Wash is large extending over 16 miles to the south allowing for drainage of the western Mule Mountains (Plate 7A).

The Wiley's Well Basin SMZ is provided a relatively higher amount of eolian sands from the local washes due to erosion of older silty-sand sedimentary deposits of the ancient Colorado River (unit Tmm) located in the "alluvial fan" regions in the southern McCoy Mountains "embayment" (Plate 7B), and western Mule Mountains (Plate 2 and Plate 4). Erosion of unit Tmm has also provides the primary eolian sand source for dune deposits along the flanks of the Mule Mountains and within the mountain range (Plate 4).

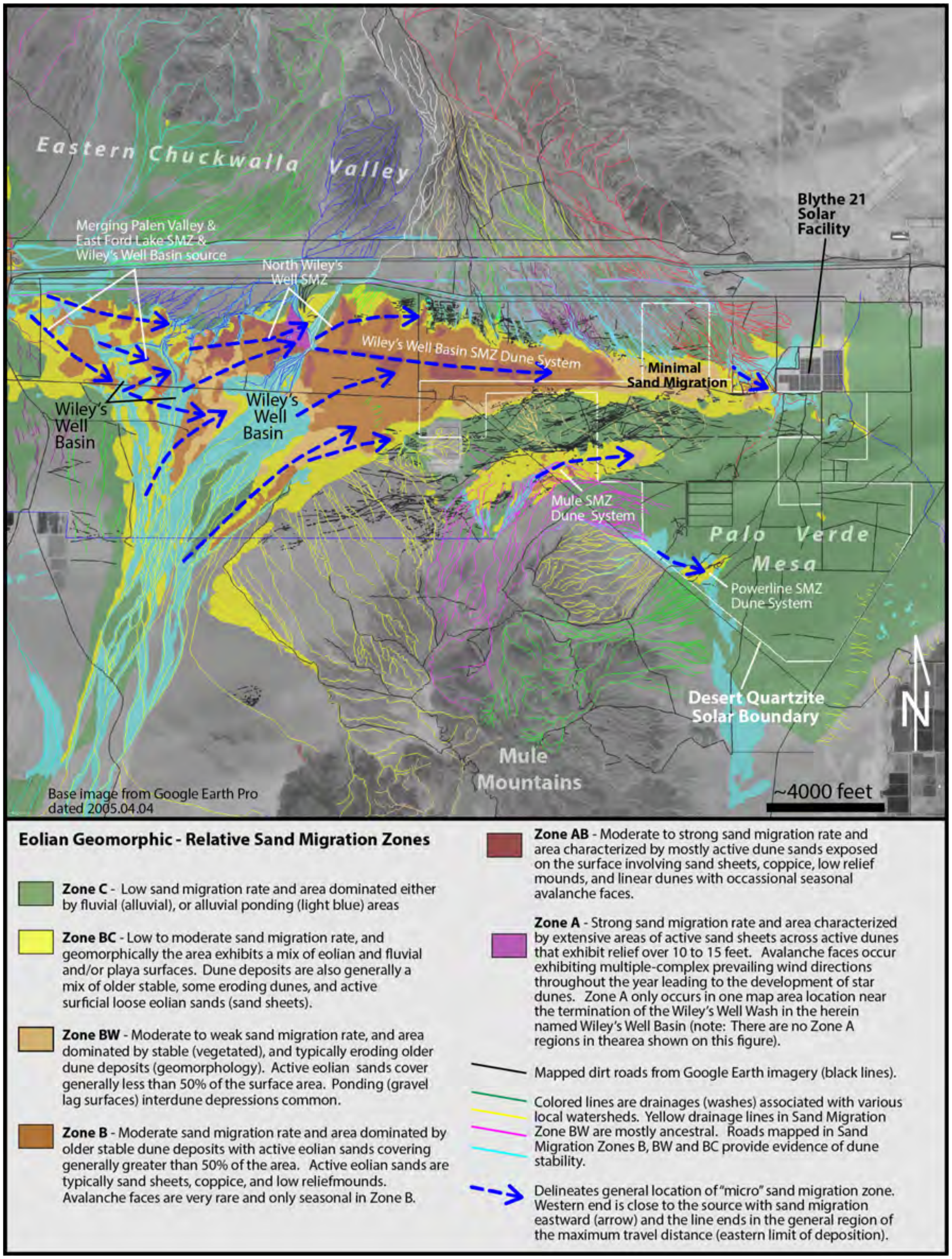
The most robust dune form in the Wiley's Well Basin SMZ are complex-star dunes that are over 15 to 20 feet tall and exhibit seasonal avalanche faces (Zone A on Plate 4). These features are also mapped as within the North Wiley's Well Basin SMZ that is discussed later (see Plate 3A). The Zone A area is bounded on the eastern side by washes emanating from the southern McCoy Mountain embayment area (Plate 7B). Over time, the wash along the eastern side of Zone A has migrated eastward likely tens of feet as the dunes migrated. The wash continues to flow southward to pond in the Wiley's Well Basin, hence, to mix with waters from the Wiley's Well Wash system.

Toward the east of Zone A in the Wiley's Well Basin SMZ and its corresponding east bounding wash, the Wiley's Well Basin SMZ, the most robust eolian dunes are stabilized linear dunes that are typically less than 3 feet tall and only occasionally exhibit seasonal and alternating direction avalanche faces. These occur in areas mapped as Zone AB on Plate 5. These dunes are likely relatively more vegetated due to competing prevailing winds from the west and southwest than would be the case if there was a strongly dominant prevailing wind. Some very weak and not fully developed transverse dunes occur in the northern most region of the Wiley's Well Basin SMZ, however, this area is delineated as the North Wiley's Well Basin SMZ discussed separately later.

The dune deposits in the Wiley's Well Basin SMZ are less than 5 feet thick typically, and gradually get thinner toward the east where in some areas mapped as Zone BC and Zone BW are less than 3 feet. In areas mapped as Zone BC, older alluvium of Soil S4 occur at depths of only a few inches within interdune depressions and the dune deposits represent relict dune mounds that vary from full connectivity to scattered connectivity. Eolian deposits are generally thinner for progressively less active geomorphic eolian sand migration zone designations. In addition, the eolian deposits associated with Zone BC which bounds the limits of an eolian dominated area, gradually thin toward its contact with mapped Zone C. Hence, in contrast to Lancaster (2014) eolian mapping for this project was not based on dune deposit thickness, but instead, on observed eolian geomorphology on the surface.

The Wiley's Well Basin SMZ gradually narrows from a width proportional to that of the Wiley's Well Basin (~3.5 miles), to approximately 0.5 mile within the DQSP (Plate 5). The dunes activity also decreases toward the east with the eastern portion of the Wiley's Well Basin SMZ receiving very little sand flux input from the west within the DQSP (Zone BW on Plate 4 and Plate 5). The primary cause for the decrease in width of the sand migration zone is the Palo Verde Topographic Sill, which is the geographic/geomorphic boundary between the eastern Chuckwalla Valley and the Western Palo Verde Mesa (Plate 5). The Palo Verde Topographic Sill, is located approximately in the middle region of the Wiley's Well SMZ (Plate 5). The Palo Verde Topographic Sill consists of rise from an elevation of ~438 feet in the Wiley's Well Basin in the west, to the sill itself at an elevation of ~488 feet (high point), and then back down to an elevation of ~400 feet near the Palowalla SMZ. Hence, eolian sands migrating eastward from the Wiley's Well Basin move uphill approximately 50 feet in relief, and this rise causes eolian sands to deposit. On the downwind leeward side of the topographic sill, eolian sands are also encouraged to deposit as wind speeds decrease. The sill has likely allowed for relatively more eolian sands to be deposited on the western side, crest and immediate eastern side than would have deposited if the topographic sill did not exist. In addition, the amount of wind-blown sand reaching the eastern most area of the Wiley's Well Basin SMZ is dramatically decreased because most of the transporting sand is encouraged to deposit on the to the west associated with the topographic sill (see area Zone BW on Plate 5). Most of the active eolian sands in Zone BW (Plate 5) are produced by the erosion (cannibalization) of older relict (dormant) dune deposits.

Figure 11: Eolian Geomorphic & Relative Sand Migration Zone map of the eastern Chuckwalla Valley and Palo Verde Mesa area.


Eastern Chuckwalla Valley
Merging Palen Valley & East Ford Lake SMZ & Wiley's Well Basin source
North Wiley's Well SMZ
Wiley's Well Basin SMZ Dune System
Minimal Sand Migration
Blythe 21 Solar Facility
Wiley's Well Basin
Wiley's Well Basin
Mule SMZ Dune System
Palo Verde Mesa
Powerline SMZ Dune System
Desert Quartzite Solar Boundary
N
Mule Mountains
Base image from Google Earth Pro dated 2005.04.04
~4000 feet
Eolian Geomorphic - Relative Sand Migration Zones
Zone C - Low sand migration rate and area dominated either by fluvial (alluvial), or alluvial ponding (light blue) areas
Zone BC - Low to moderate sand migration rate, and geomorphically the area exhibits a mix of eolian and fluvial and/or playa surfaces. Dune deposits are also generally a mix of older stable, some eroding dunes, and active surficial loose eolian sands (sand sheets).
Zone BW - Moderate to weak sand migration rate, and area dominated by stable (vegetated), and typically eroding older dune deposits (geomorphology). Active eolian sands cover generally less than 50% of the surface area. Ponding (gravel lag surfaces) interdune depressions common.
Zone B - Moderate sand migration rate and area dominated by older stable dune deposits with active eolian sands covering generally greater than 50% of the area. Active eolian sands are typically sand sheets, coppice, and low reliefmounds. Avalanche faces are very rare and only seasonal in Zone B.
Zone AB - Moderate to strong sand migration rate and area characterized by mostly active dune sands exposed on the surface involving sand sheets, coppice, low relief mounds, and linear dunes with occassional seasonal avalanche faces.
Zone A - Strong sand migration rate and area characterized by extensive areas of active sand sheets across active dunes that exhibit relief over 10 to 15 feet. Avalanche faces occur exhibiting multiple-complex prevailing wind directions throughout the year leading to the development of star dunes. Zone A only occurs in one map area location near the termination of the Wiley's Well Wash in the herein named Wiley's Well Basin (note: There are no Zone A regions in thearea shown on this figure).
Mapped dirt roads from Google Earth imagery (black lines).
Colored lines are drainages (washes) associated with various local watersheds. Yellow drainage lines in Sand Migration Zone BW are mostly ancestral. Roads mapped in Sand Migration Zones B, BW and BC provide evidence of dune stability.
Delineates general location of "micro" sand migration zone. Western end is close to the source with sand migration eastward (arrow) and the line ends in the general region of the maximum travel distance (eastern limit of deposition).

9.1.9 North Wiley's Well Basin Sand Migration Zone (anthropogenic)

The North Wiley's Well Basin SMZ occurs within the Wiley's Well Sand Migration Zone and is designated as a separate system based on the interpretation that this dune area has been affected by anthropogenic activities related to water flow diversions. Most drainages from the southern McCoy Mountain embayment are diverted since construction of Highway 10, as shown on Plate 7B. This has caused some of the northern areas of the Wiley's Well Basin dune system to receive more and less drainage flow (Plate 7B). The water flow diversions have resulted in more water entering the western region of the North Wiley's Well Basin SMZ leading to an increase in eolian sand generation, and relatively dryer conditions in the eastern portion of the North Wiley's Well Basin SMZ leading to a region exhibiting less vegetation density where eolian sands can migrate further distances than would be the case naturally (Plate 7B). These conditions have led to a historical increase in sand migration from the southward flowing wash along the eastern side of Zone A in northern Wiley's Well Basin area (Plate 4), toward the ENE within the North Wiley's Well Basin SMZ. A series of low relief, active, poorly vegetated transverse dunes occur in this area (Zone A areas on Plate 5), that may have resulted from ablation erosion of older more pronounced linear dunes due to a decrease in internal dune stabilizing moisture. This area receives less moisture in historical times due to water flow diversions (Plate 7B). Alternatively, these weak linear dune forms may have developed during historical times due to the increase in eolian sand production downwind and increase in the ability for sand to migrate in the area due to a decrease in vegetation.

9.1.10 Palowalla Sand Migration Zone (Anthropogenic)

The Palowalla SMZ occurs at the eastern end of the Wiley's Well SMZ and is designated as a separate zone based on anthropogenic water flow diversions associated with the construction of Highway 10 to the north. Construction of the Blythe 21 Solar Facility cut off water flow in a wash that historically ran through the facility site resulting in creation of, or increase in, ponding adjacent to the facility (Plate 3A and Plate 7B). This region has experienced an increase in drainage flow due to diversion of watershed area K1 and a portion of K, which since construction, is completely diverted to flow through the Palowalla Ditch (flow under Highway 10, Plate 7B). In addition, a north-south trending flood control berm extending from Palowalla Ditch at Highway 10 to just northwest of the Blythe 21 Solar Facility has also focused flow that would have spread out over the alluvial surface to the western area of the existing solar plant. Un-natural ponding of these flood waters occurs along the western and southwestern areas just outside of the facility due to elevated berms bounding the site (Figure 12).

It is proposed that the water diversions from upper fan areas and the ponding during recent historical times has led to an increased flux of eolian sand to this local area of the Wiley's Well Basin SMZ. The increase in eolian sand flux has resulted in an isolated area that was likely a Zone BC, consistent with regions to the west, to Zone B and Zone BW with respect to geomorphic relative sand migration rate areas (Figure 12). Note that the geomorphic relative sand migration zone rate mapping in this area shown on Figure 12 is a better depiction than the mapping on Plate 5 and Plate 6A.

9.1.11 Mule Sand Migration Zone

The Mule SMZ was originally mapped by Kenney (2011) during a preliminary eolian study for the DQSP identifying the sand transport zone as emanating from a drainage system from the northern Mule Mountains

(Figure 11, Plate 3A and Plate 6A). The watershed area for the drainage system producing the eolian sands for the Mule SMZ is relatively small (Plate 7A – Watershed P) and believed to be too small to be able to produce the magnitude of eolian sands identified in the zone if this drainage system was a typical wash system emanating from a local Mojave Desert mountain range. However, the washes of watershed P have eroded into exposures of the ancient Colorado River deposits (unit Tmm, Plate 6A) indicating that the washes carry a larger bedload of eolian size grains during flood events compared to typical desert washes emanating from bedrock regions and through typical alluvial fan terrains. The generation of eolian sands from the upwind source wash area is assisted by the orientation of the prevailing winds trending in a similar direction as the wash system, low bar and swale relief, and that the drainages system is wide and braided.

The most robust dune form in the Mule SMZ are active sand sheets in a small region on the leeward (downwind) side of a topographic high associated with remnants of an ancient shoreline berm of the receding Colorado River in Pliocene (unit Tmw, Soil S7, Plate 5). This area is mapped as Zone AB and comprises an area of only ~3.5 acres. Most of the Mule SMZ exhibits relict dune mounds with active eolian sands representing sand sheets and small coppice.

9.1.12 *Highway 10 Sand Migration Zones (Anthropogenic)*

Several relatively small areas were identified north of the modern Highway 10 where eolian sand generation has increased associated with construction of the old and modern Highway 10. These include the Highway 10-Palen-Ford Dry Lake Pass, Highway 10-South Ford Dry Lake, and SE Ford Dry Lake SMZ's (Plate 3A). These regions receive newly generated eolian sands from washes that flow toward the north from the Chuckwalla and Little Chuckwalla Mountains (Plate 3A). This region is part of the regional Chuckwalla Valley sand migration corridor; however, it has received additional eolian sand input since construction activities of the modern and old Highway 10 (Plate 3A). In Pre-historical times, the drainages flowing northward from the Chuckwalla Mountains would have gradually fanned out into a dense braided network of progressively weaker flowing drainages. In this condition, flow would have reached the valley axis much less frequently resulting in a smaller magnitude of eolian sand generation in the valley axis dune system.

Since highway construction, water flow has been diverted by flood control berms for both the older and newer Highway 10 and this has increased flow rates at specific points (i.e. subdrains) along both freeway systems (Plate 3A). The increased flow rates have allowed water to more frequently reach the valley axis and have increased channel erosion. These processes transport more alluvial sand to the valley axis area where prevailing winds are the strongest. The sand is subsequently mobilized by the wind to produce eolian sands. The increased flow of these drainages may also cause portions of the Ford Dry Lake bed to inundate, which would result in an additional, but slight, increase in eolian sand generation.

9.1.13 Powerline Sand Migration Zone

The Powerline SMZ is a small and weak eolian system that has developed naturally, but may be slightly affected by minor water diversions and surface disturbances along the graded (dirt) powerline road to the southwest (Figure 11 and Plate 3A). The dune system receives eolian sands from wash flow in the southwest and ponding areas to the northwest and southeast (Plate 5). The area exhibits thin, relict and subdued dune mounds with active eolian sands consisting of scattered sand sheets and small coppice. The eolian deposits are less than 1 foot thick.

9.2 Mid to Late Holocene dune connectivity of local sand migration zone

Mapping of eolian systems is complex due to many factors. Some of these include lateral gradational changes in dune forms and activity, variations in dune activity over time that results in relict dune forms that are no longer active, and degree of internal erosion of relict dunes. However, these are important criteria when evaluating dune activity and stability. The eolian geomorphic relative sand migration zones provide a method for showing various degrees of dune form and activity, but various degrees of internal dune erosion or dune migration are not indicated sufficiently. The Geologic and Geomorphic symbols for eolian, fluvial and playa systems discussed in Section 7.3 assist in the communication regarding variations of ground surface stability. For example, simply indicating that a dune system is stable does not provide information whether internal erosion of older relict dunes is a significant source of eolian sands. For playa lake surfaces, it is beneficial to be able to characterize whether the playa lake surface is primarily just a pathway for eolian sands (i.e. unit Ql), or if the playa lake surface is eroding resulting in a source of eolian sands as well (i.e. unit Ql-de).

General regions of the dune systems in Chuckwalla Valley were mapped utilizing the Geologic and Geomorphic eolian, fluvial (alluvial) and playa designations in combination with the relative sand migration zone designations (Plate 3B). Due to their importance as regions of eolian sand production, areas of frequent water disturbance are also shown (soil S0, washes and lakebeds, Plate 6B).

The map shows that regions of Qe-a exhibiting the most active eolian areas are isolated, only occurring in the Palen Dry Lake and eastern most Chuckwalla Valley areas (Plate 3B). Areas exhibiting significant erosion in areas dominated by relict dunes (unit Qs-de) occur at numerous localities along the regional Chuckwalla Valley sand migration corridor suggesting that sand migration rates along the system have significantly decreased since the older more robust dune forms were originally deposited. Regions where older more robust relict dunes no longer receive sufficient sand to maintain their form and instead are dominated by active sand sheets with minor internal erosion (unit Qe-ds) also occur at numerous locations in the valley. This also indicates a decrease in sand migration rates since the original more robust relict dunes were deposited. However, regions mapped as Qe-ds do allow for eolian sand transport through the system.

Review of the entire map shown on Plate 3B indicates that the Ford Dry Lake eolian system represents a significant obstacle for through going eolian sand transport. In addition, it is more likely that throughout the Holocene, Ford Dry Lake eolian systems have received most of their sand from local sources as discussed in the previous section.

9.3 Correlation of watershed size and drainage flow type (tributary vs. distributary) with sand migration zones

Water flow within washes and in ponding regions is the most important source of eolian sand generation in addition to providing stabilizing moisture for dune systems. It seems reasonable that the size of the watershed (drainage system aerial extent) of a wash system would be an important parameter in terms of the wash systems ability to generate eolian sands. Larger watershed areas capture more precipitation that leads to stronger water flow. Drainage systems that remain primarily tributary systems where water flow merges downstream also allow for increased flow rates downstream which increases the probability that water flow to the valley axis will occur leading to production of eolian sands. One characteristic that many of the wash systems have that lead to the production of sufficient eolian sands to produce a local sand migration zone is that they flow primarily as a braided tributary system where the flow has accumulated from wash flow over an extensive aerial extent within their watersheds. This is the case for essentially all identified local sand migration zones in the Chuckwalla Valley and across southeastern California. For example, drainage areas A, C, B, R1, Q, and P (Plates 7A and 7B) all focus their overland water flow into a relatively narrow zone close to the valley axis.

In areas of alluvial fan distributary drainage systems, much less eolian sand is produced in the valley axis as flow from these wash systems much less frequently reaches the strength required to reach the valley axis and most have deposited their sand bedload prior to reaching the valley axis. This is the case along the northern Chuckwalla Mountains where flow across a very wide and dense distributary system across the alluvial fan (bajada) has not led to significant eolian sand production (Plate 7A).

There is also a correlation of the relative sand migration zone (SMZ) magnitude and the size of its associated watershed (Plate 7A). For example, comparing the relative strength of the Ironwood and the Wiley’s Well Basin sand migration zones with their watershed areas S+R1 and Q respectively, which are relatively robust eolian systems, with the North Ford Dry Lake SMZ (Cz) resulting from flow in watershed area C shows a correlation of sand migration zone robustness and watershed size (Plate 7A). These watersheds appear to be of sufficient size to generate enough sand to supply the respective SMZ’s, indicating that this may be the sole source of sand for the SMZ’s. Another example is the relatively weak Mule SMZ (area Pz on Plate 7A) and its relatively small watershed P (Plate 7A).

9.4 Prevailing winds and effects on sand migration zones

Prevailing winds are those that are sufficient to transport eolian sands. In Chuckwalla Valley and western Palo Verde Mesa, the prevailing winds vary locally due to the type of storms producing the winds and from local topography. Within the valley axis, prevailing winds, are from the west and southwest which generally coincide with storms generated in the Pacific during the winter (westerly prevailing winds) and summer monsoonal storms (southwesterly prevailing winds). However, the north-south trend of the Palen and McCoy Mountains results in strong north to south prevailing winds in the Palen Valley causing sands within the Palen Sand Migration Zone (SMZ) to migrate south-southeastward in the northern area and curved toward the southeast as the zone enters the Chuckwalla Valley axis (Plate 7B).

Prevailing winds from the west and southwest play a very important role for the Wiley’s Well Basin dune system as it has caused the formation of complex-star dunes in the northern Wiley’s Well Basin area, and stabilized small linear dunes down the axis of the dune system. The linear dunes occur in the western and central areas mapped as Zone A on Plate 7B within the Wiley’s Well Basin Dune System.

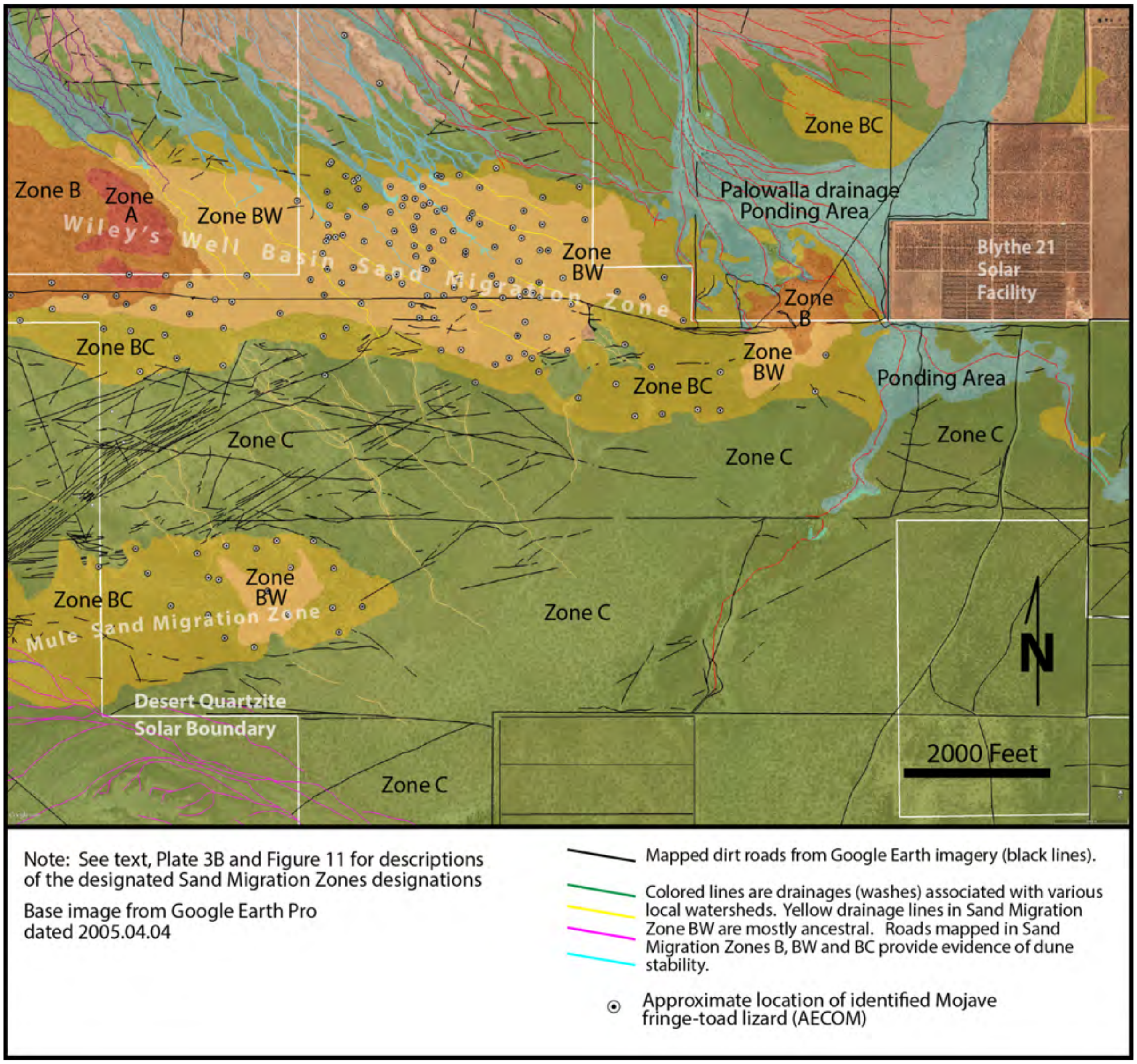
10 AGE OF DUNE SYSTEMS IN THE EASTERN CHUCKWALLA VALLEY AND PALO VERDE MESA AREA

S3a soil profiles in the eastern Wiley's Well Basin dune system that are estimated to be 8 to 5 kya show a mixed parent material of eolian and alluvial sediments suggesting that wind-blown sediments (sands) had begun to reach the area in the early mid-Holocene. The identification of widespread S2 soils in eolian parent sediments that are estimated to be a minimum of 5 to 3 kya indicates that a relatively robust period of dune deposition occurred in the eastern Wiley's Well Basin SMZ during the early to mid-Holocene. S2 soils developed in alluvial deposits (parent material) occur to the north and the south of the region mapped as S2 eolian parent soils (Figure 13 and Figure 14). This indicates that fluvial washes flowed across the region of the dune system likely prior to the dunes migrating to this region and growing to such an extent to be able to block water flow (Figure 14). The soil profile ages are estimates, and are not accurate enough to determine the exact timing of the migration of the dunes eastward, but the data provided indicates that the local dune aggradational event in the eastern Wiley's Well Basin SMZ occurred relatively quickly and possibly over the course of one to two thousand years during the late-early to early mid-Holocene.

To the west, older alluvial soils of early Holocene age occur south of the Wiley's Well Basin SMZ (soils S3b estimated to be a minimum of 12 to 8 kya, Figure 14). This indicates that the S3b Alluvial Soil area was essentially abandoned as an active alluvial fan once the obstructing eolian dune deposits to the north were deposited. These data are also interpreted to indicate that eolian dune sands in this area were deposited prior to the dunes to the east. In addition, it indicates that the dune deposits in the Wiley's Well Basin SMZ migrated eastward over time gradually and deposited over an active alluvial fan surface and then cut off alluvial processes from upslope once the dunes reached sufficient thickness to obstruct overland flow. Additional evidence to support this claim was the identification of alluvial sediments of late to earliest Holocene age under the eolian deposits where S2 Eolian Soils are shown on Figure 14.

The eastern Wiley's Well Basin SMZ experienced essentially one dune aggredational event, likely occurring in the early Holocene, and then by the mid to late Holocene retracted. Since the cessation of the dune aggradational event, the dune areas exhibiting S2 Dune Soils (Figure 14) have degraded. Based on the rate of past dune aggregation indicated in the soil record for the Wiley's Well Basin and Mule SMZ, it is likely that if dune parameter conditions changed that encouraged dune growth (i.e. a future dune aggredational event) that the existing mapped areas of dunes would be able to accommodate the additional dune sands for at least a thousand years prior to expanding beyond its current mapped footprint. This finding assumes that current drainage flows, acknowledging current anthropogenic diversions, remain relatively constant to provide critical stabilizing moisture to the dunes. The Mule SMZ in the southwestern region of the DQSP experienced a similar history in the sense that the dune deposits are primarily relict dunes that experienced a dune aggredational event during the early Holocene and then became stable by the mid-Holocene. Therefore, this region experienced a decrease in relative sand migration rates during the mid-Holocene. Eolian activity in the DQSP site is therefore consistent with other dune systems across southeastern California in that they experienced strong eolian deposition in the early Holocene which has decreased substantially since the mid-Holocene.

Figure 12: Relative Geomorphic sand migration zone map of the eastern Wiley's Well Basin and Mule Sand Migration Zones in the DQSP. Locations of identified Mojave fringe-toad lizard from an AECOM biological report for the DQSP (circles with enclosed black dot) are shown which correlate well with the mapped limits of Sand Migration Zones A, B, BW and BC.


Zone BC
Zone B
Zone A
Zone BW
Wiley's Well Basin Sand Migration Zone
Palowalla drainage Ponding Area
Zone BW
Blythe 21 Solar Facility
Zone B
Zone BC
Zone BW
Zone BC
Ponding Area
Zone C
Zone C
Zone C
Zone BW
Zone BC
Mule Sand Migration Zone
Zone C
N
Desert Quartzite Solar Boundary
2000 Feet
Zone C

Note: See text, Plate 3B and Figure 11 for descriptions of the designated Sand Migration Zones designations

Base image from Google Earth Pro dated 2005.04.04

Mapped dirt roads from Google Earth imagery (black lines).

Colored lines are drainages (washes) associated with various local watersheds. Yellow drainage lines in Sand Migration Zone BW are mostly ancestral. Roads mapped in Sand Migration Zones B, BW and BC provide evidence of dune stability.

⊙ Approximate location of identified Mojave fringe-toad lizard (AECOM)

Figure 13: Soil stratigraphic map of the Desert Quartzite Solar Project (DQSP) indicating the soil designations, estimated minimum ages of the surface, and parent sediments to surface soils that indicate what type of deposits (alluvial vs. eolian) the soils developed in.

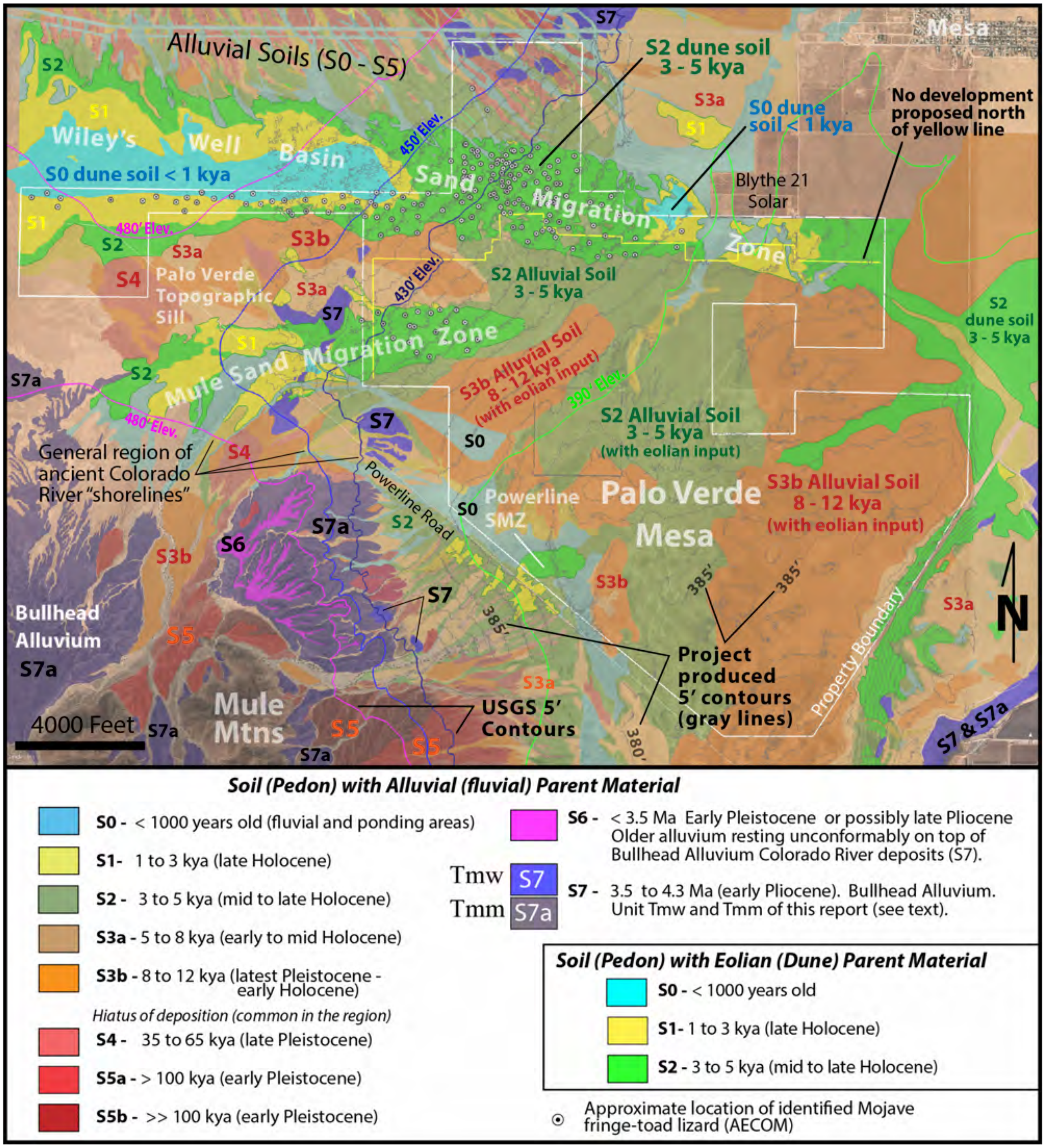
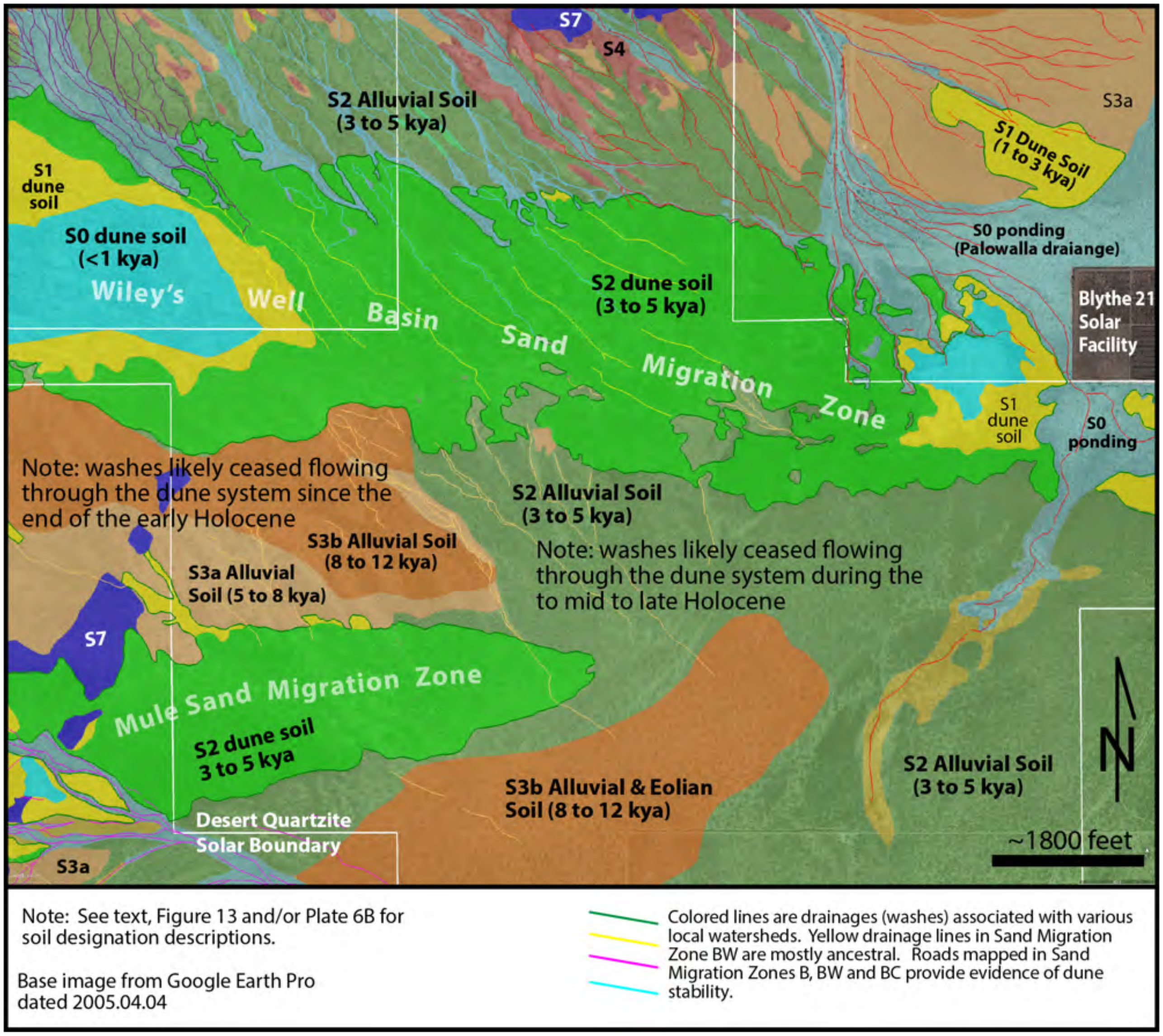

Alluvial Soils (S0 - S5)
S7
S2 dune soil
3 - 5 kya
Mesa
S2
S1
S3a
S0 dune
soil < 1 kya
No development
proposed north
of yellow line
S1
Wiley's Well Basin
450' Elev.
S0 dune soil < 1 kya
Sand Migration Zone
Blythe 21
Solar
S1
480' Elev.
S2
S3a
S3b
S4
Palo Verde
Topographic
Sill
S3a
430' Elev.
S2 Alluvial Soil
3 - 5 kya
S7
S2
dune soil
3 - 5 kya
S1
Mule Sand Migration Zone
S3b Alluvial Soil
8 - 12 kya
(with eolian input)
S7a
S2
390' Elev.
480' Elev.
S7
S0
S2 Alluvial Soil
3 - 5 kya
(with eolian input)
General region of
ancient Colorado
River "shorelines"
S4
Powerline Road
S0
Powerline
SMZ
Palo Verde
Mesa
S3b Alluvial Soil
8 - 12 kya
(with eolian input)
S7a
S2
S6
S3b
S3b
385'
385'
S3a
N
S7
Bullhead
Alluvium
S7a
S5
385'
Property Boundary
S3a
Project
produced
5' contours
(gray lines)
4000 Feet
S7a
Mule
Mtns
S5
USGS 5'
Contours
S5
380'
S7a
S7 & S7a
Soil (Pedon) with Alluvial (fluvial) Parent Material
S0 - < 1000 years old (fluvial and ponding areas)
S1- 1 to 3 kya (late Holocene)
S2 - 3 to 5 kya (mid to late Holocene)
S3a - 5 to 8 kya (early to mid Holocene)
S3b - 8 to 12 kya (latest Pleistocene - early Holocene)
Hiatus of deposition (common in the region)
S4 - 35 to 65 kya (late Pleistocene)
S5a - > 100 kya (early Pleistocene)
S5b - >> 100 kya (early Pleistocene)
S6 - < 3.5 Ma Early Pleistocene or possibly late Pliocene Older alluvium resting unconformably on top of Bullhead Alluvium Colorado River deposits (S7).
Tmw S7
Tmm S7a
S7 - 3.5 to 4.3 Ma (early Pliocene). Bullhead Alluvium. Unit Tmw and Tmm of this report (see text).
Soil (Pedon) with Eolian (Dune) Parent Material
S0 - < 1000 years old
S1- 1 to 3 kya (late Holocene)
S2 - 3 to 5 kya (mid to late Holocene)
Approximate location of identified Mojave fringe-toad lizard (AECOM)

Figure 14: Soil stratigraphic map of the Desert Quartzite Solar Project (DQSP) focusing on site dune systems that indicate soil designations, estimated minimum ages of the surface, and parent sediments to surface soils that indicate what type of deposits (alluvial vs. eolian) the soils developed in.

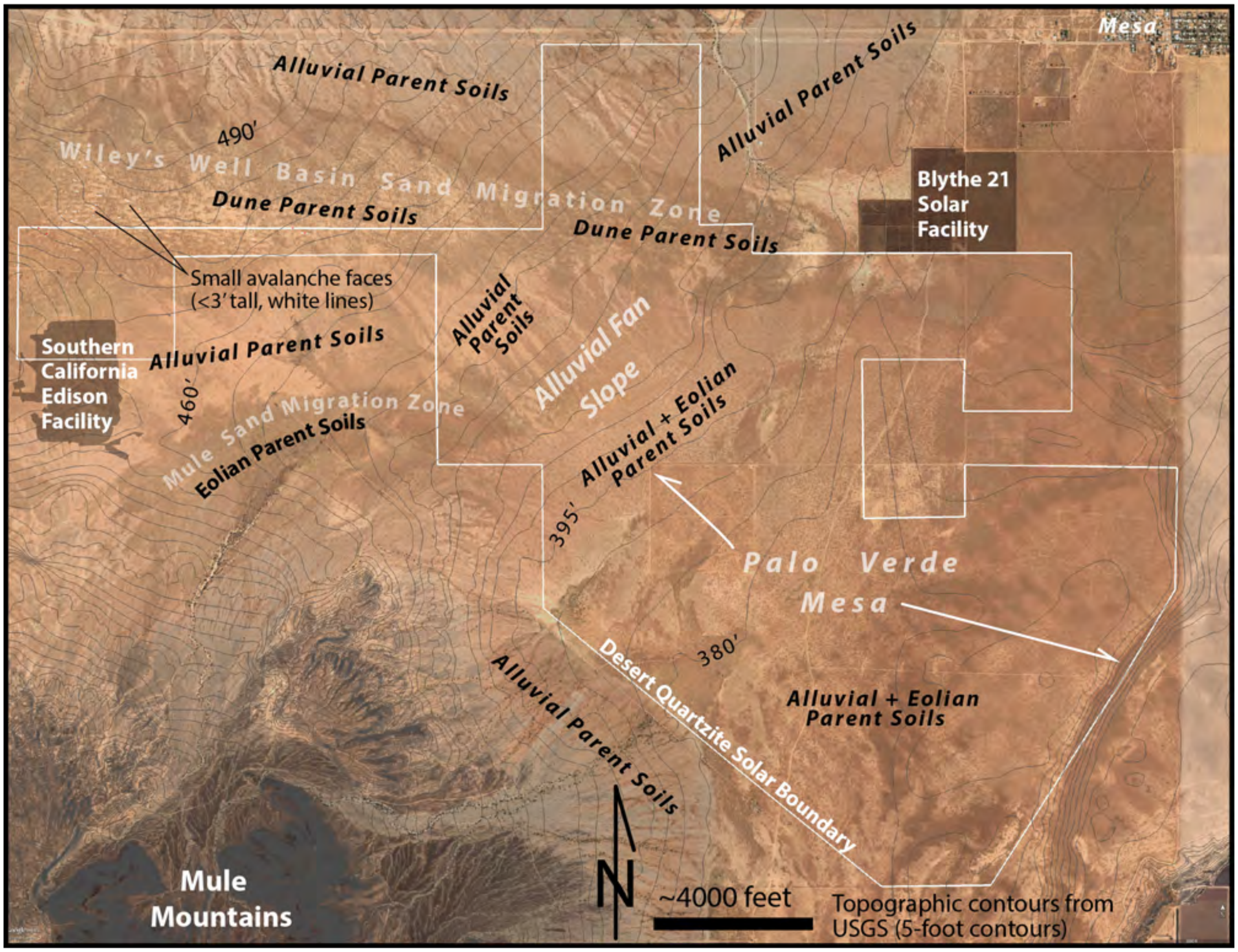

S7
S4
S2 Alluvial Soil
(3 to 5 kya)
S3a
S1 Dune Soil
(1 to 3 kya)
S1
dune
soil
S0 dune soil
(<1 kya)
S0 ponding
(Palowalla draiange)
Wiley's Well Basin Sand Migration Zone
S2 dune soil
(3 to 5 kya)
Blythe 21
Solar
Facility
S1
dune
soil
S0
ponding
Note: washes likely ceased flowing through the dune system since the end of the early Holocene
S2 Alluvial Soil
(3 to 5 kya)
S3b Alluvial Soil
(8 to 12 kya)
S3a Alluvial
Soil (5 to 8 kya)
Note: washes likely ceased flowing through the dune system during the to mid to late Holocene
S7
Mule Sand Migration Zone
S2 dune soil
3 to 5 kya
Desert Quartzite
Solar Boundary
S3a
S3b Alluvial & Eolian
Soil (8 to 12 kya)
S2 Alluvial Soil
(3 to 5 kya)
N
~1800 feet

Note: See text, Figure 13 and/or Plate 6B for soil designation descriptions.

Base image from Google Earth Pro dated 2005.04.04

Colored lines are drainages (washes) associated with various local watersheds. Yellow drainage lines in Sand Migration Zone BW are mostly ancestral. Roads mapped in Sand Migration Zones B, BW and BC provide evidence of dune stability.

Figure 15: Aerial image map obtained from Google Earth Pro with a date of 2005.04.04 showing generalized regions where the surficial sediments are either eolian or alluvial. Pedogenic soils developed in these sediments and the mapping of these soils with their corresponding age and parent sediments are shown on Figure 13 and Figure 14.


Mesa
Alluvial Parent Soils
Alluvial Parent Soils
490'
Wiley's Well Basin Sand Migration Zone
Dune Parent Soils
Blythe 21 Solar Facility
Dune Parent Soils
Small avalanche faces (<3' tall, white lines)
Southern California Edison Facility
Alluvial Parent Soils
Alluvial Parent Soils
Alluvial Fan Slope
460'
Mule Sand Migration Zone
Eolian Parent Soils
Alluvial + Eolian Parent Soils
395'
Palo Verde Mesa
380'
Alluvial Parent Soils
Desert Quartzite Solar Boundary
Alluvial + Eolian Parent Soils
Mule Mountains
N
~4000 feet
Topographic contours from USGS (5-foot contours)

11 LOCAL VEGETATION DENSITY AND SAND MIGRATION RATES

Vegetation density is a very important eolian parameter in that vegetation provides stability for the dunes and as discussed earlier in the report, just 10% vegetation aerial coverage decreases sand migration rates by 90% (Lancaster et al. 1998). Estimates of aerial vegetation densities in the dune areas is problematic due to order of magnitude variations from relatively low values when no Sahara Mustard exists (dead or alive) compared to times when Sahara Mustard plants occur either dead or alive.

Vegetation densities across the DSQP dune systems, which have been observed in the field during many times of the year since 2010 by the author, have exhibited a visual aerial coverage of 5 to 10% for species other than Sahara Mustard. An example of average vegetation densities dominated by native species (very minor to no Sahara Mustard) across the site is shown on Figure 16 that provides a Google Earth Pro historical aerial image of mostly sand migration Zone BW (see Figure 17a). The vegetation is evenly spaced across the dune area and provides a strong inhibitor to sand transport. A pixel capture evaluation of the aerial image in the southern picture of Figure 16 indicates a vegetation density of 6%, however, it was visually evident that this image processing technique had not captured all vegetation. Therefore, vegetation densities on the site, at 6 to 10%, are sufficient to decrease sand migration rates up to 90%. Note that to the west of the green box close-up area shown in the lower image of Figure 16 that vegetation densities are very similar in sand migration Zone B (refer also to Figure 17a). Additional field photographs are provided in Appendix C (designated sand migration zone photographs) and Appendix D (soil stratigraphy photographs).

Based on field mapping by the author, the DSQP dune systems have experienced a minimum of 1, but likely 2 Sahara Mustard blooms since 2010. When the invasive Sahara Mustard blooms in the area it results in essentially 100% vegetation aerial density as observed in Figure 17b. The plant grows to heights of over a foot and is so thick that it binds on legs inhibiting walking. As shown in Figure 17b, once the Sahara Mustard plant dies, it remains “planted” in the ground and this was observed to remain the case for many months to possibly a year from when the plant died. The dead plant stems break free and blow in the wind piling up on nearby dunes and coppice dunes, which still impedes eolian sand transport. Hence, once there is a Sahara Mustard bloom, eolian sand migration rates are greatly diminished not only for the year of the bloom, but for a minimum of the next year, and most likely into a third year.

The influence of the invasive Sahara Mustard on dunes systems where they have encroached will change the dunes long term behavior dramatically. It is anticipated that eolian sands will likely continue to be created at their sources, but will have much more difficulty transporting as far within the dune system away from their source. This model suggests that due to the invasive Sahara Mustard, new eolian sands will primarily deposit near their source causing near source aggredational events (increased sand near the source, compared to the past), and downwind dune systems will receive less eolian sands than they had in the past.

Figure 16: Aerial images from Google Earth Pro from 10/25/2012. The upper image shows the northern portion of the DQSP. The green inset box in the upper image is the enlarged area shown in the lower image. The vegetation density shown in the lower image is typical of Zone BW in the site during a typical year not experiencing higher vegetation densities associated with a have precipitation year or a Sahara Mustard bloom. The minimum vegetation density is 5 to 6% based on a crude photoshop pixel evaluation, but is likely at least 10 percent.

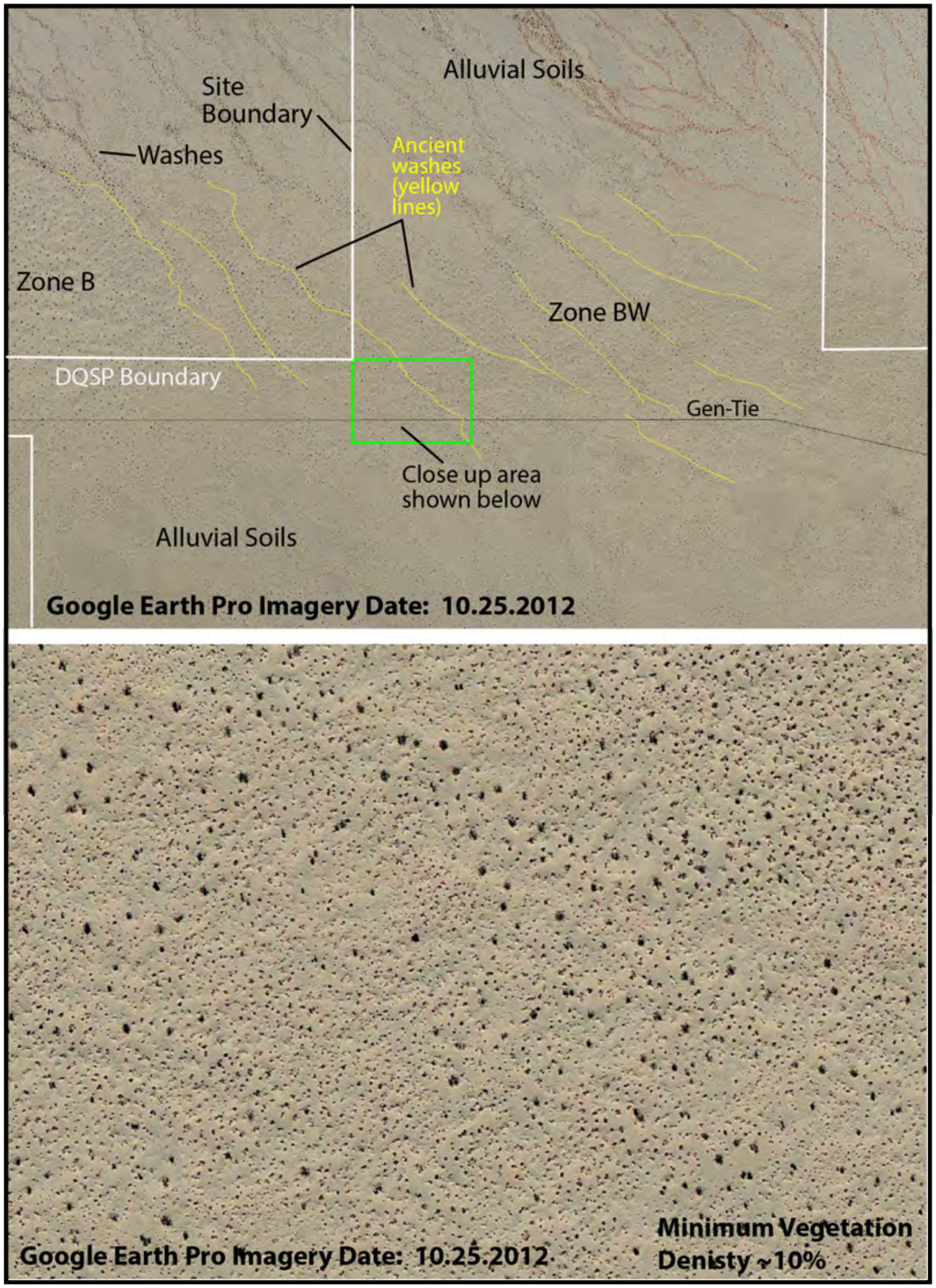

Site Boundary
Alluvial Soils
Washes
Ancient washes (yellow lines)
Zone B
Zone BW
DQSP Boundary
Gen-Tie
Close up area shown below
Alluvial Soils
Google Earth Pro Imagery Date: 10.25.2012
Minimum Vegetation Denisty ~10%
Google Earth Pro Imagery Date: 10.25.2012

Figure 17a: Geomorphic relative sand migration zone map of the northern DQSP. The location of the vegetation pictures shown in Figure 16 identified as the green rectangular box. The site of field photograph at geomorphic site 53 shown in Figure 17b is also identified.

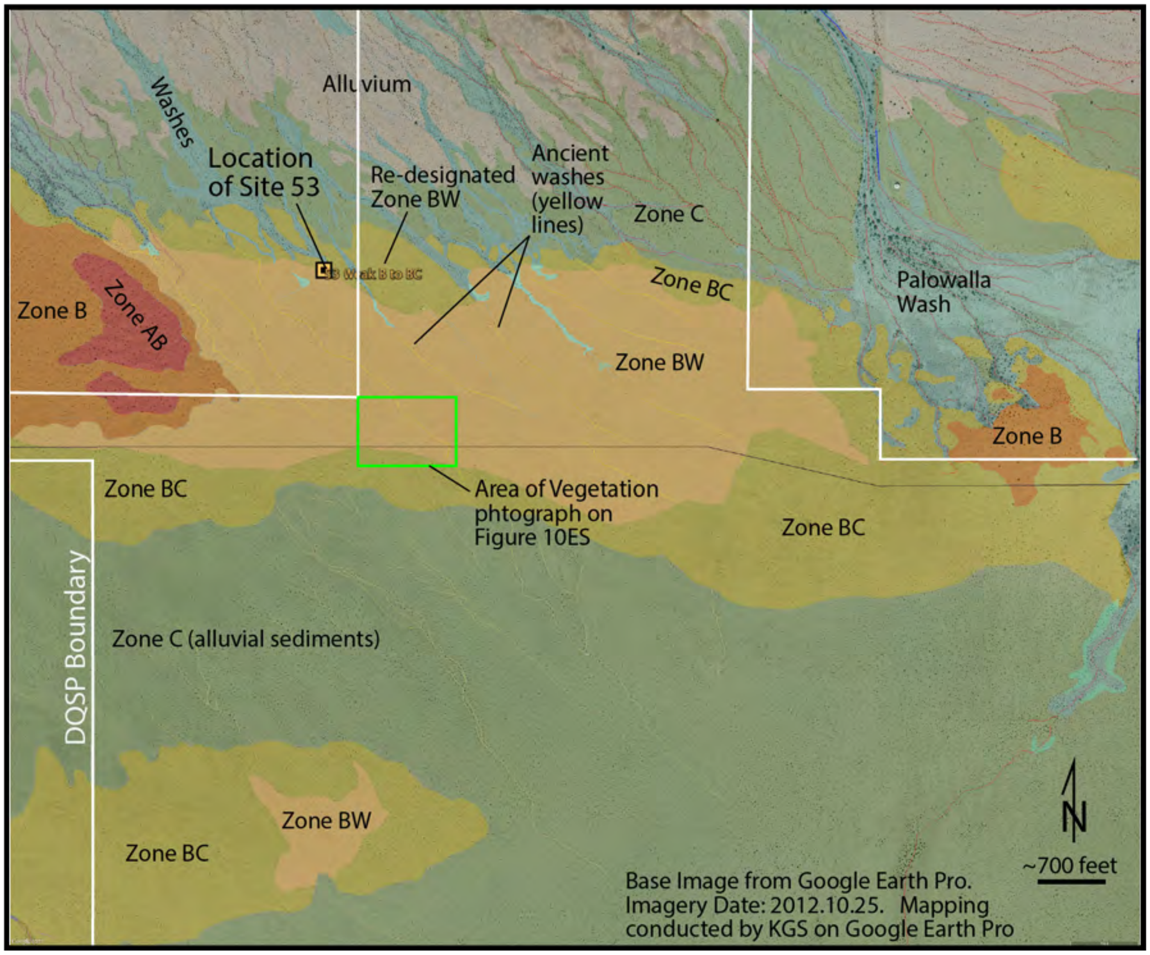
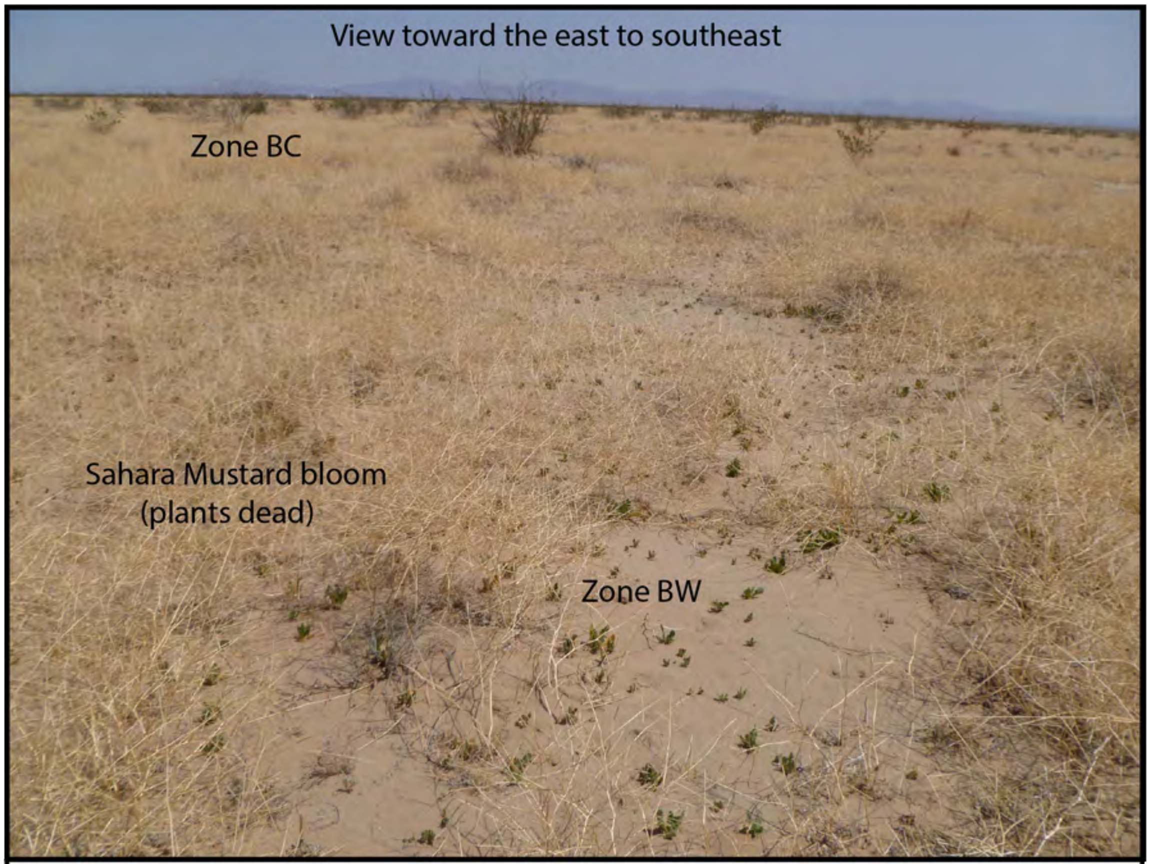

Washes
Alluvium
Location of Site 53
Re-designated Zone BW
Ancient washes (yellow lines)
Zone C
53 Weak B to BC
Zone B
Zone AB
Zone BC
Palowalla Wash
Zone BW
Zone B
Zone BC
Area of Vegetation phtograph on Figure 10ES
Zone BC
DQSP Boundary
Zone C (alluvial sediments)
Zone BW
Zone BC
N
~700 feet
Base Image from Google Earth Pro. Imagery Date: 2012.10.25. Mapping conducted by KGS on Google Earth Pro

Figure 17b: Field photograph of geomorphic field Site 53 (map location shown on Figure 17a). The photograph was taken on April 4th, 2011 and several months after a Sahara Mustard bloom. In this image, the Sahara Mustard plants, have died but remain emplaced in the ground. During and for many months to over a year of a Sahara Mustard bloom, the vegetation density increases to nearly 100% which essentially shuts down sand migration.



Site 53	Latitude	33 35.622
	Longitude	114 46.813

Date of photograph: 2011.04.04

Geomorphic Eolian Sand Migration Zone is Zone BW in foreground, turns to Zone BC in the background.

12 LOCAL HISTORIC VS. PRE-HISTORIC SURFACE WATER FLOW

As discussed throughout this report, one key dune parameter is local water flow both in terms of natural flow, and Historic flow if construction activities have occurred. Water flow is critical for the generation of new eolian sands and infiltrating waters for dune stability (Kenney, 2012, Schaaf and Kenney, 2016). The findings of the surface water flow analysis conducted in this report in terms of waters reaching the dune areas in the eastern Chuckwalla Valley and western Palo Verde Mesa are provided on Plate 7B. Generalized areas that may be receiving more and less water flow than in the past are identified with blue stipple dots and red stipple dots respectively.

Water diversions from north flowing drainages emanating from the Little Chuckwalla Mountains and Mule Mountains have not experienced water diversions significant enough to affect the Wiley’s Well Basin dune system (Plate 7A and Plate 7B). The only possibly significant water diversion with north flowing drainages is the construction of an east west trending paved access road which was constructed sometime during the past 5 to 6 years (Plate 7B). The road transects the important Wiley’s Well Basin ponding area that is considered the primary source for eolian sands for the Wiley’s Well Basin dune system. Portions of this road are constructed on a man-made berm with a series of sub-drains allowing for water to continue flowing north of the road to the northern portion of the Wiley’s Well Basin. However, it is not known if the sub-drains impede northward water flow compared to natural conditions prior to the road being constructed. Regardless, increased water flow to the northern portion of the Wiley’s Well Basin has been occurring from south flowing drainages emanating from the southern McCoy Mountains since construction of water diversions associated Highway 10 (Plate 7A and Plate 7B).

Diversion of water flow associated with watershed E (Plate 7B) has caused less water flow to a region northwest-west of the Wiley’s Well Basin area. Some relict dune areas in this “dry area” are abrading and vegetation densities on the relict dunes may have decreased. It is possible based on this limited research that older eolian sands are being re-mobilized in this area and able to travel greater distances due to a decrease in historical moisture.

Water flow diversion of washes from watershed F and G (Plate 7A and Plate 7B) are concentrated to the northern central portion of the Wiley’s Well Basin which is interpreted as increasing moisture to this area. The most prominent dunes in the Wiley’s Well Basin dune system occur in this area and it is possible that these dunes have grown due to increased eolian sand source and stabilizing moisture during historic times. Water flow diversions of watersheds F and H (Plate 7B) have been diverted from a dune area in the north-central region of the Wiley’s Well Basin dune system. This area is shown as a red “dryer” region on Plate 7B. Although more research would need to be conducted to resolve the matter, the dunes in this area appear more “dried out”, and less vegetated than other dune areas and active dune areas may be encroaching into areas where pre-Historical dunes had not occurred or the sand migration rate has increased during Historical times.

Water flow diversions of watershed K1 along the north side of Highway 10 to the Palowalla Ditch has caused less water flow to watersheds M and L south of Highway 10 (Plate 7B). The region of the dunes that is receiving less water is shown as a dry area on Plate 7B occurring along the northern portion of the Wiley’s Well Basin dune system at the southern limits of watersheds M and L. Although the drainage analysis of the area had not been completed prior to field mapping, review of field data including notes and photographs does not suggest that the dunes are being negatively impacted by the water diversions. In the western portion of the dry area flow within watershed M is concentrated by Highway 10 borrow pits allowing for more regular flow to the dune system near the Zone AB-Zone B to the west and Zone BW to the east contact. The area of increased flow is shown as light blue Soil S0 in the southern portion of Watershed M (Plate 7B).

In the eastern most Wiley's Well Basin dune system, an increase in water flow has occurred in Historic times associated with water diversions of watersheds K and K1 under Highway 10 via the Palowalla Ditch (Plate 7B). In addition, un-natural water ponding occurs along the western and southwestern region of the Blythe Solar Facility due to construction of the facility intersecting and diverting flow from a drainage that previously flowed through the footprint of the facility. The increase water flow to this area and ponding has increase eolian sand production leading to an increase in sand migration in the eastern most portion of the Wiley's Well Basin dune system.

Based on the Historic water flow analysis, most of the Wiley's Well Basin dune system continues to receive water flow that allows the dunes to remain stable.

13 EOLIAN RESPONSE TO GLOBAL AND LOCAL CLIMATE

Eolian dune systems across southeastern California (the regional study area) have clearly not experienced a steady and consistent growth rate since the latest Pleistocene (Lancaster, 1995). Instead, eolian systems have experienced dramatic variations in development since the Last Glacial Maximum (LGM). The LGM is defined as the time when the continental ice sheets reached their maximum positions, which is believed to have occurred about 33 to 26.5 kya and that these magnitudes of ice were maintained to 19 to 20 kya (Clark et al., 2009). Eolian systems across the southeastern California region experienced a strong aggradational event that began approximately 15 kya, which coincides with the timing of many of the playa and particularly pluvial glacial lakes desiccating across the southwestern United States (Plate 8A, Plate 8B and Plate 8C). Hence, there is a correlation between eolian dune development and climate (Tchakerian, 1991; Lancaster, 1992; Lancaster, 1994, Lancaster, 1995; Zimbelman et al., 1995; Lancaster and Tchakerian, 1996; Lancaster, 1997, Lancaster and Helm; 2000; Lancaster et al., 2003; Pease and Tchakerian, 2003; Tsoar, 2004; Bateman et al., 2012).

Strong eolian aggredational events correlate with periods of time when relatively abundant eolian sand is generated and the sands can migrate and deposit within dune systems away from their source. This is clearly the case on a large regional scale soon after pluvial and playa lakes desiccate providing both an eolian sand source from playa erosion and pathways for the sand to migrate. However, review of dune ages, times of dune re-activation, aggredational events and periods of dune stability since the late Pleistocene indicate a complex story suggesting that numerous climatic factors and their related secondary effects play a role in dune activity (Plate 8A, Plate 8B and Plate 8C).

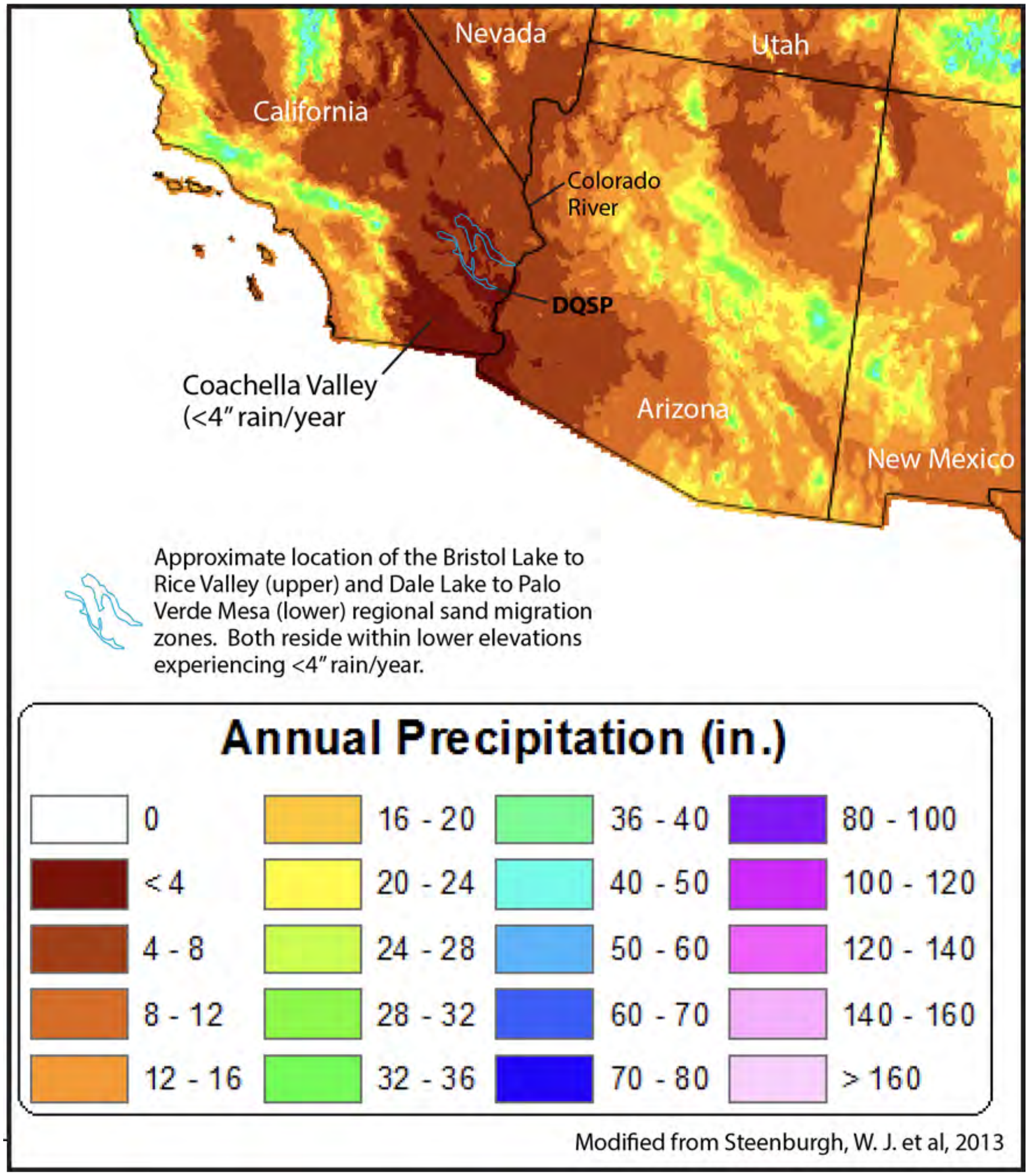
Numerous possible parameters were evaluated during this study including Global Climate variations, regional climate variations, pluvial lake levels, alluvial fan depositional periods, areas of alluvial fan deposition, upper fan trenching (down-cutting), vegetation variations, monsoonal vs. Pacific Storm frequencies and magnitude variations, dune aggredational and re-activation periods (Plate 8A, Plate 8B and

Plate 8C). These data suggest that dune systems react to both global and local changes in climate and the secondary effects of climate such as vegetation density, and alluvial fan behavior. Dune systems experienced aggredational events once pluvial lakes and playa lakes desiccated after the last global glaciation period ending during the Latest Pleistocene (~15 kya). For the most part, the Holocene has been a period of time allowing for the development of dune systems to both aggrade by re-activation and then to become stable. This is likely due to the Holocene climate across the study region that has been semi-arid but close to the hyper-arid climate. Annual precipitation criteria for semi-arid and hyper-arid is ~4 inches/year, which is the amount of average rainfall that the desert regions of southeastern California have received in historical times (Figure 18A and Plate 1). Zimbelman et al. (1995) indicates that semi-arid regions can preserve evidence of substantial eolian deposits via vegetation stabilization as a variety of desert flora are adapted to the intermittent rainfall. However, it seems reasonable that if rainfall decreased slightly to cause the region to experience hyper-arid conditions, that it may be sufficient to cause stabilizing vegetation to die off allowing for an increase in dune instability (increase active sand transport), increase the ability for sand transport and increase eolian sand production. If the decrease in annual precipitation were associated primarily with a decrease in cool-wet Pacific storms (Figure 18B) then the vegetation die off particularly at lower elevations may be more dramatic causing a greater increase in eolian activity. And finally, if all that were to occur but at the same time the magnitude and frequency of extreme but highly intermittent monsoonal storms increased in the region causing increased alluvial fan (washes) activity and fluctuating water levels on playa surfaces, then eolian systems would likely experience re-activation. This eolian re-activation model suggesting relatively small climatic changes can lead to an eolian aggredational event from a “dormant period” may support findings by Bateman et al. (2012) that indicate that eolian systems can accumulate quickly (<5 kya) in a single-phase event before becoming relict.

The Holocene climate across the southeastern California region is therefore close to a critical geomorphic threshold where subtle changes in climate over the course of millennia can lead to either dune re-activation or stability. The combination of the global warming event of the Bølling-Allerød interstadial from 15 to 13 kya that decreased cooler Pacific Storm events in the study area (Plate 8A) with the onset of more frequent and intense gulf Monsoonal storm events in the study region (Plate 8B) led to a robust regional dune aggradational event. Similar conditions occurred again beginning with a global warming period from 10 to 8 kya decreasing Pacific Storm strength in the study region aligning with either continued or increased monsoonal storm frequency and magnitude compared to recent times. These conditions or close approximation continued to about 4 kya which allowed for relatively robust eolian activity from about 10 to 4 kya across southeastern California. The cooler conditions associated with the global Neo-Glacial period from 4.5 to 2.5 that increased cool Pacific Storm and coincides with a decrease in monsoonal storm magnitude and frequency led to a period of dune stability across the study region including all the regional sand migration corridors.

However, southeastern California region (southwestern United States) has experienced local climate variations that do not correlate exactly with changes in global climate. For example, regional dry-warm periods occurring in the southwestern United States encroach into the global cooling New-Glacial period occurring from 4.5 to 2.5 kya. Dune re-activation and some continued dune aggradational behavior continued in southeastern California during the Neo-Glacial likely due to local climate exhibiting drier-warmer conditions and higher monsoonal storm strength and frequency (Plate 8B). Note that alluvial fan deposition across the study region also increased from about 6 to 2 kya (Plate 8A).

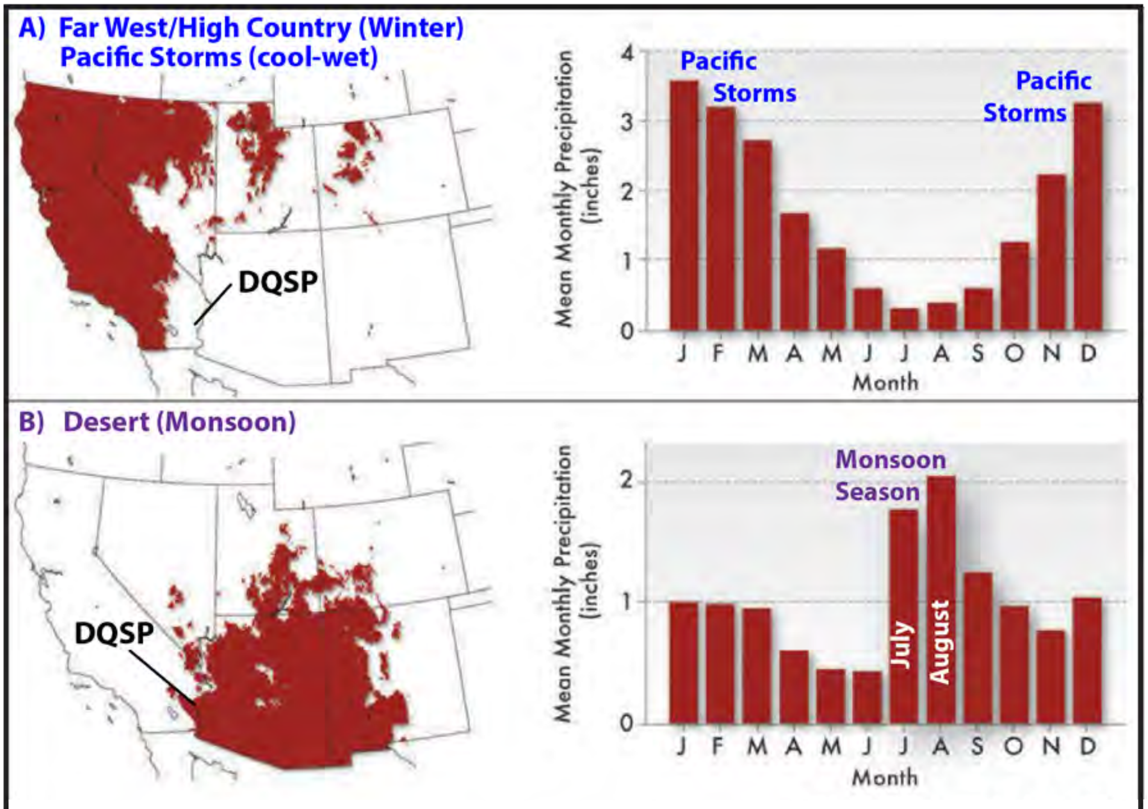
Figure 18a: Average annual precipitation in the southwestern United States. The area of the site (DQSP) and the regional sand migration corridors correlate well with low elevation regions experiencing <4 inches/years, which are areas that receive the least amount of rain in the southeastern California region. The bounding mountain areas are experiencing between 4 to 8 inches/year.


Nevada
Utah
California
Colorado River
DQSP
Coachella Valley (<4" rain/year
Arizona
New Mexico
Annual Precipitation (in.)
0
< 4
4 - 8
8 - 12
12 - 16
16 - 20
20 - 24
24 - 28
28 - 32
32 - 36
36 - 40
40 - 50
50 - 60
60 - 70
70 - 80
80 - 100
100 - 120
120 - 140
140 - 160
> 160

Approximate location of the Bristol Lake to Rice Valley (upper) and Dale Lake to Palo Verde Mesa (lower) regional sand migration zones. Both reside within lower elevations experiencing <4" rain/year.

Modified from Steenburgh, W. J. et al, 2013

Figure 18b: Regional climate data for the southwestern United States showing: A) Upper-Figure – areas receiving significant "far west/high country" winter Pacific storm precipitation and the mean monthly precipitation per month; B) Middle-Figure – areas receiving significant desert monsoonal "thunderstorm" precipitation and the mean monthly precipitation per month; and C) Lower-Figure – average wind speed for various times of the year measured in Blythe, California located approximately 20 miles east of the project site.



Steenburgh, W. J. et al, 2013

C) Average Wind Speed in Miles Per Hour (MPH) at Blythe, California

January	**6.5**	**Winter - Strong Pacific Storms (low winds & wet)**
April	8.9	Spring - (strong winds, mostly dry)
July	**9.4**	**Summer - Strong Monsoon (strong winds & dry)**
August	**8.8**	**Summer - Strong Monsoon (strong winds & dry)**
October	6.7	Fall - (low winds)

https://pubs.usgs.gov/of/2004/1007/weather.html

Dune systems appear to experience aggradational (increase in size and magnitude of eolian sand production and movement) during times when pluvial and playa lakes are drying up and/or experiencing repeated lake fluctuations, when alluvial fans are experiencing aggradational events (abundant fan deposition), when monsoonal storms are more frequent and with higher intensity, and when alluvial fans that had been deposited earlier are eroded into (fan trenching) or eroding into even older non-fan sediments with abundant eolian size grains. It turns out that during the Holocene it is common that one of these parameters allowing for dunes to be more active is occurring at any particular time. Hence, dune system aggradational events do not appear to correlate to a single geologic parameter consistently throughout the Holocene, but instead, responding to numerous parameters each of which vary over time. Dunes can experience variations in activity based on the additive nature of the parameter wavelengths when they collectively "add up" (aggradational events), or cancel each other out (times of stability).

The combination of decrease in vegetation density at lower elevations associated with a decrease in cold/wet winter pacific storms intensity and frequency, increase in monsoonal storms with relatively higher frequency and strength (extreme storm events), abundant available sediment in the mountains and its transport to distal fan areas (see Wells and Dohrenwend, 1985; Nichols et al., 2007), and pluvial and playa lakes experiencing fluctuating levels, all contributed to a regional strong dune aggradational event between 14 and 8 kya. In addition, periods of relatively strong monsoonal storm frequency and strength (Figure 18B) since the mid-Holocene have resulted in dune aggradational and re-activation events (Plate 8B). Dune systems appear to react to this type of climate change on the order of less than 1000 years. Geomorphic response times of dune systems are likely faster than that of other desert processes and may provide the "canary in the coal mine" process indicating that desert systems are changing relatively significantly.

Relatively strong alluvial fan aggradational events correlate with periods of stronger and more frequent monsoonal storm strength (thunderstorm-extreme events; Reheis et al., 1996; Harvey et al., 1999; Reheis et al., 1996; McDonald et al., 2003; Miller et al., 2010). Hence, eolian systems activity level correlates well with that of alluvial fan systems. It is important to point out that during periods of relatively intense monsoonal climate across that many of the playa and pluvial lakes can fill and desiccate which increases eolian sediment supply substantially (Plate 8). In contrast, the relatively wet period in the southwestern United States associated with the global Neo-Glacial from 4.5 to 2.5 kya that led to increased vegetation density at lower elevations assisted in stabilizing most eolian dune systems in the study region (Plate 8A).

Harvey et al. (1999) provide a strong case for alluvial fan aggredational events across the southwestern United States during periods of time of strong monsoonal (extreme storm events) climate in terms of increased frequency and magnitude. The observation that torrential rains in the deserts play a critical role to increased erosion and flow to playa regions was also suggested by Tolman (1909). Eolian dune systems experience aggredational events when relatively strong monsoonal storm periods correlate with periods of relatively weaker Pacific Storms that provide long duration rains leading to increased lake filling (Miller et al., 2010) and higher vegetation density at lower valley axis elevations. These processes lead to dune stability. Monsoonal storms are extreme events that allow for strong flow carrying abundant sediment and moisture to the valley axis (playas and distal fan areas), but soon dry up to not allow for more dense vegetation to occupy the landscape. Therefore, the most productive climate for dune development (growth) is the combination of relatively strong monsoonal extreme storm frequency and magnitude in combination with relatively weaker but longer duration cold/wet Pacific Storm events.

The findings of Harvey et al. (1999) indicate that the southwestern most region of the United States experienced relatively stronger monsoonal storm strength and frequency compared to regions to the northwest, north and northeast. In fact, the region they show as experiencing stronger and more frequent monsoonal storms and relatively weaker cold/wet Pacific Storms correlates very well with the region of the numerous regional sand migration corridors shown on Plate 1 and Plate 2. This indicates that one of the principle reasons that the southeastern California region, in addition to western Arizona, have resulted in extensive dune systems is that these regions have experienced strong monsoonal storm strength and frequency during the Holocene. Other factors include the difficulty of Pacific storms to reach southeastern California due to rain shadow effects, and the local topography in southeastern California exhibiting Basin and Range extensional tectonic mountain ranges and valleys that provide strong and controlled prevailing winds. It is likely that even a small decrease in the strength and frequency of cool winter Pacific storm systems hitting the southern California coast may lead to a substantial drop in precipitation in southeastern California due to the difficulty of these storms maintaining moisture over a series of mountain ranges to the west.

Monsoonal storms, in addition to their ability to create flows that carry sediment to the valley axis allowing for the distal fan regions to grow, also have a much larger ability to cause erosion upstream and carry more sediment, as first described by Tolman (1909). This indicates that extreme flood events have an ability to generate much more eolian sand than long duration Pacific Storm events. It has been observed that during the Holocene, alluvial fan deposition has primarily occurred in the distal regions of the fan (Wells and Dohrenwend, 1985; Nichols et al., 2007), and this observation is consistent with increased monsoonal storm frequency and strength relative to Pacific Storms in the southwestern United States. Monsoonal storms have the added benefit for eolian sand generation in that extreme monsoonal storm events also exhibit much more erosion capabilities than long duration Pacific Storms. Hence, periods of strong monsoonal storm frequency and strength will erode more deeply into the upper fan regions (fan trenching) and into older non-fan sediments. This proposal for increased eolian sand production associated with monsoonal storm periods is supported by work on alluvial fan deposition by McFadden and McAuliffe (1997). They identified a correlation between alluvial fan depositional-aggredational events with the lithology of the materials that the alluvial fan washes eroded into. This observation regarding alluvial fan depositional rates increasing due to the washes carrying additional sediment from the erosion of older sediments is consistent with the hypothesis proposed herein for heavily sand laden washes emanating from eroding fan-trench areas and/or older non-fan sediments increasing eolian sand source to dune systems. Alluvial fan-trenching in the proximal and mid-fan portions of the fan increased from approximately 14 kya and extending to the mid-Holocene (~6 to 7 kya, Plate 8C). Hence, washes during this time carried a relatively large abundance of eolian size sand grains assisting in eolian dune development.

The arid-semi arid climate conditions since the mid-Holocene has resulted in a geomorphic condition where slight changes in regional climate (i.e. monsoonal storm activity) is sufficient to result in local re-activation of dune systems, but not sufficient to produce a robust eolian system where sand migration corridors are continuous. Dune systems across the study region have been relatively stable since the mid Neo-Glacial period approximately 4.0 to 3.5 kya. However, the semi-arid climate occurring in the study region for much of the Holocene is near a critical threshold condition where small changes in dune parameters such as global climate affecting Pacific Storm strength and frequency and local monsoonal strength frequency and magnitude can be reflected in changes in dune behavior on a cyclic scale of approximately 1000 to 500 years. There is a strong correlation with increased monsoonal extreme storm frequency and magnitude with increased eolian activity (aggredational events), and/or with periods of time exhibiting a warmer global climate (Plate 8B). However, Garfin et al. (2012) indicate that forecasting variations in monsoonal behavior in the southwestern United States (i.e. the North American monsoon - NAM) is fraught with difficulties and essentially not possible at present. Therefore, it is unknown whether NAM will increase or decrease in the future. Garfin et al. (2012) do forecast that the southwestern United States will likely get drier and hotter in the coming century which will lead to soils moisture decreasing.

14 POTENTIAL FUTURE IMPACTS

The dune systems in the area and within the DQSP have been stable for a minimum of several thousand years since the end of the mid-Holocene aggredational event. Dune parameters that could lead to changes in the dune system in the future include a continuation of surface water flow diversions that has led to some areas particularly along the northern portion of the Wiley’s Well Basin dune system to be dryer and wetter (Plate 7B). As discussed in this report, this has led to an increase in eolian sand source in areas receiving more water (i.e. sand source for sand migration zones Qz1 and Kz on Plate 7A), and drying out of dunes in areas receiving less water that has led to minor dune degradation and increased sand transport rates locally (pathway of sand migration zone Qz1 on Plate 7A). The flood control measures for construction of Highway 10 and older roads in this area have existed for decades and have only led to subtle changes in the local dune systems. With the advent of the invasion of Sahara Mustard which has dramatically slowed down sand migration rates from their eolian sources, the slight increase in eolian sand generation in the wetter source area associated with the Palowalla Ditch-Wash (Plate 7A) will likely continue to deposit in the area mapped as sand migration Zone B, Zone BW and Zone BC (Figure 12, Plate 5 and Plate 6A) for many decades.

Flow within the watershed of the Wileys Well Wash (watershed Q on Plate 7A) has not been altered significantly in Historical times and should result in similar eolian sand production as it did in pre-Historical times if climate remains similar. Numerous subdrains located under the Southern California Edison Facility appear to allow for substantial Wiley’s Well Wash flow to migrate north of the access road (Plate 7B).

The watershed and drainage system feeding the Mule SMZ (watershed P feeding sand migration zone Pz on Plate 7A) has not been altered in Historical times and therefore continues to provide sufficient flow for dune moisture stability and generation of eolian sands to feed the system. The Mule sand migration zone has been stable for at least several thousand years like the Wiley’s Well Basin sand migration zone to the north.

If the frequency and magnitude of cool winter Pacific storms decrease and warm summer monsoonal storms increase, then this is proposed to lead to an increase in eolian sand generation in the valley axis area. The existing dune systems in the DQSP have been degrading (internally eroding mostly) for several thousand years, and thus can “absorb” newly derived eolian sands for hundreds of years or more without expanding outside of the mapped dune areas where the dunes had originally expanded to in the mid-Holocene (i.e.

beyond the contact of sand migration Zones BC/Zone C). However, the invasion of Sahara Mustard has greatly diminished the ability for sand to migrate from their sources. Hence, if Sahara mustard persisted, it is proposed that it would primarily lead to thicker and more robust dune systems near their sources during the next century.

15 CONCLUSIONS

Global and local climatic conditions and their secondary effects during the Holocene has been beneficial for dune growth at various periods of time and near a geomorphic threshold condition where relatively subtle changes in climate can lead to dune re-activation. However, dune systems across the southeastern California region have been dominantly stable since the mid-Holocene and the sand migration corridors have essentially shut down since that time. Eolian sand sources during times of dune aggredational events similar to that of the early Holocene and during times of dune stability have primarily been from local sources with the possible exception of the Kelso dune system that was likely provided relatively large magnitudes of eolian sands during the early Holocene when dune parameter conditions greatly favored eolian sand production and migration.

Dune systems in the area of the DQSP have received most of their eolian sands from local sources throughout the Holocene. The dunes encroached into the DQSP during the late-early Holocene and continued to grow until the later mid-Holocene. Since the mid-Holocene, existing dune systems across the southeastern California region are degrading and relying in large degree on the erosion of older dune deposits for new eolian sands. This is certainly the case for the dune areas in the DQSP. If there is an increase in eolian sand production due to climate change via a decrease Pacific storms and increase in monsoonal storms frequency and magnitude, then these newly derived sands will be deposited for likely a minimum of a hundred years within the existing mapped dune system area (i.e. areas of sand migration zones A through BC, which are not impacted by the proposed development). The reach of the deposits is likely to be furthermore constrained by the incursion of the invasive Sahara Mustard plant, which blooms relatively frequently (estimated to be 2 to 3 times per decade) and has decreased sand migration rates by over an order of magnitude where it occurs. These blooms will cause newly derived eolian sands to deposit closer to their sources and within mapped eolian dune systems, altering only the dune forms and increase in localized eolian sediment mass.

The findings of this report are that eolian sand sources remain intact near and within the DQSP, and that for decades to come, the area of dune deposition will not expand beyond the mapped region of sand migration Zone BC.

Miles Kenney PhD, PG
Kenney GeoScience

REPORT END

APPENDIX A

REFERENCES

APPENDIX A

REFERENCES

Note: This is a partial reference list of publications available to the author during preparation of this report; however, not all the references provided below were formally referenced in the report.

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APPENDIX B

GLOSSARY OF TERMS

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ABRASION: Erosion of a surface when coarser sediments move across the surface in a saltation process. For example, when the wind transports sand grains and the sand grains dislodge bits of the ground surface, that is abrasion.

ACTIVE AEOLIAN (EOLIAN) LANDFORMS: Active eolian landforms are features on which contemporary surface sand and, locally, avalanche faces at the angle of repose. Primary sedimentary structures are preserved. Depending on their morphological type, active dunes may be migrating in the net transport direction (e.g. concentric or transverse dunes), extending (e.g. linear dunes), or vertically accreting (e.g. star dunes-complex dunes). The degree of aeolian activity may vary seasonally, annually or decadally in response to changes in sand supply, wind velocity, vegetation cover and moisture contents. Definition from Lancaster, 1992. Also see Dormant and Relict dune definitions below from Lancaster, 1992. Note however, that this definition does not take into account where active sands requiring nominal active eolian sands (i.e. sand sheets, small coppice, weak dune mounds) are currently occurring in an ancient dune system representing an ancient more robust eolian system in the past.

AEOLIAN/EOLIAN: Alternate spelling of eolian. See Eolian.

AGGRADATION: Aggradation (or alluviation) is the term used in geology for the increase in land elevation, typically in a river system, due to the deposition of sediment. Aggradation occurs in areas in which the supply of sediment is greater than the amount of material that the system is able to transport. The mass balance between sediment being transported and sediment in the bed is described by the Exner equation. The term *aggradational event* is used by eolian scientists to describe a period of time when a dune systems increases its mass of eolian sands indicating that the eolian sand sources are producing sufficient sand to allow for dune deposition. Hence, a perio9d of time when the wind supplies more sand than leaves the dunes system. In alluvial environments, when washes and streams deposit sediments it is referred to as *alluviation*.

ALLUVIAL/ALLUVIAL DEPOSITS: Sediments deposited by flowing water.

ALLUVIATION: Another name for aggradation but specific to alluvial processes (washes, channels, streams, stream terrace, etc).

ANGLE OF REPOSE: The angle, from 0 to 90 degrees, of a slope that marks the last stable slope angle. If the angle gets any steeper, material on the slope will move downhill.

BAJADA: An alluvial plain that forms along the flanks of a mountain where fan-shaped alluvial deposits overlap. Often, numerous alluvial fans from an individual valley within a mountain range merge to form a relatively smooth surface referred to as a bajada. A Bajada is a type of Piedmont Surface.

BARCHAN DUNES: A **barchan** or **barkhan dune**, (from Kazakh бархан [bɑɾˈ.χɑn]), is a crescent-shaped dune. The term was introduced in 1881 by Russian naturalist Alexander von Middendorf,[1] for crescent-shaped sand dunes in Turkestan and other inland desert regions. Barchans face the wind, appearing convex and are produced by wind action predominately from one direction. They are a very common landform in sandy deserts all over the world and are arc-shaped, markedly asymmetrical in cross section, with a gentle slope facing toward the wind sand ridge, comprising well-sorted sand. This type of dune possesses two "horns" that face downwind, with the steeper slope known as the slip face, facing away from the wind, downwind, at the angle of repose of sand, approximately 30–35 degrees for medium-fine dry sand.[2] The upwind side is packed by the wind, and stands at about 15 degrees. Barchans may be 9–30 m (30–98 ft) high and 370 m (1,210 ft) wide at the base measured perpendicular to the wind. Simple barchan dunes may appear as larger, compound barchan or megabarchan dunes, which can gradually migrate with the wind as a result of erosion on the windward side and deposition on the leeward side, at a rate of migration ranging from about a meter to a hundred metres per year. Barchans usually occur as groups of isolated dunes and may form chains that extend across a plain in the direction of the prevailing wind. Barchans and megabarchans may coalesce into ridges that extend for hundreds of kilometers. Dune collisions and changes in wind direction that spawn new barchans from the horns of the old govern the size distribution in a given field.[3] As barchan dunes migrate, smaller dunes outpace larger dunes, catching-up the rear of the larger dune and eventually appear to punch through the large dune to appear on the other side. The process appears superficially similar to waves of light, sound, or water that pass directly through each other, but the detailed mechanism is very different. The dunes emulate soliton behavior, but unlike solitons, which flow through a medium leaving it undisturbed (think of waves through water), the sand particles themselves are moved. When the smaller dune catches up the larger dune, the winds begin to deposit sand on the rear dune while blowing sand off the front dune without replenishing it. Eventually, the rear dune has assumed dimensions similar to the former front dune which has now become a smaller, faster moving dune that pulls away with the wind.[4]

BASIN AND RANGE PROVINCE: A vast region that covers much of the inland Western United States and northwestern Mexico. It is defined by unique topography: abrupt changes in elevation that alternate between narrow faulted mountain chains and flat arid valleys or basins.

BATHYMETRIC: Related to bathymetry.

BATHYMETRY: The features of land when it lies underwater. Underwater equivalent of topography.

CAMBIC HORIZON (Bw Horizon): A weakly developed mineral layer in the middle part (B horizon) of a soil profiles. The Bw horizon can be recognized by minor chemical weathering (a yellowish stain due to oxidation), and minor secondary flux of wind-blown dust. In desert regions such as the Mojave Desert, southeastern California, Bw horizons generally require a couple of thousand years to develop, but are typically less than several thousand years old.

COPPICE DUNES: Vegetated sand mounds that are often scattered throughout sand sheets in semi-arid regions where shrubs and blowing sand are abundant. Any shrub sticking up into the airborne stream of sand impedes the flow. The resulting turbulence and lost speed cause sand grains to settle on the downwind side of the shrub and around its base. Coppice dunes range from about 1.5 – 9 feet high and 3 – 45 feet wide. Within any given field of coppice dunes, however, the dune size tends to be uniform. Because the sand accumulates in piles around the plants and is swept from the surfaces between the plants, a hummocky, rough topography develops that is very different from sand sheets without vegetation (which are typically smooth, flat, and gently undulatory). Under certain conditions, individual or clusters of coppice dunes become very large and are then called vegetation mounds. Coppice dunes are commonly associated with parabolic dune fields.

COPPICE TAIL: On the leeward (downwind) side of the coppice mound, at the base of the plant, is a triangular tail; the wide end attaches to the mound and points (narrows) downwind. The coppice tails are generally 3 inches to 3 feet long and provide excellent wind vector data for the past 1 to 10 years. A lack of active coppice tails (or degraded and/or vegetated coppice mounds) is an excellent indicator that sand is not currently migrating within that area. Most active coppice dunes in the Chuckwalla Valley region do exhibit coppice tails.

CORRIDOR SYSTEM, EOLIAN: Proposed eolian sand pathways that may allow wind-blown sand to travel for tens of miles and involve numerous sub-basins and possibly sand ramps. A corridor system allows wind-blown sand to travel tens of miles via topographic valleys and playa lake basins. It is clear that the proposed sand migration corridors in southeastern California are provided significant amounts of local sands.

TEMPORAL AND SPATIAL SCALE - CYCLIC: A way to measure the evolution of large dune field areas over time (Lancaster, 1995). A cyclic temporal scale spans periods of 1 thousand to 10 thousand years and its spatial scale corresponds to that of large dune field areas. These large dune field areas developed over thousands of years during major aggradational events of the latest Pleistocene to mid Holocene. Cyclic scale covers the formation of most of the larger dunes within the Chuckwalla eolian system.

TEMPORAL AND SPATIAL SCALE - GRADED: A way to measure the dynamics and morphology of dunes, including the migration of individual dunes within a dune system. Graded temporal scale spans time periods of 1 to 100 years. During those time frames, dunes tend to be in full or partial equilibrium with the rates and directions of sand movements generated by surface winds (Lancaster, 1995). In the Mojave Desert, graded time structures include small active dunes and medium to larger active coppice dunes and their respective tails.

TEMPORAL AND SPATIAL SCALE - INSTANTANEOUS: Instantaneous temporal and spatial scale involves very short periods of time and small areas. Eolian structures that form within instantaneous scale include the formation of sand ripples – which can develop in a few minutes - and very small coppice dune tails behind shrubs.

DEFLATION: A process in which wind picks up loose, fine particles, such as whitish, powdery mineral salts, and the particles then move suspended in the airstream. Deflation is common on "wet" playa surfaces where the groundwater is within 15 feet of the surface and routinely produces new salt crusts on the surface.

DISTRIBUTARY DRAINAGE SYSTEM: A **distributary**, or a **distributary channel**, is a stream that branches off and flows away from a main stream channel. They are a common feature of river deltas. The phenomenon is known as river bifurcation. The opposite of a distributary is a tributary. Distributaries usually occur as a stream nears a lake or an ocean, but they can occur inland as well, such as on alluvial fans or when a tributary stream bifurcates as it nears its confluence with a larger stream. In some cases, a minor distributary can divert so much water from the main channel that it can become the main route.

DORMANT AEOLIAN (EOLIAN) LANDFORMS: Dormant aeolian landforms are those on which surface sand transport and deposition are currently absent or at low level, yet are capable of reverting to an active condition as a result of minor climate changes (e.g. prolonged regional drought). Wind rippled surfaces are rare or absent, as are avalanche faces at the angle of repose. The former avalanche slope may be degraded, so that lee face slope angles of 20 degrees or less are common on crescentic dunes. Primary sedimentary structures are still present, but may be partially destroyed by bioturbation. Vegetation cover is usually well developed and includes a high percentage of perennial plants, including shrubs. The sand surface may be stabilized with biogenic crusts. Sand mobility may be reduced by a low=energy wind regime, lack of sand supply, and/or presence of a well-developed vegetation cover. Dormant dunes may revert to active features as a result of minor cyclic or secular environmental changes. A wide variety of degrees of dune dormancy can occur, but this class of aeolian landforms implies that they have not experienced active sand transport on time-scales of decades or greater. This definition is from Lancaster, 1992. Within Kenney GeoScience reports, the term "dormant dunes" and "relict dunes" is utilized to represent an eolian system that exhibits older dunes that are no longer receiving sufficient eolian sands to maintain those dune forms. In these areas, active sand in the form of sand sheets and coppice dunes that require minor magnitudes of eolian sand are transported over the older dune system. In addition, areas mapped by Kenney GeoScience as dormant or relict dunes also exhibit internal abrasion providing an internal source of eolian sand.

EOLIAN/(AEOLIAN): Wind blown. Eolian refers to processes associated with the wind, such as ventifacts, abrasion, wind-blown sand transport, and dune deposition. Aeolus was ruler of the winds in Greek mythology.

EOLIAN DEPOSITS: Sediments transported and subsequently deposited by moving air. Sand dunes form by eolian deposits.

EROSION: In earth science, erosion is the action of surface processes (such as water flow or wind) that remove soil, rock, or dissolved material from one location on the Earth's crust, then transport it away to another location.[1] The particulate breakdown of rock or soil into clastic sediment is referred to as physical or mechanical erosion; this contrasts with chemical erosion, where soil or rock material is removed from an area by its dissolving into a solvent (typically water), followed by the flow away of that solution. Eroded sediment or solutes may be transported just a few millimeters, or for thousands of kilometers.

GEOLOGIC TIMESCALE: A way to measure time and compare ages over millions of years. Geologists often need to compare the ages of rocks or landscapes, or discuss how long before the present something occurred. The geologic timescale provides a standardized reference. Thus, for example, when someone says a formation developed in "Late Pliocene", everyone else knows it developed between 12,000 and 126,000 years ago. In the geologic timescale, the longest divisions of time are the three eras, (from oldest to youngest) the Paleozoic, Mesozoic, and Cenozoic. Each era is divided into periods, and the periods are divided into epochs.

GEOMORPHIC: Related to geomorphology.

GEOMORPHIC PROVINCE: An area with common geologic or geomorphic attributes. A province may include a single dominant structural feature.

GEOMORPHOLOGIST: Scientists who seek to understand why landscapes look the way they do, to identify landform history and dynamics, and to predict future landscape changes through a combination of field observations, physical experiments, and numerical modeling. Geomorphologists work within a broad base of disciplines, including physical geography, geology, geodesy, engineering geology, archaeology and geotechnical engineering – which contributes to varied research styles and interests.

GEOMORPHOLOGY: The scientific study of landscapes – how they form and change, what their topographic and bathymetric features say about physical, chemical, and biological processes operating at or near the Earth's surface.

HOLOCENE: A measure of geologic time. In the geologic timescale, the Holocene is the current epoch, which began about 11,700 years ago (10,000 ^{14}C years ago).

HORIZON, SOIL: A layer generally parallel to the soil crust, whose physical characteristics differ from the layers above and beneath. Typically, soil horizons develop once a surface becomes stable, and thus affected by near-surface and surficial processes. Each soil type usually has three or four horizons defined by color, texture, or other obvious physical features. Typical soil horizons, from shallowest to deepest, are called: A, B, and C horizons. In many cases, particularly for buried soils, only the B and C horizons remain. Soil horizons change over time due to chemical and mechanical weathering, percolating water, plant and animal activity, wind-blown influx of material, and more. The soil changes occur over predictable time intervals, which allows soil scientists to estimate ages of the surfaces. Also see Soil Profile.

INTERDUNE AREAS: Desert floor between dunes in dune fields. Closed interdune areas may be poorly drained, contain playas, and are typically flat. Where dry and floored by sandy sediment, interdune areas have many of the same characteristics as sand sheets. With near-surface moisture, interdune areas may contain grasses, shrubs, trees, or even settlements. Interdune areas range in size from a few to tens of square miles. In any given locality, the sizes and shapes of the interdune areas are similar, as are those of the intervening dunes.

Kya: Abbreviation for "thousand years ago". Sometimes shown as ka or KYA.

LACUSTRINE: Lacustrine deposits are sedimentary rock formations which formed in the bottom of ancient lakes.[1] A common characteristic of lacustrine deposits is that a river or stream channel has carried sediment into the basin. Lacustrine deposits form in all lake types including rift graben lakes, oxbow lakes, glacial lakes, and crater lakes. Lacustrine environments, like seas, are large bodies of water. They share similar sedimentary deposits which are mainly composed of low-energy particle sizes. Lacustrine deposits are typically very well sorted with highly laminated beds of silts, clays, and occasionally carbonates.[2] In regards to geologic time, lakes are temporary and once they no longer receive water, they dry up and leave a formation. In desert environments, lacustrine environments include both playa and pluvial lakes.

LAST GLACIAL MAXIMUM: The Last Glacial Maximum (LGM) was the last period in the Earth's climate history during the last glacial period when ice sheets were at their greatest extension. Growth of the ice sheets reached their maximum positions in about 24,500 BCE. Deglaciation commenced in the Northern Hemisphere between approximately 18,000 to 17,000 BCE and in Antarctica approximately 12,500 BCE, which is consistent with evidence that it was the primary source for an abrupt rise in the sea level in about 12,500 BCE.[1] Vast ice sheets covered much of North America, northern Europe, and Asia. The ice sheets profoundly affected Earth's climate by causing drought, desertification, and a dramatic drop in sea levels.[2] It was followed by the Late Glacial.

LARGE SCALE MAPS: Large scale maps show a smaller amount of area with a greater amount of detail. The geographic extent shown on a large scale map is small. A large scaled map expressed as a representative scale would have a smaller number to the right of the ratio. Also see small scale map.

LEE(WARD) SIDE OF A DUNE : Leeward is downwind from the dominant wind direction that is primarily responsible for a dune's form. The lee side of a dune exists between the crest and the base of the avalanche face. Many active dunes (geologic unit Qsa), exhibit a free avalanche face where sand sediment is deposited near the angle of repose. (Lee side is opposite of stoss side, which is upwind)

LINEAR DUNES: One of the most common dune types, linear dunes are straight to irregularly sinuous, elongate, ridges of loose, well-sorted, very fine to medium sand. The straight varieties are often called *sand ridges*, and the sinuous varieties are often called *seifs*. Sinuosity and alternate slip faces develop because crosswinds change direction and shepherd the sand to one side then the other of the dune axes. The length of a linear dune, can range from several feet to many miles and is much greater than its width. The long axes of the linear dunes align within 15° of the prevailing wind or with the drift direction of the local winds. Linear dunes form in at least two environmental settings: where winds of bimodal direction blow across loose sand, and where single-direction winds blow over sediment that is locally stabilized (through vegetation, sediment cohesion, or topographic shelter from the winds). Linear dunes do exist in areas with varied wind speeds and directions. Most are probably "fossil" dunes formed during the Pleistocene, which had similar wind directions but more vigorous winds. Where linear dunes are active today, they are becoming more complex, with secondary dunes. Long standing opinion is that linear dunes migrate parallel to and along the downwind axis of the dune. However, new evidence indicates that linear dunes move about 15° oblique to the dune axis.

Ma: Abbreviation for “million years ago”.

MINERALOGY: A field of geology specializing in the chemistry, crystal structure, and physical (including optical) properties of minerals and mineralized artifacts. Mineralogy studies classification of minerals, the processes of mineral origin and formation, their geographical distribution, and their utilization.

PARABOLIC DUNES: In plan view, these are U- or V-shaped mounds of well-sorted, very fine to medium sand with elongated arms that extend upwind (opposite of Barchan dunes). Slip faces occur on the outer (convex) side of the nose of the dune and on the outside slopes of its elongated arms. Parabolic dunes are always associated with vegetation--grasses, shrubs, and occasional trees anchor the trailing arms. Most parabolic dunes do not grow taller than tens of feet except at their forward portions. There, vegetation halts or slows the sand and it piles up. In inland deserts, parabolic dunes extend downwind from blowouts in sand sheets that are only partly anchored by vegetation. They can also originate from beach sands and on shores of large lakes. Parabolic dunes, like crescentic dunes (i.e. barchan), are characteristic of areas where winds were strong and unidirectional during their growth and migration.

PALEOSOL: (*palaeosol* in Great Britain and Australia) A former or “fossil” soil, preserved by burial underneath sediments or volcanic deposits, which may have lithified into rock.

PENETROMETER: An instrument for determining the consistency or hardness of a substance by measuring the depth or rate of penetration when a rod or needle is driven into the substance by a known force.

PIEDMONT SLOPE: An “apron” of sediment debris that lies between a mountain and a valley floor. A piedmont slope characteristically slopes away from the mountains, and flow directions are transverse to flow directions in the valley floor, so a piedmont slope indicates where the mountain and valley were at the time of the slope’s formation. The piedmont slope is subdivided into five types based on morphology and relative age. Each of the five types forms by similar processes. Three of the types are relevant to this study: debris flows (fluidized slurries that flow downslope following intense downpours), grain flow (gravity-driven grain-to-grain downslope movement of sediment), and traction currents (sediments entrained by streams or sheet flows).

PLAN VIEW: Also known as map view. Looking at a feature or area from directly above it.

PLAYA LAKE – DRY LAKES: A playa lake is formed when water from rain or other sources, like intersection with a water table, flows into a dry depression in the landscape, creating a pond or lake. If the total annual evaporation rate exceeds the total annual inflow, the depression will eventually become dry again, forming a playa. Salts originally dissolved in the water precipitate out and are left behind, gradually building up over time. A playa appears as a flat bed of clay, generally encrusted with precipitated salts. These evaporite minerals are a concentration of weathering products such as sodium carbonate, borax, and other salts. In deserts, a playa may be found in an area ringed by bajadas. Dry lakes are typically formed in semi-arid to arid regions of the world. The largest concentration of dry lakes (nearly 22,000) is in the southern High Plains of Texas and eastern New Mexico. Most dry lakes are small. However, Salar de Uyuni in Bolivia, near Potosí, the largest salt flat in the world, comprises 4,085 square miles (10,582 square km).[2] Also see Pluvial Lakes.

PLIOCENE: A measure of geologic time. In the geologic timescale, the Pliocene epoch extends from 5.3 to 2.58 Ma. It is the second and youngest epoch of the Neogene period in the Cenozoic Era. From youngest to oldest, the epochs in the Cenozoic Era are Holocene, Pleistocene, Pliocene, Miocene, Oligocene, Eocene, Paleocene. In the Mojave Desert, most formations are Pliocene or younger.

PLEISTOCENE: A measure of geologic time. In the geologic timescale, the Pleistocene epoch extends from 2.58 million to ~12,000 years before present. The Pleistocene includes the world's most recent period of repeated glaciations and is subdivided into *Early* (2.6 million to 781k years ago), *Middle* (781k to 126k years ago) and *Late* (126k to 12k years ago. This report refers to *Latest* Pleistocene, which began 50k to 60k years ago.

PLUVIAL LAKES: A **pluvial lake** is a landlocked basin (endorheic basin) that fills with rainwater during times of glaciation, when precipitation is higher.[1] Pluvial lakes that have since evaporated and dried out may also be referred to as paleolakes.[2]

QUATERNARY: A measure of geologic time. The present day is part of the Quaternary period of the Cenozoic Era. The Quaternary began about 2.588 million years ago (Ma) and is divided into two epochs: the Pleistocene and the Holocene. The end of the Pleistocene is considered to occur at 11.7 Ma. The Quaternary continues to this day.

RELICT AEOLIAN (EOLIAN) LANDFORMS: Relict aeolian landforms are those that are clearly a product of past climatic regimes or depositional environments and have been stabilitzed for a period of at least 1000 years. They include dunes and sand sheets that are stabilized by soil development (including calcic horizons, early stages of diagenesis (partial cementation), deflation lag surfaces, colluvial cover, and woodland vegetation. Relict features may revert to an active state only as a result of major environmental changes. This definition is from Lancaster, 1992. Within Kenney GeoScience reports, the term “relict dunes” is utilized to represent an eolian system that exhibits older dunes that during their development required more eolian sand migration than is currently taking place. In these areas, active sand in the form of sand sheets and coppice dunes that require minor magnitudes of eolian sand are transported over the older dune system. In addition, areas mapped by Kenney GeoScience as dormant or relict dunes also exhibit internal abrasion providing an internal source of eolian sand. The Lancaster, 1992 relict dune definition is reasonable for dunes that developed during interglacial period prior to the Holocene interglacial as it takes tens of thousands of years for well developed calcic soil horizons to developed. However, it is a useful definition for quite ancient relict dune systems.

RUBIFICATION: Rubification refers to a substance becoming more reddish in color. For the purposes of eolian geomorphic and stratigraphic reports, the term rubification is utized as a soil profile term where reddening under surficial clasts increase over time which assists in estimating a surficial soils minimum age.

SAND SHEETS (SAND PLAINS): Flat, or gently undulatory, broad floors of windblown sand deposits that lie in thin layers that are gently inclined or horizontal. Sand sheets have fine grained material separated by layers – only one grain thick! - of coarser, “wind lag” particles. The latter are the coarsest particles that can be shifted by the wind. In any one place, the sizes of the wind lag particles are remarkably uniform, and may be so closely packed that the layer forms a miniature desert pavement. Sand sheets give information about the strength of the winds. Inactive sand sheet deposits provide evidence of past wind sand migration corridors.

SALTATION: The movement of loose, hard particles in a turbulent flow of wind or water over an uneven surface. Examples include pebbles in rivers, sand drift over deserts, and soil blowing over prairies.

SAND RIDGE: see Linear Dunes.

SEDIMENT: **Sediment** is a naturally occurring material that is broken down by processes of weathering and erosion, and is subsequently transported by the action of wind, water, or ice, and/or by the force of gravity acting on the particles. For example, sand and silt can be carried in suspension in river water and on reaching the sea be deposited by sedimentation and if buried this may eventually become sandstone and siltstone, (sedimentary rocks). Sediments are most often transported by water (fluvial processes), but also wind (aeolian processes) and glaciers. Beach sands and river channel deposits are examples of fluvial transport and deposition, though sediment also often settles out of slow-moving or standing water in lakes and oceans. Desert sand dunes and loess are examples of aeolian transport and deposition. Glacialmoraine deposits and till are ice-transported sediments.

SEIF: see Linear Dunes.

SMALL SCALE MAP: Small scale maps show a larger amount of area with less amount of detail. The geographic extent shown on small scale maps is relatively larger than for large scale maps. A small scaled map expressed as a representative scale would have a larger number to the right of the ratio compared to large scale maps. Also see large scale map.

SOIL PROFILE: The **soil profile** is a vertical section of the **soil** that depicts all of its horizons**.** A **soil** horizon makes up a distinct layer of **soil**. The horizon runs roughly parallel to the **soil** surface and has different properties and characteristics than the adjacent layers above and below.

STABILIZED DUNES: Sand dunes that are unable to migrate due to vegetation growth on the dune. Stabilized dunes often develop due to limited eolian sand input. However, some dunes evaluated by the author appear to be stabilized not by vegetation, but by moisture. (The moisture may come from underlying springs, precipitation on the dunes that penetrates into the dune, or storm runoff that seeps into the dune mass. This process is poorly studied, although critical to the stability of dunes.) Within this study, stabilized dunes dominate dune areas mapped as Qsad and Qsr. Also referred to as vegetated dunes.

STOSS SIDE OF A DUNE: The stoss side of a dune points in the direction of the dominant wind, responsible for the primary dune form. The stoss side lies between the toe and the crest of the dune, on the upwind side (opposite of the lee side, which is downwind).

TOPOGRAHIC: relating to topography.

TOPOGRAPHY: The arrangement of the physical features of an area. For example, the location and elevations of valleys and mountains are part of an area's topography.

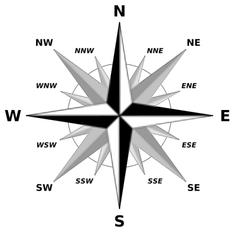
TRIBUTARY DRAINAGE SYSTEM: A **tributary**[1] or **affluent**[2] is a stream or river that flows into a larger stream or main stem (or parent) river or a lake.[3] A tributary does not flow directly into a sea or ocean.[4] Tributaries and the main stem river drain the surrounding drainage basin of its surface water and groundwater, leading the water out into an ocean. A confluence, where two or more bodies of water meet together, usually refers to the joining of tributaries. The opposite to a tributary is a distributary, a river or stream that branches off from and flows away from the main stream.[5] Distributaries are most often found in river deltas.

VEGETATION MOUND: A large Coppice Dune.

VENTIFACTS: Rocks that have been abraded, pitted, etched, grooved, or polished by wind-driven sand. Ventifacts typically occur on gravel-size rocks exposed to sand-bearing wind. Ventifacts are identified by rounded edges and a soft feel on the gravel side exposed to the atmosphere. Ventifacts provide information regarding the prevailing wind direction.

WIND DIRECTIONS: Meteorologists always define the wind direction as the direction the wind is coming from. If you stand so that the wind is blowing directly into your face, the direction you are facing names the wind.

WINDROSE DIRECTIONS FOR WIND AND SAND MIGRATION DIRECTIONS: The windrose figure below provides the direction nomenclature for the direction wind is moving, and within this report, the direction eolian sands are migrating. The wind direction is described by the direction the wind is coming from, and for eolian sand migration, it's the direction that the sand is toward. Hence, for sand migration moving ESE, the sand is moving from the WNW toward the ESE.



APPENDIX C

SAND MIGRATION ZONE DESIGNATION PHOTOGRAPHS

APPENDIX C

SAND MIGRATION ZONE DESIGNATION PHOTOGRAPHS

Photograph of geomorphic sites across the site to provide documentation of the geomorphic characteristics of the various sand migration zones within the property, but also to document the dune conditions at a particular time. The photographs also provide evidence of a Sahara Mustard bloom exhibiting abundant dead plants months after they had grown and died.

Figure AC-1: Location map for selected Geomorphic Sites in which photographs of the test pits with soil stratigraphy evaluated.

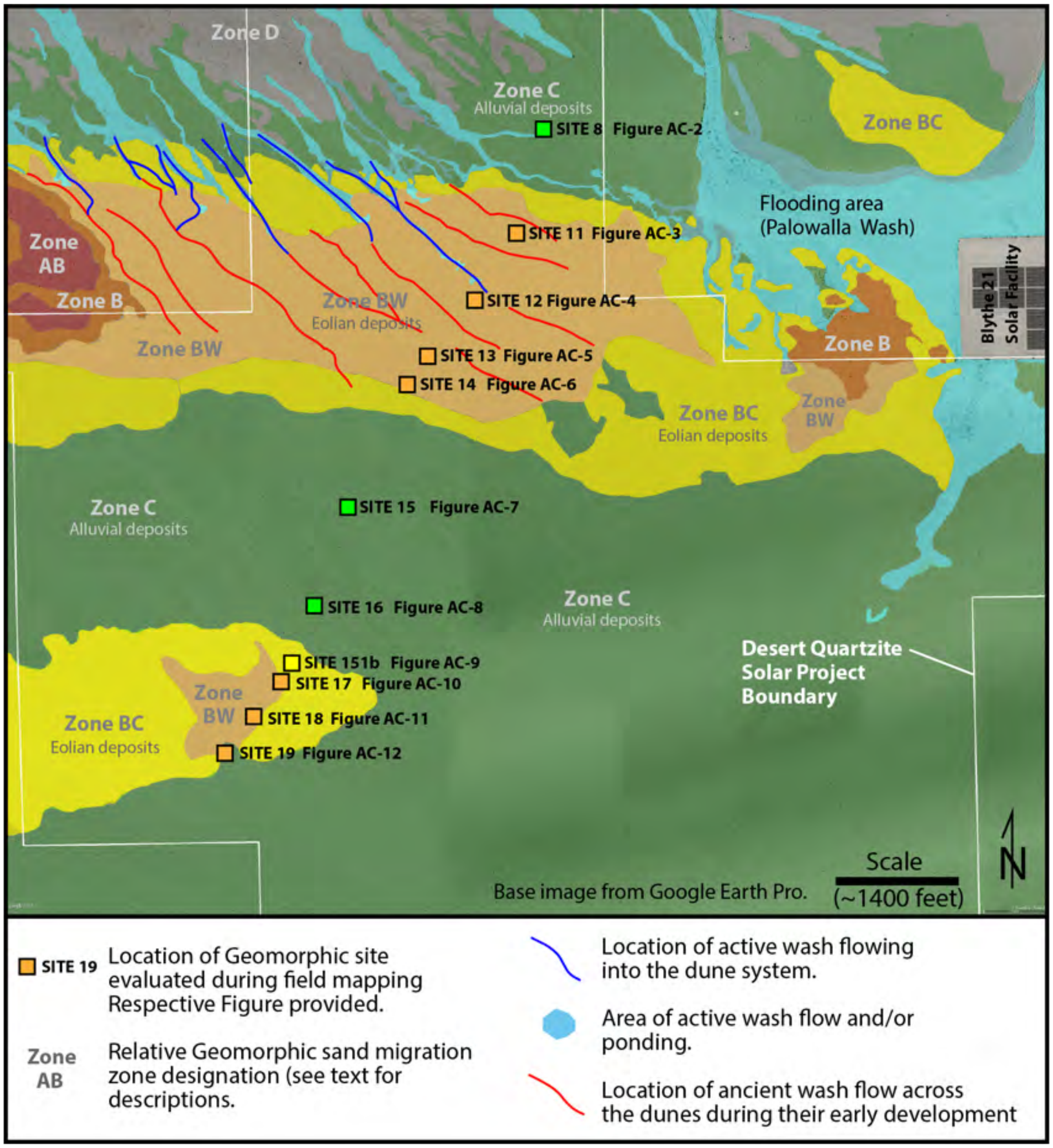

Zone D
Zone C
Alluvial deposits
SITE 8 Figure AC-2
Zone BC
Flooding area
(Palowalla Wash)
Zone AB
Zone B
SITE 11 Figure AC-3
Zone BW
Eolian deposits
SITE 12 Figure AC-4
Blythe 21 Solar Facility
Zone B
Zone BW
SITE 13 Figure AC-5
SITE 14 Figure AC-6
Zone BC
Eolian deposits
Zone BW
Zone C
Alluvial deposits
SITE 15 Figure AC-7
SITE 16 Figure AC-8
Zone C
Alluvial deposits
SITE 151b Figure AC-9
SITE 17 Figure AC-10
Zone BW
SITE 18 Figure AC-11
SITE 19 Figure AC-12
Zone BC
Eolian deposits
Desert Quartzite Solar Project Boundary
N
Scale
(~1400 feet)
Base image from Google Earth Pro.
SITE 19 Location of Geomorphic site evaluated during field mapping Respective Figure provided.
Zone AB Relative Geomorphic sand migration zone designation (see text for descriptions.
Location of active wash flowing into the dune system.
Area of active wash flow and/or ponding.
Location of ancient wash flow across the dunes during their early development

Figure AC-2: Geomorphic Site 8 Geomorphic Relative Sand Migration **Zone C**

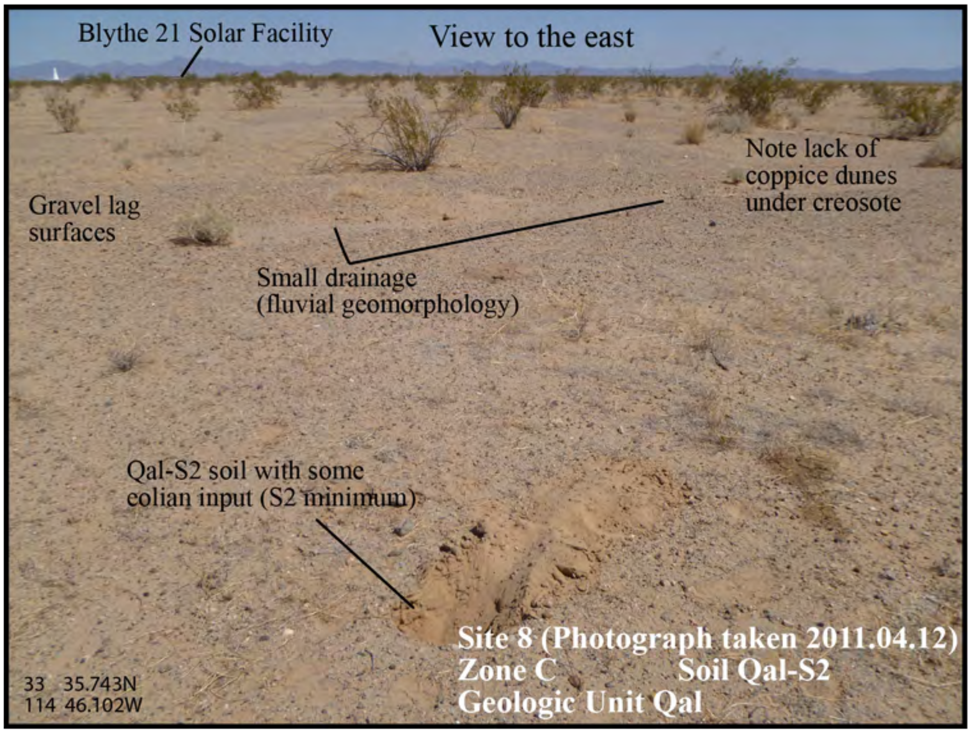

Blythe 21 Solar Facility
View to the east
Note lack of coppice dunes under creosote
Gravel lag surfaces
Small drainage (fluvial geomorphology)
Qal-S2 soil with some eolian input (S2 minimum)
Site 8 (Photograph taken 2011.04.12)
Zone C
Soil Qal-S2
Geologic Unit Qal
33 35.743N
114 46.102W

Figure AC-3: Geomorphic Site 11 Geomorphic Relative Sand Migration **Zone BW**

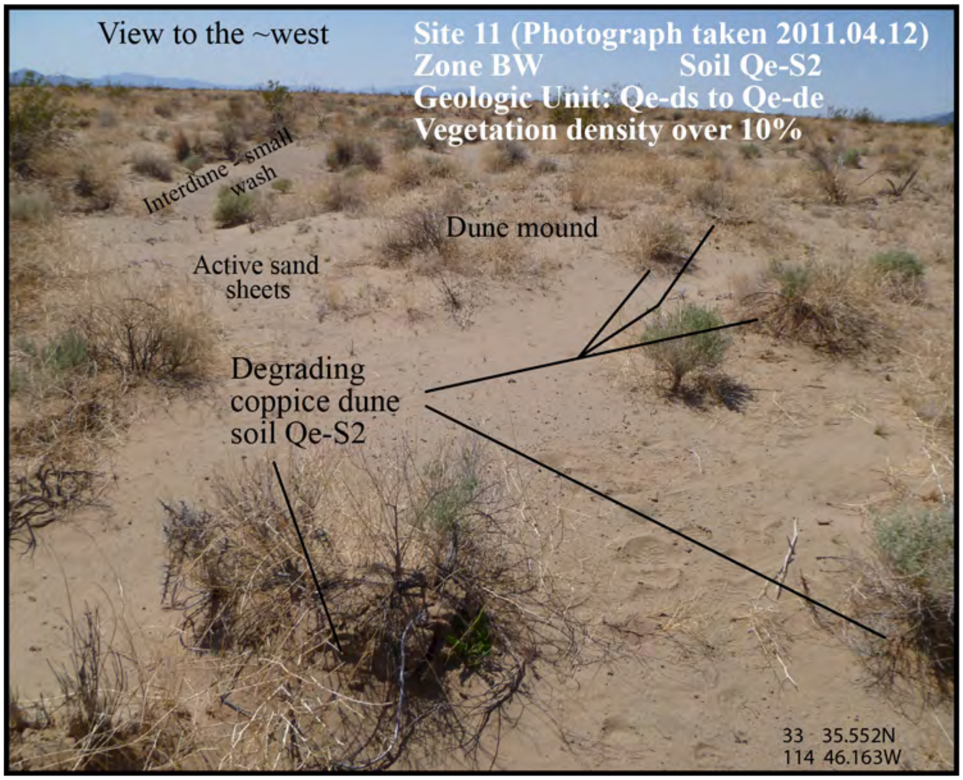

View to the ~west
Site 11 (Photograph taken 2011.04.12)
Zone BW
Soil Qe-S2
Geologic Unit: Qe-ds to Qe-de
Vegetation density over 10%
Interdune - small wash
Dune mound
Active sand sheets
Degrading coppice dune soil Qe-S2
33 35.552N
114 46.163W

Figure AC-4: Geomorphic Site 12 Geomorphic Relative Sand Migration **Zone BW**

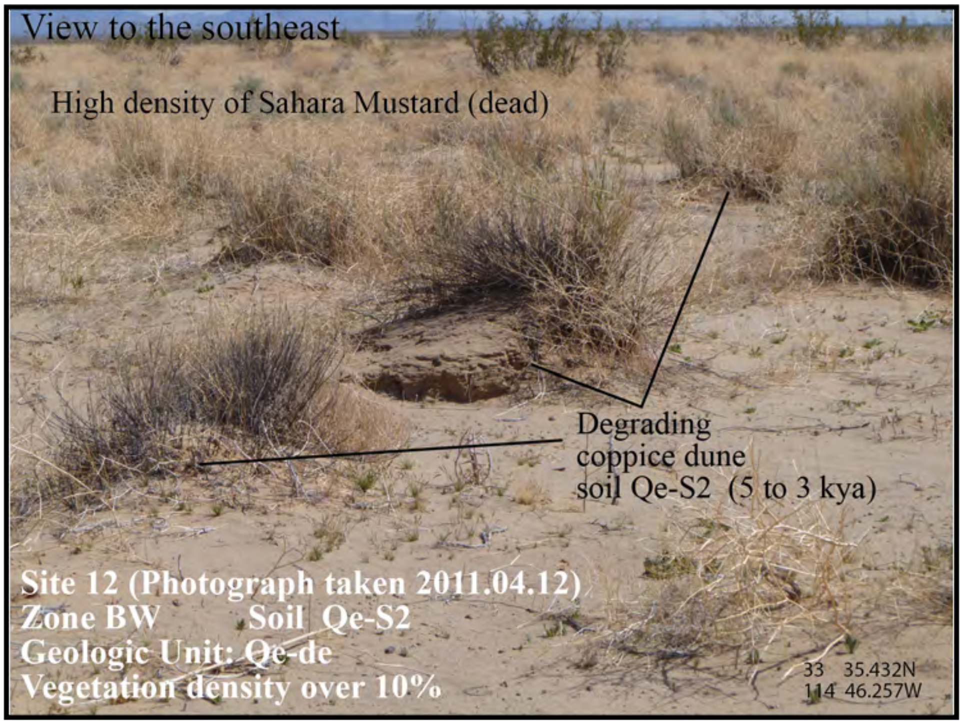

View to the southeast
High density of Sahara Mustard (dead)
Degrading
coppice dune
soil Qe-S2 (5 to 3 kya)
Site 12 (Photograph taken 2011.04.12)
Zone BW Soil Qe-S2
Geologic Unit: Qe-de
Vegetation density over 10%
33 35.432N
114 46.257W

Figure AC-5: Geomorphic Site 13 Geomorphic Relative Sand Migration **Zone BW**

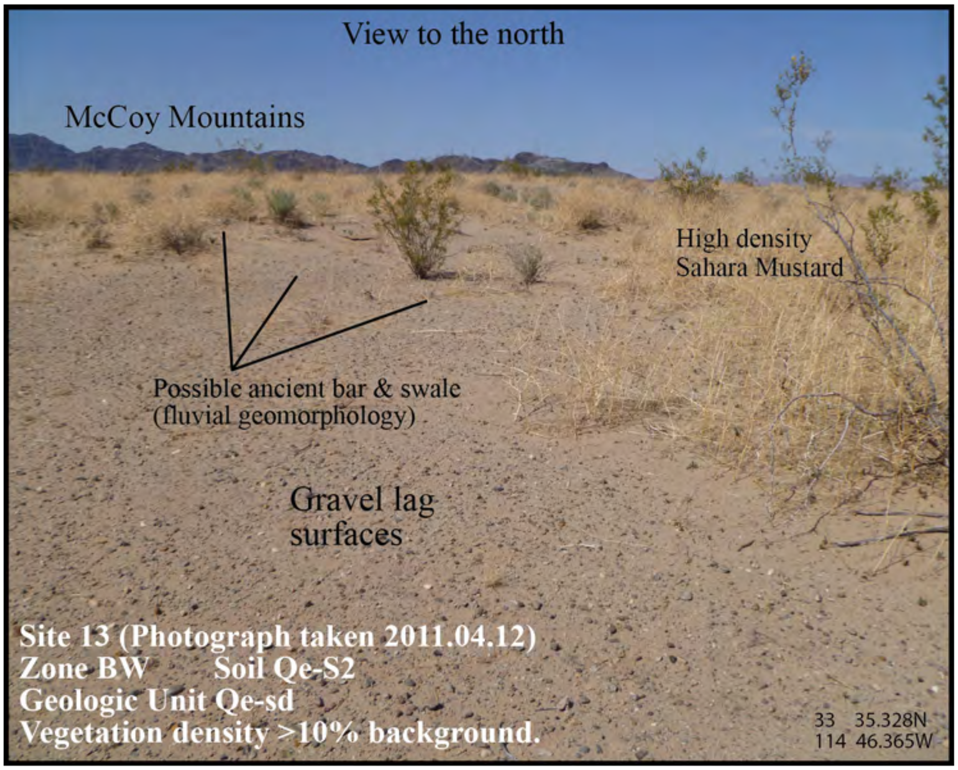

View to the north
McCoy Mountains
High density
Sahara Mustard
Possible ancient bar & swale
(fluvial geomorphology)
Gravel lag
surfaces
Site 13 (Photograph taken 2011.04.12)
Zone BW Soil Qe-S2
Geologic Unit Qe-sd
Vegetation density >10% background.
33 35.328N
114 46.365W

Figure AC-6: Geomorphic Site 14 Geomorphic Relative Sand Migration **Zone BW**

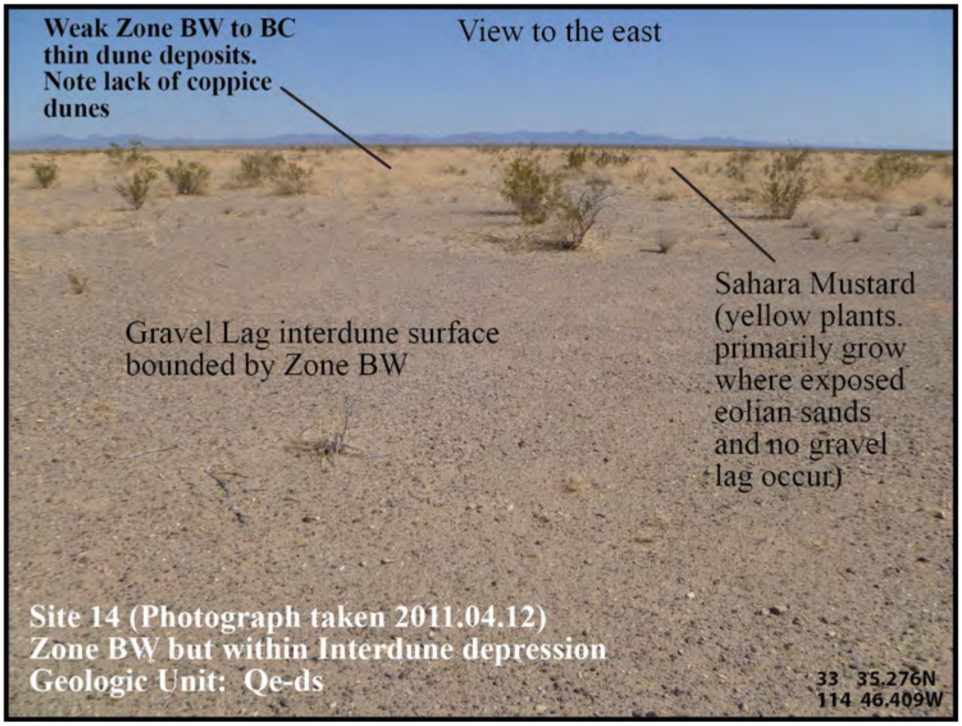

Weak Zone BW to BC thin dune deposits. Note lack of coppice dunes
View to the east
Sahara Mustard (yellow plants. primarily grow where exposed eolian sands and no gravel lag occur)
Gravel Lag interdune surface bounded by Zone BW
Site 14 (Photograph taken 2011.04.12)
Zone BW but within Interdune depression
Geologic Unit: Qe-ds
33 35.276N
114 46.409W

Figure AC-7: Geomorphic Site 15 Geomorphic Relative Sand Migration **Zone C**

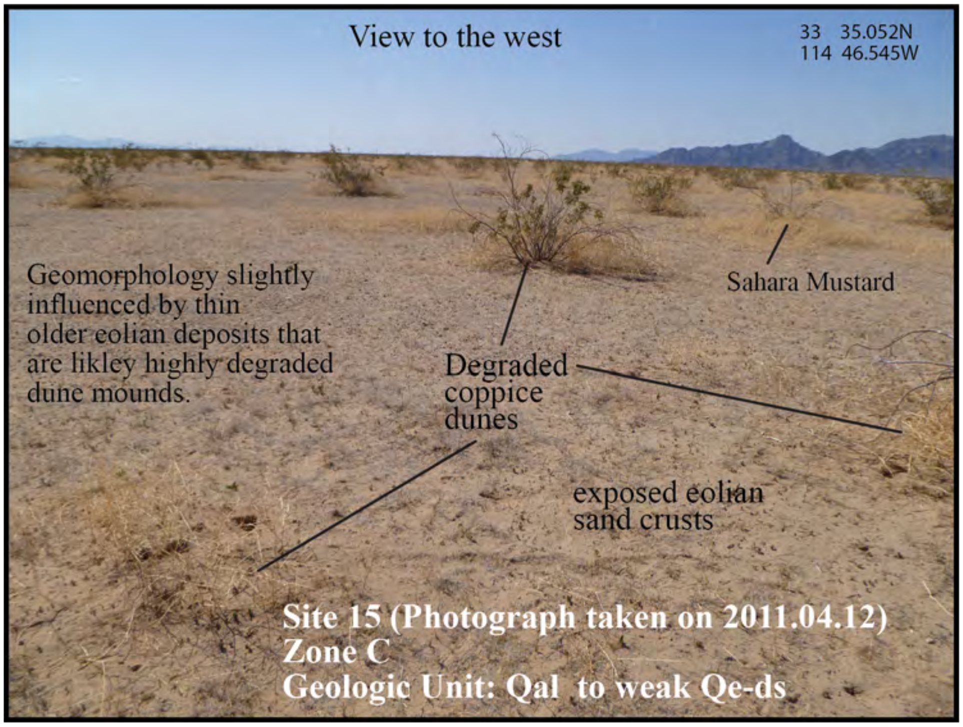

View to the west
33 35.052N
114 46.545W
Geomorphology slightly influenced by thin older eolian deposits that are likley highly degraded dune mounds.
Sahara Mustard
Degraded coppice dunes
exposed eolian sand crusts
Site 15 (Photograph taken on 2011.04.12)
Zone C
Geologic Unit: Qal to weak Qe-ds

Figure AC-8: Geomorphic Site 16 Geomorphic Relative Sand Migration **Zone C**

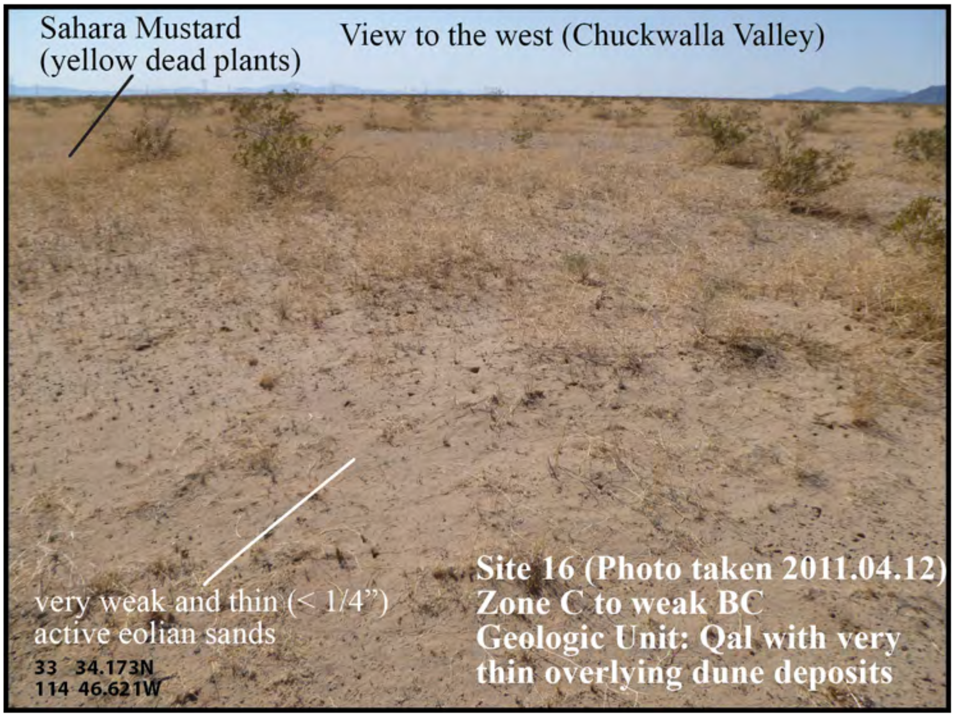

Sahara Mustard
(yellow dead plants)
View to the west (Chuckwalla Valley)
very weak and thin (< 1/4”)
active eolian sands
33 34.173N
114 46.621W
Site 16 (Photo taken 2011.04.12)
Zone C to weak BC
Geologic Unit: Qal with very
thin overlying dune deposits

Figure AC-9: Geomorphic Site 151b Geomorphic Relative Sand Migration **Zone BC**

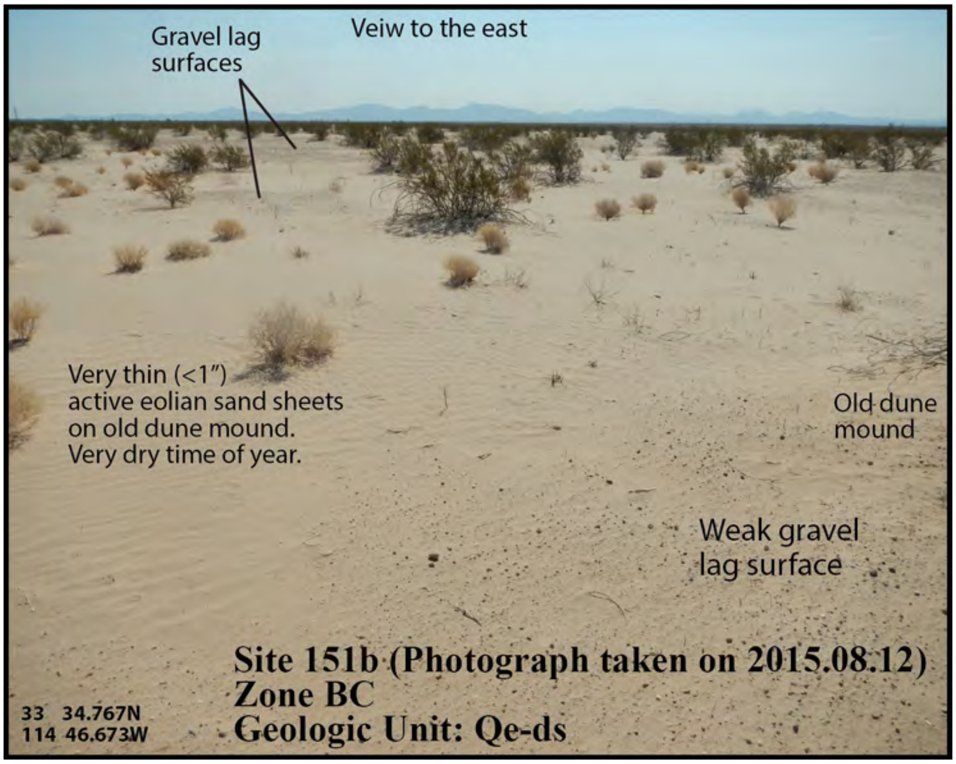

Gravel lag
surfaces
Veiw to the east
Very thin (<1”)
active eolian sand sheets
on old dune mound.
Very dry time of year.
Old dune
mound
Weak gravel
lag surface
Site 151b (Photograph taken on 2015.08.12)
Zone BC
Geologic Unit: Qe-ds
33 34.767N
114 46.673W

Figure AC-10: Geomorphic Site 17 Geomorphic Relative Sand Migration **Zone BC to BW**

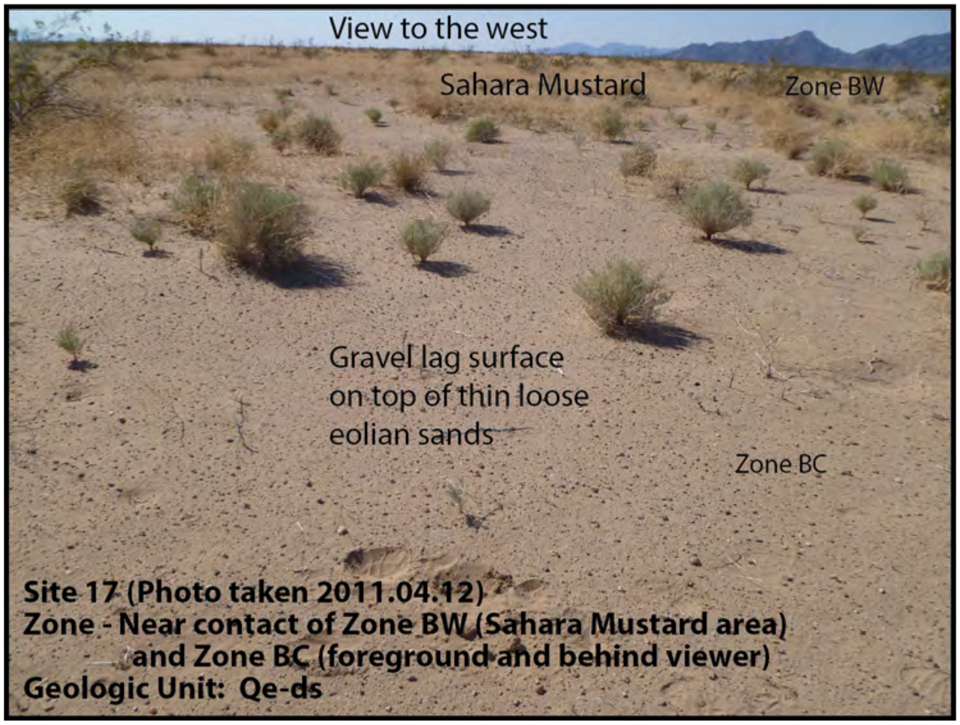

View to the west
Sahara Mustard
Zone BW
Gravel lag surface on top of thin loose eolian sands
Zone BC
Site 17 (Photo taken 2011.04.12)
Zone - Near contact of Zone BW (Sahara Mustard area)
and Zone BC (foreground and behind viewer)
Geologic Unit: Qe-ds

Figure AC-11: Geomorphic Site 18 Geomorphic Relative Sand Migration **Zone BW**

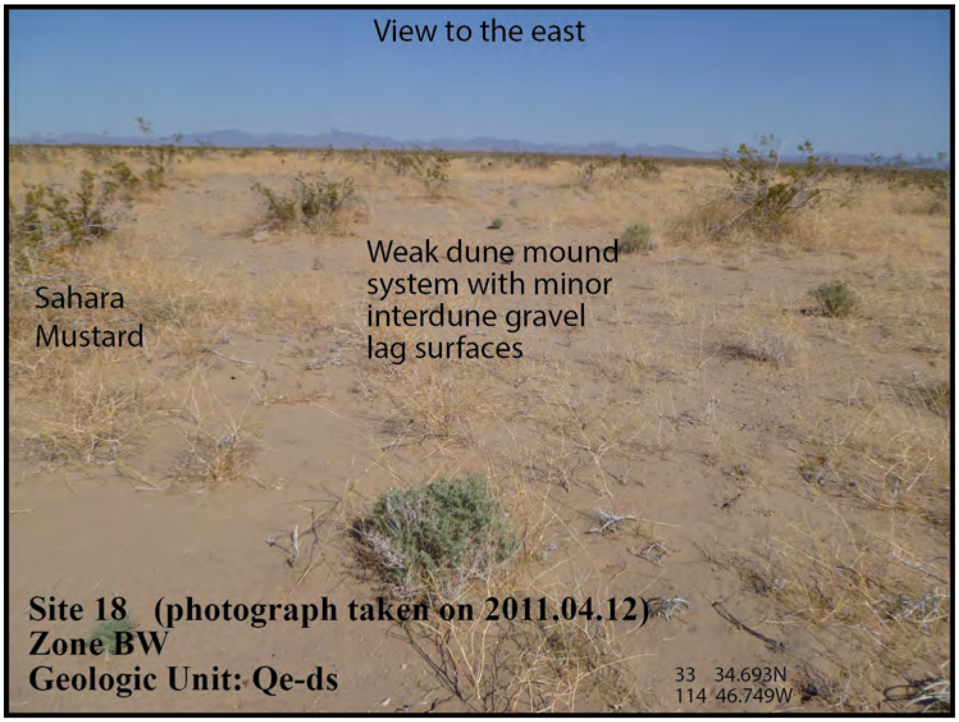
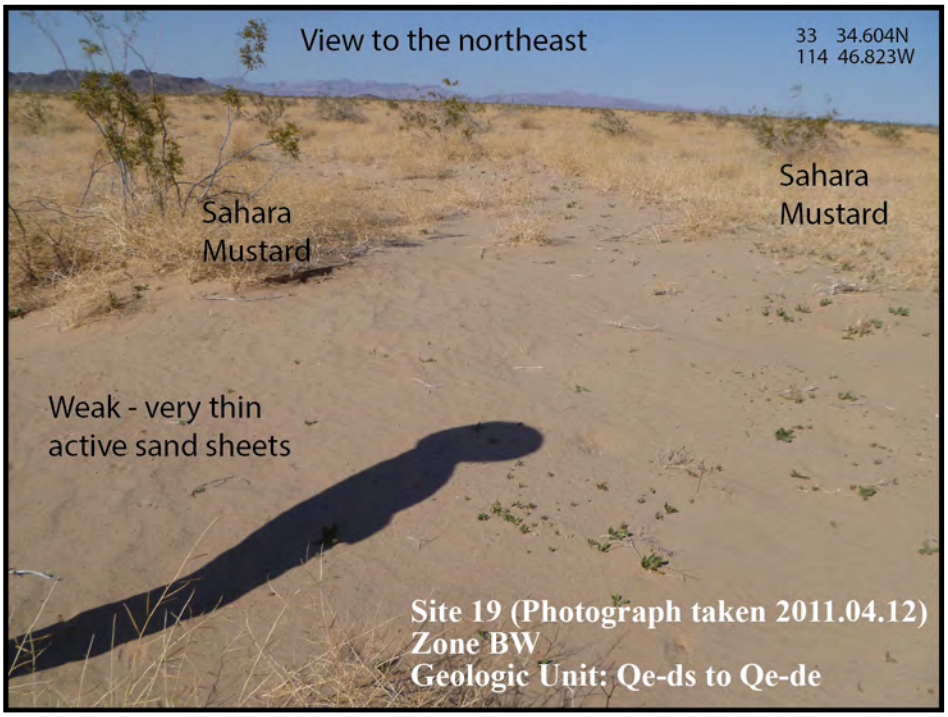

View to the east
Sahara Mustard
Weak dune mound system with minor interdune gravel lag surfaces
Site 18 (photograph taken on 2011.04.12)
Zone BW
Geologic Unit: Qe-ds
33 34.693N
114 46.749W

Figure AC-12: Geomorphic Site 19 Geomorphic Relative Sand Migration **Zone BW**


View to the northeast
33 34.604N
114 46.823W
Sahara Mustard
Sahara Mustard
Weak - very thin active sand sheets
Site 19 (Photograph taken 2011.04.12)
Zone BW
Geologic Unit: Qe-ds to Qe-de

APPENDIX D

SOIL STRATIGRAPHIC DESIGNATION PHOTOGRAPHS

APPENDIX D
SOIL DESIGNATION PHOTOGRAPHS

Photographs of various soils of the designated soil stratigraphy utilized in this study. The photographs are organized by providing eolian parent material soils first, then alluvial parent soils second and in increasing age.

Soil stratigraphy nomenclature example: Qe-S2/Qal-S3a/Qoaf-S4 describes a surface soil with eolian parent material of S2 development (age of 5 to 3 kya), overlying a soil with alluvial parent material soil of S3a development (8 to 5 kya), that overlies the deepest soil with older alluvium parent material of S4 development (age of ~35 to 65 kya).

Figure AD-1: Location map for selected Geomorphic Sites in which photographs of the test pits with soil stratigraphy evaluated.

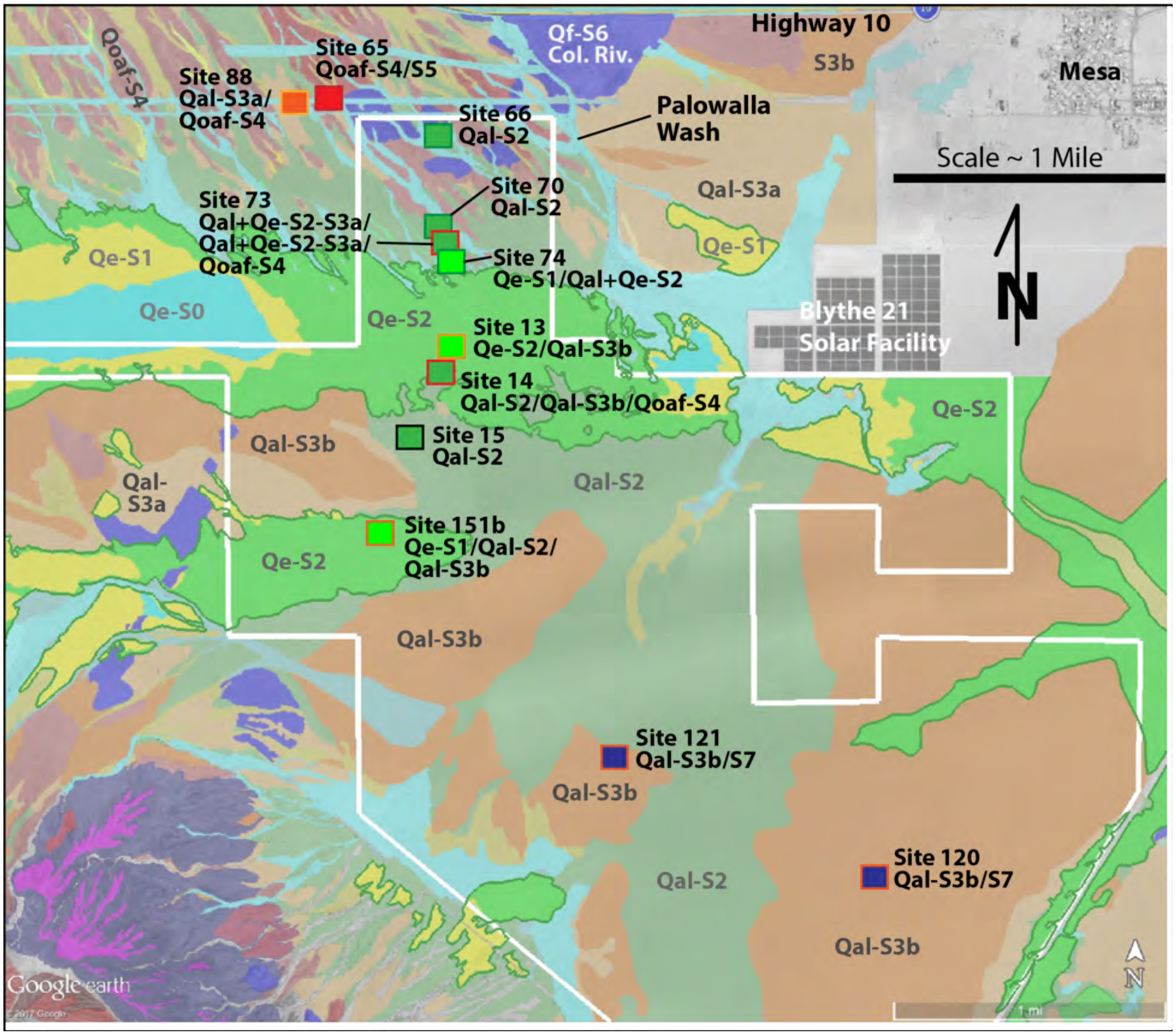

Qoaf-S4
Site 88
Qal-S3a/
Qoaf-S4
Site 65
Qoaf-S4/S5
Qf-S6
Col. Riv.
Highway 10
S3b
Mesa
Site 66
Qal-S2
Palowalla
Wash
Scale ~ 1 Mile
Site 70
Qal-S2
Qal-S3a
Site 73
Qal+Qe-S2-S3a/
Qal+Qe-S2-S3a/
Qoaf-S4
Qe-S1
Qe-S1
Site 74
Qe-S1/Qal+Qe-S2
N
Qe-S0
Qe-S2
Blythe 21
Solar Facility
Site 13
Qe-S2/Qal-S3b
Site 14
Qal-S2/Qal-S3b/Qoaf-S4
Qe-S2
Qal-S3b
Site 15
Qal-S2
Qal-
S3a
Qal-S2
Site 151b
Qe-S1/Qal-S2/
Qal-S3b
Qe-S2
Qal-S3b
Site 121
Qal-S3b/S7
Qal-S3b
Qal-S2
Site 120
Qal-S3b/S7
Qal-S3b
Google earth
© 2017 Google
N
1 mi

Figure AD-2: Geomorphic Site 74 Soil Stratigraphy: Qe-S1/Qal+Qe-S1 to S2

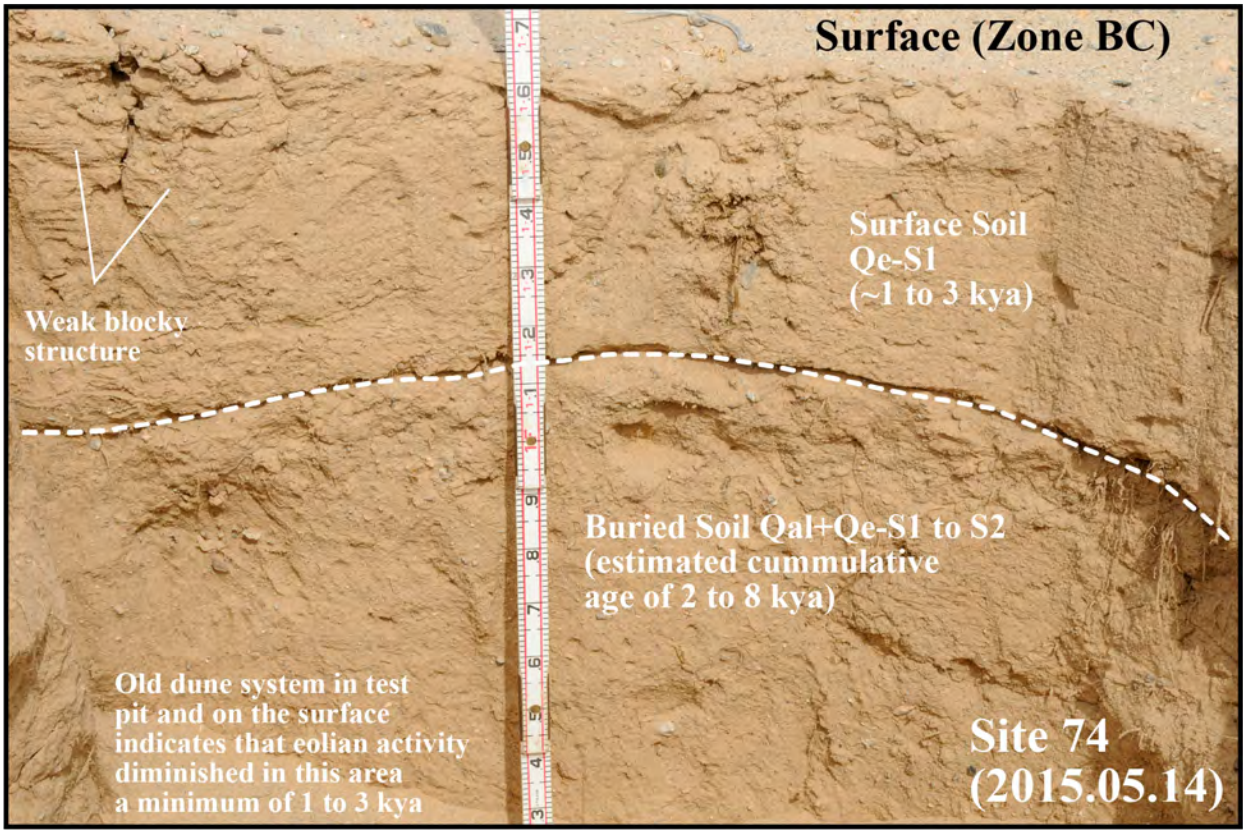

Surface (Zone BC)
Weak blocky structure
Surface Soil
Qe-S1
(~1 to 3 kya)
Buried Soil Qal+Qe-S1 to S2
(estimated cummulative
age of 2 to 8 kya)
Old dune system in test
pit and on the surface
indicates that eolian activity
diminished in this area
a minimum of 1 to 3 kya
Site 74
(2015.05.14)

Figure AD-3: Geomorphic Site 151b Soil Stratigraphy: Qe-S1/Qal-S3b/Qoaf-S4

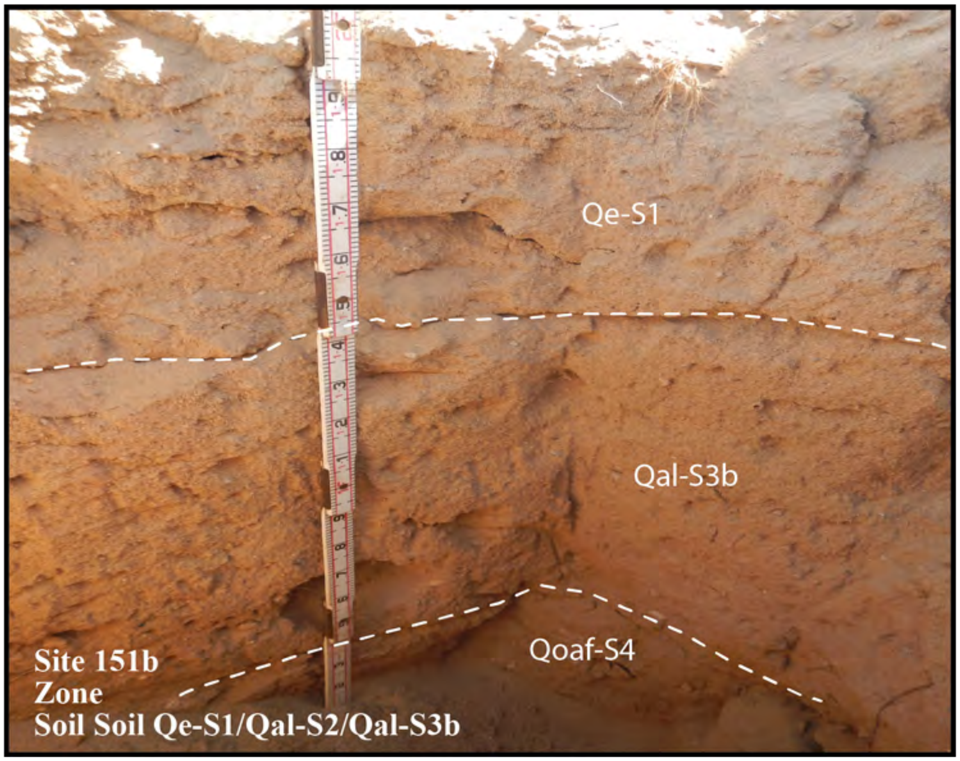

Qe-S1
Qal-S3b
Qoaf-S4
Site 151b
Zone
Soil Soil Qe-S1/Qal-S2/Qal-S3b

Figure AD-4: Geomorphic Site 13 Soil Stratigraphy: Qe-S2/Qal-S3b to possibly Qoaf-S4

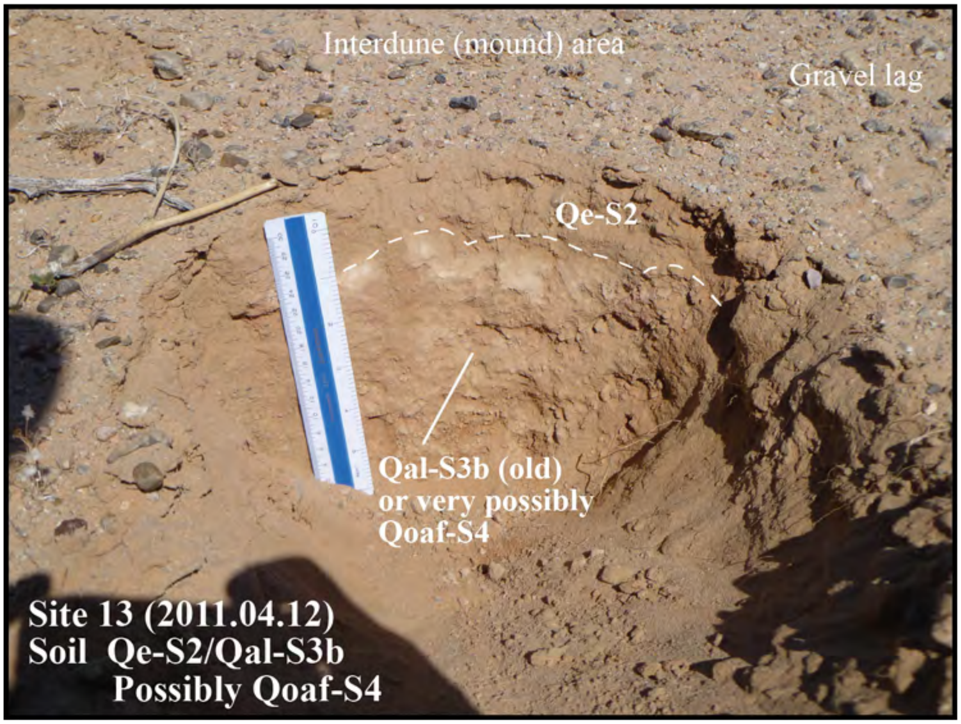

Interdune (mound) area
Gravel lag
Qe-S2
Qal-S3b (old)
or very possibly
Qoaf-S4
Site 13 (2011.04.12)
Soil Qe-S2/Qal-S3b
Possibly Qoaf-S4

Figure AD-5: Geomorphic Site 14 Soil Stratigraphy: Qe-S2/Qal-S3b/Qoaf-S4

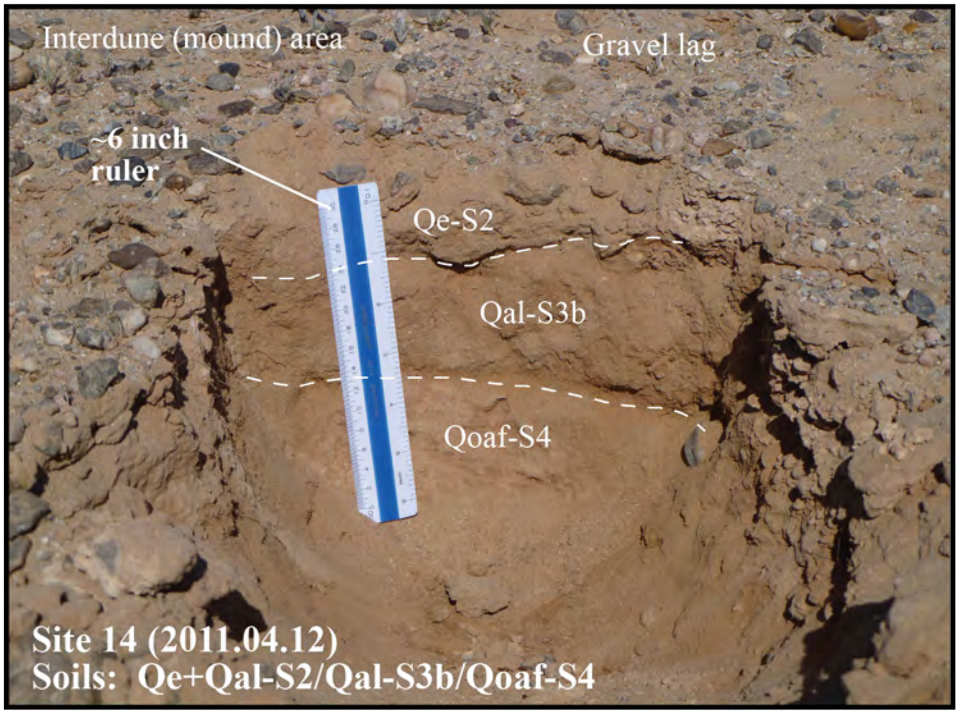

Interdune (mound) area
Gravel lag
~6 inch ruler
Qe-S2
Qal-S3b
Qoaf-S4
Site 14 (2011.04.12)
Soils: Qe+Qal-S2/Qal-S3b/Qoaf-S4

Figure AD-6: Geomorphic Site 70 Soil Stratigraphy: Qal-S2 (mature) approaching Qal-S3a

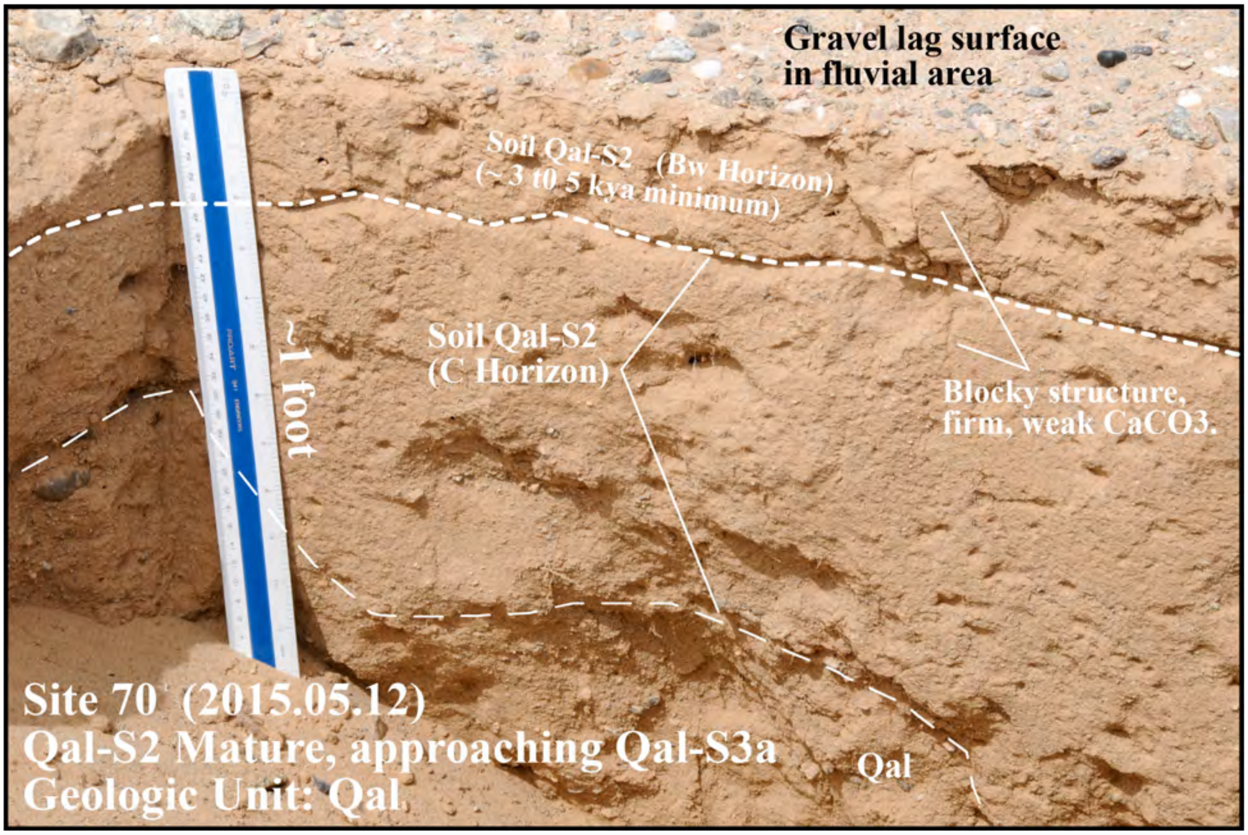

Gravel lag surface
in fluvial area
Soil Qal-S2 (Bw Horizon)
(~3 to 5 kya minimum)
~1 foot
Soil Qal-S2
(C Horizon)
Blocky structure,
firm, weak CaCO3.
Site 70 (2015.05.12)
Qal-S2 Mature, approaching Qal-S3a
Geologic Unit: Qal
Qal

Figure AD-7: Geomorphic Site 66 Soil Stratigraphy: Qal-S2/Qal-S2 buried-1/Qal-S2 buried-2

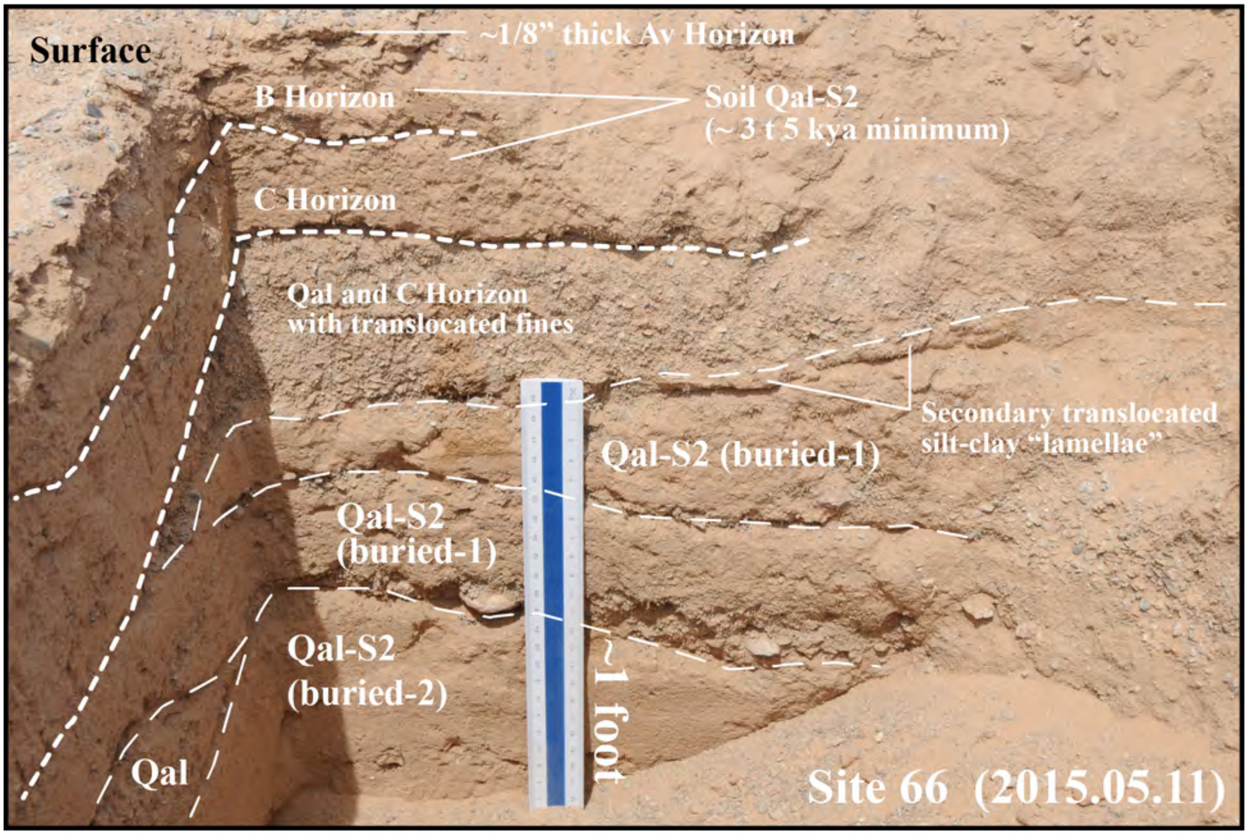

Surface
~1/8" thick Av Horizon
B Horizon
Soil Qal-S2
(~ 3 t 5 kya minimum)
C Horizon
Qal and C Horizon
with translocated fines
Secondary translocated
silt-clay "lamellae"
Qal-S2 (buried-1)
Qal-S2
(buried-1)
Qal-S2
(buried-2)
~1 foot
Qal
Site 66 (2015.05.11)

Figure AD-8: Geomorphic Site 15 Soil Stratigraphy: Qal-S2

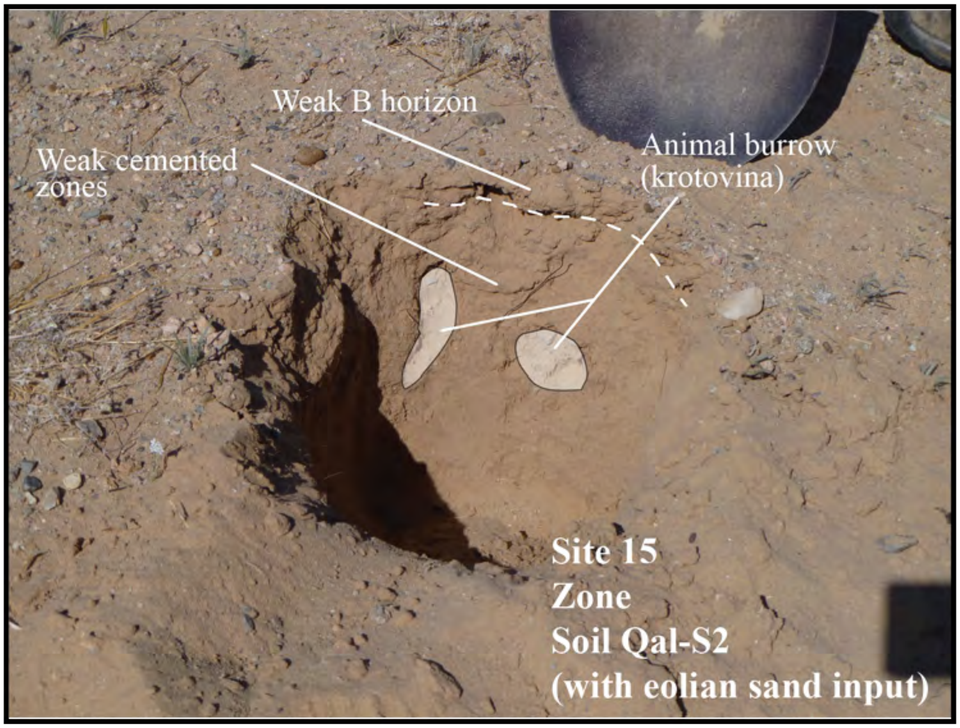

Weak B horizon
Weak cemented zones
Animal burrow (krotovina)
Site 15
Zone
Soil Qal-S2
(with eolian sand input)

Figure AD-9: Geomorphic Site 73 Soil Stratigraphy: Qal+Qe-S2 to weak S3a/Qal-S2-S3a/Qoaf-S4

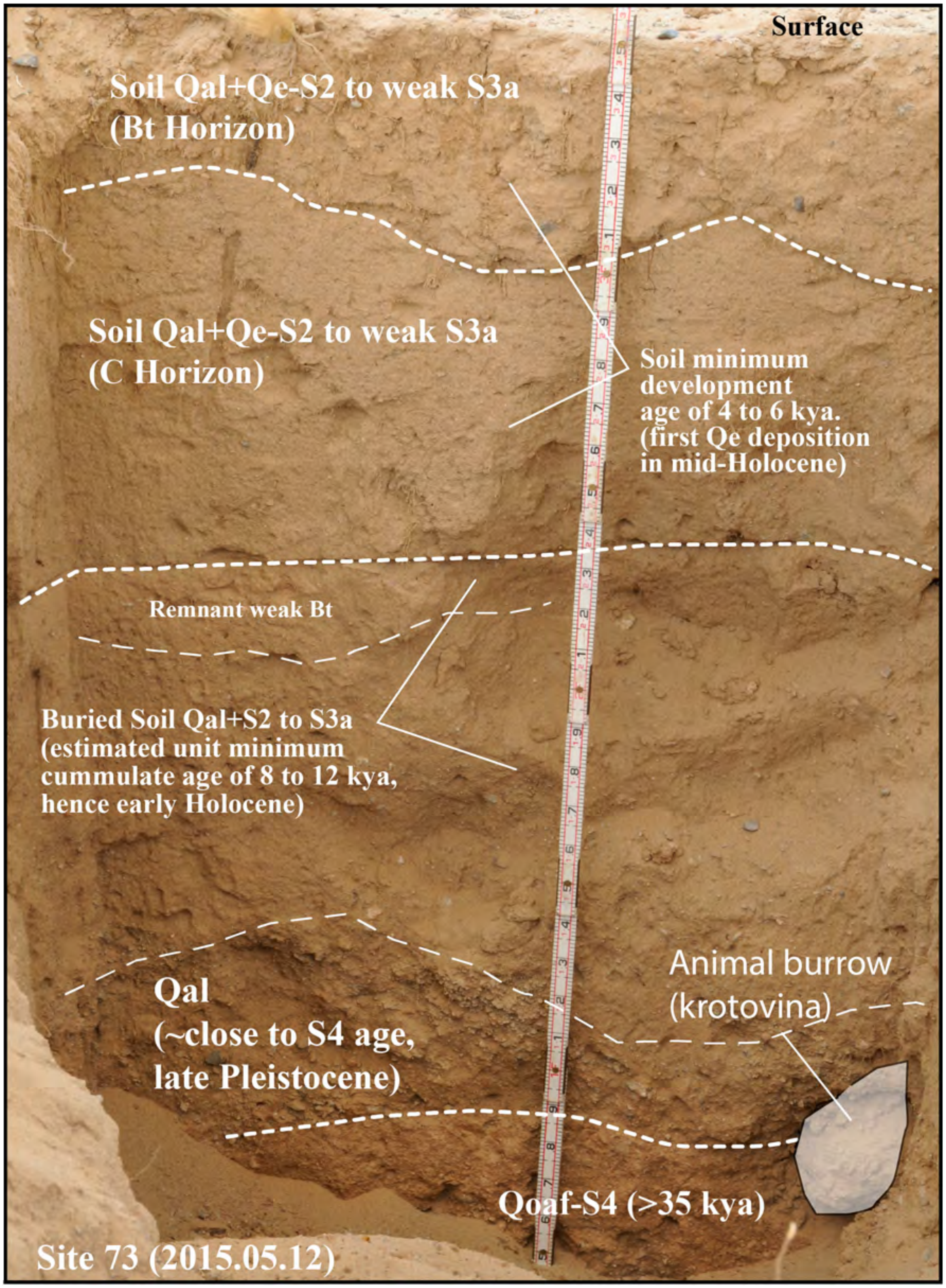

Surface
Soil Qal+Qe-S2 to weak S3a
(Bt Horizon)
Soil Qal+Qe-S2 to weak S3a
(C Horizon)
Soil minimum development age of 4 to 6 kya. (first Qe deposition in mid-Holocene)
Remnant weak Bt
Buried Soil Qal+S2 to S3a (estimated unit minimum cummulate age of 8 to 12 kya, hence early Holocene)
Qal
(~close to S4 age, late Pleistocene)
Animal burrow (krotovina)
Qoaf-S4 (>35 kya)
Site 73 (2015.05.12)

Figure AD-10: Geomorphic Site 88 Soil Stratigraphy: Qal-S3a/Qoaf-S4

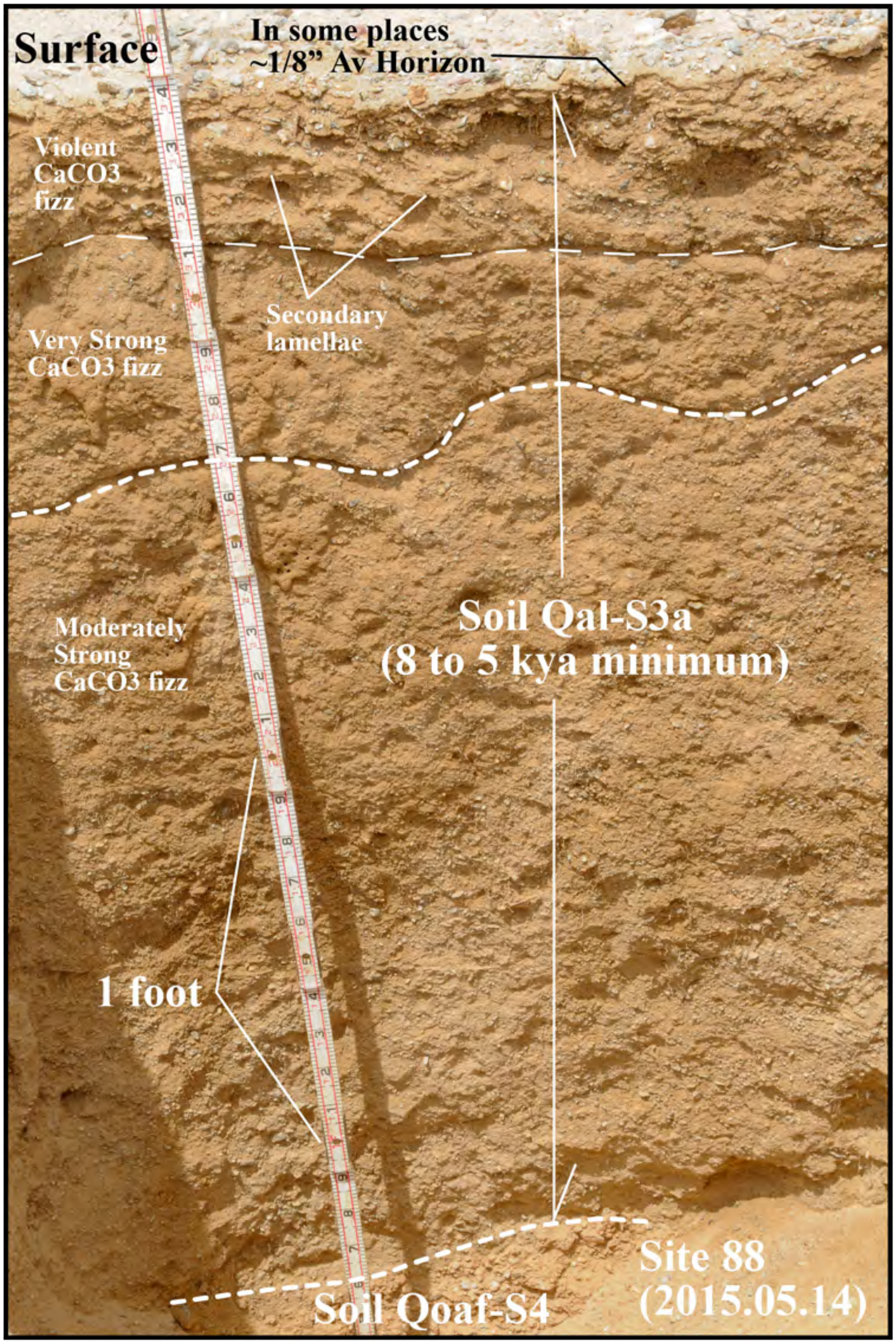

Surface
In some places
~1/8" Av Horizon
Violent
CaCO3
fizz
Secondary
lamellae
Very Strong
CaCO3 fizz
Moderately
Strong
CaCO3 fizz
Soil Qal-S3a
(8 to 5 kya minimum)
1 foot
Site 88
(2015.05.14)
Soil Qoaf-S4

Figure AD-11: Geomorphic Site 120 Soil Stratigraphy: Qal-S3b/S7 Bullhead Alluvium (Tmw)

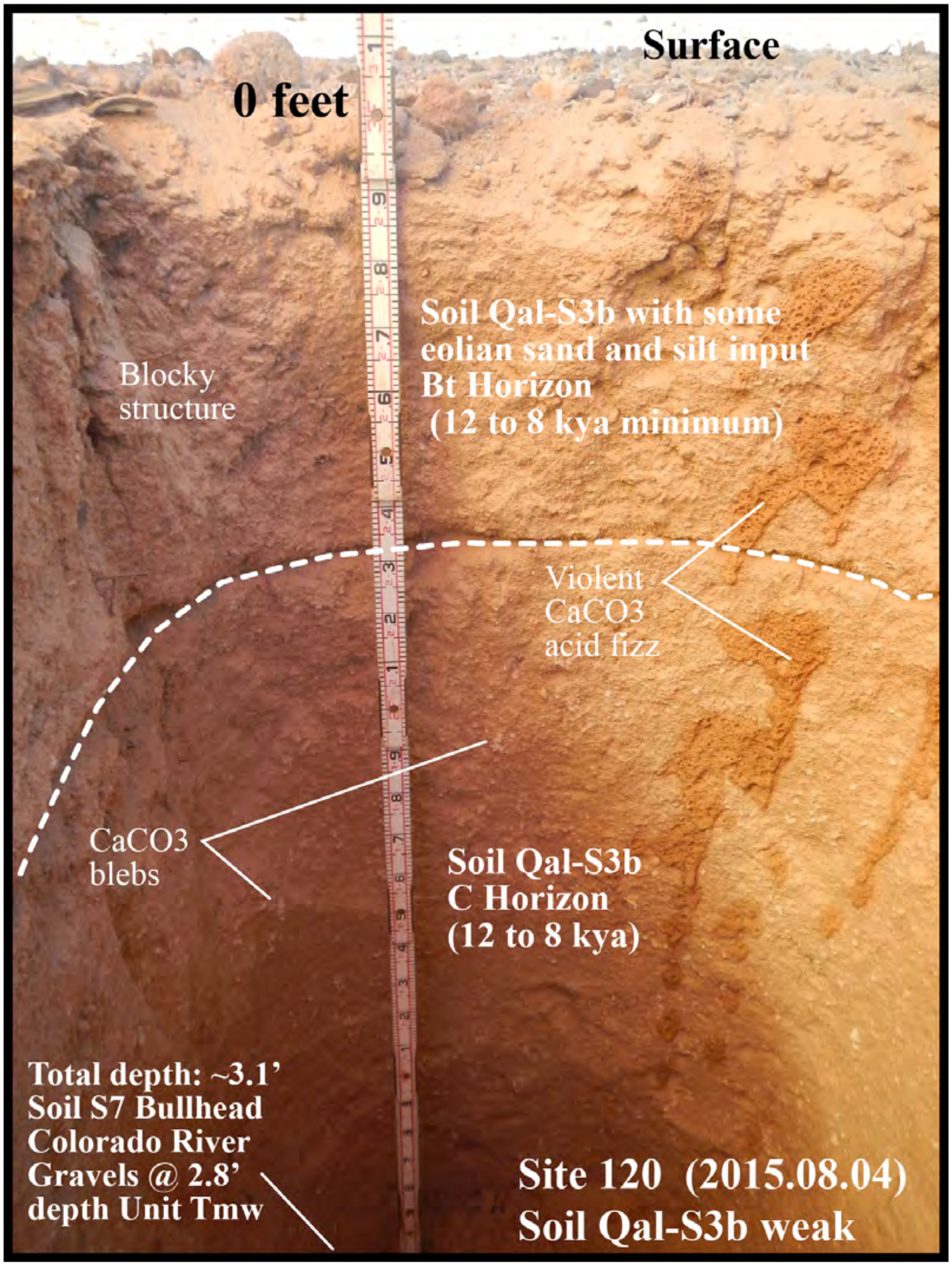

Surface
0 feet
Soil Qal-S3b with some eolian sand and silt input Bt Horizon (12 to 8 kya minimum)
Blocky structure
Violent CaCO3 acid fizz
CaCO3 blebs
Soil Qal-S3b C Horizon (12 to 8 kya)
Total depth: ~3.1' Soil S7 Bullhead Colorado River Gravels @ 2.8' depth Unit Tmw
Site 120 (2015.08.04)
Soil Qal-S3b weak

Figure AD-12: Geomorphic Site 121 Soil Stratigraphy: Qal-S3b/S7 Bullhead Alluvium (Tmw)

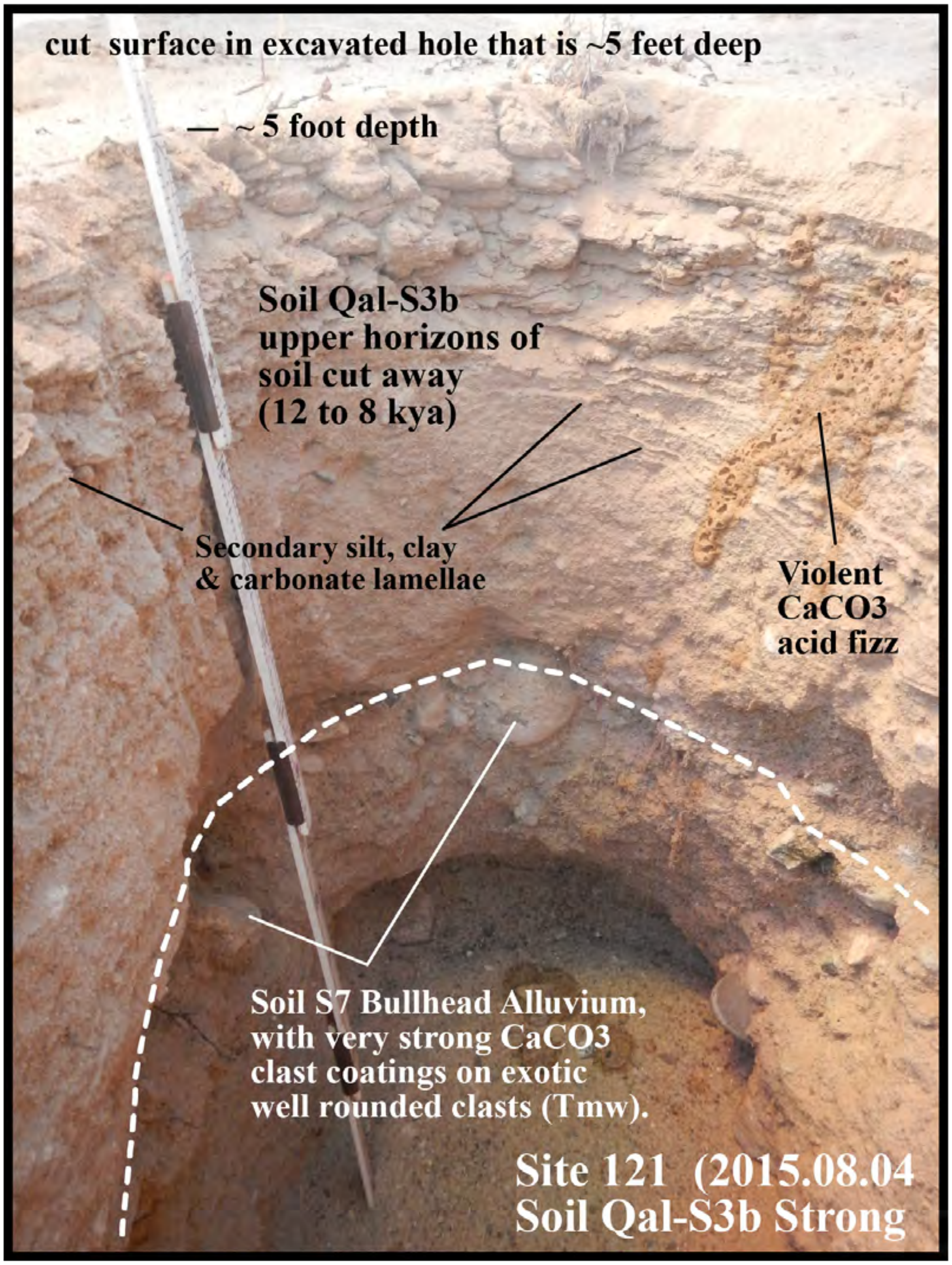
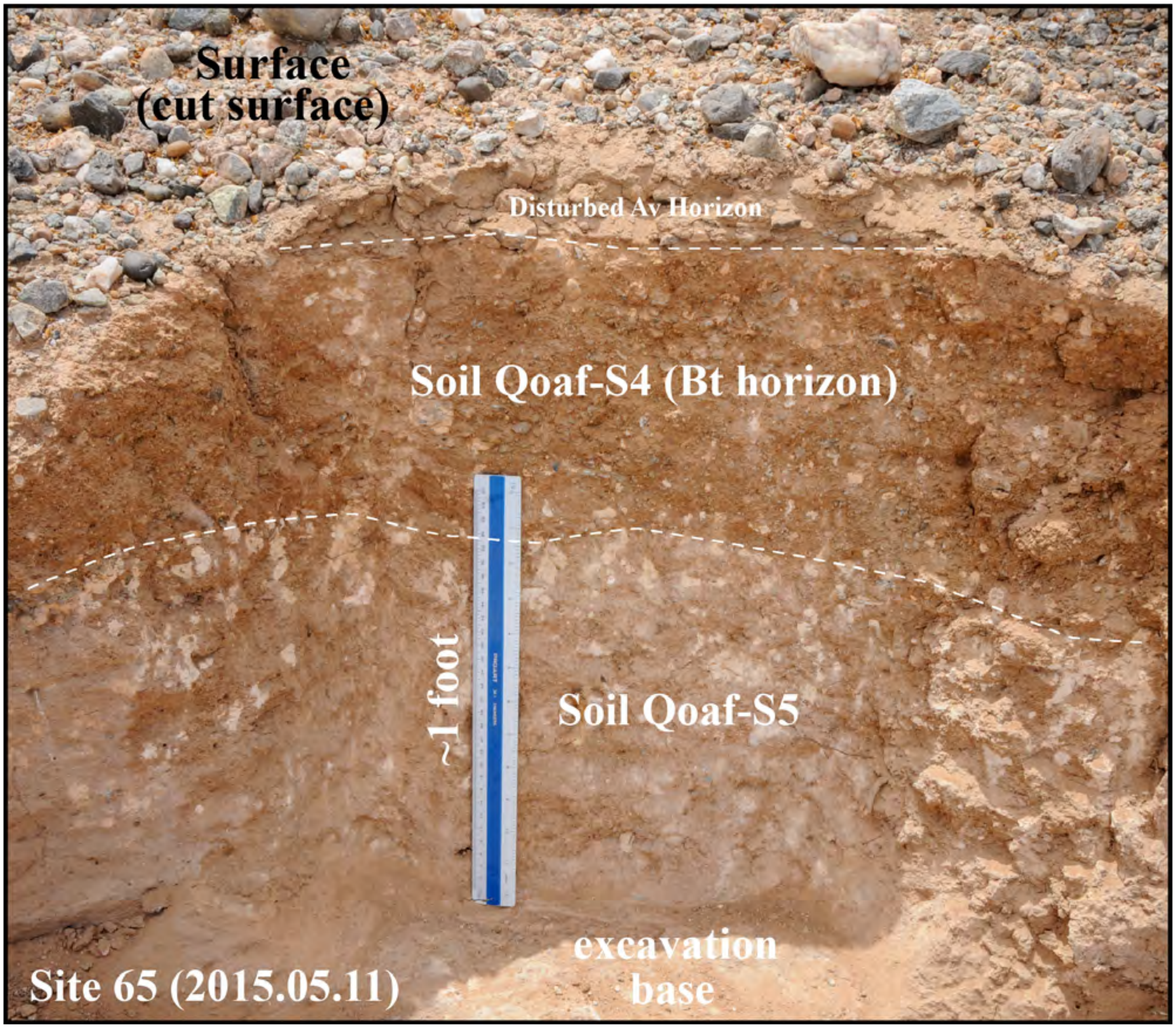

cut surface in excavated hole that is ~5 feet deep
— ~ 5 foot depth
Soil Qal-S3b upper horizons of soil cut away (12 to 8 kya)
Secondary silt, clay & carbonate lamellae
Violent CaCO3 acid fizz
Soil S7 Bullhead Alluvium, with very strong CaCO3 clast coatings on exotic well rounded clasts (Tmw).
Site 121 (2015.08.04
Soil Qal-S3b Strong

Figure AD-13: Geomorphic Site 65 Soil Stratigraphy: Qoaf-S4/Qoaf-S5


Surface
(cut surface)
Disturbed Av Horizon
Soil Qoaf-S4 (Bt horizon)
~1 foot
Soil Qoaf-S5
excavation
base
Site 65 (2015.05.11)

APPENDIX E

REPORT PLATES

RELATIVE GEOMORPHIC EOLIAN (DUNE) SAND MIGRATION ZONES

Generalized Eolian Deposits (where not mapped via Eolian Zones below)

🟧 Eolian deposits mapped in regions outside of the Dale Lake-Palo Verde Mesa, and Cadiz Dry Lake to Rice Valley sand migration zones

Eolian Zones Dominated by Dune Geomorphology

🟥 Zone AB

🟧 Zone B and Zone BW (weak B)

Eolian Zones Exhibiting Mixed Eolian and Fluvial Geomorphology

🟨 Zone BC

🟩 Zone C (fluvially dominated)

Eolian Sand Sources

🟦 Generalized unit representing active playa lake surfaces (Lacustrine), active washes, and ponding areas. These areas are important for eolian systems as a sand source and transport. Hence, new sand is generated in these areas and is transported from and/or across these areas.

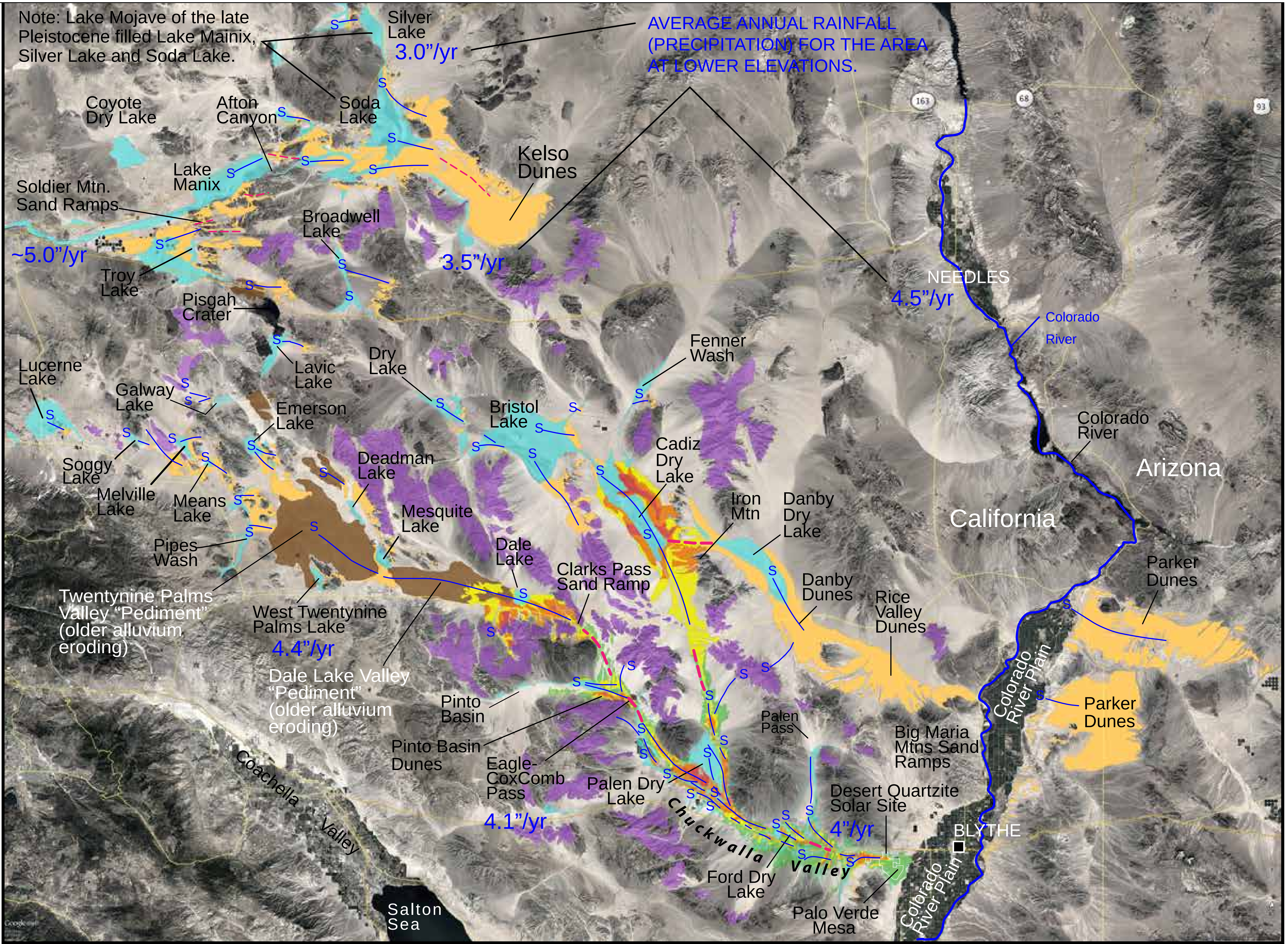
🟫 Valley fill sedimentary units eroding and providing an eolian sand source

🟪 Granitic rocks in the region mapped by CGS (1964 & 1967). Identified as regional and local eolian sand source upon erosion and transport via local washes by Muhs et al. (2003).

Eolian Sand Migration Zones & Sources

S— Approximate locations of "micro" localized eolian sand migration zones along the paths of some proposed regional and continuous sand migration zone; however these zones have not been continuous paths for sand migration since the early Holocene (~8 kya). "S" placed near eolian sand source.

- - - Portions of the proposed regional sand migration zones that are essentially shut down to eolian sand transport.


Note: Lake Mojave of the late Pleistocene filled Lake Mainix, Silver Lake and Soda Lake.
Silver Lake
3.0"/yr
AVERAGE ANNUAL RAINFALL (PRECIPITATION) FOR THE AREA AT LOWER ELEVATIONS.
Coyote Dry Lake
Afton Canyon
Soda Lake
Kelso Dunes
Lake Manix
Soldier Mtn. Sand Ramps
Broadwell Lake
~5.0"/yr
3.5"/yr
Troy Lake
Pisgah Crater
NEEDLES
4.5"/yr
Colorado River
Fenner Wash
Lucerne Lake
Galway Lake
Lavic Lake
Dry Lake
Emerson Lake
Bristol Lake
Cadiz Dry Lake
Colorado River
Arizona
Soggy Lake
Melville Lake
Means Lake
Deadman Lake
Mesquite Lake
Iron Mtn
Danby Dry Lake
California
Pipes Wash
Dale Lake
Clarks Pass Sand Ramp
Danby Dunes
Rice Valley Dunes
Parker Dunes
Twentynine Palms Valley "Pediment" (older alluvium eroding)
West Twentynine Palms Lake
4.4"/yr
Dale Lake Valley "Pediment" (older alluvium eroding)
Pinto Basin
Colorado River Plain
Parker Dunes
Palen Pass
Big Maria Mtns Sand Ramps
Pinto Basin Dunes
Eagle-CoxComb Pass
Palen Dry Lake
Desert Quartzite Solar Site
Coachella Valley
4.1"/yr
Chuckwalla Valley
4"/yr
BLYTHE
Ford Dry Lake
Palo Verde Mesa
Colorado River Plain
Salton Sea
S
163
68
93

N

~ 20 Miles

Mapping conducted by M. Kenney via Google Earth Pro utilizing various years of their Historical Imagery. Image created with Google Earth Pro (10.2016).

Kenney GeoScience

CLIENT:
FIRST SOLAR ENERGY

PROJECT:
DESERT QUARTZITE SOLAR PROJECT,
NEAR BLYTHE, CA

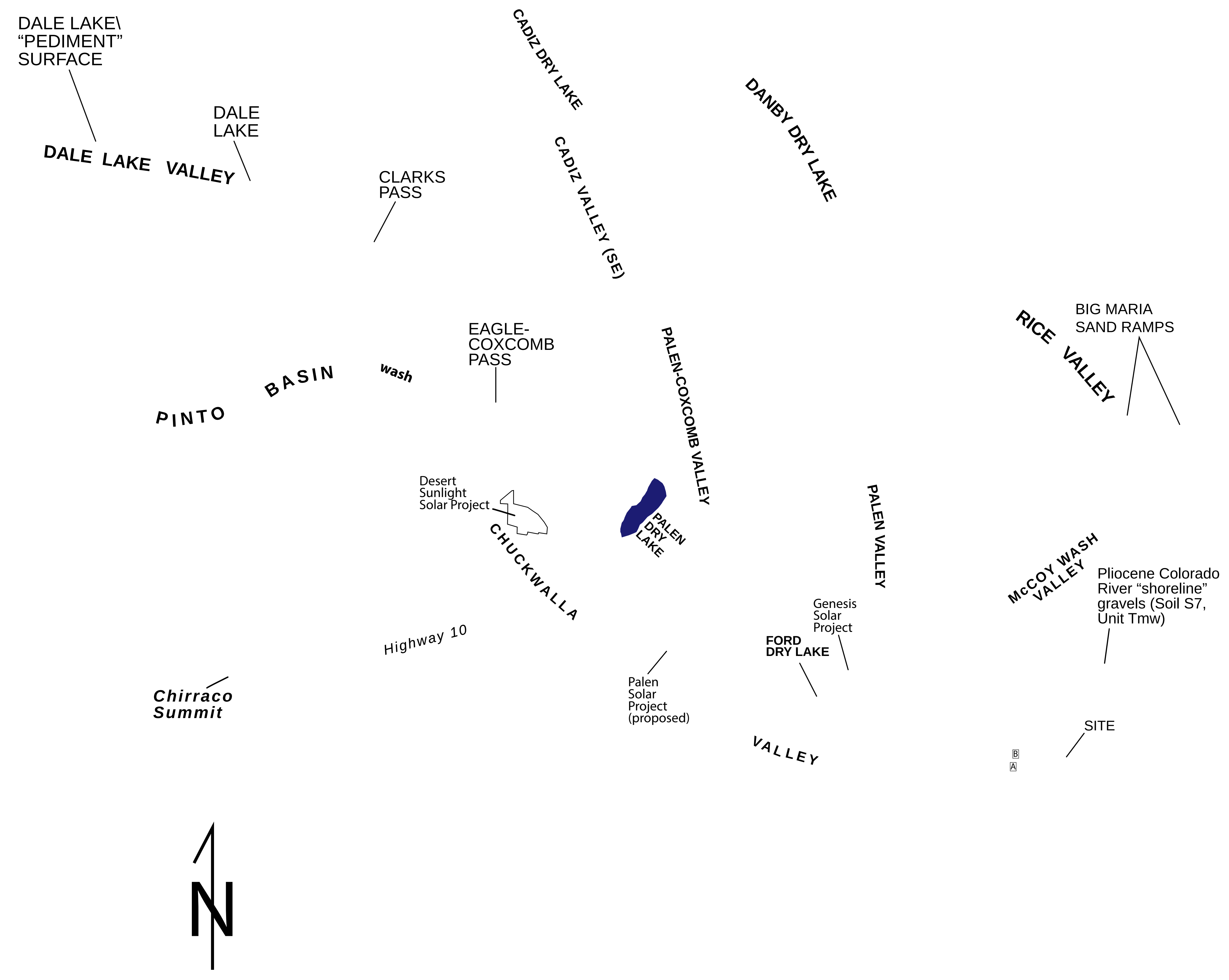
Eolian dune & sand source map,
in Southeastern California

Job No. 721-11

Date: September, 2017

Drafted by: MDK

PLATE 1


DALE LAKE\ "PEDIMENT" SURFACE
DALE LAKE
DALE LAKE VALLEY
CLARKS PASS
CADIZ DRY LAKE
CADIZ VALLEY (SE)
DANBY DRY LAKE
EAGLE-COXCOMB PASS
PINTO BASIN
wash
PALEN-COXCOMB VALLEY
RICE VALLEY
BIG MARIA SAND RAMPS
Desert Sunlight Solar Project
PALEN DRY LAKE
CHUCKWALLA
PALEN VALLEY
McCOY WASH VALLEY
Pliocene Colorado River "shoreline" gravels (Soil S7, Unit Tmw)
Genesis Solar Project
FORD DRY LAKE
Highway 10
Palen Solar Project (proposed)
Chirraco Summit
VALLEY
SITE
B
A
N

Eolian Geomorphic Zones Dominated by Dune Geomorphology

🟥 *Zone A and Zone AB*

🟧 *Zone B and Zone BW (weak)*

Eolian Geomorphic Zones Exhibiting Mixed Eolian and Fluvial Geomorphology

🟨 *Zone BC*

🟩 *Zone C (fluvially dominated)*

Generalized Eolian Deposits (where not mapped via Eolian Zones below)

🟨 Eolian deposits mapped in regions outside of the Dale Lake-Palo Verde Mesa, and Cadiz Dry Lake to Rice Valley sand migration zones

Eolian Sand Sources

🟦 Generalized unit representing active playa lake surfaces (Lacustrine), active washes, and ponding areas. These areas are important for eolian systems as a sand source, sand transport and stabilizing moisture.

🟦 Fluvial, ancient playa-lake, and Colorado River Deposits that produce relatively abundant eolian sands upon erosion. Unit primarily correlates with the Bullhead Alluvium of Howard et al. (2015), unit QTmm of Stone (2006), possibly some Bouse Formation of Spencer (2008), and Unit B of Metzger et al.(1973). Mapped as unit Tmm (Soil S7) in this study.

🟪 Granitic rocks in the region mapped by CGS (1964 & 1967). Identified as regional and local eolian sand source upon erosion and trasonport via local washes by Muhs et al. (2003).

General Prevailing Wind Direction

Generalized direction of "prevailing" winds most of which are altered by local valley-mountain topography

B A Location of the existing Southern California Edison substation [A] and initially proposed Southern California Edison substaion [B] (Kenney, 2010d and 2010e).

Job No. 721-11

Mapping conducted by M. Kenney via Google Earth Pro utilzing various years of their Hisorical Imagery.Image created with Google Earth Pro (10.2016).

~ 5 Miles

Kenney GeoScience

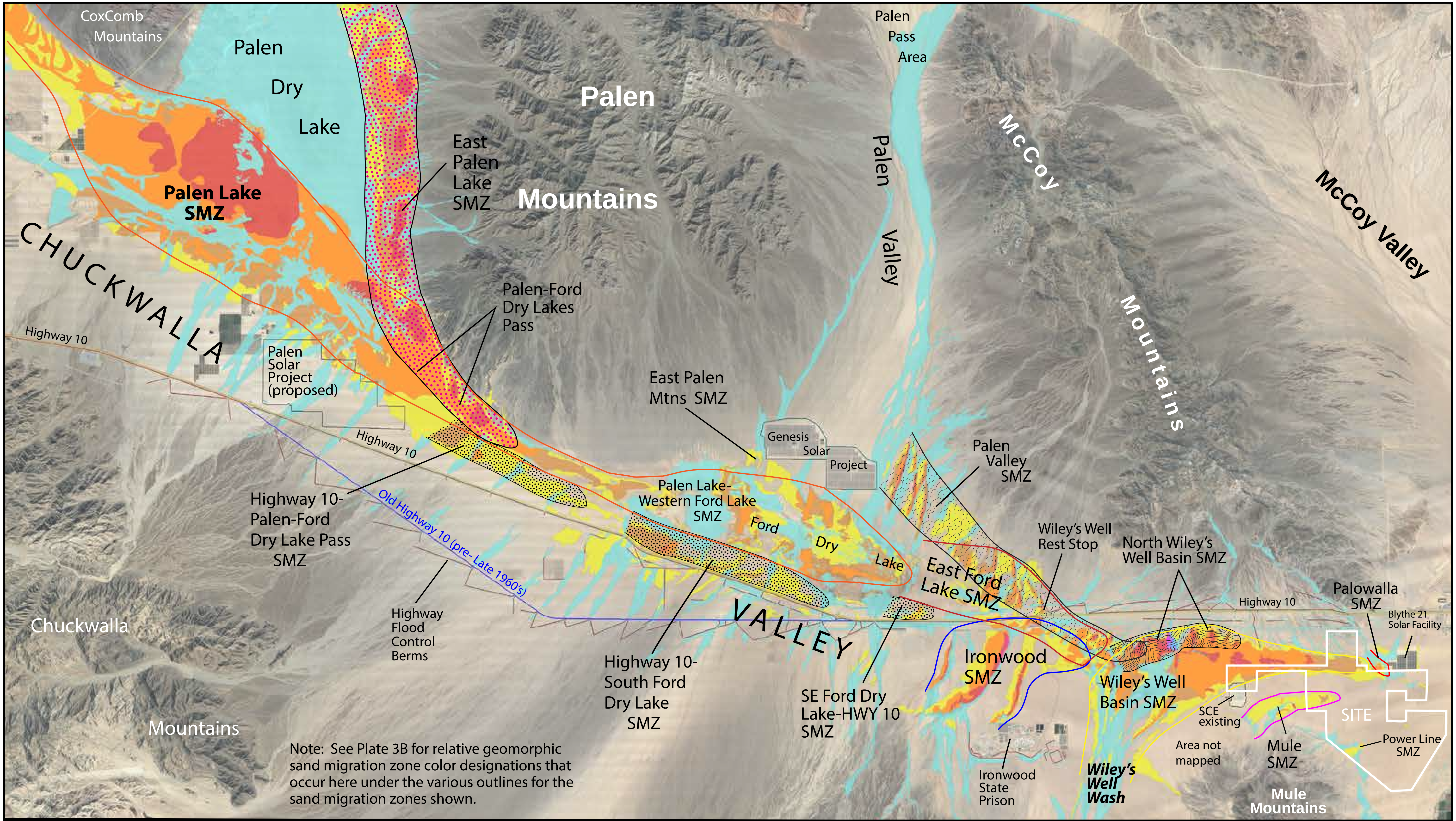
CLIENT:
FIRST SOLAR ENERGY

PROJECT:
DESERT QUARTZITE SOLAR PROJECT, NEAR BLYTHE, CA

Eolian geomorphic, dune & sand source map in Southeastern California

Date: September, 2017
Drafted by: MDK

PLATE 2


CoxComb Mountains
Palen Dry Lake
Palen Mountains
Palen Lake SMZ
East Palen Lake SMZ
CHUCKWALLA VALLEY
Highway 10
Palen Solar Project (proposed)
Palen-Ford Dry Lakes Pass
Highway 10
Highway 10-Palen-Ford Dry Lake Pass SMZ
Old Highway 10 (pre- Late 1960's)
Highway Flood Control Berms
Chuckwalla Mountains
East Palen Mtns SMZ
Genesis Solar Project
Palen Lake-Western Ford Lake SMZ
Ford Dry Lake
Highway 10-South Ford Dry Lake SMZ
SE Ford Dry Lake-HWY 10 SMZ
Palen Pass Area
Palen Valley
McCoy Mountains
McCoy Valley
Palen Valley SMZ
East Ford Lake SMZ
Wiley's Well Rest Stop
North Wiley's Well Basin SMZ
Highway 10
Palowalla SMZ
Blythe 21 Solar Facility
Ironwood SMZ
Wiley's Well Basin SMZ
SCE existing
SITE
Area not mapped
Mule SMZ
Power Line SMZ
Ironwood State Prison
Wiley's Well Wash
Mule Mountains

Note: See Plate 3B for relative geomorphic sand migration zone color designations that occur here under the various outlines for the sand migration zones shown.

N

~ 2 Miles

Kenney GeoScience

CLIENT:
FIRST SOLAR ENERGY

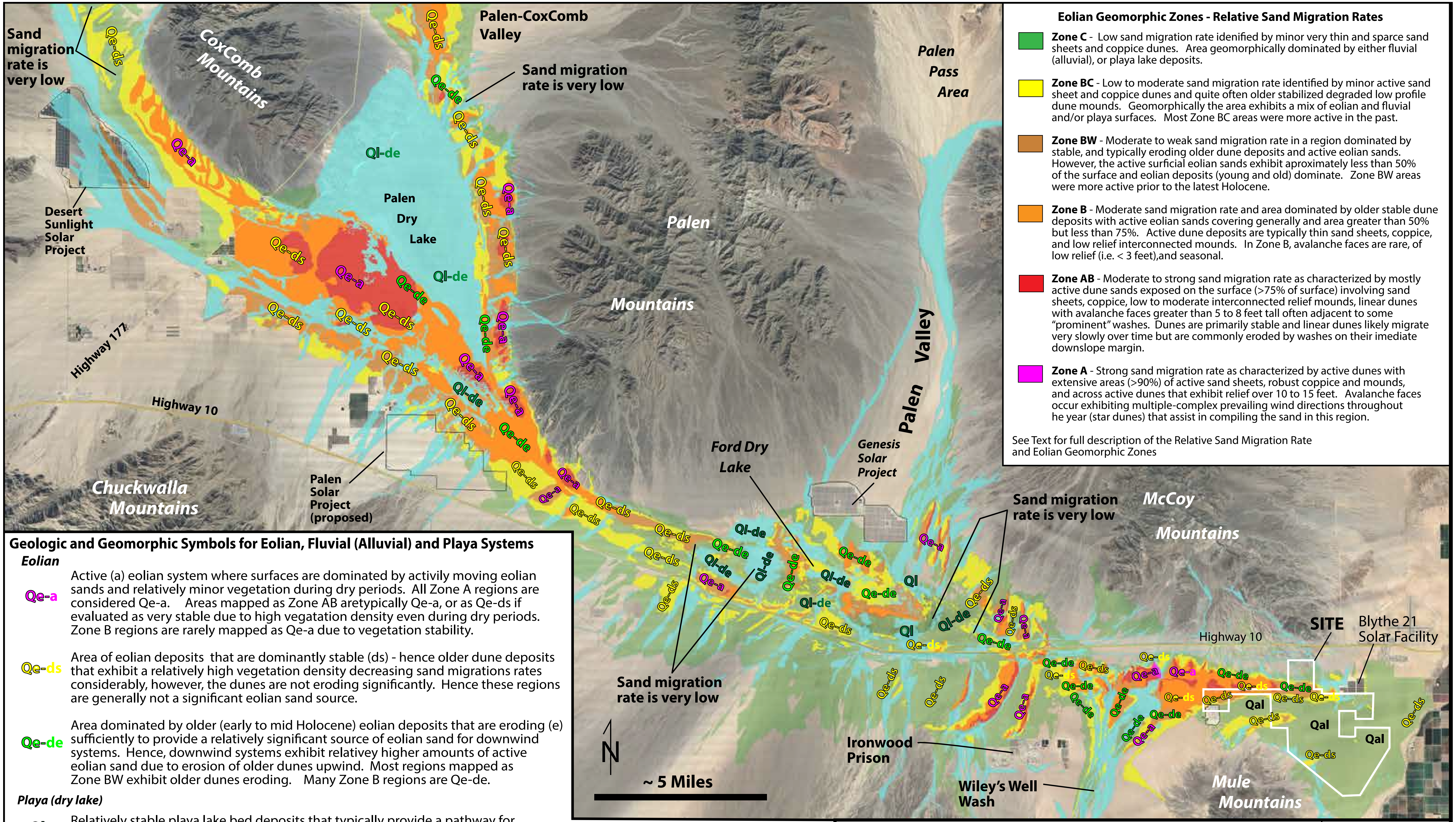
PROJECT (SITE):
DESERT QUARTZITE SOLAR

Local Geomorphic Eolian Sand Migration Zones
along the Chuckwalla Valley Eolian System

Job No. 721-11

Date: September, 2017
Drafted by: MDK

PLATE 3A


Sand migration rate is very low
CoxComb Mountains
Qe-ds
Qe-a
Palen-CoxComb Valley
Qe-de
Sand migration rate is very low
Ql-de
Palen Dry Lake
Palen Pass Area
Desert Sunlight Solar Project
Palen Mountains
Highway 177
Highway 10
Palen Valley
Palen Solar Project (proposed)
Chuckwalla Mountains
Ford Dry Lake
Genesis Solar Project
Sand migration rate is very low
McCoy Mountains
Ql
Sand migration rate is very low
Highway 10
SITE
Blythe 21 Solar Facility
Qal
Ironwood Prison
Wiley's Well Wash
Mule Mountains
N
~ 5 Miles

Eolian Geomorphic Zones - Relative Sand Migration Rates

🟩 **Zone C** - Low sand migration rate idenified by minor very thin and sparce sand sheets and coppice dunes. Area geomorphically dominated by either fluvial (alluvial), or playa lake deposits.

🟨 **Zone BC** - Low to moderate sand migration rate identified by minor active sand sheet and coppice dunes and quite often older stabilized degraded low profile dune mounds. Geomorphically the area exhibits a mix of eolian and fluvial and/or playa surfaces. Most Zone BC areas were more active in the past.

🟫 **Zone BW** - Moderate to weak sand migration rate in a region dominated by stable, and typically eroding older dune deposits and active eolian sands. However, the active surficial eolian sands exhibit aproximately less than 50% of the surface and eolian deposits (young and old) dominate. Zone BW areas were more active prior to the latest Holocene.

🟧 **Zone B** - Moderate sand migration rate and area dominated by older stable dune deposits with active eolian sands covering generally and area greater than 50% but less than 75%. Active dune deposits are typically thin sand sheets, coppice, and low relief interconnected mounds. In Zone B, avalanche faces are rare, of low relief (i.e. < 3 feet),and seasonal.

🟥 **Zone AB** - Moderate to strong sand migration rate as characterized by mostly active dune sands exposed on the surface (>75% of surface) involving sand sheets, coppice, low to moderate interconnected relief mounds, linear dunes with avalanche faces greater than 5 to 8 feet tall often adjacent to some "prominent" washes. Dunes are primarily stable and linear dunes likely migrate very slowly over time but are commonly eroded by washes on their imediate downslope margin.

🟪 **Zone A** - Strong sand migration rate as characterized by active dunes with extensive areas (>90%) of active sand sheets, robust coppice and mounds, and across active dunes that exhibit relief over 10 to 15 feet. Avalanche faces occur exhibiting multiple-complex prevailing wind directions throughout he year (star dunes) that assist in compiling the sand in this region.

See Text for full description of the Relative Sand Migration Rate and Eolian Geomorphic Zones

Geologic and Geomorphic Symbols for Eolian, Fluvial (Alluvial) and Playa Systems

Eolian

Qe-a	Active (a) eolian system where surfaces are dominated by activily moving eolian sands and relatively minor vegetation during dry periods. All Zone A regions are considered Qe-a. Areas mapped as Zone AB aretypically Qe-a, or as Qe-ds if evaluated as very stable due to high vegatation density even during dry periods. Zone B regions are rarely mapped as Qe-a due to vegetation stability.
Qe-ds	Area of eolian deposits that are dominantly stable (ds) - hence older dune deposits that exhibit a relatively high vegetation density decreasing sand migrations rates considerably, however, the dunes are not eroding significantly. Hence these regions are generally not a significant eolian sand source.
Qe-de	Area dominated by older (early to mid Holocene) eolian deposits that are eroding (e) sufficiently to provide a relatively significant source of eolian sand for downwind systems. Hence, downwind systems exhibit relativey higher amounts of active eolian sand due to erosion of older dunes upwind. Most regions mapped as Zone BW exhibit older dunes eroding. Many Zone B regions are Qe-de.

Playa (dry lake)

Ql	Relatively stable playa lake bed deposits that typically provide a pathway for sand migration, an eolian source after flooding, but generally the playa surface is not eroding significantly to provide a relatively strong eolian sand source.
Ql-de	Playa lake bed deposits that are evaluated as eroding; hence, providing a source for eolian sand deposits for downwind (toward the southeast) dune systems. These surfaces also provide eolian sands after flooding.

Alluvial (Fan Deposits)

Qal	Regions dominated by alluvial deposits shown only within the proposed Desert Quartzite Solar Project

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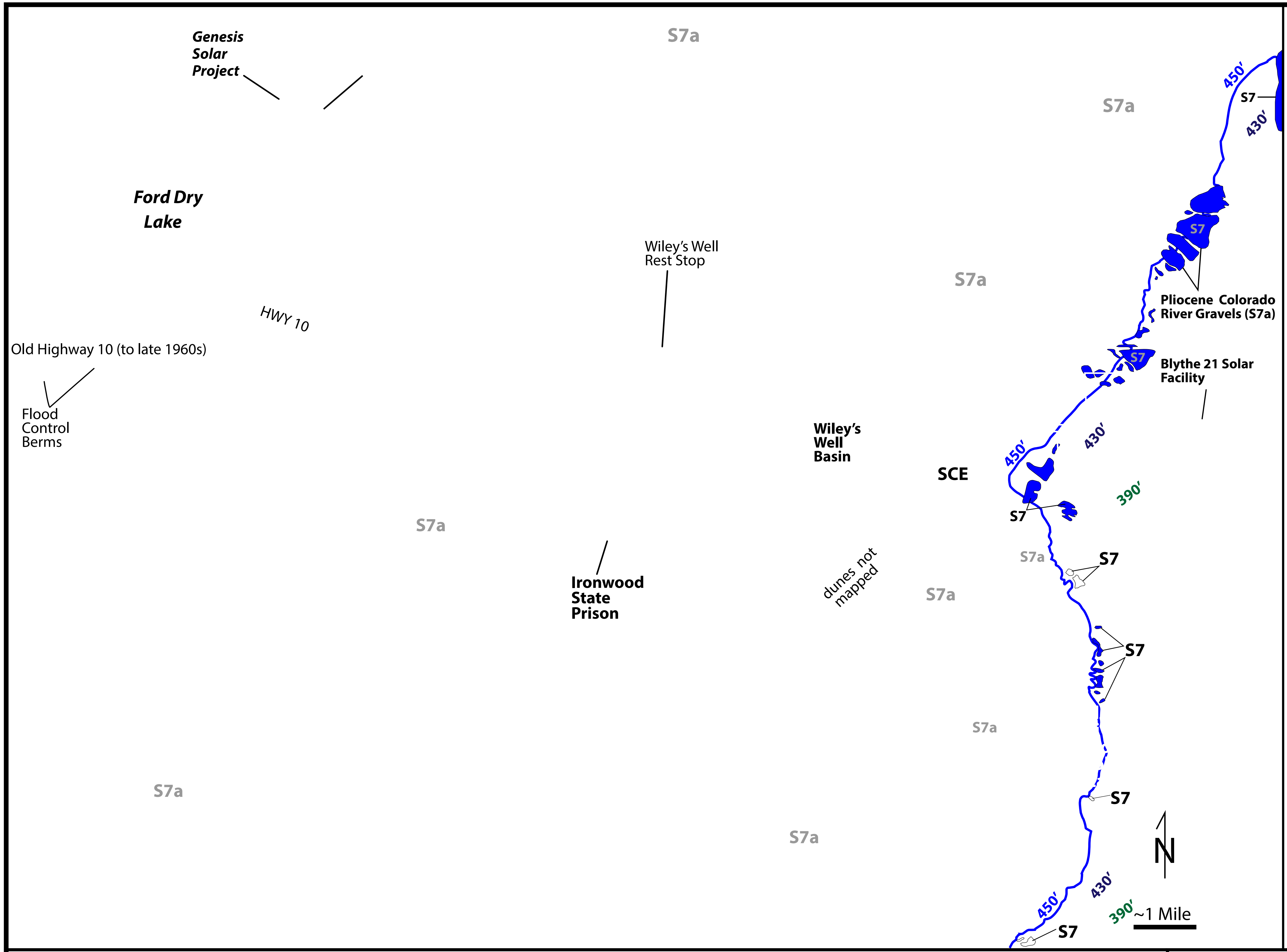
Geomorphic map showing variations in dune deposit activity and stability along the Chuckwalla Valley eolian sand system

Job No. 721-11

Date: Sept., 2017

Drafted by: MDK

PLATE 3B



Eolian Geomorphic - Relative Sand Migration Zones

🟩 **Zone C** - Low sand migration rate idenified by minor very thin and sparce sand sheets and coppice dunes. Area geomorphically dominated by either fluvial (alluvial), or playa lake deposits.

🟨 **Zone BC** - Low to moderate sand migration rate identified by minor active sand sheet and coppice dunes and quite often older stabilized degraded low profile dune mounds. Geomorphically the area exhibits a mix of eolian and fluvial

🟫 **Zone BW** - Moderate to weak sand migration rate in a region dominated by stable, and typically eroding older dune deposits and active eolian sands. However, the active surficial eolian sands exhibit aproximately less than 50% of the surface and eolian deposits (young and old) dominate. Zone BW areas were more active prior to the latest Holocene.

🟧 **Zone B** - Moderate sand migration rate and area dominated by older stable dunedeposits with active eolian sands covering generally and area greater than 50% but less than 75%. Active dune deposits are typically thin sand sheets, coppice, and low relief interconnected mounds. In Zone B, avalanche faces are rare, of low relief (i.e. < 3 feet), and seasonal.

🟥 **Zone AB** - Moderate to strong sand migration rate as characterized by mostly active dune sands exposed on the surface (>75% of surface) involving sand sheets, coppice, low to moderate interconnected relief mounds, linear dunes with avalanche faces greater than 5 to 8 feet tall often adjacent to some "prominent" washes. Dunes are primarily stable and linear dunes likely migrate very slowly over time but are commonly eroded by washes on their imediate downslope margin.

🟪 **Zone A** - Strong sand migration rate as characterized by active dunes with extensive areas (>90%) of active sand sheets, robust coppice and mounds, and across active dunes that exhibit relief over 10 to 15 feet. Avalanche faces occur exhibiting multiple-complex prevailing wind directions throughout the year (star dunes) that assist in compiling the sand in this region.

Eolian Source Geologic Deposits - Formations

■ Generalized unit representing active playa lake surfaces (Lacustrine), active washes, and ponding areas. These areas are important for eolian systems as a sand source, sand transport and stabilizing moisture.

🟦 **S7 Tmw** Fluvial Colorado River Gravels associated with an ancient "shoreline-river edge) near elevavation 430 to 450 feet above sea level (msl, blue lines). This unit is correlated stratigraphically to unit QTmw of Stone (2006), Unit B (Quarry Gravels) of Metzger et al. (1973), and member of the **Bullhead Alluvium** of Howard et al. (2015). Units are early Pliocene in age (Bullhead Alluvium - 4.5 to 3.5 Ma; Howard et al., 2015).

■ **S7a Tmm** Fluvial, ancient playa-lake, and Colorado River Deposits that producerelatively abundant eolian sands upon erosion. Unit primarily correlates with the **Bullhead Alluvium** of Howard et al. (2015), unit QTmm of Stone (2006), possibly some Bouse Formation of Spencer (2008), and Unit B of Metzger et al.(1973). Units are early Pliocene in age (Bullhead Alluvium - 4.5 to 3.5 Ma; Howard et al., 2015). Petrified wood bearing uper slope member extending to elevations over 850 feet.

Eolian Deposits - General in Mule Mountains

■ Generalized area of dune deposits typically exhibiting Zones A, AB and B (see above) along the flanks, and within upper valleys of the Mule Mountains.

Mapping conducted by M. Kenney via Google Earth Pro utilizing various years of their Hsicorical Imagery.Image created with Google Earth Pro (2016). Sand migration rates varied considerably across Ford Dry Lake and near the site due to large magnitude changes in vegetation density (wet vs dry years). Mapping was conducted where possible that exhibited the strongest sand migration rates that corresponded to relatively low vegetation densities.

"Prevailing" Wind Directions Influencing Eolian Systems

Generalized direction of pertinent "prevailing" wind directions resulting in eolian sand movement as observed in the field during strong wind events and eolian dune structures. These wind directions are controlled by local valley-mountain topography and seasonal storm track dominant movement directions. These occur from the SW along Wiley's Well Wash, from the west (W) down the Chuckwalla Valley, and from the NNW down Palen Valley. The SW to NE winds have commonly been observed to flow over the Chuckwalla Mountains. Blue arrows were observed and measured and the field, gray arrows are generalized based on field experience and dune forms.

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PROJECT:
DESERT QUARTZITE SOLAR PROJECT,
NEAR BLYTHE, CA

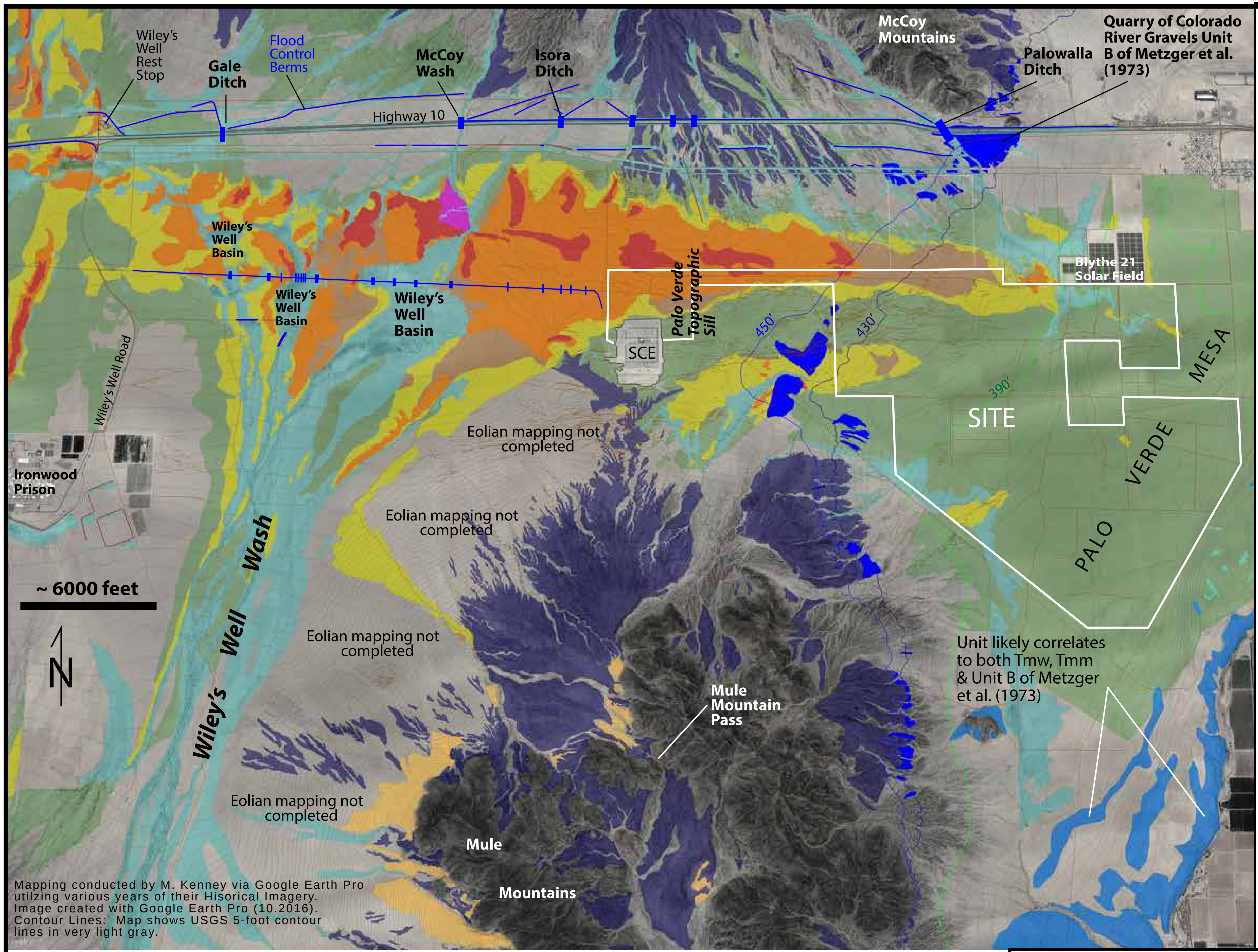
Job No. 721-11

Date: September, 2017

Drafted by: MDK

Geomorphic Eolian Zone Map & Geologic Map of the Eastern Chuckwalla Valley

PLATE 4


Wiley's
Well
Rest
Stop
Gale
Ditch
Flood
Control
Berms
McCoy
Wash
Isora
Ditch
Highway 10
McCoy
Mountains
Palowalla
Ditch
Quarry of Colorado
River Gravels Unit
B of Metzger et al.
(1973)
Wiley's
Well
Basin
Wiley's
Well
Basin
Wiley's
Well
Basin
Palo Verde
Topographic
Sill
Blythe 21
Solar Field
450'
430'
390'
SCE
SITE
MESA
VERDE
PALO
Wiley's Well Road
Ironwood
Prison
Eolian mapping not
completed
Eolian mapping not
completed
Eolian mapping not
completed
Eolian mapping not
completed
Wiley's Well Wash
~ 6000 feet
N
Mule
Mountain
Pass
Unit likely correlates
to both Tmw, Tmm
& Unit B of Metzger
et al. (1973)
Mule
Mountains

Mapping conducted by M. Kenney via Google Earth Pro utilzing various years of their Hisorical Imagery. Image created with Google Earth Pro (10.2016). Contour Lines: Map shows USGS 5-foot contour lines in very light gray.

Eolian Geomorphic - Relative Sand Migration Zones

🟩 **Zone C** - Low sand migration rate and area dominated either by fluvial (alluvial), or playa lake surfaces (deposits).

🟨 **Zone BC** - Low to moderate sand migration rate, and geomorphically the area exhibits a mix of eolian and fluvial and/or playa surfaces. Dune deposits are also generally a mix of older stable, some eroding dunes, and active surficial loose active eolian sands (sand sheets).

🟫 **Zone BW** - Moderate to weak sand migration rate, and area dominated by stable (vegetated), and typically eroding older dune deposits (geomorphology). Active eolian sands cover generally less than 50% of the surface area. Ponding (gravel lag surfaces) interdune depressions common.

🟧 **Zone B** - Moderate sand migration rate and area dominated by older stable dune deposits with active eolian sands covering generally greater than 50% of the area. Active eolian sands are typically sand sheets, coppice, and low reliefmounds. Avalanche faces are very rare and only seasonal in Zone B.

🟥 **Zone AB** - Moderate to strong sand migration rate and area characterized by mostly active dune sands exposed on the surface involving sand sheets, coppice, low relief mounds, and linear dunes with occassional seasonal avalanche faces.

🟪 **Zone A** - Strong sand migration rate and area characterized by extensive areas of active sand sheets across active dunes that exhibit relief over 10 to 15 feet. Avalanche faces occur exhibiting multiple-complex prevailing wind directions throughout the year leading to the development of star dunes. Zone A only occurs in one map area location near the termination of the Wiley's Well Wash in the herein named Wiley's Well Basin.

Eolian Source Geologic Deposits - Formations

▨ Generalized unit representing active playa lake surfaces (Lacustrine), active washes, and ponding areas. These areas are important for eolian systems as a sand source, sand transport and stabilizing moisture.

🟦 **S7 Tmw** Fluvial Colorado River Gravels associated with an ancient "shoreline-river edge) near elevavation ~420 to 450 feet above sea level (msl, blue lines). This unit is correlated stratigraphically to unit Tmw (QTmw of Stone (2006), Unit B (Quarry Gravels) of Metzger et al. (1973), and member of the Bullhead Alluvium of Howard et al. (2015). Units are early Pliocene in age (Bullhead Alluvium - 4.5 to 3.5 Ma; Howard et al., 2015). Also soil S7 in this report.

🟦 **S7a Tmm** Fluvial, ancient playa-lake, and Colorado River Deposits that produce relatively abundant eolian sands upon erosion. Unit primarily correlates with the Bullhead Alluvium of Howard et al. (2015), unit Tmm (QTmm of Stone (2006), possibly some Bouse Formation of Spencer (2008), and Unit B of Metzger et al.(1973). Units are early Pliocene in age (Bullhead Alluvium - 4.5 to 3.5 Ma; Howard et al., 2015). Also soil S7 of this report.

Eolian Deposits - General in Mule Mountains

🟨 Generalized area of dune deposits typically exhibiting Zones A, AB and B (see above) along the flanks, and within upper valleys of the Mule Mountains.

Subdrains and flood control berms. Thin blue lines are flood control berms and thicker orthogonal lines are subdrains allow flow to pass.

Mapped dirt roads. Many of the dirt roads in close proximity and within the Site are surmised to have been produced during General Pattons tank war excersises in the early 1940's. These roads provide evidence supporting eolian geomorphic zones stability on a decadal scale, particularly for Zone BC, and Zone C, and lesser extent Zone BW, where many of these roads remain partitially preserved on the landscape.

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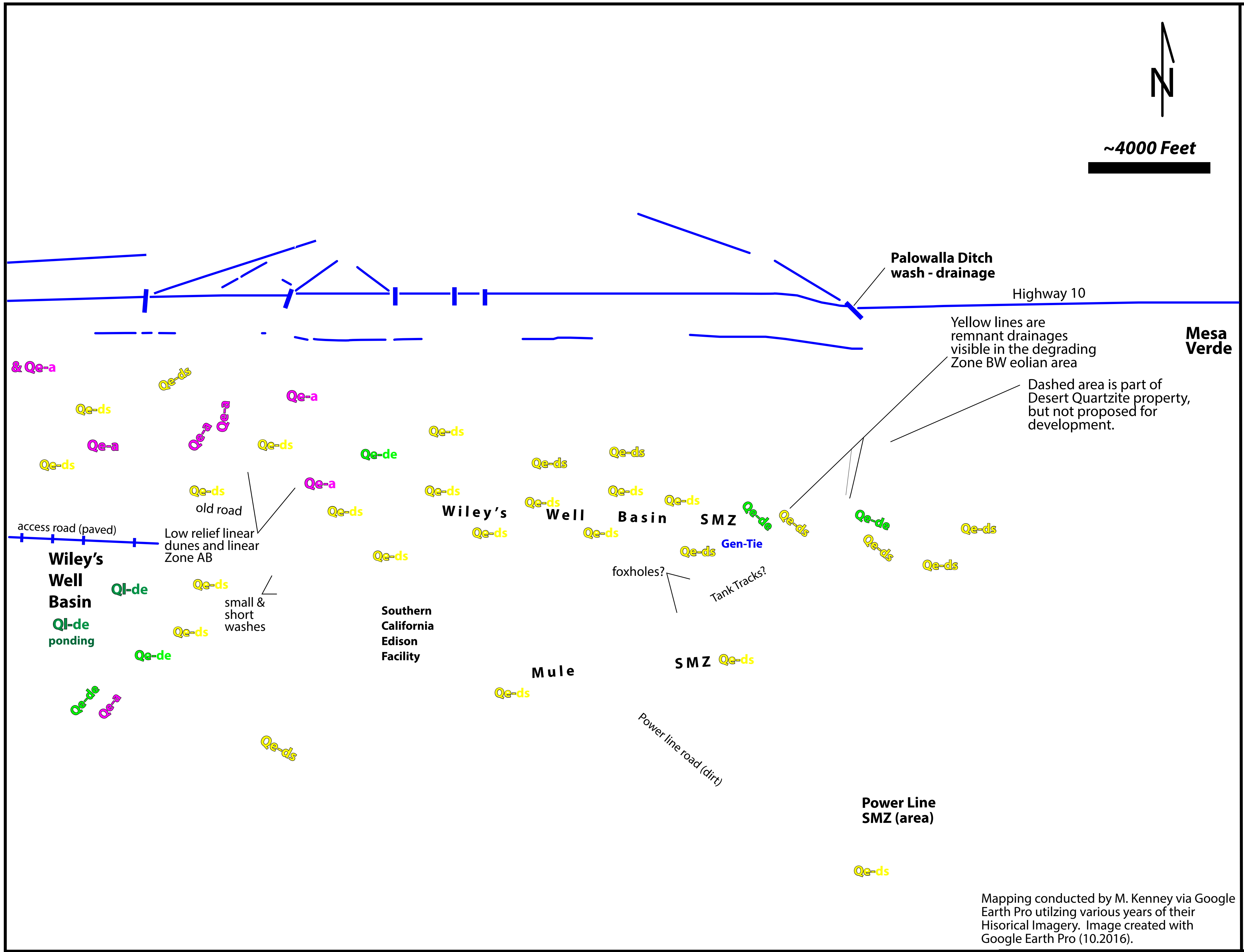
Eolian Geomorphic Zone Map in the vicinity of the Desert Quartzite Solar Project

Job No. 721-11

Date: September, 2017
Drafted by: MDK

PLATE 5


N
~4000 Feet
Palowalla Ditch wash - drainage
Highway 10
Yellow lines are remnant drainages visible in the degrading Zone BW eolian area
Mesa Verde
Dashed area is part of Desert Quartzite property, but not proposed for development.
& Qe-a
Qe-ds
Qe-a
Qe-de
old road
access road (paved)
Low relief linear dunes and linear Zone AB
Wiley's Well Basin
Ql-de
ponding
small & short washes
Wiley's Well Basin SMZ
Gen-Tie
foxholes?
Tank Tracks?
Southern California Edison Facility
Mule SMZ
Power line road (dirt)
Power Line SMZ (area)

Mapping conducted by M. Kenney via Google Earth Pro utilzing various years of their Hisorical Imagery. Image created with Google Earth Pro (10.2016).

Eolian Geomorphic - Relative Sand Migration Zones

- ☐ **Zone C** - Low sand migration rate and area dominated either by fluvial (alluvial), or alluvial ponding areas
- 🟨 **Zone BC** - Low to moderate sand migration rate, and geomorphically the area exhibits a mix of eolian and fluvial and/or playa surfaces. Dune deposits are also generally a mix of older stable, some eroding dunes, and active surficial loose eolian sands (sand sheets).
- ☐ **Zone BW** - Moderate to weak sand migration rate, and area dominated by stable (vegetated), and typically eroding older dune deposits (geomorphology). Active eolian sands cover generally less than 50% of the surface area. Ponding (gravel lag surfaces) interdune depressions common.
- ☐ **Zone B** - Moderate sand migration rate and area dominated by older stable dune deposits with active eolian sands covering generally greater than 50% of the area. Active eolian sands are typically sand sheets, coppice, and low reliefmounds. Avalanche faces are very rare and only seasonal in Zone B.
- ☐ **Zone AB** - Moderate to strong sand migration rate and area characterized by mostly active dune sands exposed on the surface involving sand sheets, coppice, low relief mounds, and linear dunes with occassional seasonal avalanche faces.
- ☐ **Zone A** - Strong sand migration rate and area characterized by extensive areas of active sand sheets across active dunes that exhibit relief over 10 to 15 feet. Avalanche faces occur exhibiting multiple-complex prevailing wind directions throughout the year leading to the development of star dunes. Zone A only occurs in one map area location near the termination of the Wiley's Well Wash in the herein named Wiley's Well Basin.

Eolian Source Geologic Deposits - Formations

- 🟦 Generalized unit representing ponding areas at the termination area of drainages and active washes. These areas are critically important for eolian systems as a sand source and stabilizing moisture for dune systems.
- ☐ Sediments associated with the Colorado River when it inundated this region to an upper elevation of possibly 1,200 feet 4.3 to 3.5 Ma. These sediments produce a strong eolian sand source upon erosion. Unit correlates with the Bullhead Alluvium of Howard et al. (2015) estimated to be deposited between 4.5 to 3.5 Ma (Pliocene) and unit Tmm of this report (Soil 7).

Geologic and Geomorphic Symbols for Eolian and Playa Systems (see Plate 3A for full legend details)

Eolian

Qe-a	Active dune area, however, dunes are not migrating
Qe-ds	Strongly stabilized dune area
Qe-de	Strongly stabilized dune area that is eroding producing eolian sand source for downwind systems

Playa (dry lake) and other smaller Ponding areas

Ql-de	Ponding area that floods frequently providing an eolian sand source for downwind (toward the east and northeast) dune systems

Subdrains and flood control berms. Thin blue lines are flood control berms and thicker orthogonal lines are subdrains allow flow to pass.

Mapped dirt roads. Many of the dirt roads in close proximity and within the Site are surmised to have been produced during General Pattons tank war excersises in the early 1940's. These roads provide evidence supporting eolian geomorphic zones stability on a decadal scale, particularly for Zone BC, and Zone C, and lesser extent Zone BW, where many of these roads remain partitially preserved on the landscape.

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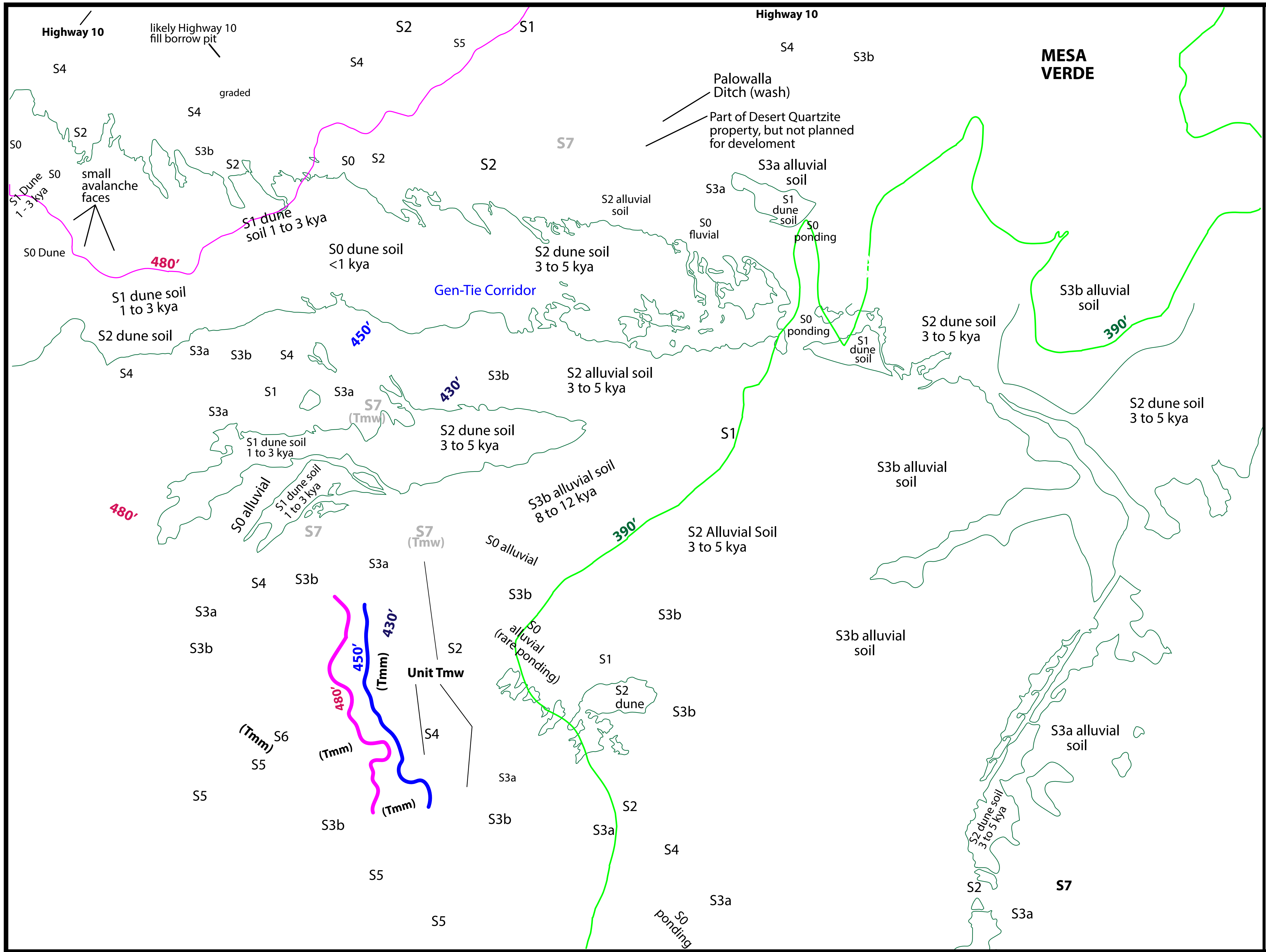
Eolian Geomorphic Zone Map and Drainage Map of the Wiley's Well Basin and Mule Sand Migrations Zones (SMZ), Desert Quartzite Proposed Solar Project area

Job No. 721-11
Date: September, 2017
Drafted by: MDK

PLATE 6A


Highway 10
likely Highway 10 fill borrow pit
S2
S5
S1
S4
S4
graded
S4
S0
S2
S3b
S2
S0
S2
S2
S7
S1 Dune 1 - 3 kya
S0
small avalanche faces
S1 dune soil 1 to 3 kya
S0 Dune
480'
S0 dune soil <1 kya
S1 dune soil 1 to 3 kya
S2 dune soil
S3a
S3b
S4
450'
Gen-Tie Corridor
S4
S1
S3a
S7 (Tmw)
430'
S3b
S3a
S1 dune soil 1 to 3 kya
S2 dune soil 3 to 5 kya
S0 alluvial
S1 dune soil 1 to 3 kya
480'
S7
S7 (Tmw)
S0 alluvial
S2 alluvial soil
S2 dune soil 3 to 5 kya
S2 alluvial soil 3 to 5 kya
S3b alluvial soil 8 to 12 kya
390'
Highway 10
S4
S3b
Palowalla Ditch (wash)
Part of Desert Quartzite property, but not planned for develoment
S3a alluvial soil
S3a
S1 dune soil
S0 ponding
S0 fluvial
S0 ponding
S1 dune soil
S1
S2 Alluvial Soil 3 to 5 kya
MESA VERDE
S3b alluvial soil
390'
S2 dune soil 3 to 5 kya
S2 dune soil 3 to 5 kya
S3b alluvial soil
S4
S3b
S3a
S3b
480'
450'
430'
(Tmm)
Unit Tmw
S2
S3b
S0 alluvial (rare ponding)
S1
S2 dune
S3b
S3b alluvial soil
(Tmm)
S6
S5
(Tmm)
S4
S5
(Tmm)
S3b
S3a
S3b
S2
S3a
S4
S5
S5
S0 ponding
S3a
S3a alluvial soil
S2 dune soil 3 to 5 kya
S2
S7
S3a

Soil (Pedon) Stratigraphy

Alluvial (fluvial) Parent Material (minimum ages)

☐ **S0** - < 1000 years old (fluvial and ponding areas)

☐ **S1**- 1 to 3 kya (late Holocene)

☐ **S2** - 3 to 5 kya (mid to late Holocene)

🟫 **S3a** - 5 to 8 kya (early to mid Holocene)

🟧 **S3b** - 8 to 12 kya (latest Pleistocene to early Holocene)

☐ **S4** - 35 to 65 kya (late Pleistocene)

S5a - > 100 kya (early Pleistocene)

🟥 **S5b** - > 100 kya (early Pleistocene)

☐ **S6** - < 3.5 Ma Early Pleistocene or possibly late Pliocene Older alluvium with strongly developed soil profile resting unconformably on top of Bullhead Alluvium Colorado River deposits.

S7 - 3.5 to 4.5 Ma (early Pliocene). Bullhead Alluvium - Colorado River Gravels - exotic rounded cobbles with channel cross bedding (Unit Tmw) and the older member deposited to elevations of >1000 ft. throughout Chuckwalla Valley (Unit Tmm)

Eolian (Dune) Parent Material (minimum ages)

🟦 **S0** - < 1000 years old

S1- 1 to 3 kya (late Holocene)

☐ **S2** - 3 to 5 kya (mid to late Holocene)

Note Regarding Soil Ages: All soil ages are considered minimum values, indicating that these surfaces are likley not younger than the ages provided.

Geologic Contact - Dune Soil to Alluvial Soil Contacts

Geologic contact between eolian dune soils and alluvial soils. Contacts are gradations within eolian systems.

Topographic Contours - Colorado River Pliocene Levels

480' Topographic escarpment in Pliocene Bullhead Alluvium along the flanks of the northeastern Mule Mountains at approximate elevation 480 feet above sea level. Highest water elevation in the Pliocene associated with the Colorado River based on regional mapping was likely over 1,100 feet.

450' Topographic escarpment in the Pliocene Bullhead Alluvium along the flanks of the northeastern Mule Mountains at approximate elevation 450 feet above sea level. This escarpment is not as pronounced as the 480-foot elevation contour escarpment.

Topographic contours are from the USGS,
5-foot contour interval

Mapping conducted by M. Kenney via Google Earth Pro utilzing various years of their Hisorical Imagery.
Image created with Google Earth Pro (10.2016).

N

~4000 Feet

Kenney GeoScience

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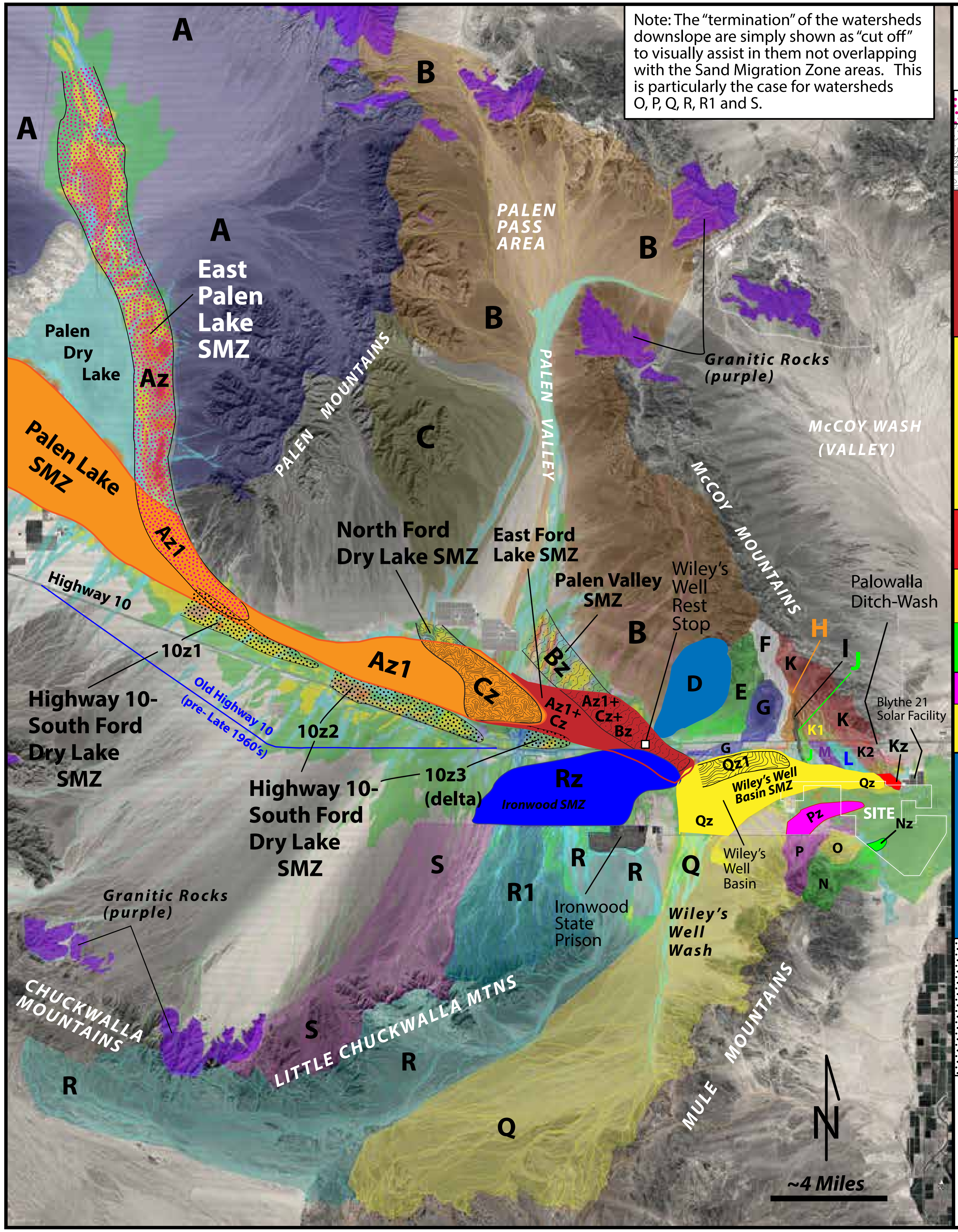
Soil (Pedon) Stratigraphy Map of Alluvial vs Eolian
Soil Parent Deposits, Desert Quartzite Proposed
Solar Project area

Job No. 721-11

Date: Sept., 2017
Drafted by: MDK

PLATE 6B


A
A
A
B
B
B
B
B
East Palen Lake SMZ
Palen Dry Lake
Az
Palen Lake SMZ
Az1
PALEN MOUNTAINS
C
PALEN PASS AREA
PALEN VALLEY
Granitic Rocks (purple)
McCOY WASH (VALLEY)
McCOY MOUNTAINS
North Ford Dry Lake SMZ
East Ford Lake SMZ
Palen Valley SMZ
Wiley's Well Rest Stop
Palowalla Ditch-Wash
Highway 10
10z1
Highway 10- South Ford Dry Lake SMZ
Old Highway 10 (pre- Late 1960's)
10z2
Az1
Cz
Bz
Az1+ Cz
Az1+ Cz+ Bz
D
E
F
G
G
H
I
J
J
K
K
K1
K2
Kz
L
M
Blythe 21 Solar Facility
Highway 10- South Ford Dry Lake SMZ
10z3 (delta)
Rz
Ironwood SMZ
Qz1
Wiley's Well Basin SMZ
Qz
Qz
Pz
SITE
Nz
P
O
N
S
R
R
R1
Q
Ironwood State Prison
Wiley's Well Basin
Wiley's Well Wash
Granitic Rocks (purple)
CHUCKWALLA MOUNTAINS
S
LITTLE CHUCKWALLA MTNS
R
R
MULE MOUNTAINS
Q
N
~4 Miles

Note: The "termination" of the watersheds downslope are simply shown as "cut off" to visually assist in them not overlapping with the Sand Migration Zone areas. This is particularly the case for watersheds O, P, Q, R, R1 and S.

Water-shed	Square Miles	What Sand Migration Zone the watershed feeds	Notes Regarding Sand Migration Zones Interactions and Eolian Sand Sources
A	265	Az	**East Palen Lake SMZ** - mixes with Palen Lake SMZ to create SMZ Az1
B	127	Bz	**Palen Valley SMZ** - mixes with East Ford Lake SMZ to the souteast (Az1+Cz+Bz)
C	26	Cz	**North Ford Dry Lake SMZ** - mixes with SMZ Az1 and East Ford Lake SMZ to the east
		Az1+Cz	**East Ford Dry Lake SMZ** - mix of Az1+Cz SMZ's, and sands from erosion of playa sediments & older degrading dunes from the west
		Az1+Cz+Bz	**East Ford Dry Lake SMZ** - mix of Az1+Cz +Bz SMZ's, and sands from erosion of playa sediments & older degrading dunes from the west
D	5.4	Az1+Cz+Bz	Watershed D flow is diverted to provide sand to SMZ's Az1+Cz+Bz
E	3.7	Az1+Cz+Bz	Watershed E flow is diverted to under Highway 10 to provide sand to SMZ's Az1+Cz+Bz
F	1.9	Qz1	Watershed F flow is diverted to Wiley's Well Basin to provide sand to SMZ's Qz1 & Qz
G	2.3	Qz1	Watershed G flow is diverted to Wiley's Well Basin adding sand to SMZ's Qz1 & Qz
H	0.4	Qz1	Watershed H flow is diverted to Wiley's Well Basin adding sand to SMZ's Qz1 & Qz
I	0.3	Qz	Watershed I flows close to natural course under HWY10 to north central SMZ Qz
J	0.3	Qz	Watershed J flows close to natural course under HWY10 to north central SMZ Qz
K	4.0	Kz	**Pallowalla SMZ** - Watershed K flow diverted to Palowalla Ditch adding sand to SMZ Kz
K1	1.3	Kz	**Pallowalla SMZ** - Watershed K1 flow diverted to Palowalla Ditch adding sand to SMZ Kz
K2	1.0	Kz	**Pallowalla SMZ** - Watershed K2 flows mostly naturally adding sand to SMZ Kz
L	0.6	Qz	**Wiley's Well Basin SMZ**
M	0.5	Qz	**Wiley's Well Basin SMZ**
N	3.1	Nz	**Powerline SMZ** - Watershed N flows with slight dirt road diversion to ponding area Nz
O	1.1	Nz	**Powerline SMZ** - Watershed O flows with slight dirt road diversion to ponding area Nz
P	1.7	Pz	**Mule SMZ** - Watershed P flows without diversion (naturally) providing sand to SMZ Pz
Q	71	Qz	**Wiley's Well Basin SMZ** - Watershed Q flows naturally along Wiley's Well Wash providing abundant eolian sands to SMZ Qz
R	68	Rz	**Ironwood SMZ** - Most flow in Watershed R occurs naturally west of Ironwood Prison. Relatively minor flow diversions in Watershed R flows and ponds around Ironwood Prison. These flows, primarily on west side of R provided abundant eolian sand to SMZ Rz
R1	16.4	Rz	**Ironwood SMZ** - Watershed R1 flows naturally to the west side of SMZ Rz and provides relatively abundant eolian sand to SMZ Rz. Further downslope, flow in the western part of watershed R1 is focused by flood control berms of HWY10 providing sands to SMZ 10z3.
S	26.3	Rz	Watershed S provides flows naturally to provide minor eolian sand to the western upwind western region of the Ironwood SMZ. Downslope, watershed S is focussed by flood control berms and flows onto Ford Dry Lake providing sands to East Ford Dry Lake SMZ.
	10z1	I	Increased and focussed drainage flow associated with HWY 10 flood control berms (old and new highways) resulted in increased eolian sand production north of HWY 10 where flow rate is increased substantially leading to the creation of SMZ 10z2.
	10z2		(Same description as for SMZ 10z1
S	10z3		Eolian sands eminating from the delta in SE Ford Dry Lake with historical drainage flow increaseed due to flood control berms associated with HWY 10

Mapping conducted by M. Kenney via Google Earth Pro utilzing various years of their Hisorical Imagery. Image created with Google Earth Pro (10.2016).

Kenney GeoScience

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PROJECT:
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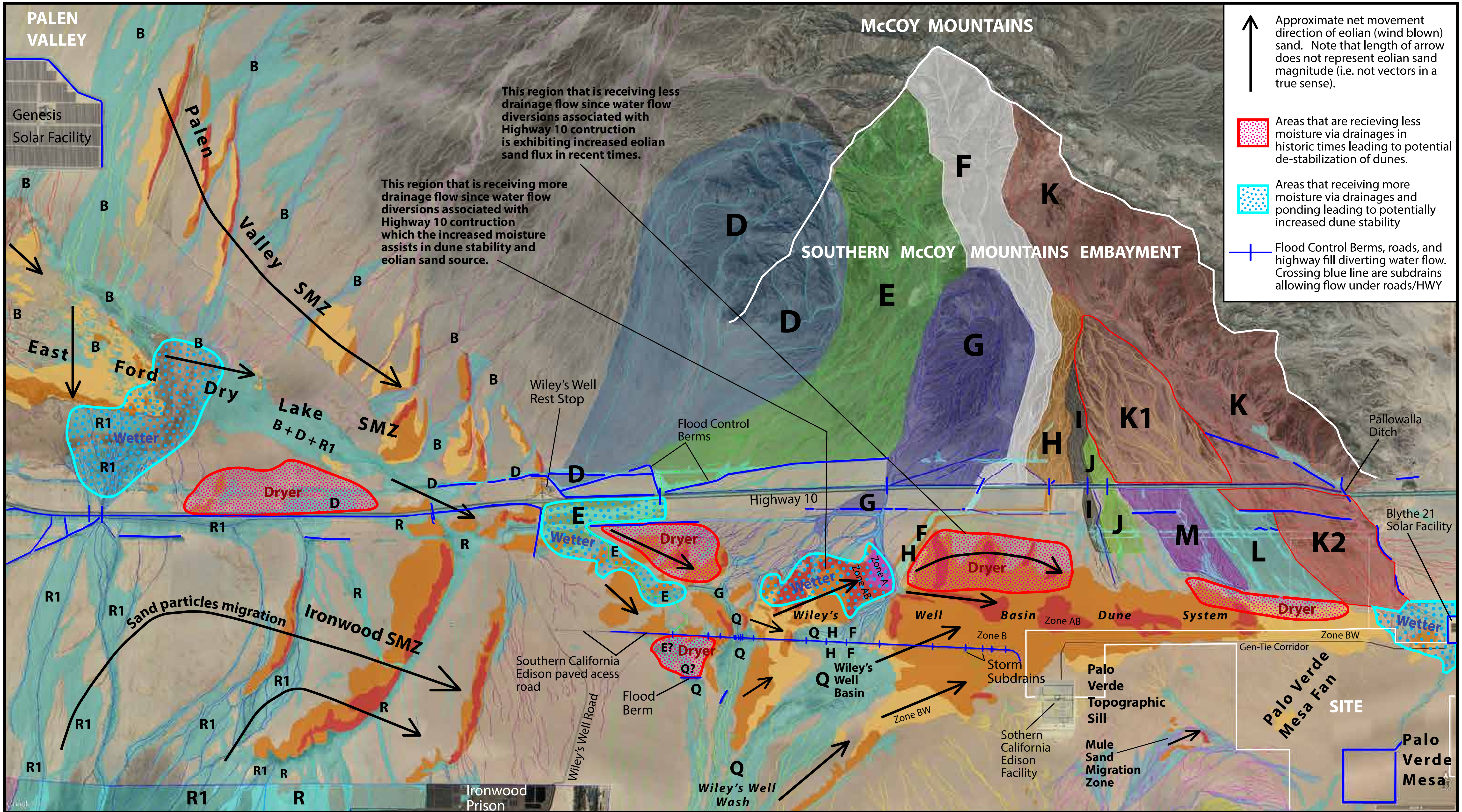
Watershed and Respective Eolian Sand Migration Zones (SMZ) of the Chuckwalla Valley Region

Job No. 721-11

Date: September, 2017
Drafted by: MDK

PLATE 7A


PALEN VALLEY
Genesis Solar Facility
McCOY MOUNTAINS
SOUTHERN McCOY MOUNTAINS EMBAYMENT
Palen Valley SMZ
East Ford Dry Lake SMZ
B+D+R1
Wetter
Dryer
R1
B
D
E
F
G
H
I
J
K
K1
K2
L
M
Q
R
This region that is receiving less drainage flow since water flow diversions associated with Highway 10 contruction is exhibiting increased eolian sand flux in recent times.
This region that is receiving more drainage flow since water flow diversions associated with Highway 10 contruction which the increased moisture assists in dune stability and eolian sand source.
Wiley's Well Rest Stop
Flood Control Berms
Highway 10
Pallowalla Ditch
Blythe 21 Solar Facility
Zone A
Zone AB
Zone B
Zone BW
Wiley's Well Basin Dune System
Sand particles migration
Ironwood SMZ
Southern California Edison paved acess road
Flood Berm
E? Dryer
Q?
Wiley's Well Basin
Storm Subdrains
Gen-Tie Corridor
Palo Verde Topographic Sill
Palo Verde Mesa Fan
SITE
Palo Verde Mesa
Sothern California Edison Facility
Mule Sand Migration Zone
Wiley's Well Road
Wiley's Well Wash
Ironwood Prison
Approximate net movement direction of eolian (wind blown) sand. Note that length of arrow does not represent eolian sand magnitude (i.e. not vectors in a true sense).
Areas that are recieving less moisture via drainages in historic times leading to potential de-stabilization of dunes.
Areas that receiving more moisture via drainages and ponding leading to potentially increased dune stability
Flood Control Berms, roads, and highway fill diverting water flow. Crossing blue line are subdrains allowing flow under roads/HWY

See text and Plate 5 for descriptions of the Eolian Geomorphic Sand Migration Zones A, AB, B, and BW, which are areas geomorphically dominated by eolian deposits.

Significant washes, ponding areas and playa lake surfaces shown as light cyan blue (Soil S0).

Watershed "drainage system" designations (**B** through **Q**) and regions are the same as shown on Plate 7A. Drainages are shown as thin lines of various colors

N

~8000 FEET

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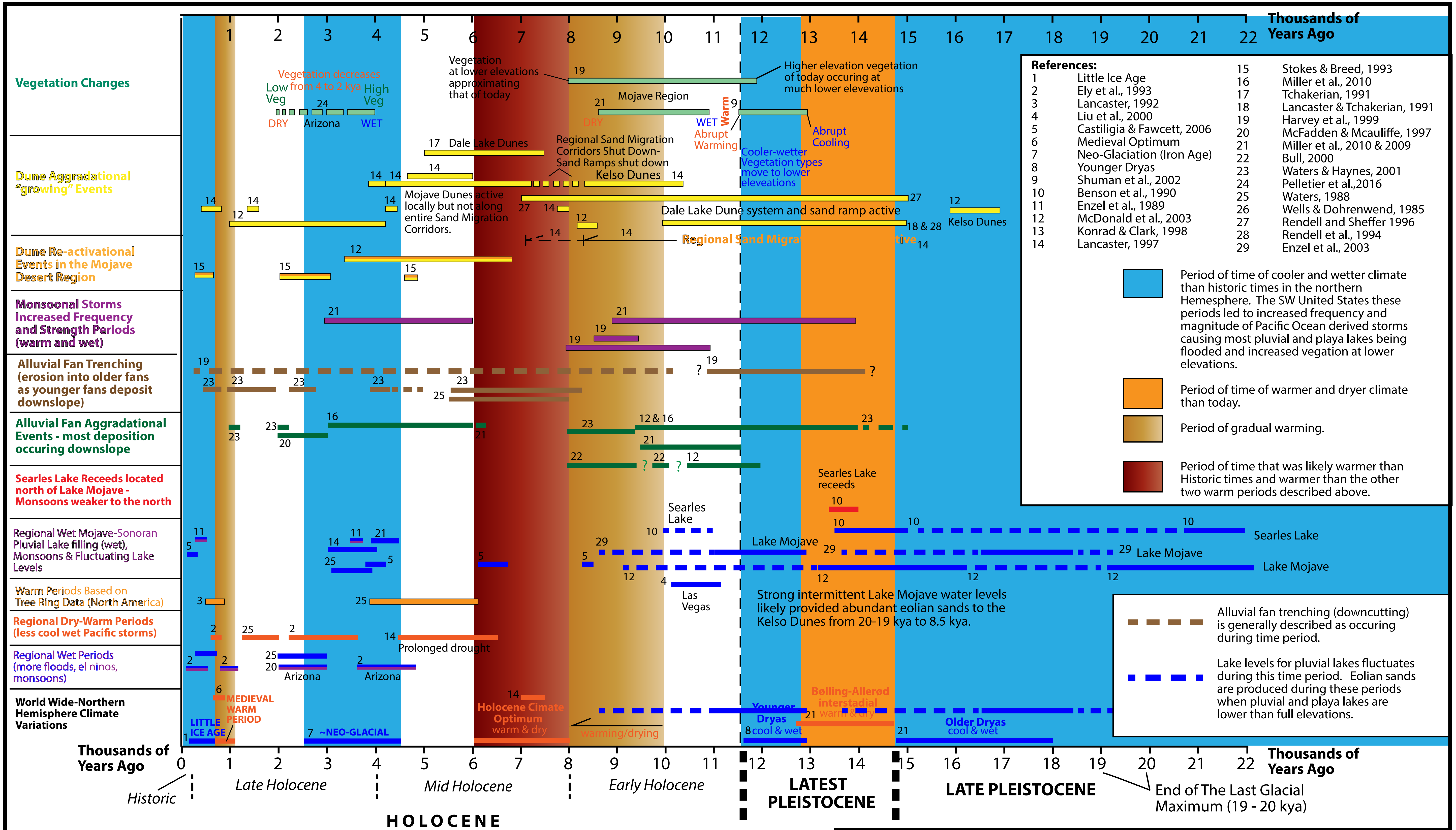
PROJECT:
DESERT QUARTZITE SOLAR

Job No. 721-11

Local Watersheds & Historic Drainage Flow, Historic Dry and Wet Areas, Sand Migration Zones A, AB, B an BW, and Net Sand Migration Directions Over Time

Date: September, 2017
Drafted by: MDK

PLATE 7B



References:

1	Little Ice Age	15	Stokes & Breed, 1993
2	Ely et al., 1993	16	Miller et al., 2010
3	Lancaster, 1992	17	Tchakerian, 1991
4	Liu et al., 2000	18	Lancaster & Tchakerian, 1991
5	Castiligia & Fawcett, 2006	19	Harvey et al., 1999
6	Medieval Optimum	20	McFadden & Mcauliffe, 1997
7	Neo-Glaciation (Iron Age)	21	Miller et al., 2010 & 2009
8	Younger Dryas	22	Bull, 2000
9	Shuman et al., 2002	23	Waters & Haynes, 2001
10	Benson et al., 1990	24	Pelletier et al.,2016
11	Enzel et al., 1989	25	Waters, 1988
12	McDonald et al., 2003	26	Wells & Dohrenwend, 1985
13	Konrad & Clark, 1998	27	Rendell and Sheffer 1996
14	Lancaster, 1997	28	Rendell et al., 1994
		29	Enzel et al., 2003

- 🟦 Period of time of cooler and wetter climate than historic times in the northern Hemesphere. The SW United States these periods led to increased frequency and magnitude of Pacific Ocean derived storms causing most pluvial and playa lakes being flooded and increased vegation at lower elevations.
- 🟧 Period of time of warmer and dryer climate than today.
- 🟫 Period of gradual warming.
- 🟥 Period of time that was likely warmer than Historic times and warmer than the other two warm periods described above.

- ▬ ▬ ▬ Alluvial fan trenching (downcutting) is generally described as occuring during time period.
- ▬ ▬ ▬ Lake levels for pluvial lakes fluctuates during this time period. Eolian sands are produced during these periods when pluvial and playa lakes are lower than full elevations.

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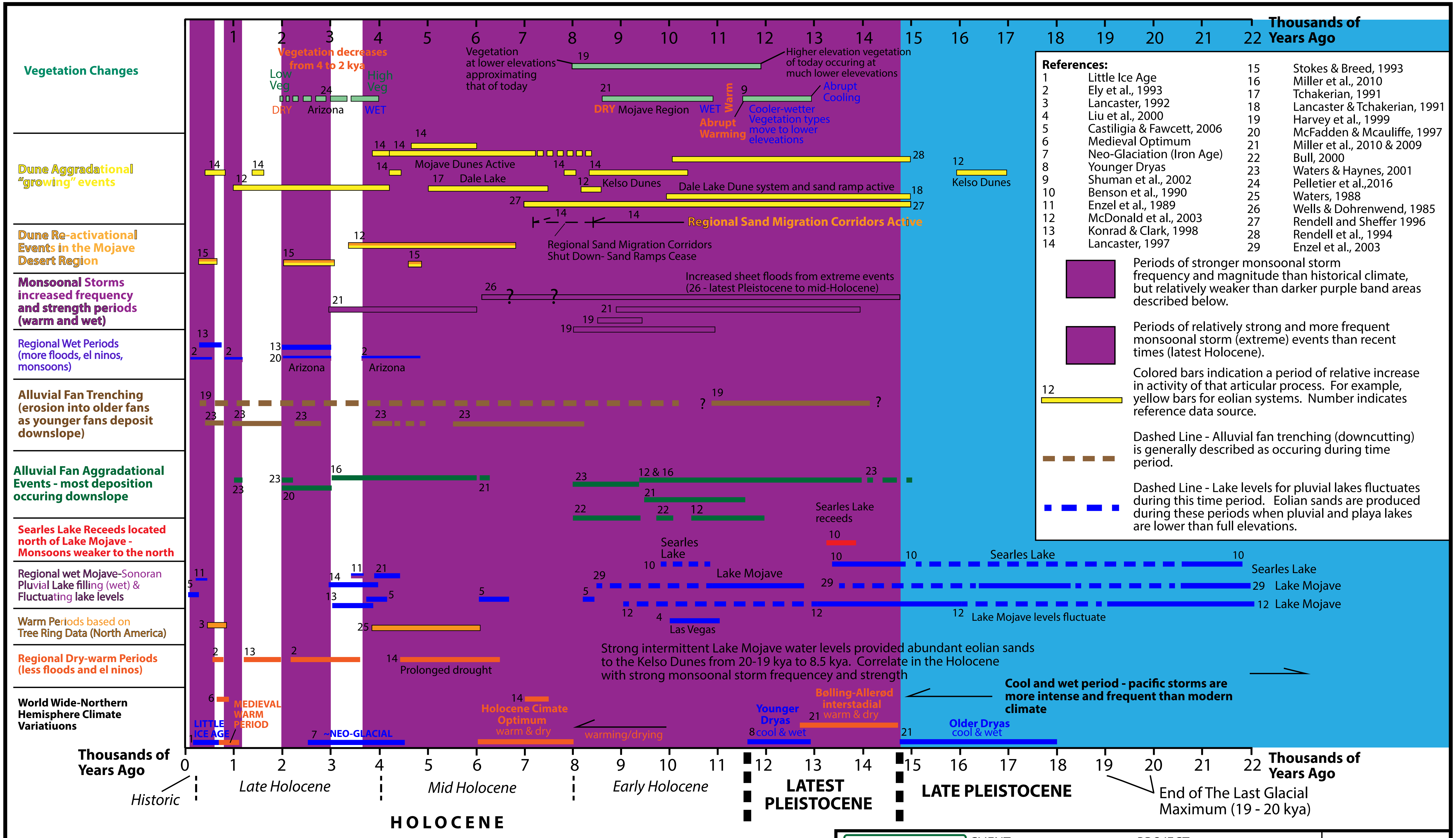
PROJECT:
DESERT QUARTZITE SOLAR

Table of Pertinent Geologic Events From the Latest Pleistocene to Late Holocene - Focus on World Climate

Job No. 721-11
Date: September, 2017
Drafted by: MDK

PLATE 8A



References:

1	Little Ice Age
2	Ely et al., 1993
3	Lancaster, 1992
4	Liu et al., 2000
5	Castiligia & Fawcett, 2006
6	Medieval Optimum
7	Neo-Glaciation (Iron Age)
8	Younger Dryas
9	Shuman et al., 2002
10	Benson et al., 1990
11	Enzel et al., 1989
12	McDonald et al., 2003
13	Konrad & Clark, 1998
14	Lancaster, 1997
15	Stokes & Breed, 1993
16	Miller et al., 2010
17	Tchakerian, 1991
18	Lancaster & Tchakerian, 1991
19	Harvey et al., 1999
20	McFadden & Mcauliffe, 1997
21	Miller et al., 2010 & 2009
22	Bull, 2000
23	Waters & Haynes, 2001
24	Pelletier et al.,2016
25	Waters, 1988
26	Wells & Dohrenwend, 1985
27	Rendell and Sheffer 1996
28	Rendell et al., 1994
29	Enzel et al., 2003

🟪	Periods of stronger monsoonal storm frequency and magnitude than historical climate, but relatively weaker than darker purple band areas described below.
🟪	Periods of relatively strong and more frequent monsoonal storm (extreme) events than recent times (latest Holocene).
12 ▬	Colored bars indication a period of relative increase in activity of that articular process. For example, yellow bars for eolian systems. Number indicates reference data source.
▬ ▬ ▬ ▬	Dashed Line - Alluvial fan trenching (downcutting) is generally described as occuring during time period.
▪ ▬ ▬ ▪	Dashed Line - Lake levels for pluvial lakes fluctuates during this time period. Eolian sands are produced during these periods when pluvial and playa lakes are lower than full elevations.

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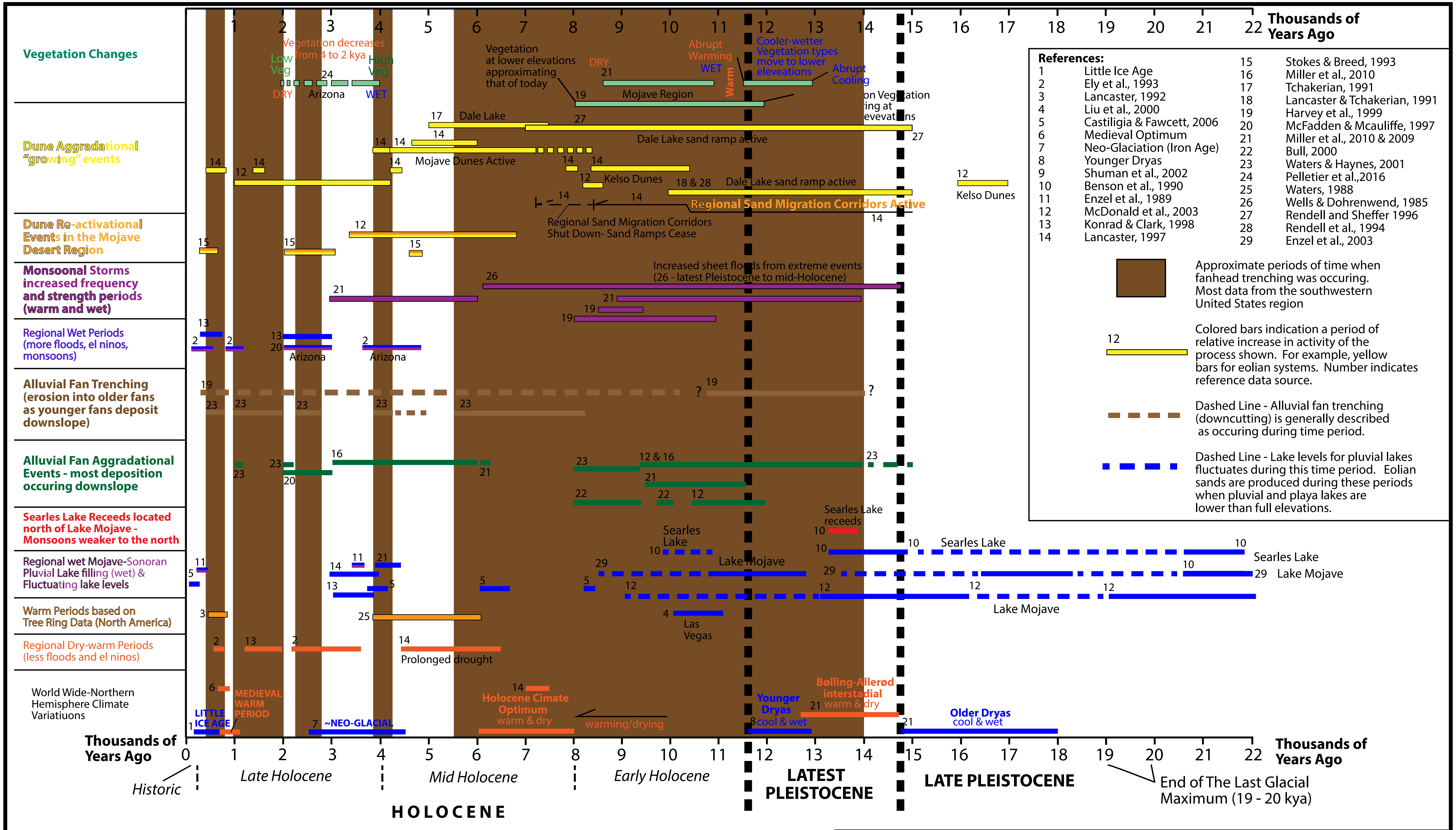
DESERT QUARTZITE SOLAR

Table of Pertinent Geologic Events From the Latest Pleistocene to Late Holocene

Job No. 721-11

Date: September, 2017
Drafted by: MDK

PLATE 8B



References:

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13	Konrad & Clark, 1998	27	Rendell and Sheffer 1996
14	Lancaster, 1997	28	Rendell et al., 1994
		29	Enzel et al., 2003

■	Approximate periods of time when fanhead trenching was occuring. Most data from the southwestern United States region
12 ▬	Colored bars indication a period of relative increase in activity of the process shown. For example, yellow bars for eolian systems. Number indicates reference data source.
▬ ▬ ▬	Dashed Line - Alluvial fan trenching (downcutting) is generally described as occuring during time period.
▬ ▬ ▬	Dashed Line - Lake levels for pluvial lakes fluctuates during this time period. Eolian sands are produced during these periods when pluvial and playa lakes are lower than full elevations.

Kenney GeoScience

CLIENT:
FIRST SOLAR ENERGY

PROJECT:
DESERT QUARTZITE SOLAR

Table of Pertinent Geologic Events From the Latest Pleistocene to Late Holocene- Focus on Fan Trenching

Job No. 721-11

Date: September, 2017
Drafted by: MDK

PLATE 8C

APPENDIX P

CLASS III ARCHAEOLOGICAL SURVEY REPORT

Class III Archaeological Survey of the Desert Quartzite Solar Project, Palo Verde Mesa, Riverside County, California

Edited by Michael K. Lerch, Patrick B. Stanton, and Karen K. Swope

Contributions by Dean M. Duryea, Jr., Scott H. Kremkau, Michael K. Lerch,
Tim M. Mills, Patrick B. Stanton, Mark Q. Sutton, Karen K. Swope,
Carly Whelan, and Jason D. Windingstad

Screen check final report prepared for
George E. Kline, Archaeologist
Bureau of Land Management
Palm Springs–South Coast Field Office
1201 Bird Center Drive
Palm Springs, CA 92262

Technical Report 15-36
Statistical Research, Inc.
Redlands, California

Class III Archaeological Survey of the Desert Quartzite Solar Project, Palo Verde Mesa, Riverside County, California

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January 2016

CONTENTS

List of Figures ix
List of Tables xi
Abstract xiii
Acknowledgments xv

1. Introduction, *by Michael K. Lerch and Scott H. Kremkau* 1.1
  Project Location 1.1
  Project Description 1.4
  Applicable Regulations 1.4
  APE Definitions 1.4
    Direct APE 1.5
    Indirect APE 1.5
  Personnel Qualifications 1.6
  Organization of the Report 1.7

***2.* Background Information, *by Scott H. Kremkau, Tim M. Mills, Mark Q. Sutton, Carly Whelan, Karen K. Swope, Jason D. Windingstad, and Michael K. Lerch* 2.1**
  Environmental Setting 2.1
    Geology 2.1
    Flora 2.2
    Fauna 2.3
  Cultural Setting 2.7
    Prehistoric Background 2.7
      The Paleoindian Period (12,000–8500 B.P.) 2.7
      The Archaic Period (8500–1500 B.P.) 2.7
      The Patayan Period (1500–200 B.P.) 2.8
  Ethnographic Background 2.9
    Ethnographic Sources from the Colorado Desert 2.9
      Academic Studies 2.9
      Land Management Studies 2.11
    The Cahuilla 2.12
      Settlement and Subsistence 2.12
      Sociopolitical Organization 2.12
      Material Culture 2.13
        Houses and Other Structures 2.13
        Hunting and Gathering Implements 2.13
        Baskets, Pottery, and Steatite Vessels 2.13
        Miscellaneous Implements 2.13
      Trade and Conflict 2.14
      Worldview and Ritual Practice 2.14
    The Chemehuevi 2.14
      Settlement and Subsistence 2.15
      Sociopolitical Organization 2.16
      Material Culture 2.16
        Houses and Other Structures 2.16

            - Hunting, Gathering, and Farming Implements 2.16
            - Baskets and Pottery 2.16
        - Trade and Conflict 2.17
        - Worldview and Ritual Practice 2.17
    - The Mojave 2.18
        - Subsistence and Settlement 2.18
        - Sociopolitical Organization 2.19
        - Material Culture 2.19
            - Houses and Other Structures 2.19
            - Hunting, Fishing, Farming, and Gathering Implements 2.19
            - Baskets and Pottery 2.20
        - Trade and Conflict 2.20
        - Worldview and Ritual Practice 2.20
    - The Halchidhoma 2.21
        - Subsistence and Settlement 2.21
        - Sociopolitical Organization 2.21
        - Material Culture 2.22
            - Houses and Other Structures 2.22
            - Hunting, Fishing, Farming, and Gathering Implements 2.22
            - Baskets and Pottery 2.22
        - Trade and Conflict 2.22
        - Worldview and Ritual Practice 2.22
    - The Quechan 2.23
        - Subsistence and Settlement 2.23
        - Sociopolitical Organization 2.24
        - Material Culture 2.24
            - Houses and Other Structures 2.24
            - Hunting, Fishing, Farming, and Gathering Implements 2.24
            - Baskets and Pottery 2.24
        - Trade and Conflict 2.25
        - Worldview and Ritual Practice 2.25
- Historical-Period Background 2.25
    - Exploration 2.25
    - European–Native American Relations 2.26
    - Mining 2.27
    - Transportation 2.27
    - Settlement and Agriculture 2.31
    - Military Activities 2.36
        - Fort Yuma 2.36
        - World War II and the Desert Training Center 2.36
        - Operation Desert Strike 2.36

***3.* Research Design and Methods, *by Scott H. Kremkau, Karen K. Swope, Mark Q. Sutton, and Michael K. Lerch* 3.1**

- Research Design 3.1
    - Prehistoric and Protohistoric Research Themes 3.1
        - Research Questions and Data Requirements 3.2
            - Chronology 3.2
                - Data Requirements 3.2
            - Trade and Regional Interaction 3.2
                - Data Requirements 3.3
            - Ceremonial Landscapes 3.4

      Data Requirements 3.4
    Technology 3.5
      Data Requirements 3.5
    Settlement and Subsistence 3.6
      Data Requirements 3.7
  Historical-Period Research Themes 3.7
   Research Questions and Data Requirements 3.7
    European–Native American Contact and Historical-Period Interactions 3.7
      Data Requirements 3.8
    Mining 3.8
      Data Requirements 3.9
    Transportation 3.9
      Data Requirements 3.9
    Settlement and Agriculture 3.9
      Data Requirements 3.10
    World War II and the DTC 3.10
      Data Requirements 3.11
    Operation Desert Strike 3.11
      Data Requirements 3.11
Resources of Tribal or Cultural Significance 3.12
  Burial Sites 3.12
  Intaglios/Geoglyphs 3.12
  Resource Collection Areas 3.13
  Sacred Places and Places of Power 3.13
  Traditional-Event Sites 3.14
  Trails 3.14
  Habitation Sites 3.15
Methods of Data Collection 3.15
  Background and Archival Research Methods 3.16
  Records-Search Methods 3.17
  Native American Coordination 3.17
  Pedestrian Archaeological Survey Methods 3.17
  Site Recording Methods 3.19
  Site Types within the APE 3.19
   Prehistoric Site Types 3.20
    Artifact Concentrations 3.20
    Rock Feature Sites 3.20
    Rock Features with Artifact Scatters 3.20
    Trails 3.20
   Historical-Period Site Types 3.22
    Artifact Concentrations 3.22
    Roads/Trails 3.22
    Military Sites 3.22
    Water Well Sites 3.22
    Survey Markers 3.23
   Multicomponent Sites 3.23

4. Results, ***by Patrick B. Stanton, Dean M. Duryea, Jr., Karen K. Swope, Jason D. Windingstad, and Michael K. Lerch* 4.1**
Records-Search Results 4.1
  Previous Cultural Resource Studies 4.1
  Previously Recorded Cultural Resources 4.4

NRHP-Listed Sites within the Indirect APE 4.5
Archaeological Survey Results 4.6
Prehistoric Sites 4.6
Artifact Concentrations 4.6
Ceramic Scatters 4.6
Lithic Scatters 4.9
Rock Feature Sites 4.9
Rock Features with Artifact Scatters 4.12
P-33-001821 .... 4.12
SRI-17 .... 4.16
SRI-83 .... 4.16
SRI-1059 .... 4.16
SRI-2021 .... 4.17
SRI-3019 .... 4.17
SRI-4241 .... 4.17
SRI-6033 .... 4.17
SRI-6034 .... 4.17
Trails 4.18
Historical-Period Sites 4.18
Pre-DTC/C-AMA/Homesteading (Pre-1942) Sites 4.18
SRI-1024 .... 4.21
SRI-3014 .... 4.21
SRI-4045 .... 4.21
DTC/C-AMA (1942–1944) Sites 4.22
Post-DTC/C-AMA (Post–1942) Sites 4.22
General and Multitemporal Historical-Period Sites 4.22
Multicomponent Sites 4.32
Sites That Could Not Be Relocated 4.34
Isolated Resources 4.34
Architectural Resources 4.40
Buried-Site Sensitivity 4.40
Buried-Site Sensitivity Models 4.40
Limitations of Sensitivity Models 4.42
Model Construction 4.42
Model Explanation 4.43
Catellus/BLM Land Exchange Project Sensitivity Study 4.47
Summary and Interpretation 4.48

5. Evaluations and Recommendations, ***by Michael K. Lerch, Karen K. Swope, Scott Kremkau, and Patrick B. Stanton*** **........ 5.1**
NRHP-Eligibility Recommendations 5.1
NRHP-Eligibility Criteria 5.1
Research Potential 5.2
Integrity 5.2
Criteria of Adverse Effect 5.2
NRHP Site Evaluations 5.3
Historical-Period Sites 5.3
Artifact Concentrations 5.3
Military-Activity Sites 5.4
Water-Well Sites 5.4
Survey Markers 5.5
Roads/Trails 5.5

        Architectural Resources 5.7
    Prehistoric Sites 5.7
        Artifact Concentrations 5.7
        Rock Feature Sites 5.7
        Rock Features with Artifact Scatters 5.8
        Trails 5.8
    Multicomponent Sites 5.8
    NRHP-Eligibility Summary 5.8
Management Recommendations 5.10
    Recommended Eligible Sites 5.10
    Possibly Eligible Sites 5.10
    Additional Testing of Rock Feature Sites 5.11
    Mule Tank Discontiguous Rock Art District Viewshed 5.11
    Buried-Site Sensitivity 5.11

Appendix A. Soil Descriptions **A.1**

Appendix B. Site Evaluations and NRHP Eligibility **B.1**

References Cited **Refs.1**

Confidential Appendixes .... **Separate Volume**

Appendix C. Maps of Archaeological Resources **C.**1

Appendix D. Site Records .... **forthcoming**

Appendix E. Isolate Records .... **forthcoming**

LIST OF FIGURES

Figure 1.1. Vicinity map of the DQSP 1.2

Figure 1.2. Project location map of the DQSP 1.3

Figure 2.1. Territories of Native American groups living in the project region, ca. 1825, before the Halchidhoma were expelled in 1826 ..... 2.10

Figure 2.2. Major historical-period transportation routes in the project region 2.28

Figure 2.3. 1918 GLO plat of 1917 survey of Township 7 South, Range 21 East, SBBM, showing location of SRI-2333 ..... 2.30

Figure 2.4. 1953 map showing proposed Palo Verde Mesa irrigation canal. 2.35

Figure 2.5. Location of the DQSP in relation to DTC/C-AMA camps in the region. 2.37

Figure 3.1. Fire-affected rock feature 3.21

Figure 3.2. Well-traveled prehistoric trail exhibiting compacted surface 3.21

Figure 3.3. 1917 GLO survey trail 3.23

Figure 4.1. Chalcedony biface fragments associated with P-33-001821 ..... 4.15

Figure 4.2. Sperry ball turret ammunition door 4.35

Figure 4.3. Shell shirt button 4.35

Figure 4.4. Close-up view of punctated pattern on ceramic body sherd 4.41

Figure 4.5. Possible Gypsum point 4.41

Figure 4.6. Distribution of soil types within the direct APE 4.45

Figure 4.7. Overview of Chuckawalla soil series in the northern portion of the direct APE 4.46

Figure 4.8. Intersection of Chuckawalla and Carrizo soil series in northwestern portion of project area 4.46

Figure 4.9. Overview of aeolian sand deposits within the Rositas soil series 4.48

LIST OF TABLES

Table 1.1. Project Personnel and Qualifications 1.6

Table 2.1. Plant Taxa Identified within the Project Area 2.4

Table 2.2. Land Claimants Associated with the Direct APE 2.34

Table 3.1. Repositories Consulted for Archival Information 3.16

Table 4.1. Previous Cultural Resources Studies within the APE 4.2

Table 4.2. Previously Recorded Archaeological Sites within the APE 4.4

Table 4.3. Previously Recorded Isolated Artifacts within the APE 4.5

Table 4.4. Previously Recorded and Newly Discovered Artifact Concentrations within the Direct APE, by Site Type 4.7

Table 4.5. Sherd Types Associated with Ceramic Scatters 4.8

Table 4.6. Previously Recorded and Newly Discovered Rock Feature Sites within the Direct APE 4.10

Table 4.7. Previously Recorded and Newly Discovered Rock Feature Sites with Artifact Scatters within the Direct APE 4.13

Table 4.8. Previously Recorded and Newly Discovered Trails within the Direct APE 4.19

Table 4.9. Previously Recorded and Newly Discovered Pre-DTC/C-AMA/Homesteading (Pre-1942) Sites within the Direct APE, by Site Type 4.20

Table 4.10. Previously Recorded and Newly Discovered DTC/C-AMA (1942–1944) Sites within the Direct APE, by Site Type 4.23

Table 4.11. Previously Recorded and Newly Discovered Post-DTC/C-AMA (Post-1944) Sites within the Direct APE, by Site Type 4.28

Table 4.12. Previously Recorded and Newly Discovered General Historical-Period/Multitemporal Sites within the Direct APE, by Site Type 4.30

Table 4.13. Previously Recorded and Newly Discovered Multicomponent Sites within the Direct APE, by Site Type 4.33

Table 4.14. Distribution of Ceramic Types among Isolated Resources within the Direct APE........ 4.36

Table 4.15. Sensitivity Model Summary and Explanation........ 4.44

Table 5.1. Survey Crewmembers on the 1917 GLO Survey of Township 7 South, Range 21 .... 5.6

Table 5.2. Summary of NRHP-Eligible Sites and Recommendations 5.9

ABSTRACT

Project: Desert Quartzite Solar Project, BLM Project Number CACA 049397

Applicant: Desert Quartzite, LLC, A Wholly Owned Subsidiary of First Solar Development, Inc.

Agency: Bureau of Land Management (BLM), Palm Springs–South Coast Field Office

Permits: BLM Permit for Archaeological Investigations CA-13-06, Fieldwork Authorization 66.66-15-02

Project location:

USGS 7.5-minute Quadrangle	Township/Range (BM)	Sections
Ripley, California	7 South/21 East (SBBM)	11, 12, 13, 14, 23, 24
Roosevelt Mine, California	7 South/21 East (SBBM)	3, 4, 5, 6, 9, 10, 11, 14, 15, 22, 23

Key: BM = baseline and meridian; SBBM = San Bernardino Baseline and Meridian; USGS = U.S. Geological Survey.

Dates of Fieldwork: October 13–December 11, 2014; February 3, 2015

Acreage of Direct Area of Potential Effects (APE): 5,010

Total Acreage Surveyed: 5,010

Total Acreage Surveyed on Bureau of Land Management Land: 4,850; **Private Land:** 160

Acreage of Indirect APE: 18,060

Results—Direct APE: In total, 278 sites were recorded within the direct APE, including 181 historical-period sites, 89 prehistoric sites, and 8 multicomponent sites. In addition, 620 isolated artifacts were recorded (Appendix B).

Results—Indirect APE: Based on the results of the records search completed prior to the survey fieldwork and reported in the research design (Kremkau, Stanton, et al. 2014:3.5, Tables 3.2 and 3.3), 220 sites are located within the indirect APE, defined as a 1-mile radius around the direct APE and a travel corridor into the Mule Mountains, including 89 historical-period sites, 95 prehistoric sites, and 36 multicomponent sites.

Sites Recommended Eligible for Listing in the National Register of Historic Places (NRHP): Within the direct APE, 7 prehistoric sites and the prehistoric component of 1 multicomponent site are recommended eligible for listing in the NRHP on the basis of available information. An additional 9 prehistoric sites are possibly eligible for listing in the NRHP, pending additional research and formal evaluation.

Two sites recommended NRHP eligible, P-33-000343 and P-33-001821, are within the direct APE and also extend into the indirect APE. Two additional sites, P-33-000733 and P-33-000504, are listed in the NRHP as the Mule Tank Discontiguous Rock Art District and are situated within the indirect APE.

Sites Recommended Not Eligible for Listing in the NRHP: The remaining 261 sites and all 620 isolates within the direct APE are recommended not eligible for listing in the NRHP.

Management Recommendations: Sites that are listed in or recommended eligible for listing in the NRHP should be avoided. Until the possibly eligible sites are formally evaluated, they should be assumed NRHP eligible for planning purposes.

ACKNOWLEDGMENTS

Many people deserve thanks for their help in organizing and conducting this project. Director of Project Execution Roy Skinner and Director of Project Development James F. Cook of First Solar Development, Inc. (First Solar), along with David Watkins, assisted us throughout the course of the study and kept us apprised of changes in the project configuration and schedule. Laura Abram and Ashley Hudgens, First Solar public-relations staff, helped to coordinate Native American outreach for the project. We appreciate the assistance of Attorney General Rebecca A. Loudbear, Deputy Attorney General Nancy H. Jasculca, and Law Clerk Douglas Bonamici of the Office of the Attorney General, Colorado River Indian Tribes (CRIT); Director Wilene Fisher-Holt and Coordinators Lisa Swick and Jessica Yazzie of the CRIT Museum; as well as tribal monitors Derrick Ameelyenah, Jr.; Noah Charles; Coy Eddy; Galen Fisher; Kyle Humeumptewa; Lawton Humeumptewa; Allan McCabe; Keith Nopah, Sr.; Alton Paddock; and Robert Pintor.

George Kline, Palm Springs Field Office archaeologist, and Tiffany Arend, California Desert District and former Renewable Energy Coordination Office archaeologist, Bureau of Land Management (BLM), assisted with review of the research design and area of potential effects definition, joined us in the field for a review of selected portions of the project, and provided ongoing feedback regarding the information needs and policies of their agency. We thank Mr. Kline and Ms. Arend, as well as Roderic N. McLean of LSA Associates, who served as BLM’s third-party reviewer, for their comments and suggestions on the draft report. Dr. M. C. Hall, Rachel L. Jacobus, and Shaina Ho of the California Historical Resources Information System, Eastern Information Center, at the University of California, Riverside, assisted in the archaeological and historical records searches, reviewed site records, and assigned primary and trinomial designations. John Arreoloa, County of Riverside Transportation Department Survey Division, helped us obtain surveyor’s field notes from the 1917 General Land Office survey of Township 7 South, Range 21 East, San Bernardino Baseline and Meridian. We are also indebted to Robert Ray, Senior Project Manager with AECOM, for sharing archival data related to wells and irrigation on the project site.

At Statistical Research, Inc., the research design and ethnographic overview were prepared by the senior editor and Dr. Scott H. Kremkau, assisted by Patrick B. Stanton; Dean Duryea, Jr.; Carly Whelan; and Dr. Mark Q. Sutton. The project director for the archaeological field survey was Patrick B. Stanton. Field crewmembers included Dean Duryea and Matthew Hyland, who served as crew chiefs and also led the prehistoric and historical-period site recording crews, respectively. Robert Foster, Elizabeth Gonzalez-Negrete, Devin Johnson, Melanie Lerman, Dr. Justin Lev-Tov, Garnett Smith, Joseph Woods, and Kevin Wright served as crewmembers for the survey and site recording portions of the project.

Dr. Tim M. Mills prepared the ethnobotanical review; Dr. Karen K. Swope prepared the historical-period portions of the background, research design, results, and evaluations; and Jason D. Windingstad prepared the geoarchaeological background and buried-site sensitivity model in the report. Stephen Norris and Matthew Hyland did the site and project location mapping and geographic information system analysis. Luke Wisner prepared the graphics for the report and site records. Grant Klein edited and produced the report under the direction of Maria Molina. James J. Clark served as project manager and coordinated all staff logistics and scheduling. Janet C. Grenda managed the contracts. Thank you all.

Michael K. Lerch
Patrick B. Stanton
Karen K. Swope

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CHAPTER 1

Introduction

Michael K. Lerch and Scott H. Kremkau

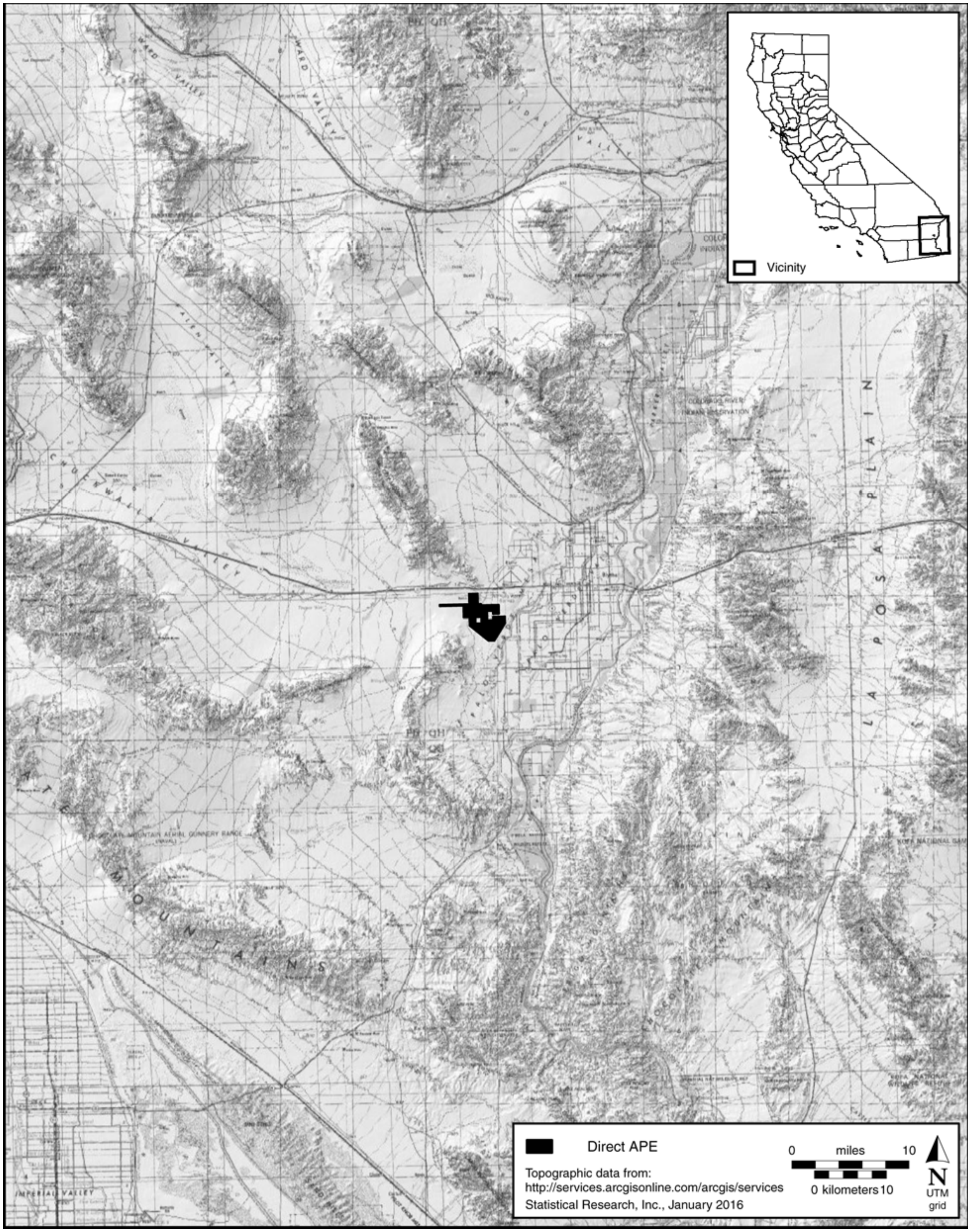
Desert Quartzite, LLC, a wholly owned subsidiary of First Solar Development, Inc. (First Solar), is proposing to develop, construct, and operate a 300-megawatt (MW) power generating solar photovoltaic (PV) facility in eastern Riverside County, California—the Desert Quartzite Solar Project (DQSP). At the request of First Solar, Statistical Research, Inc. (SRI), conducted a Class III archaeological survey of the project site to provide information for the Bureau of Land Management (BLM) and County of Riverside (County) to comply with federal and state environmental and historic-preservation laws and regulations.

The purpose of the study was to identify and evaluate archaeological resources within the project's area of potential effects (APE) regarding their eligibility for inclusion in the National Register of Historic Places (NRHP) and, for a portion of the project site, the California Register of Historical Resources (CRHR). The field survey was preceded by a records search and literature review, which were documented in a research design/work plan and an ethnographic literature review that served as the basis for initial consultation by the BLM with the State Historic Preservation Officer (SHPO) and interested Native American tribes.

Project Location

The proposed project area is located 0.8 km (1/2 mile) south of Interstate 10 and the community of Mesa Verde and about 13 km (8 miles) west of the city of Blythe (Figure 1.1). The DQSP area is located in Sections 11–14, 23, and 24, Township 7 South, Range 21 East (San Bernardino Baseline and Meridian [SBBM]), on the Ripley, California, 7.5-minute U.S. Geological Survey (USGS) topographic quadrangle and in Sections 3–6, 9–11, 14, 15, 22, and 23, Township 7 South, Range 21 East (SBBM), on the Roosevelt Mine, California, 7.5-minute USGS topographic quadrangle (Figure 1.2). The project site is situated on Palo Verde Mesa in eastern Riverside County, California. The study area is located in the Colorado Desert, with the McCoy Mountains to the north, the Mule Mountains to the southwest, Chuckwalla Valley to the west, and Palo Verde Valley and the Colorado River to the east.

The DQSP area is bounded on the southwest and southeast by existing transmission lines and access roads, including the Devers–Palo Verde Transmission Lines No. 1 (DPV1) and No. 2 (DPV2). An existing 7.5-MW solar PV project, the NRG Blythe Solar Power Plant, is located on 200 acres adjacent to the northern boundary of the DQSP site. A portion of the Blythe Mesa Solar Project, a 485-MW, 3,660-acre PV project approved by the County in 2014 and by the BLM in 2015, is located on a parcel of land that is surrounded on three sides (the north, west, and south) by the DQSP site. The DQSP is located within the Riverside East Solar Energy Zone (SEZ), identified as part of BLM's comprehensive Solar Energy Program (the Western Solar Plan) for utility-scale solar energy development on BLM-administered lands in six southwestern states, including California.


Vicinity
Direct APE
Topographic data from:
http://services.arcgisonline.com/arcgis/services
Statistical Research, Inc., January 2016
0 miles 10
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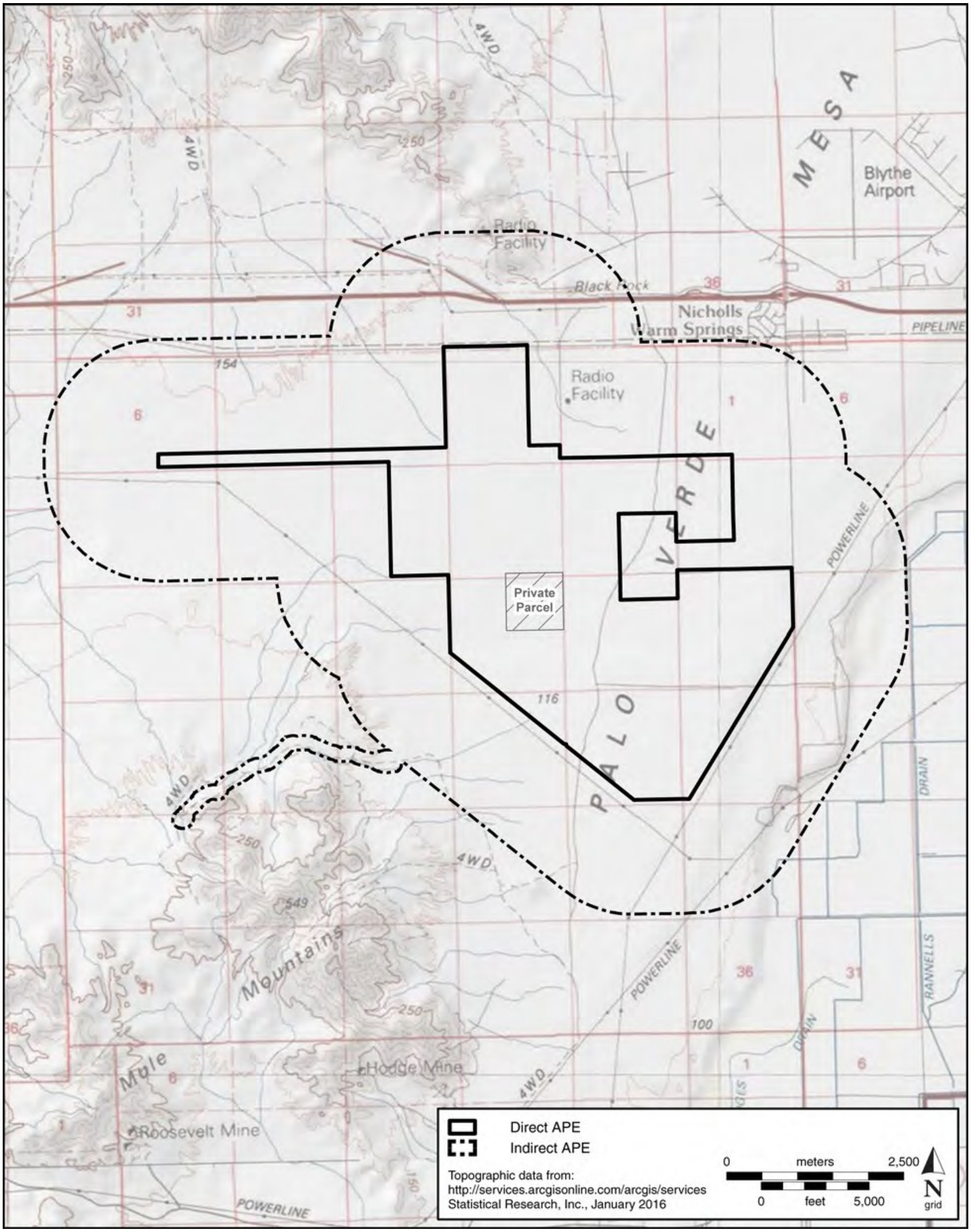
LA POSA PLAIN
MOUNTAINS
IMPERIAL VALLEY

Figure 1.1. Vicinity map of the DQSP.


Direct APE
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http://services.arcgisonline.com/arcgis/services
Statistical Research, Inc., January 2016
0 meters 2,500
0 feet 5,000
N grid
Private Parcel
Radio Facility
Black Rock
Nicholls Warm Springs
Blythe Airport
MESA
PALO VERDE
PIPELINE
POWERLINE
Mule Mountains
Hodge Mine
Roosevelt Mine
4WD
DRAIN
RANNELLS

Figure 1.2. Project location map of the DQSP.

Project Description

The DQSP includes a PV solar-facility site of approximately 3,560 acres on BLM land and 160 acres of private land, along with a corridor for generator tie lines (gen-tie lines) that extends for 3 miles and covers an area of 58 acres; this is all situated within a total project area of 5,010 acres. The total project area was initially defined on the basis of the right-of-way (ROW) grant application for a somewhat larger project footprint and associated buffer areas proposed in earlier versions of the DQSP Plan of Development (Desert Quartzite, LLC 2014).

The DQSP would consist of a single unit with a generating capacity of 300 MW. The proposed facilities on BLM-managed public land would include PV solar arrays, a gen-tie line, a 120-by-50 foot operations and maintenance building, an on-site substation, and ancillary facilities. The only facilities to be placed on the private land parcel would be solar arrays. The only linear facility extending out of the solar plant site would be the gen-tie line. The DQSP would use existing access roads.

The DQSP would involve the installation of thin-film solar modules made by First Solar, or other PV technology, mounted on either single-axis horizontal tracker structures, fixed-tilt mounting systems, or a combination of these two mounting systems. The mounting system for the PV modules would consist of steel posts driven into the ground to a depth of between 1.2 and 2.1 m (4 and 7 feet), and posts for single-axis tracking structures would need to be driven up to 3.7 m (12 feet) into the ground. The solar module assemblies would be organized into arrays. Each array would be approximately 800 feet long and 500 feet wide. The exact placement of the arrays within the DQSP area would be based on topography, hydrology, and geotechnical conditions and could also be modified to avoid cultural resources.

Applicable Regulations

Because most of the project area is on public land managed by the BLM, the project will require a BLM ROW grant (ROW No. CACA 049397). Issuance of a ROW grant for the project is considered an *undertaking* as defined by the National Historic Preservation Act (NHPA), and therefore, the project must comply with Section 106 of the NHPA, as amended (54 *U.S. Code* 300101), and its implementing regulations, 36 *Code of Federal Regulations* (CFR) 800, as well as BLM policies regarding cultural resources (BLM 2004). The BLM also must comply with the requirements of the National Environmental Policy Act (NEPA). The portion of the project on private land will require a Conditional Use Permit (CUP) from the County (Riverside County CUP No. 3721), along with review under the California Environmental Quality Act (CEQA), with the County as the lead CEQA agency. The BLM and the County will prepare a joint Environmental Impact Statement/Environmental Impact Report to meet the NEPA and CEQA requirements for the DQSP.

As part of data collection and analysis for compliance with Section 106 of the NHPA and the NEPA/CEQA review, First Solar contracted SRI to conduct a Class III archaeological resource inventory and evaluation for the APE. The purpose of the archaeological resource inventory was to identify, record, and evaluate historic properties and historical resources (cultural resources that are listed in or eligible for listing in the NRHP or CRHR) that may be affected by the project.

APE Definitions

Studies to identify and evaluate cultural resources must carefully establish the impact area, referred to in federal regulations as the APE, for the undertaking. We refer to the regulations implementing the NHPA for the following definition of APE:

> *Area of potential effects* means the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking [36 CFR 800.16(d)].

The APE considered for this study consists of the direct APE and the indirect APE, which are defined below. When the term "APE" is not defined as "direct" or "indirect," it refers to both together.

Direct APE

The direct APE is defined as the entire 5,010-acre area containing the ROW grant application area and gen-tie corridor. The direct APE includes 4,850 acres of BLM land and 160 acres of private land. It is the area where direct effects due to the implementation of the proposed development are possible (36 CFR 800.5[a][2][i]). Such direct effects to archaeological resources evaluated as NRHP eligible may include construction of perimeter fences and staging areas, grading for interior access roads, mowing and tilling to prepare the ground surface for installation of solar panels, trenching and excavation for electrical conduits and vaults, and construction of the gen-tie pylons and access road.

Within the direct APE, ground-disturbing activities would range in depths from 12–18 cm (5–7 inches) for the site surface preparation to 3.7 m (12 feet) for the solar-panel-support posts to 1.2 m (4 feet) for electrical-conduit trenches and to approximately 3 m (10 feet) for electrical vaults (Desert Quartzite, LLC 2014:35–38). These depths of disturbance, or the vertical APE, will be distributed across the project site at various locations within the direct APE. No mass grading is proposed for the DQSP.

Indirect APE

The indirect APE includes those areas outside of the direct APE that may contain historic properties that could be affected by the proposed project. The indirect APE takes into consideration the introduction of visual, atmospheric, or audible elements that could diminish the integrity of significant historic features of resources listed in, or eligible for listing in, the NRHP (36 CFR 800.5[a][2][v]). Based on the results of the literature review and archaeological records search presented in the research design and work plan (Kremkau, Stanton, et al. 2014), the indirect APE was defined initially as a 1-mile area extending around all sides of the direct APE that contained approximately 13,000 acres. This definition was included by the BLM in its initial consultation letter to the SHPO dated August 21, 2014 (Wakefield 2014), and the SHPO concurred (Roland-Nawi 2014). However, during subsequent government-to-government consultation between BLM archaeologists and interested tribal representatives, concerns were expressed over potential effects of the DQSP on two sites containing rock art and ceremonial features that are listed in the NRHP (George Kline, personal communication 2015), and the indirect APE was expanded to 18,060 acres to include those resources (see Figure 1.2).

No resources listed in or eligible for listing in the NRHP were located within the indirect APE as defined initially; however, two NRHP-listed resources, P-33-000504 and P-33-000773,[1] listed in the NRHP as the

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[1] Resources mentioned in this report are identified by several numbering systems. Generally, previously recorded sites are depicted on maps and listed in text and tables by their primary numbers, which consist of the letter P (for the Primary Record of the California Department of Parks and Recreation (DPR) recordation forms (DPR 523 series), the two-digit code for the relevant county, and sequentially assigned six-digit numbers (e.g., P-33-000010 refers to the tenth primary number assigned in Riverside County). Archaeological sites may also be listed by a trinomial designation. The trinomial consists of the two-letter code CA (for California), the three-letter code for the relevant county, and a sequentially assigned number (e.g., CA-RIV-3 refers to the third trinomial assigned in Riverside County). In addition, a suffix that indicates the presence of "prehistoric" or "historical-period" materials at a recorded property may be included. The lack of a suffix on a trinomial indicates the presence of exclusively prehistoric materials, the suffix H indicates the presence of exclusively historical-period materials, and the suffix /H indicates the presence of

Mule Tank Discontiguous Rock Art District, are located within the revised indirect APE, both located more than 1 mile from the DQSP boundary and the direct APE. Potential cumulative effects of the DQSP and other previous projects in the region on these resources are considered in this study.

Personnel Qualifications

All SRI personnel who worked on the project, including prehistoric and historical archaeologists, ethnographers, and geoarchaeologists, meet the Secretary of the Interior's Professional Qualifications Standards in their respective disciplines. The personnel involved with the implementation of this project have extensive experience in the region and have worked on a number of large renewable-energy projects across the western United States. SRI staff who contributed to the study are listed in Table 1.1, along with their qualifications, experience, and contributions to the study.

The professional staff responsible for conducting and reporting the archaeological field survey was assisted by specialists in SRI's Cartography and Geospatial Technologies department and support staff in its Publications and Accounting departments.

Table 1.1. Project Personnel and Qualifications

Name and Qualifications	Years of Experience	Role	Contribution to the Study
Michael K. Lerch, M.A., RPA	36	research director; senior principal investigator (archaeology and ethnography)	senior editor and coauthor of all chapters and appendixes
Mark Q. Sutton, Ph.D., RPA	48	principal investigator (prehistoric archaeology)	coauthor of Chapters 2 and 3
Karen K. Swope, Ph.D., RPA	31	principal investigator (historical archaeology)	coeditor and coauthor of Chapters 2–5
Scott H. Kremkau, Ph.D., RPA	20	principal investigator	coauthor of Chapters 1–3 and 5
Patrick B. Stanton, M.A., RPA	14	project director	field director of field survey, coeditor and coauthor of Chapters 4 and 5 and Appendixes B–E
Dean M. Duryea, Jr., M.A., RPA	9	crew chief	crew chief for field survey, coauthor of Chapter 4
Jason D. Windingstad, M.S.	15	geoarchaeologist	coauthor of Chapters 2 and 4 and Appendix A
Carly Whelan, Ph.D.	10	project director	coauthor of Chapter 2
Tim M. Mills, Ph.D., RPA	12	ethnobotanist	coauthor of Chapter 2
James J. Clark, M.A., RPA	19	project manager	coordinator of all staffing and field logistics

Key: RPA = Registered Professional Archaeologist.

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prehistoric and historical-period materials. Some archaeologists also use the suffix T to denote trail sites. Isolated archaeological resources and architectural resources are listed by primary number only. Finally, newly recorded sites are listed by their field numbers, which are indicated in this report as "SRI-*nnnn*." Primary numbers and trinomials for the newly recorded sites and isolates have been added to the master table of sites shown in Appendix B.

Organization of the Report

Prior to conducting the field survey reported here, SRI prepared an ethnographic literature review of the project area and the surrounding region (Kremkau, Whelan, et al. 2014) and a research design and work plan (Kremkau, Stanton, et al. 2014). The purpose of the ethnographic literature review, presented here in Chapter 2, was to identify Native American groups that might have traditional cultural properties (TCPs) in or near the project area, places of cultural or spiritual significance to Native American tribes, and/or important Native American resource-gathering locations that might be affected by the proposed project. The research design and work plan document included an overview of the natural and cultural setting of the project area, also presented here in Chapter 2, and contained a research design, presented here in Chapter 3, which serves as the theoretical and methodological foundation for the Class III archaeological inventory.

The results of a records search conducted at the California Historical Resources Information System (CHRIS) Eastern Information Center (EIC) at the University of California, Riverside, are contained in Chapter 4, followed by the results of the current archaeological survey and a geoarchaeological buried-site sensitivity model. The fieldwork was conducted pursuant to fieldwork authorization 66.66-15-02 issued by the BLM Palm Springs Field Office under SRI's BLM Permit No. CA-13-06.

The report concludes with an evaluation of the identified archaeological resources found within the direct APE for their eligibility for listing in the NRHP. Following the body of the report are appendixes containing detailed soil descriptions (Appendix A) and a table of evaluations for NRHP eligibility (Appendix B), along with a list of references cited. A compact disc contains a separate, confidential, volume with appendixes for archaeological site location maps (Appendix C) and California Department of Parks and Recreation (DPR) 523 forms for all identified archaeological sites and isolates (Appendixes D and E, respectively). The confidential appendixes contain sensitive information and are not intended for public distribution.

CHAPTER 2

Background Information

Scott H. Kremkau, Tim M. Mills, Mark Q. Sutton, Carly Whelan, Karen K. Swope,
Jason D. Windingstad, and Michael K. Lerch

In this chapter, we provide background information on the environmental and cultural settings of the study area, followed by a summary of ethnographic literature pertaining to the Native American groups who have lived in the area and used its resources, including the Cahuilla, Chemehuevi, Mojave, Halchidhoma, and Quechan. We also review the historical-period uses of the area, with a focus on mining, transportation, settlement and agriculture, and military activities.

Environmental Setting

The DQSP is located on the western side of the Colorado River, above the Palo Verde Valley (see Figure 1.1). The region is part of the Colorado Desert geomorphic province, an area that includes both sides of the lower Colorado River and Coachella and Imperial Valleys of California (Jenkins 1980).

High temperatures during the summer months average between 38°C (100°F) and 43°C (109°F). During the winter, the mean temperature falls to about 21°C (70°F) during the day, with lows reaching near 4°C (40°F) at night. However, summer temperatures may reach as high as 46°C–49°C (115°F–120°F) for short durations. Average annual precipitation in the area is 9.1 cm (3.6 inches); most of this falls between December and March (WorldClimate.com 2012), but there are occasional summer thunderstorms in August and September. Such single-event thunderstorms can result up to 15.2 cm (6 inches) of rainfall in a short period of time and result in flash floods that can alter normal drainage patterns.

Geology

The DQSP is located in the Colorado Desert, west of the Colorado River—more specifically, on Palo Verde Mesa, along the western edge of the Palo Verde Valley (see Figure 1.2). Elevations on the project site range from 110 to 145 m (330 to 475 feet) above mean sea level. The Colorado Desert lies mostly within southeastern California but extends into western Arizona and northern Mexico. It is characterized by low elevations, hot summers, warm winters, and low precipitation. The Palo Verde Mesa is one of a number of ancient river terraces associated with the Pleistocene course of the Colorado River. Several steep-sided ridges are located just above the floodplain and provide sources of lithic materials, including both igneous and metamorphic rocks. Because of the nature of the geology and soils within the project area, there is potential for buried resources to be present. Buried resources may be found in distal alluvial-fan deposits and beneath aeolian sand deposits and dunes. Further information regarding buried-site sensitivity can be found in Chapter 4.

The Colorado River, which forms the border between California and Arizona, originates in the Rocky Mountains and flows generally south through the southwestern Unites States and into the Gulf of California, in Mexico. As the river flows south from the Colorado Plateau, it enters a shallow valley where it forms a broad floodplain (Jahns 1954) that can reach up to 18 km in width. Much of the floodplain has been converted to farmland, but before recent development, the area formed a large wetland that would have been home to a variety of flora and fauna. The river bottom also was used by the late prehistoric and ethnographic inhabitants of the region to practice floodplain agriculture that focused on maize, beans, squash and gourds, and melons, among other plants (Castetter and Bell 1951:97–130).

Flora

The Colorado Desert is generally considered the western extension of the Sonoran Desert and corresponds to the Lower Colorado Valley subdivision of the Sonoran Desert (Shreve 1951). Overall, the vegetation of the Colorado Desert is considerably more diverse than in the Mojave Desert to the north. This is, in part, a result of the lack of freezing temperatures, which allows frost-sensitive and arboreal species to survive. A bimodal rainfall pattern, which produces summer precipitation, is also responsible for elevated levels of seasonal annuals. Summer precipitation varies significantly from west to east, with Shreve having reported that summer rainfall increases from approximately 5 percent of the total on the western edge to 43 percent at the Colorado River and 50 percent at Tucson, Arizona.

An interrelationship with the westerly sections of the Sonoran Desert is obvious, although large succulent species of Arizona are conspicuously absent. The most widespread vegetation community is Desert Scrub. The southern version typically includes a wider range of other plants, in addition to creosote bush. More than half of the desert's plant species are herbaceous annuals, and appropriately timed winter rains produce abundant early spring wildflowers. In the southern portion of the region, the additional moisture supplied by summer rainfall promotes the germination of summer annuals. Schoenherr and Burk (2007) proposed seven distinct plant communities within the Colorado Desert: (1) Creosote Bush Scrub; (2) Cactus Scrub; (3) Saltbush Scrub; (4) Alkali Sink; (5) Microphyll Woodland; (6) Palm Oasis; and (7) Psammophyte Scrub. These are based on assemblages of species with similar adaptive strategies, but they basically delineate microclimatic boundaries and soil types, with soil salinity also being a major contributor.

Much of the region's flora evolved out of Madro-Tertiary sclerophyllous and microphyllous shrub (Raven and Axelrod 1978; Brown 1982). Subsequent to the Eocene, dry climates expanded, culminating in the greatest severity during the Pliocene. By the close of the Tertiary period, the major families, genera, and species of the Colorado Desert were in place; however, there have been significant biogeographic shifts in terms of both elevation and latitude. Pleistocene winter climates were prohibitive for much of the subtropical taxa characteristic of the southern Sonoran Desert, and during the early Holocene, xeric pinyon-juniper woodlands expanded into areas presently under a dominant summer monsoon rainfall pattern. Further reductions in annual and summer rainfall resulted in the present assemblages of diverse subtropical and warm-temperature scrub communities in the middle–late Holocene.

Brown (1982:12) delineated a lower Colorado River Valley subdivision to the Sonoran Desert that is functionally equivalent to the Colorado Desert, stating that the subdivision plays a central role in the overall Sonoran Desert, because it alone is in contact with all of the various subdivisions of the desert, as well as Mohave and California coastal scrub. Plant growth in this region is typically open and broken as a result of intense competition for scarce water resources. Vegetation patterns are frequently tied to closed or dendric drainageways offset by contravening interfluves. A high percentage of arboreal species within these drainages are aphyllous or microphyllous or carry the chlorophyll in or beneath the bark or stems. In more-arid areas, perennial plants are often absent, having been replaced by ephemeral species that survive by taking advantage of summer rainfall.

Table 2.1 shows a list of 125 taxa that have been previously identified within the project area. Many of these plants were used for food or were considered medicinal or therapeutic by the prehistoric inhabitants of the area (Lerch et al. 2013; for a more detailed discussion, see sources such as Bean and Saubel 1972; Castetter and Bell 1951; Forde 1931; Lawlor 1995). In total, 27 families are represented on the list. Particularly noteworthy are relatively large numbers of species in the Asteraceae, Boraginaceae, Chenopodiaceae, and Fabaceae families. Asteraceae are generally herbaceous, with a distribution mainly within arid and semiarid regions of subtropical and lower temperate latitudes and, from an economic perspective, Asteraceae is an economically important family. Members provide products such as cooking oils, greens, seeds, sweetening agents, and herbal infusions. Chenopodiaceae provide edible seeds. Boraginaceae hold astringent properties, whereas others are mucilaginous and useful for their emollient properties. Many contain volatile oils and may serve as an antidote to poisons by functioning as diaphoretics. Fabaceae is a large and economically important family that includes trees, shrubs, and herbaceous perennials or annuals, including the desert staple of honey mesquite (*Prosopis glandulosa*). Their preference for semiarid to arid habitats is closely correlated with their ability to colonize barren and marginal lands and fix atmospheric nitrogen via a symbiotic association with nodulating bacteria. Many species are used as staple foods, and their use, in general, is closely tied to the development of late agricultural societies in both the Old and New Worlds. Also important in this area are members of the Agavaceae and Cactaceae families, which provide geophytes, such as desert lily (*Hesperocallis undulata*), and edible cactus and cholla buds. Conspicuously absent are large numbers of families of annual monocots. Although the reasons for this remain unclear (Raven and Axelrod 1978:7), California does not typically have a high proportion of monocot species, with only about 85 species present (9 *Juncus*, 13 Cyperaceae, and 63 Poaceae) (Raven and Axelrod 1978:7). This stands in sharp contrast to the desert regions farther east, where in many areas, annual and perennial grasses either dominate or are closely integrated with desert scrub (Burgess 1995).

Fauna

A number of desert animals inhabit the greater Colorado Desert, including mammals, such as desert bighorn sheep (*Ovis canadensis nelsoni*), desert mule deer or burro deer (*Odocoileus hemionus eremicus*), coyotes (*Canis latrans*), gray foxes (*Urocyon cinereoargenteus*), kit foxes (*Vulpes macrotis*), various mouse species (*Peromyscus* spp. and *Perognathus* spp.), squirrels (*Citellus* spp. and *Spermophilus* spp.), and lagomorphs (*Lepus californicus* and *Sylvilagus audubonii*); reptiles, including rattlesnakes (*Crotalus* spp.), desert tortoise (*Gopherus agassizii)* and a variety of lizards (*Crotaphytus* spp., *Dipsosaurus* spp., *Sceloporus* spp., *Streptosaurus* spp., and *Urosaurus* spp.); and birds, such as turkey vultures (*Cathartes aura*), red-tailed hawks (*Buteo jamaicensis*), mourning doves (*Zenaida macroura*), and ravens (*Corvus corax*). From prehistory through the early twentieth century, pronghorn (*Antilocapra americana*) were present in parts of the desert, such as the Coachella Valley, but they have since been pushed out by modern development (Jaeger 1965).

The presence of the Colorado River also provided people with access to additional aquatic species not available elsewhere in the deserts. These include shellfish, such as the freshwater mussel (*Anodonta dejecta*), and a variety of other fish species, such as the humpback sucker (*Xyrauchen texanus*), the Colorado River bonytail chub (*Gila elegans*), the Colorado pikeminnow (*Ptychocheilus lucius*), the striped mullet (*Mugil cephalus*), and the desert pupfish (*Cyprinodon macularius*). Waterfowl include the great blue heron (*Ardea herodias*) and American coot (*Fulica americana*), as well as a variety of ducks and geese (Schoenherr 1992).

Table 2.1. Plant Taxa Identified within the Project Area

Scientific Name	Family	Abundance
Abronia villosa	Nyctaginaceae	common
Achyronychia cooperi	Caryophyllaceae	occasional
Acmispon strigosus	Fabaceae	common
Allionia incarnata	Nyctaginaceae	occasional
Ambrosia dumosa	Asteraceae	common
Ambrosia salsola	Asteraceae	scarce
Aristida adscensionis	Poaceae	occasional
Aristida oligantha	Poaceae	scarce
Asclepias subulata	Apocynaceae	scarce
Astragalus aridus	Fabaceae	locally common
Astragalus didymocarpus	Fabaceae	occasional
Astragalus insularis var. *harwoodii*	Fabaceae	locally common
Astragalus nuttallianus var. *imperfectus*	Fabaceae	locally abundant
Atriplex canescens	Chenopodiaceae	scarce
Atriplex polycarpa	Chenopodiaceae	scarce
Baileya pauciradiata	Asteraceae	occasional
Bebbia juncea	Asteraceae	scarce
Boerhavia triquetra var. *intermedia*	Nyctaginaceae	locally common
Boerhavia wrightii	Nyctaginaceae	common
Bouteloua aristidoides	Poaceae	occasional
Bouteloua barbata	Poaceae	occasional
Brassica tournefortii[a]	Brassicaceae	common/locally abundant
Calycoseris wrightii	Asteraceae	occasional
Caulanthus lasiophyllus	Brassicaceae	occasional
Chaenactis carphoclinia	Asteraceae	occasional
Chaenactis stevioides	Asteraceae	abundant
Chenopodium album[a]	Chenopodiaceae	scarce
Chenopodium murale[a]	Chenopodiaceae	scarce
Chorizanthe brevicornu	Polygonaceae	occasional
Chorizanthe corrugata	Polygonaceae	occasional
Chorizanthe rigida	Polygonaceae	occasional
Chylismia brevipes	Onagraceae	scarce
Chylismia claviformis ssp. *aurantiaca*	Onagraceae	common
Croton californicus	Euphorbiaceae	scarce
Cryptantha angustifolia	Boraginaceae	abundant
Cryptantha costata	Boraginaceae	occasional
Cryptantha maritima	Boraginaceae	occasional
Cryptantha micrantha	Boraginaceae	occasional
Cryptantha nevadensis	Boraginaceae	scarce
Cryptantha pterocarya var. *pterocarya*	Boraginaceae	scarce
Cylindropuntia echinocarpa	Cactaceae	scarce
Cynodon dactylon[a]	Poaceae	scarce

Scientific Name	**Family**	**Abundance**
Dalea mollis	Fabaceae	occasional
Dalea mollissima	Fabaceae	occasional
Dicoria canescens	Asteraceae	occasional
Ditaxis neomexicana	Euphorbiaceae	scarce
Dithyrea californica	Brassicaceae	occasional
Encelia farinosa	Asteraceae	scarce
Encelia frutescens	Asteraceae	scarce
Eremalche exilis	Malvaceae	occasional
Eremalche rotundifolia	Malvaceae	scarce
Eremothera boothii	Onagraceae	occasional
Eriastrum harwoodii	Polemoniaceae	scarce
Eriogonum inflatum	Polygonaceae	scarce
Eriogonum pusillum	Polygonaceae	scarce
Eriogonum reniforme	Polygonaceae	scarce
Eriogonum thomasii	Polygonaceae	occasional
Eriogonum trichopes	Polygonaceae	occasional
Erodium texanum	Geraniaceae	common
Eschscholzia minutiflora	Papaveraceae	scarce
Eschscholzia parishii	Papaveraceae	scarce
Eucalyptus sp.[a]	Myrtaceae	scarce
Euphorbia abramsiana	Euphorbiaceae	scarce
Euphorbia micromera	Euphorbiaceae	common
Euphorbia polycarpa	Euphorbiaceae	common
Euphorbia setiloba	Euphorbiaceae	occasional
Ferocactus cylindraceus	Cactaceae	scarce
Funastrum cynanchoides	Apocynaceae	scarce
Funastrum hirtellum	Apocynaceae	scarce
Funastrum utahense	Apocynaceae	scarce
Geraea canescens	Asteraceae	common
Hesperocallis undulata	Agavaceae	common
Hilaria rigida	Poaceae	locally common
Kallstroemia californica	Zygophyllaceae	common/locally abundant
Krameria bicolor	Krameriaceae	occasional
Larrea tridentata	Zygophyllaceae	common/dominant shrub
Langloisia setosissima ssp. *setosissima*	Polemoniaceae	scarce
Lepidium lasiocarpum var. *lasiocarpum*	Brassicaceae	common
Loeseliastrum schottii	Polemoniaceae	occasional
Lupinus arizonicus	Fabaceae	scarce
Malacothrix glabrata	Asteraceae	occasional
Mammillaria tetrancistra	Cactaceae	scarce
Marina parryi	Fabaceae	occasional
Mentzelia albicaulis	Loasaceae	occasional

continued on next page

Scientific Name	**Family**	**Abundance**
Mentzelia longiloba	Loasaceae	occasional
Monoptilon bellioides	Asteraceae	occasional
Nama demissum	Boraginaceae	scarce
Oenothera deltoides	Onagraceae	common/locally abundant
Oenothera primiveris	Onagraceae	scarce
Oligomeris linifolia	Resedaceae	occasional
Olneya tesota	Fabaceae	scarce
Palafoxia arida	Asteraceae	occasional
Parkinsonia florida	Fabaceae	scarce
Pectis papposa	Asteraceae	common/locally abundant
Pectocarya heterocarpa	Boraginaceae	common
Pectocarya platycarpa	Boraginaceae	common
Pectocarya recurvata	Boraginaceae	scarce
Perityle emoryi	Asteraceae	scarce
Phacelia crenulata var. *ambigua*	Boraginaceae	occasional
Phacelia crenulata var. *crenulata*	Boraginaceae	occasional
Phacelia crenulata var. *minutiflora*	Boraginaceae	occasional
Phacelia ivesiana	Boraginaceae	scarce
Plagiobothrys jonesii	Boraginaceae	scarce
Plantago ovata	Plantaginaceae	common
Proboscidea althaeifolia	Martyniaceae	occasional
Prenanthella exigua	Asteraceae	scarce
Polygonum aviculare ssp. *depressum*[a]	Polygonaceae	scarce
Prosopis glandulosa	Fabaceae	scarce
Psathyrotes ramosissima	Asteraceae	scarce
Psorothamnus emoryi	Fabaceae	occasional
Rafinesquia neomexicana	Asteraceae	common
Salsola tragus[a]	Chenopodiaceae	occasional/locally abundant
Schismus barbatus[a]	Poaceae	common/widespread
Sphaeralcea angustifolia	Malvaceae	scarce
Stephanomeria exigua	Asteraceae	occasional
Stephanomeria pauciflora	Asteraceae	occasional
Stillingia spinulosa	Euphorbiaceae	scarce
Stipa hymenoides	Poaceae	occasional
Streptanthella longirostris	Brassicaceae	occasional
Tamarix ramosissima[a]	Tamaricaceae	scarce
Tidestromia suffruticosa var. *oblongifolia*	Amaranthaceae	scarce
Tiquilia palmeri	Boraginaceae	scarce
Tiquilia plicata	Boraginaceae	locally common
Tribulus terrestris[a]	Zygophyllaceae	scarce

Sources: Quartzite Fall 2012 and Spring 2013 Plant List. In: Draft Biological Resources Technical Report, Desert Quartzite Solar Project, Riverside County, California, Appendix F (January 2014). BLM Case File CACA-43937. Prepared by Ironwood Consulting, Inc. On file, First Solar, Inc.

Note: All nomenclature conforms to Baldwin et al. 2012.

[a] Nonnative taxa.

Cultural Setting

The cultural setting of the study area included three prehistoric periods, which culminated in the ethnographic cultures of the lower Colorado River region at the time of historic contact. Following a review of the Native American cultures of the study area, we summarize historical-period land uses.

Prehistoric Background

The prehistory of the Colorado Desert is poorly understood, although a number of recent studies have greatly improved our knowledge. Treatments of the region include the classic works of Rogers (1939, 1945, 1966), von Till Warren et al. (1981), Warren (1984), and more-recent studies by Schaefer (1994a), Love and Dahdul (2002), and Schaefer and Laylander (2007). Schaefer (1994a) defined three principal prehistoric periods: the Paleoindian, Archaic, and Patayan (see also Love and Dahdul 2002); this sequence is generally followed below.

The Paleoindian Period (12,000–8500 B.P.)

Paleoindian groups, probably with Clovis complex technology, occupied much of California beginning about 12,000 B.P. There is very little evidence of a Paleoindian occupation of the Colorado Desert, although there are notable exceptions, such as a Paleoindian fluted point found recently at CA-RIV-11733 near Ford Dry Lake in Chuckwalla Valley (George E. Kline, personal communication 2015) and another fluted point discovered at CA-RIV-23891 north of the project area in the McCoy Mountains (Kline 2014). The reasons for this are unclear but may be related to a lack of habitat for the large game hunted by Clovis people. More evidence of occupation of the desert region during this early period is coming to light, however. Very recent surveys for solar development in the project region have identified fluted and stemmed points and artifact assemblages mirroring those of the Pinto Basin in Joshua Tree National Park (George E. Kline, personal communication 2015; Newland 2013:39–40).

Across much of western North America, the Clovis complex developed into the Western Stemmed Point tradition or Western Pluvial Lakes tradition after 10,000 B.P. (Bedwell 1973), probably in response to the warming and drying climate of the early Holocene. This transition marked the beginning of the Archaic period, the post-Paleoindian/pre-farming period in the Colorado River region.

The Archaic Period (8500–1500 B.P.)

The Archaic period is associated with western Arizona and the Colorado River region and begins about 8500 B.C. and lasts until ca. A.D. 500, when agriculture became the dominant subsistence system along the Colorado River. The Archaic period has been called the San Dieguito tradition (Cordell 1997:93), although this term should only be applied to specific early Archaic period materials from southern California (e.g., Sutton 2013; Sutton et al. 2007). The basic early–middle Archaic period chronology used for portions of California and much of the Great Basin (Sutton et al. 2007; Warren 1984) is used here, divided into three sequential complexes: Lake Mojave, Pinto, and Gypsum; none of these is well represented in the project area. However, recent investigations at the Genesis Solar Power Project near Ford Dry Lake west of the project area have yielded projectile points characteristic of the both Lake Mojave and Pinto complexes (George E. Kline, personal communication 2015).

The earliest of the Archaic period complexes was originally called San Dieguito (Rogers 1939, 1958, 1966) but is now commonly called the Lake Mojave complex for the southern California deserts (Sutton 2013; Warren 1984). The Lake Mojave complex (ca. 10,000–8000 B.P.) is associated with late Pleistocene/early Holocene lakeshores and is characterized by crescents and large stemmed, shouldered, and lanceolate points (Sutton et al. 2007), with an economy presumably based on the exploitation of lacustrine resources plus terrestrial plants and animals (see Warren 1984). There is little evidence of a Lake Mojave complex presence near the project area, as Lake Mojave complex groups were probably just a few "small, mobile bands exploiting small and large game and collecting seasonally available wild plants" (Schaefer 1994a:63; see also Schaefer and Laylander 2007). However, two examples of Lake Mojave points have recently been identified at the Genesis Solar Power Project near Ford Dry Lake (George E. Kline, personal communication 2015).

The Pinto complex (ca. 8500–5000 B.P.) seems to have developed from, and with, the Lake Mojave complex, but it appears to have had a different subsistence focus, perhaps on large game (e.g., mountain sheep) rather than lacustrine resources. There may be an occupational hiatus between the Pinto complex and the later Gypsum complex, perhaps between ca. 5000 and 4000 B.P., when conditions became hotter and drier in the region (Sutton et al. 2007). The Pinto complex is poorly known in the region, as it is elsewhere in the West.

After ca. 4000 B.P., the Gypsum complex begins, as environmental conditions in the deserts improved and the Colorado Desert apparently was reoccupied (Love and Dahdul 2002; Schaefer 1994a:64). The new occupants brought with them a new settlement system (sites near streams) and new point types (Gypsum and Elko). Subsistence strategies included the exploitation of deer, mountain sheep, rabbits, and rodents, and there is evidence of increases in trade and social complexity. The Gypsum complex was followed by the Patayan period, when agriculture became the dominant subsistence activity.

One of the best-documented Archaic period sites in the Colorado Desert is the Indian Hill Rockshelter, located near Anza-Borrego State Park (McDonald 1992; Wilke et al. 1986), approximately 150 km southwest of the project area. Excavators found a number of rock-lined storage pits, as well as hearths and Elko Eared projectile points. Radiocarbon dates indicated that the site was occupied approximately 4,000 years ago. McDonald (1992) postulated that this was a base camp for hunter-gatherers who likely roamed over a large area in search of food. A rockshelter from Tahquitz Canyon also contained rock-lined pits and similar artifacts, but no radiocarbon dates were obtained at the site, so its true age remains unknown (Schaefer 2002). Taken together, these sites suggest that people lived in highly mobile bands and took advantage of a variety of resources in the area.

The Patayan Period (1500-200 B.P.)

The groups that occupied the lower Colorado River region during late prehistory were the direct ancestors of the ethnographic Mojave, Quechan, and Halchidhoma, known collectively as the River Yumans (Stewart 1983a). Most researchers believe that these prehistoric people, called the Patayan (also known as Yuman [Rogers 1945] or Hakataya [Schroeder 1957, 1979; see also Warren 1984]), formed from relatively small hunting and gathering bands living along the edges of the Colorado River beginning ca. 1500 B.P. (Bee 1983; Stewart 1983a). The Patayan chronology includes a preceramic period (Rogers 1945:170; Warren 1984; Waters 1982a, 1982b) and three ceramic periods, Patayan I, II, and III. Patayan I (ca. 1500–1000 B.P.) is marked by the introduction of both pottery and agriculture, although hunting and gathering remained important. During Patayan II (ca. 1000–500 B.P.), farming had become central, although hunting, gathering, and fishing remained important. Patayan III (ca. 500–100 B.P.) is generally the time after European contact.

After ca. 1000 B.P. (Patayan II), the long-distance trade networks that connected the Patayan and their neighbors to the east and west were firmly established. The tribes that lived in and near the project area had a complex system of trails. Some of these trails, such as the Coco-Maricopa Trail, were part of long-distance exchange networks that connected the tribes within the project area with the wider world. Other trails led to mountains, canyons, or other important or sacred sites (Bean and Vane 1978:6-40).

During the late prehistoric period, there was a significant increase in human occupation of the region, supported by the increase in agriculture. It is during this time that the intaglios, or geoglyphs, found throughout the Lower Colorado River area were probably built (Ezzo 1994; Ezzo and Altschul 1993). Intaglios are images created on the ground surface by the removal of the darker-colored surface layer to expose a lighter-colored soil layer beneath (von Werlhof 1995). Several groupings of intaglios are known between Blythe and the mouth of the Gila River (Ezzo 1994; Ezzo and Altschul 1993), and others are present at CA-RIV-773 located within the indirect APE of the DQSP on the northern Mule Mountains *bajada* (George E. Kline, personal communication 2015). Often, these intaglios mark sacred locations. Ceremonies were conducted at these places to commemorate mythic events and the beings and ancestors who took part in them (Bourke 1889; Johnson n.d.). Intaglio locations often also contain dance circles and dance paths (Kroeber 1925).

Ethnographic Background

The area along the Colorado River has been home to a number of Native American groups for thousands of years. Five main groups, belonging to two different language families, were present in or near the project area at the time of European contact: the Cahuilla and Chemehuevi of the Northern Uto-Aztecan (NUA) language family and the Mojave, Halchidhoma, and Quechan of the Yuman language family (Goddard 1996:Table 3; Golla 2011:117–122, 178–183) (Figure 2.1). The three Yuman-speaking groups—the Mojave, Halchidhoma, and Quechan—are sometimes collectively referred to as the River Yumans, as they share a number of cultural elements. The following section discusses each of the five tribes, presenting information on settlement and subsistence practices, sociopolitical organization, material culture, trade, conflict, and worldview and ritual practice.

Ethnographic Sources from the Colorado Desert

The ethnographic literature review builds on a large volume of data. A number of ethnographic studies have been conducted along the Colorado River and in the Colorado Desert and southwestern Arizona. These studies can broadly be divided into two types: (1) academic studies of Native American tribes and (2) studies used to provide assistance to state and federal agencies in developing land-management regulations and programs.

Academic Studies

Several academic studies of the five Native American tribes that live, or lived, near the project area—the Cahuilla, the Chemehuevi, the Mojave, the Halchidhoma, and the Quechan—were undertaken during the late nineteenth and early twentieth centuries, as well as more recently. Descriptions of Cahuilla culture from the early twentieth century include Barrows (1900) and Hooper (1920). Barrows was an ethnobotanist and explored the Cahuilla's extensive use of plants, whereas Hooper provided a broad ethnographic overview. More recently, Bean and his colleagues have presented a number of studies tackling a variety of subjects related to the Cahuilla. Bean (1972, 1978) provided summaries of Cahuilla lifeways and explored various aspects of leadership (Bean 1964). Bean and Saubel (1972) built upon the groundbreaking work of Barrows and provided additional information on Cahuilla plant use.

A number of ethnographic studies provide information on the Chemehuevi, the most thorough of which are by Euler (1966), Kelly (1934, 1936), Laird (1976), Powell (Fowler and Fowler 1971), and Roth (1976). Powell described some of the tribes he encountered during his exploration of the Grand Canyon area (Fowler and Fowler 1971). Laird was married to a Chemehuevi man, George Laird, and her memoirs (Laird 1976) provide an insider's view of many aspects of Chemehuevi society. She also published papers on the oral tradition and religious beliefs of the Chemehuevi (Laird 1974, 1980, 1984).

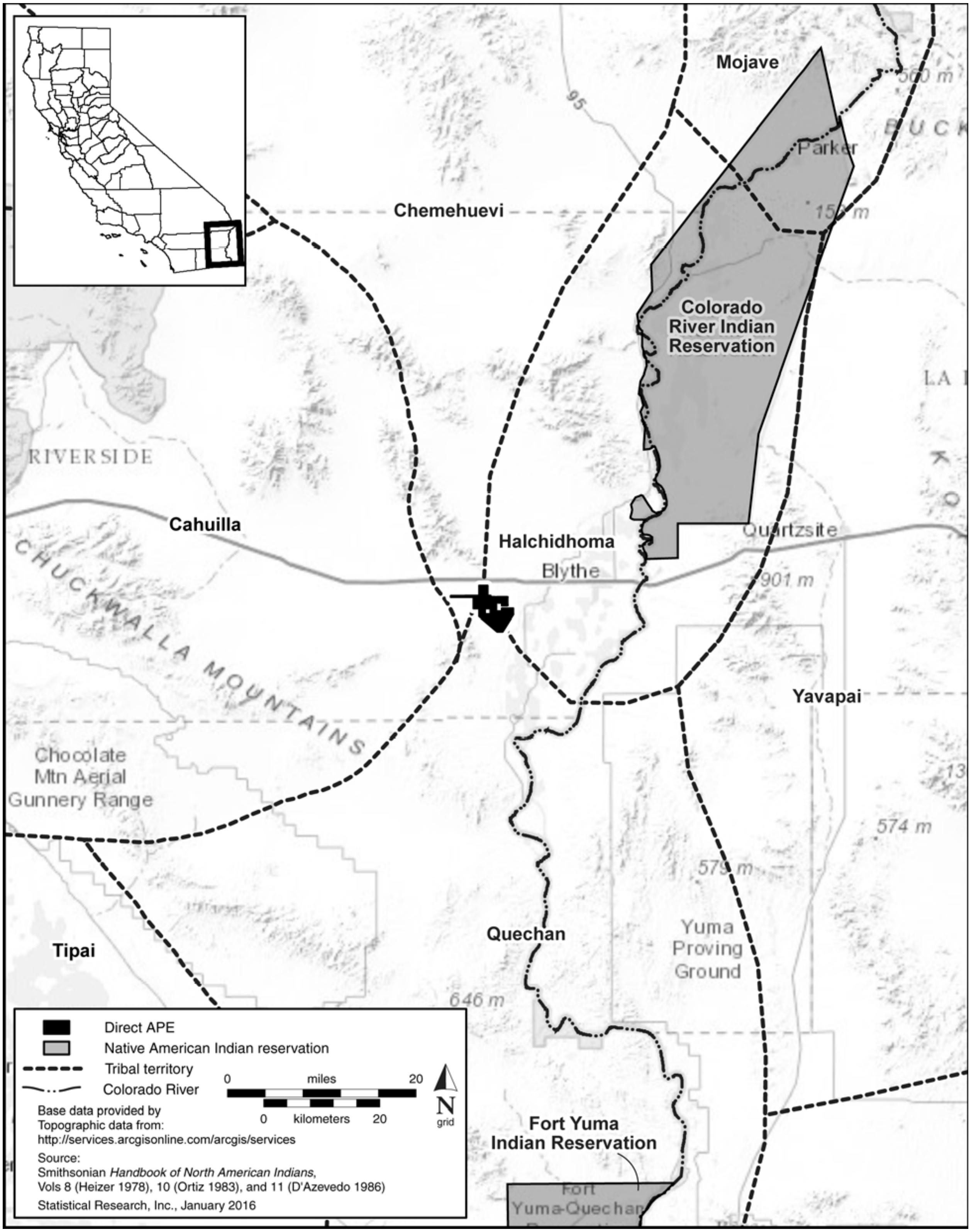

Mojave
Chemehuevi
Parker
Colorado River Indian Reservation
RIVERSIDE
Cahuilla
Halchidhoma
Blythe
Quartzsite
CHUCKWALLA MOUNTAINS
Yavapai
Chocolate Mtn Aerial Gunnery Range
Tipai
Quechan
Yuma Proving Ground
Fort Yuma Indian Reservation
Fort Yuma-Quechan
95
560 m
150 m
901 m
574 m
579 m
646 m
Direct APE
Native American Indian reservation
Tribal territory
Colorado River
0 miles 20
0 kilometers 20
N grid
Base data provided by Topographic data from: http://services.arcgisonline.com/arcgis/services
Source: Smithsonian Handbook of North American Indians, Vols 8 (Heizer 1978), 10 (Ortiz 1983), and 11 (D'Azevedo 1986)
Statistical Research, Inc., January 2016

Figure 2.1. Territories of Native American groups living in the project region, ca. 1825, before the Halchidhoma were expelled in 1826.

Several ethnographic studies exploring a wide variety of topics have been published on the Mojave, including overviews by Kroeber (1920, 1943, 1948, 1972, 1974), Spier (1933, 1936, 1953, 1955), and Stewart (1968a), studies of belief systems (Devereux 1937, 1941, 1948, 1950, 1951, 1956, 1957, 1961; Stewart 1970, 1973, 1974a, 1974b, 1977; Wallace 1947a, 1947b, 1948), political organization and territoriality (Sherer 1965, 1966, 1967; Stewart 1947a, 1947b, 1969) and subsistence (Stewart 1947c, 1957, 1965, 1966, 1968b; Wallace 1953, 1955).

There is relatively little direct information on the Halchidhoma. One of the most authoritative discussions is from Spier (1933), based on interviews with a man named Kutox, who was of Halchidhoma ancestry. Kutox was born approximately 25 years after the Halchidhoma were forced from their lands along the Colorado River and was living on the Maricopa reservation in Arizona.

The earliest studies of the Quechan date to the late nineteenth century (Trippel 1889), but Forde's (1931) study provides the most in-depth descriptions of Quechan lifeways at the time of European contact. More-recent studies by Bee (1963, 1967, 1970, 1981, 1982) and Castetter and Bell (1951) examined elements of Quechan social organization and ethnobotany, respectively. Important information also has been provided by Forbes (1965).

In addition to specific studies of individual tribes, regional overviews have also been published. One of the most detailed is Kroeber's (1925) *Handbook of the Indians of California*, which devoted several sections to River Yuman groups and their neighbors. Strong (1929) reviewed many aspects of tribes across southern California, but except for the Cahuilla, none of those is discussed here. The Smithsonian's *Handbook of North American Indians* has volumes devoted to the American Southwest (Ortiz 1983), California (Heizer 1978), and the Great Basin (d'Azevedo 1986), and the studies in all volumes have provided excellent summaries of all of the tribes in and near the project area (see Bean 1978; Bee 1983; Harwell and Kelly 1983; Stewart 1983a, 1983b). Laylander (2001) explored two oral stories that were common across much of southern California and southwestern Arizona.

Land Management Studies

In addition to the academic studies described above, ethnographic overviews of extensive areas of southern California and southwestern Arizona have been undertaken as parts of large, interstate construction projects and to assist government agencies with managing public land resources. Several such studies have examined the area around the project area. Bean and Vane (1978) provided ethnographic overviews for all of the tribes in and around the project area for the construction of the Devers–Palo Verde High Voltage Transmission Line. In addition to the overview, Bean and Vane interviewed members of the tribes in the project area regarding concerns over impacts by the project, including threats to sensitive areas. As Cultural Systems Research, Inc. (CSRI), Bean and Vane completed a similar study for the California Low-Level Radioactive Waste Disposal Project (CSRI 1987). Two potential disposal locations, at Palen and Ford dry lakes, are located northwest of the project area. As with Bean and Vane's Devers–Palo Verde ethnographic study, the CSRI study was based on interviews with members of several tribes in southern California to understand tribal concerns about the impact of the project.

The BLM California Desert District prepared a cultural resource overview of areas then defined as the Colorado Desert Planning Units for California Desert Plan (von Till Warren et al. 1981). The BLM Yuma District, which administers the land along the Colorado River, including the portion of the Colorado River floodplain in California, has developed guidelines for managing cultural resources along the river (Stone 1991). This includes land just east of the project area. More recently, SWCA Environmental, Inc., completed a cultural resource overview of the Riverside East SEZ (Millington et al. 2013). The Riverside East SEZ contains approximately 202,000 acres of BLM land within Riverside County that has been designated as land approved for solar-energy development. The overview provides a summary of the prehistoric and historical-period cultural resources within the SEZ.

The Cahuilla

The Cahuilla occupied much of the region west of the project area, including the western Colorado Desert and the northern Peninsula Ranges. The aboriginal group that occupied the western Colorado Desert during the historical period was the Desert Cahuilla, who along with the Mountain and Pass Cahuilla, constituted the ethnographic Cahuilla. They spoke Cahuilla, a language of the Takic branch of NUA, and the Desert Cahuilla spoke a distinct dialect of Cahuilla. The precontact population size of the Cahuilla was approximately 6,000 to 10,000 individuals, based on an estimate of 80 lineages. Today, people of Cahuilla descent with possible ties to the project area are members of the Agua Caliente Band of Cahuilla Indians in Palm Springs, the Augustine Band of Cahuilla Indians in Coachella, the Cabazon Band of Mission Indians in Indio, the Cahuilla Band of Mission Indians in Anza, the Morongo Band of Mission Indians in Banning, the San Manuel Band of Mission Indians in Highland, the Soboba Band of Luiseño Indians in San Jacinto, and the Torres-Martinez Desert Cahuilla Indians in Thermal; all of which are in California (Eargle 2008; Kremkau, Whelan, et al. 2014:Appendix A; Lerch 2013).

Settlement and Subsistence

The Desert Cahuilla exploited a large number of plant species (Barrows 1900; Bean and Saubel 1972), mesquite (*Prosopis* spp.) on the valley floor being the primary staple. Other important resources, such as agave (*Agave desertii*), pinyon (*Pinus* spp.), and acorns (*Quercus* spp.) were obtained in the mountains to the west. More than 150 species of plants were used for food, fibers, medicine, manufactures, and dyes. The Cahuilla exploited a variety of animals, including deer (*Odocoileus* sp.) and mountain sheep (*Ovis canadensis*) from mountain habitats, and smaller animals, such as rabbits and rodents, from desert habitats. Deer, pronghorn antelope, rabbit, small rodents, and birds were available throughout Cahuilla territory.

Large game was typically hunted with bow-and-arrow, sometimes with the aid of blinds or deer-head decoys (Bean 1972:64, 1978:578). Small game was shot with bow-and-arrow, stunned or killed by throwing sticks, or captured with snare, trap, or deadfall. Fishing was carried out with hook and line, nets, basketry traps, spears, bow-and-arrow, and vegetal poisons. Hunting could be an individual or group pursuit, and large groups of people occasionally came together to participate in communal hunts for deer, pronghorn, or rabbits. The Desert Cahuilla also grew a few agricultural crops—corn, beans, and squash—that were probably obtained from native peoples along the Colorado River to the east; crops were irrigated from springs (Wilke and Lawton 1975). With the arrival of Europeans, wheat, melons, barley, and fruit trees were added (Bean and Mason 1962; Lawton and Bean 1968).

The Cahuilla lived in semipermanent villages (Bean 1978:575), but the location and size of villages varied across environmental zones. Availability of water was the most important determinant of settlement, and their villages were usually located next to streams in the foothills, near permanent water sources on the desert floor, or in areas where walk-in wells could be easily dug (Bean 1978:575; Kroeber 1925:617). Thus, most desert villages relied on hand-excavated walk-in wells for water. These wells were dug to a depth of about 6 m to reach the water table. Villages were loose clusters of houses over an area up to 1 km across. Some of the houses were large (e.g., 6 m [20 feet] in length), others were smaller; at least one large ceremonial structure was present in each village (Bean 1972:72). Once established, villages were considered permanent (Bean 1972:74) and were occupied by lineages. Villages were connected to each other by a complex system of trails.

Sociopolitical Organization

The Cahuilla were organized into moieties, clans, and lineages (Bean 1972). The lineages were land-holding groups, each occupying its own village. The adjacent lineage, with its own village, would generally belong to the other moiety. This arrangement served to ensure access to different habitats. Each village was economically independent. Lineages were grouped together to form clans or lineage sets that cooperated in defense, large subsistence undertakings, and ritual activities. The lineage in each village was led by a hereditary village chief. The chief acted as both religious and political leader and was responsible for conducting ceremonial affairs, determining where and when to hunt and gather, collecting goods for communal use, arbitrating disputes, and leading war parties. The chief had an assistant in ceremonial matters who organized rituals and made sure proper protocol was followed. Cahuilla society had no other hereditary positions, although individuals could become diviners, healers, or shamans if they demonstrated skill in these arenas.

Material Culture

Houses and Other Structures

Cahuilla houses were typically dome-shaped structures set over shallow depressions (Bean 1972:72). In coastal and desert areas, houses were thatched with reeds and brush; in the mountains, cedar bark was used, and houses were usually covered with earth. Houses ranged in diameter from 4.5 to 18 m (15 to 60 feet), depending on the number of people living inside. They were primarily used for sleeping and storage, and most daily activities took place outdoors, in the shade of ramadas.

All villages contained a sweathouse, which served as a gathering place for men (Bean 1972:72). They were constructed in the same manner as houses but were typically smaller and oval-shaped. Cahuilla villages contained a large ceremonial house where rituals, curing, and recreation took place. Villages also contained several granaries for storing acorns or mesquite.

Hunting and Gathering Implements

Large game was hunted primarily with bow-and-arrow, whereas small game was taken with curved, flat rabbit sticks; snares; traps; and deadfalls (Bean 1972:64, 1978:578). Fishing was done with hooks, nets, basketry traps, spears, and bow-and-arrow. Cahuilla arrow-shaft straighteners were made from steatite and incised with linear designs having magical connotations and indicating ownership.

Bedrock mortars were used to pound acorns in places with suitable bedrock outcroppings (Bean and Saubel 1972). Where bedrock was not available, portable stone mortars and pestles were used. Hoppers were only used on new, shallow mortars until they became deep enough. The Cahuilla also used portable stone mortars and pestles for grinding acorns and deep wooden mortars and long, slender stone pestles to pound mesquite beans. Seed beaters were used to collect seeds from grasses and other plants, and milling slabs and hand stones were used to grind them. Pinyon nuts were also ground on milling slabs, whereas fruits were pounded in stone or wooden mortars. Desert Cahuilla groups baked agave, yucca, and bulbs in stone-lined, earth-covered ovens.

Baskets, Pottery, and Steatite Vessels

Cahuilla basketry varied in size and shape, depending on its purpose. Small handheld baskets were used for gathering berries and bird eggs; large, round-bottomed baskets for carrying bulkier items; shallow trays for winnowing or parching seeds; large baskets for storage; and globular flat-bottomed baskets for keeping utensils and trinkets.

Pottery was introduced to the Cahuilla by Yuman groups sometime after A.D. 1000 (Rogers 1945:170; Warren 1984; Waters 1982a, 1982b). Cahuilla pottery was an unslipped ware occasionally decorated with linear red or black designs. Vessel forms include cooking pots, small-mouthed jars, bowls, dishes, and pipes.

Miscellaneous Implements

In addition to the implements described above, the Cahuilla used bird-bone and cane whistles; wood rasps; cane flutes; split-stick clappers; rattles of turtle shell, gourd, or deer hooves; and bull-roarers. The Cahuilla also used charmstones, which appear as small, amorphous stones or sometimes as animal effigies.

Trade and Conflict

The Cahuilla were avid traders and exchanged food, utilitarian items, and ceremonial items with their neighbors (Bean 1972:68–70; Bean et al. 1995). Generally, obsidian, furs, hides, nuts, and seeds moved west, whereas shell beads, tourmaline, steatite, asphaltum, sea-otter pelts, and dried fish moved east. The Coco-Maricopa Trail, which passed just north of the direct APE, connected southern California with the Southwest, bringing turquoise, Southwestern pottery, grooved axes, and agricultural products to the region (Bean 1972:74; Bean et al. 1995). Some Cahuilla specialized as traders and traveled as far as Santa Catalina to the west and the Gila River to the east. *Olivella* shell beads were used as a general medium of exchange throughout the region, but barter was also common.

Armed conflict was less frequent among the Cahuilla than their neighbors. Although disputes arose over trespass, theft, sorcery, abduction of women, personal insults, and failure to fulfill ritual obligations, these rarely escalated to the point of violence. In the event of potential conflict, a war council was called to determine whether to go to war. When war occurred, the village chief led the party, followed by warriors and old men, then by women and children who carried food and supplies. Villages allied through marriage ties usually supported one another in such conflicts. Gifts were often sent to neutral villages to enlist their support or entice them to remain neutral.

Worldview and Ritual Practice

The Cahuilla held ceremonies for birth, naming, puberty, marriage, and death, as well as for rainmaking, increasing food crops or animals, and peace making between individuals and groups (Bean 1972; Strong 1929). The most important ceremonies were the annual mourning ceremony, the eagle ceremony, and rites of passage and ceremonies marking changes in status (birth, puberty, marriage, etc.). Young girls typically participated in puberty rituals in which they were “roasted” in warm sand and taught the proper rules of behavior and necessary skills for married life.

The Cahuilla practiced cremation, including destruction of the deceased’s possessions, after several days of ritual wailing and dancing (Kroeber 1925:641−642; Strong 1929). The most significant ceremony, however, was the annual mourning ceremony held in the fall, after the acorn harvest. For the Cahuilla, the ceremony lasted 7 days. On the first day, the ceremonial enclosure was consecrated; this was followed by feasting. Over the next 6 days, men and boys danced in the enclosure while women sat in a circle and sang. The children born during the previous year were given names by the chief. Effigies of the dead were made and decorated with bows and arrows or baskets, depending on their gender. At the end of the ceremonies, the effigies were burned in the ceremonial enclosure along with personal items belonging to the dead (Strong 1929).

In Cahuilla society, shamans were both revered and feared for their ability to cure illness, divine, control natural phenomena, create food, and bewitch others (Bean 1978:581). Shamans acted as guardians during ceremonies and, together with chiefs, exercised political authority over the community at large.

The Chemehuevi

The Chemehuevi are the southernmost group of the Southern Paiute. Prior to the arrival of Europeans, they occupied a large expanse of the Mojave Desert stretching from the Colorado River westward to the Kingston Range, through the Providence Mountains, to about the present boundary of Riverside and Imperial Counties. The Chemehuevi numbered about 350 in 1883; Kroeber (1925:595) estimated that their precontact population size was somewhere between 500 and 800 people, but Bean and Vane (1978:5-20) suggested a much larger population for the Chemehuevi and Las Vegas bands of Southern Paiute combined, at least 13,000. The Chemehuevi stand out from other Southern Paiute groups in that they borrowed many linguistic and cultural elements from their neighbors, particularly the Mojave. People of Chemehuevi descent are affiliated with the Chemehuevi Indian Tribe at Havasu Lake, California, and the Colorado River Indian

Tribes (CRIT), Parker, Arizona, both located along the Colorado River north of the project area (see Figure 2.1), as well as the Twenty-Nine Palms Band of Mission Indians in Coachella, California (Eargle 2008; Kremkau, Whelan, et al. 2014:Appendix A; Lerch 2013).

Settlement and Subsistence

The Chemehuevi lived in an arid environment with marked seasonal variability in the availability of food. Consequently, storage was an essential strategy for surviving the winter and early spring months (Kelly and Fowler 1986:370). The Chemehuevi utilized a wide variety of plant and animal resources, including deer; rabbits; reptiles; seeds from pinyon, honey mesquite, and screwbean; and cacti and other succulents. Most of these resources were available seasonally, and to access them, the Chemehuevi traveled from one area to another during the year, covering a huge, diverse territory. Some resources, like agave, were available year-round (Laird 1976). The base of the agave stalk was cut with a wooden chisel, the leaves removed with a stone knife, and the "head" of the plant was baked in an earth oven. Prickly pear joints were steam-cooked in earth-covered pits to preserve them or were sun-dried and boiled when wanted.

The Chemehuevi supplemented their diets with greens, seeds, and fruits. After winter stores ran out in spring, people turned to edible greens in the lowlands. Desert greens had to be boiled, washed, and squeezed to remove the bitter salts. Seeds and berries began to ripen in the valleys and low foothills by early summer. Seeds were swept into baskets with beaters. They could then be winnowed and parched with coals in flat basketry trays and ground on metates, or they could be ground before parching. Fruits and seeds became available in the uplands during summer and fall.

During the historical period, the Chemehuevi began growing cultigens that were introduced to them by the River Yumans (Fowler and Fowler 1971; Stewart 1966:9). They planted yellow maize, squash, melons, gourds, sunflower, amaranth, and winter wheat. They also adopted the semicultivated grasses used by the Mojave and encouraged tobacco to grow by burning plots. The Chemehuevi used the flood-plain agriculture techniques practiced by the Mojave.

Large game was scarce in the region and was not a major component of the Chemehuevi diet. The Chemehuevi had access to deer and mountain sheep. Animals were stalked by one or several men, sometimes under direction of a hunt leader. Marksmen often hid behind blinds and shot game with bow-and-arrow as other men drove the animals past them. Small game was the main source of protein in their diet. Rabbits were hunted individually and in communal drives. Cottontails were taken with snares and deadfalls. Burrowing rodents were dug out with rodent skewers, flooded and smoked out, or taken with traps and deadfalls. Dove, mockingbird, sage hen, and quail were commonly hunted. Chuckwalla were captured with reptile hooks. Bee eggs, larvae, grasshoppers, and crickets were also consumed, and swarms of large black Mormon crickets provided an important food source (Kelly and Fowler 1986:370; Laird 1976:46–47; Sutton 1988).

Seasonal mobility was essential to the Chemehuevi way of life, because the plant foods they relied on were temporally and spatially variable in abundance. From spring through fall, individual families or small family clusters foraged in groups, moving according to the availability of plant foods. Chemehuevi farmers planted their crops in spring and either tended them until the danger from birds had passed or moved on and left the elderly behind to watch the fields. They returned to their fields in fall to harvest the crops. Some left before the harvest was complete to collect pinyon nuts from the mountains, whereas others stayed behind to finish collecting and storing crops. During winter, the Chemehuevi aggregated into villages of several families, located near their caches of stored food (Kelly and Fowler 1986:371). Their houses were closely grouped, and occupants were usually related by blood or marriage. Settlement size varied from 1 or 2 houses to 10. Chemehuevi groups who lived in areas with abundant pinyon spent the winter in the pinyon groves.

Sociopolitical Organization

Sociopolitical organization for the Chemehuevi was limited but did include a hierarchy of leaders: high chiefs and chiefs (Kelly 1932–1933; Laird 1976:24). During the late nineteenth century, these chiefs controlled several distinct Chemehuevi groups, and their positions carried a great deal of prestige, as well as economic power (Fowler and Fowler 1971:104). The position of chief was hereditary, with the eldest son the favored successor (Kelly 1932–1933; Kelly and Fowler 1986), but a candidate also had to have "proper dreams" to obtain this position. According to Laird, who wrote from a Chemehuevi perspective, chiefs also spoke a special language to one another at gatherings (Laird 1976:24).

Because resources were widely scattered across the landscape, families had to travel to distant resource patches, and group composition in any given year was dependent on who chose which patch. Related families tended to dwell in proximity, however, and cooperated in hunting and gathering tasks. These groups were not territorial. Among the Chemehuevi, springs were considered private property and usually owned and inherited by males, although women occasionally owned springs. Married siblings (usually brothers) tended to camp at the same spring with one brother regarded as owner. Chemehuevi men could also inherit rights to hunt large game within certain tracts of territory. These tracts were defined in songs, and one had to have the proper song, or be with one who did, in order to hunt in these areas (Laird 1976).

The Chemehuevi did not have rigid descent or kinship structures. Most marriages were monogamous, but good hunters could have more than one wife (Kelly and Fowler 1986:380). Polygyny was usually sororal. Brothers in one family frequently married sisters in another, or a brother and a sister in one family might marry a brother and sister in another. Divorce was common, and many adults remarried several times. For the Chemehuevi, residence was temporarily matrilocal at marriage but typically became patrilocal later on.

Material Culture

Houses and Other Structures

For the Chemehuevi, summer houses were ephemeral. They created domed, temporary shades adjacent to cultivated fields and often slept under trees in hot weather. Chemehuevi winter houses were built in the Mojave style but without a front wall. They were rectangular structures made with a framework of poles, covered with willow and arrowweed, and usually capped with earth (Watkins 1945). To house their stored food, the Chemehuevi built granaries in the Mojave style—a four-post frame covered by willow and arrowweed.

Hunting, Gathering, and Farming Implements

Hunting tools used by the Chemehuevi included bows, arrows, nets, snares, rodent skewers, and reptile hooks. Seed beaters, threshing sticks and paddles, and parching trays were used by Chemehuevi groups to collect and process seeds. A long, hooked pole was used to pull down pinyon cones, and digging sticks were used for roots. Both seeds and pinyon nuts were ground with manos and metates. Portable mortars and bedrock metates were also used but were of comparatively minor importance. Chemehuevi farming technology was simple, requiring only the dibble and a "flat stick" or "spade."

Baskets and Pottery

The Chemehuevi used both basketry and pottery, but they relied more heavily on basketry (Kelly and Fowler 1986:375). Basket forms included conical burden baskets, fan-shaped trays for winnowing and parching, seed beaters, water jugs sealed with various resins, cradles, and women's hats. The Chemehuevi only occasionally made pottery. They tempered the clay with sand, formed vessels using a paddle and a small stone as an anvil, and painted the finished product. Vessel forms included cooking pots, a similar vessel for preplanting germination of seeds, a spoon or scoop, a water jar (often used for seed storage), and a large vessel used for ferrying children across the river. Women usually made pots, whereas men made tubular clay pipes and children made their own toys.

Trade and Conflict

The Chemehuevi traveled widely and had friendly relations with other Paiute groups, as well as the Kawaiisu, Serrano, Cahuilla, and Ipai (Kelly and Fowler 1986:375). Men routinely hunted in Yavapai, Walapai, Quechan, Serrano, and Kawaiisu territory and reportedly traveled to the Pacific coast (Laird 1976). On rare occasions, 8–10 men from several Southern Paiute groups might travel to Hopi villages together. The Chemehuevi were heavily influenced by the Mojave in many aspects of their material culture and ritual life. From the Mojave, they received domesticates and techniques for floodplain farming; techniques for making pottery, earth-covered houses, boats, and hair dye; vocabulary; an emphasis on dreaming; basic features of the song series; and a complex of elements related to warfare. Chemehuevi who lived along the Colorado River made log rafts and reed balsas like those of the Mojave, which were used with poles to cross the river.

There is good evidence for the practice of organized warfare by the Chemehuevi in the recent past. Although still united with the Las Vegas group of Southern Paiute in the late eighteenth century, the Chemehuevi moved south, exterminated the Desert Mojave, and took possession of their territory (Kroeber 1959; Roth 1976; Sutton 1986). In the early 1800s, the Chemehuevi joined the remaining Mojave and Quechan to drive the Halchidhoma off the Colorado River (Heizer and Hester 1970:111; Kelly and Fowler 1986:370, 381−382; Kroeber 1959; Roth 1976). Afterward, they settled along the river next to the Mojave. War broke out between the Chemehuevi and Mojave around 1867, and the Chemehuevi retreated from the river (Heizer and Hester 1970:111; Kelly and Fowler 1986:370, 381−382; Kroeber 1925:594–595; Roth 1976). Warfare for the Chemehuevi primarily consisted of predawn raids in which sleeping victims were clubbed. No one was spared, and no captives were taken. Scouts surveyed at night, and women served as lookouts. When a battle did occur between two opposing groups, a “peacemaker,” who was usually related to both sides in the conflict, accompanied the war party and halted combat after one or two people had been killed. Chemehuevi warriors were selected from those who had favorable dreams of traveling to the east, of the Pleiades, Orion’s belt, the morning star, the sunrise, or of riding on the moon. War leaders used sharpened, wooden pikes that were hurled as spears, whereas other war dreamers used wooden or stone clubs. Those without promising dreams served as archers.

Worldview and Ritual Practice

The Chemehuevi have a rich tradition of songs and oral histories. Their creation story describes the birth of the world and their emergence from *nuvant*, near Mt. Charleston just outside the modern city of Las Vegas (Kelly and Fowler 1986:385). Coyote is the principal being, and he is credited with a number of deeds, such as bringing agriculture, starting many customs, and naming the other animals of the desert. The Chemehuevi believed that shamans had the power to cure and cause disease and that they received their power through dreams. Shamans typically cured illness by pursuing and restoring lost souls and removing disease-causing objects through sucking. Some Chemehuevi shamans were considered specialists who could cure rattlesnake bites, control the weather, and aid in childbirth.

Songs were, and still are, an important part of Chemehuevi ritual and belief. Songs were taught to shamans by guardians during dreams. The Chemehuevi had four main songs—Bird, Salt, Deer, and Mountain Sheep—but others, such as Quail and Funeral, were also sung (Laird 1976:38). The songs include descriptions of territories claimed by the Chemehuevi, including place names, and resources available in each area. Many of these songs are still recited by the Chemehuevi today and are an important part of storytelling and history.

Cremation was traditional for the Chemehuevi after death, although Kroeber (1925:599) claimed that burial was more common. All property of the deceased was burned, including animals, and their gardens were taken over by others. Following a death, the family, or sometimes the entire camp, moved, at least temporarily.

The Chemehuevi held a mourning ceremony at irregular intervals, usually to commemorate the death of several people. Among the Chemehuevi, buckskins, eagle feathers, rabbit-skin blankets, weapons, nets, and baskets were accumulated over a period of time by the hosts for destruction during the ceremony. Because of the enormous cost in food and goods, ceremonies occurred infrequently and were usually sponsored by a particularly prosperous family or a group of several families who had lost relatives (Kroeber 1959).

The Mojave

The Mojave, along with the Halchidhoma and Quechan, are one of the three Yuman tribes that lived along the lower Colorado River in the project area. The Mojave were the northernmost of the three groups, and during the nineteenth century, they occupied an area stretching from 24 km (15 miles) north of present-day Davis Dam to the Bill Williams River (Kroeber 1943:21; Stewart 1983a:1); they may have occupied an even wider area in the past (Stewart 1969:257). In 1776, Spanish chronicler Father Francisco Garcés estimated the population size of the Mojave at around 3,000 (Coues 1900). The Mojave were divided into three bands organized north–south along the river: the Matha Layathum (northernmost), the Hutto-pah, and the Kavi Layathum (southernmost). Mojave people today are members of the Fort Mojave Indian Tribe in Needles, California, and the Colorado River Indian Tribes, Parker, Arizona (see Figure 2.1), both located along the Colorado River north of the project area (Eargle 2008; Kremkau, Whelan, et al. 2014:Appendix A; Lerch 2013).

Subsistence and Settlement

Like all the Yuman groups along the Colorado River, the Mojave were sedentary farmers, whose livelihood was made possible by the annual flooding of the Colorado River during the spring. Snowmelt in the Rocky Mountains caused the lower Colorado River to overflow its banks in May or June and inundate the bottomlands along the river. When the floodwaters receded in June, they left behind a rich silt that required no fertilization or irrigation. Beans and corn were planted first, followed by pumpkins and melons (Stewart 1983b:58). Grass seeds were planted on less-fertile parts of the land. The fields were occasionally weeded, and the crop was harvested in late September and early October. Corn was husked in the field and either roasted and eaten immediately or sun-dried and stored in granaries. Men typically cleared and burned the land before flooding began, whereas women did most of the harvesting and storage, and both participated in planting. A man typically used a planting stick to punch holes in the soil and then a woman dropped several seeds in each hole and covered them up.

Wild plants also contributed an important part of the diet, particularly in times of famine (Castetter and Bell 1951; Stewart 1983b:59). Mesquite and screwbean were the most important wild-plant foods. Mesquite pods were pounded in mortars to remove the pulp, which was dried and ground into flour. Screwbean was prepared the same way, or fresh beans were “cooked” by being stored in large pits lined with arrowweed for about 1 month, which caused the beans to turn brown and sweet.

Game was scarce in the bottomlands, thus fish provided the principal source of meat in the Mojave diet. Fish were taken with seines or dragnets, in traps or weirs, or with dip nets, as well as driven up shallow sloughs into large basketry scoops. The fish were eaten either broiled or in a stew with corn (Stewart 1957; Wallace 1955).

Although deer occasionally strayed to the thickets along the river, large game was, for the most part, absent in the area. The Mojave sometimes undertook special excursions to the mountains east of the river to hunt deer. For the most part, however, they relied on the rodents and rabbits that lived in the bottomlands. Rabbits were shot with bow-and-arrow, caught in snares or nets, or knocked down with curved rabbit sticks. Communal rabbit drives were sometimes held.

The Mojave lived in sprawling settlements, scattered throughout the valleys on low rises above the floodplain (Stewart 1983b:57). A settlement might extend from 1.5 to 3 km, with houses separated from one another by 100 m, and be separated from the next settlement by 6–8 km. Each household was composed of an extended family and related, unmarried adults. Several extended families occupied each settlement. These settlements were only occupied during the winter and spring flooding seasons. During the summer and fall, family groups dispersed to the bottomlands to live in temporary camps. Patrilocality was preferred after marriage, but in practice, residence was bilocal. This flexibility, along with marital instability, often led to unrelated individuals sharing farming camps. The extended family formed the basic cooperative unit of subsistence, although several families might pool labor to clear land, weed, or harvest.

Only cultivated land was considered private property among the Mojave. Any tract of land that was not in use could be cleared and planted, becoming the property of the man who performed the labor (Stewart 1983b:59). These plots were not inherited by the man's relatives after death but were abandoned to be used by others. Fields were typically 1–2 acres in size, and their boundaries were marked by ridges of dirt or arrowweed branches. Disputes over boundaries that arose when floods washed these landmarks away were settled by violent shoving matches that sometimes escalated to stick fights. Mesquite trees were not owned in the same way as cultivated fields, but families tended to return to the same groves every year and might claim their yields in advance by hanging arrowweed from their branches.

Sociopolitical Organization

The Mojave were loosely divided into northern, central, and southern bands and further divided into local groups occupying particular settlements. However, they had a strong sense of tribal unity and thought of themselves as one people living in a well-defined territory that was prepared to unite in warfare against an enemy (Stewart 1983b:62). Locality of residence was unimportant, and families or individuals could move freely from place to place within tribal territory. Although the Mojave had patrilineal clans, their importance and function remains unclear.

There were no marked gradations in wealth in Mojave society, because goods and property could not be inherited and food sharing was strongly encouraged. With the exception of tribal chief, no leadership positions were inherited. The men who filled these roles (as well as orators, singers, and shamans) received their power from dreams. Those with the "right" dreams, however, had to continually demonstrate their success in practical matters to retain their positions. Positions of power could remain in prominent families, so long as the candidates were capable of performing the duties they required.

The position of tribal chief may have developed after extensive contact with Euroamericans. Although the chief could convene prominent men from each settlement to meet with him for informal discussions, he wielded little real authority and was largely expected to look after tribal welfare. Each settlement had at least one headman who handled the bulk of the leadership responsibilities for the settlement and met in a council with other headmen to discuss tribal concerns. The Mojave also had several subchiefs from each of the bands. These leaders were expected to be skillful orators, and their authority was dependent upon public support. They held their statuses only as long as they proved competent. In addition to these positions, Mojave society had religious leaders who performed ritual functions and served as festival chiefs and orators who addressed people at funerals.

Material Culture

Houses and Other Structures

For most of the year, the Mojave slept under ramadas or in dome-shaped arrowweed structures near their fields. During the winter, they lived in similar structures in the settlements. The leaders of the settlements had larger, rectangular houses made of four cottonwood posts supporting a sloping roof of poles. This was thatched with arrowweed and covered with a thick layer of sand and earth or river mud. When the weather was very cold, settlement leaders invited their neighbors to sleep in their houses. The only other structures in Mojave settlements were corn granaries. They were made of coarsely woven arrowweed branches (with the leaves still on) and resembled giant bird nests. The Mojave did not have sweathouses.

Hunting, Fishing, Farming, and Gathering Implements

Because game did not feature largely in their diet, the Mojave had only a few hunting implements, including bows and untipped arrows for shooting rabbits, wooden rabbit sticks, and nets. Fishing implements included nets, traps, weirs, and basketry scoops (Wallace 1955). Crude rafts were made of bundles of rushes lashed with willows and used with long poles for crossing the river. Farming technology was simple and included only the sharpened digging stick. Metates and manos were used to grind corn and beans. During the historical period, metates were rectangular blocks of volcanic stone and manos were cylindrical, both created in the Southwestern style (Castetter and Bell 1951). Before the advent of steel axes, metates may have been the oval type typical in California. Mesquite beans were crushed in wooden mortars with long wooden or stone pestles.

Baskets and Pottery

River Yuman basketry was not as finely woven as that made in other parts of California, likely because pottery was used to fulfill most cooking, serving, and storage functions. Basketry was used primarily to create flat receptacles, fish traps or scoops, wicker hoods for cradles, and carrying frames. Pottery vessel types are more diverse, and include water jars, cook pots, ladles or spoons, flat bowls, oval platters, open bowls, and parchers for corn. Very large pots were sometimes created to help ferry small children back and forth across the river. Pottery was tempered with sandstone and painted with yellow ochre, which turned red after firing. In the late nineteenth century, pottery was painted with geometric designs.

Trade and Conflict

The Mojave, in particular, were great travelers and were widely known for the trading expeditions to the Pacific Coast and the Southwest (Davis 1961; Farmer 1935; Kroeber 1925). An important commodity for this trade was *Olivella* shells, obtained on the Pacific Coast and then widely traded. Glass trade beads, salt, and tobacco were also popular trade items (Kroeber 1925:727, 739–740).

The Mojave and Quechan were allied with one another and had friendly relations with the Sand Papago, Tipai-Ipai, Chemehuevi, and the Chumash along the southern California coast (Bean and Vane 1978:5-4). The Cocopa, Maricopa, and Halchidhoma were considered enemies. The Mojave participated in two types of conflict: raids and campaigns. Raids were surprise attacks launched by groups of 10–12 young men from the same settlement. They were not intended to kill the enemy, but to harass enemy groups and possibly take captives or horses. Campaigns were conducted in the fall, after the harvest, and were tribal affairs launched for revenge against losses suffered at the hands of the enemy. War parties were well-structured, with a leader in front followed by spearmen and clubmen, then by archers, then by horsemen with spears. Women were also included in war parties, following the main lines to battle to finish off the wounded with large clubs (Stewart 1947a). The time and place for combat, as well as the types of weapons to be used, were often prearranged. Fighting was preceded by insults and did not begin until both sides were in formation. Once it commenced, hand-to-hand combat was the norm, as no man was considered brave in River Yuman society until he had distinguished himself in this way.

Worldview and Ritual Practice

Dreaming was a pivotal concept in Mojave culture (Kroeber 1925; Devereux 1957). Dreams were thought to be an entry into the supernatural world, the realm of myths and ancestors and the period and events before the world as we know it was created. Entry into the supernatural through dreams was therefore believed to constitute a reexperiencing of the mythical past (Kroeber 1925; Devereux 1961). Shamanistic power, bravery and fortune in war, success with women or at gaming, and every other special ability was believed to be dreamed (Kroeber 1925:754). Myths and songs were also said to have been dreamed. Ordinary dreams were regarded as "omen dreams," and could foretell coming events when interpreted properly. "Great dreams" came only to a select few who served as leaders in society.

Shamans had the most elaborate great dreams. They were believed to have the power to cure arrow wounds, rattlesnake bites, and sickness attributed to contact with outsiders, "bad dreaming," loss of one's soul, witchcraft, and ghosts. Each shaman was a specialist and could only cure certain ailments, depending on what he dreamed. Shamans were also believed to cause disease, and might be killed by warriors if they were suspected of witchcraft. Gifford (1926) related several stories retold by a Mojave man named Joe Homer, who discussed different types of dreams and how dreams functioned in Mojave society.

As for the Chemehuevi, song cycles were an important part of ritual life for the Mojave. Kroeber (1925:755) noted at least 20–30 different song cycles, each with 100–200 songs. The songs generally follow elements of myths and histories, such as creation myths, old battles, and territorial boundaries. However, the songs are usually quite short and are very stylized, with distorted words.

The only public ceremonies conducted by the Mojave were funerals and mourning ceremonies. The dead were cremated in pits dug near their houses. Their houses, ramadas, and granaries were also burned, along with all of their contents. Funeral orators made speeches and song cycles were sung while mourners wailed and some cast their own belongings into the fire. A tribal mourning ceremony was performed after a prominent man died or when there had been an accumulation of deaths which the families of the deceased wished to commemorate them with a ceremony. It lasted for a day and a night and featured a ritual enactment of warfare. Ten men in war regalia ran back and forth carrying ceremonial replicas of weapons while a funeral orator told the mythological story of the first cremation, and mourners cried and sang. At dawn on the second day, a shade that had been specially constructed for the spectators was set on fire and the weapons were thrown into the blaze. The participants in the ritual then purified themselves in the river.

The Halchidhoma

Compared to the other three River Yuman groups that lived in or near the project area, there is comparatively little information on the Halchidhoma. Also called the Panya (Bean and Vane 1978:5-37), the Halchidhoma originally occupied the territory between the Mojave and Quechan but were ousted from the Colorado River Valley by their neighbors after ca. 1825. They had joined the Maricopa in south-central Arizona by 1840 (Golla 2011:122; Stewart 1983b:55), leaving the Mojave and Quechan as the only two River Yuman groups to be documented ethnographically during the early twentieth century. A handful of studies of the Maricopa in the early to mid-twentieth century have provided some information (Harwell and Kelly 1983; Spier 1933; see also Bean and Vane 1978). In 1776, Spanish chronicler Father Francisco Garcés estimated the population of the Halchidhoma to be about 2,500 (Coues 1900).

Subsistence and Settlement

Like the other River Yumans, the Halchidhoma were sedentary farmers who planted beans, corn, pumpkins, and melons and supplemented their diets with wild plants and animals. These were relied on more heavily during drought years, when the river failed to rise enough to sufficiently flood the fields (Stewart 1983b:58). Agricultural plots were generally 2–3 acres in size.

The Halchidhoma lived along the Colorado River floodplain, from approximately the location of modern day Needles, California, to Blythe, California. When Juan de Oñate passed through the area in 1604, he noted eight villages, the largest of which contained at least 160 houses and 2,000 people (Kroeber 1925:802). When they were ousted by the Mojave and Quechan after about 1825, they first moved to the west with the Cahuilla and Chemehuevi before finally settling with their allies the Maricopa along the Gila River on the east side of the Colorado. The Mojave and Quechan briefly occupied the land of the Halchidhoma before abandoning it a few years later.

Sociopolitical Organization

Because the Halchidhoma were forced from their land in the early nineteenth century and later moved in with the Maricopa, relatively little is known about their sociopolitical organization. Like other River Yuman tribes, however, they lived in dispersed communities led by local headmen who derived their power from competent leadership and dreaming proper dreams. River Yuman tribes in general did not have extensive social hierarchies.

Material Culture

Houses and Other Structures

Halchidhoma houses were similar to other River Yuman residences. Most houses were made from arrowweed branches and consisted of small, domed structures. Larger structures included ramadas, which were rectangular structures with thatch roofing. Most roofs were further covered in earth and mud as additional protection. Granaries were also made of arrowweed and were built like large bird nests, which helped to keep the grain off of the ground (Bee 1983).

Hunting, Fishing, Farming, and Gathering Implements

Hunting implements included bows and untipped arrows for hunting rabbits, wooden rabbit sticks, and nets. Fishing implements consisted of nets, traps, weirs, and basketry scoops. Rafts were made from bundles of rushes lashed with willows. Long poles were used as paddles. Rafts were used for both fishing and for carrying people and trade goods across the river.

Agricultural technology for all Yuman groups was fairly simple. Canals and other irrigation systems were not used, and sowing and weeding was done with a sharpened digging stick. During harvest time, corn, beans, and other seeds were collected in baskets. Either wooden or stone grinding stones were used to mill seeds into flour.

Baskets and Pottery

River Yuman basketry was not as finely woven as in other parts of California, likely because pottery was used to fulfill most cooking, serving, and storage functions. Basketry was used primarily to create flat receptacles, fish traps or scoops, wicker hoods for cradles, and carrying frames. Pottery vessel types are more diverse; they include water jars, cook pots, ladles or spoons, flat bowls, oval platters, open bowls, and parchers for corn. Very large pots were sometimes created to help ferry small children back and forth across the river. Pottery was tempered with sandstone and painted with yellow ochre, which turned red after firing. In the late nineteenth century, it was painted with geometric designs.

Trade and Conflict

The Halchidhoma were avid traders and participated in long-distance trade and travel. A system of trails crisscrossed the Colorado Desert and connected the people along the Colorado River with other tribes to the east and west. The Halchidhoma traded with the Cahuilla and Gabrielino to the west and brought goods to the Sand Papago and Gila River Pima to the east (Bean and Vane 1978:5-3). They used reed rafts to ferry goods across the river but, apparently, swimmers were also used to transport goods. The Coco-Maricopa Trail—one of the major east–west trails through the region—ran just north of the direct APE.

Conflict and warfare were ever present among the River Yumans. The different tribes along the Colorado River, and to its east and west, participated in what is called the Northern Sonoran Amity-Enmity System (Bean and Vane 1978). The Halchidhoma were allied with the Gabrielino and Cahuilla to the west and the Cocopa and Maricopa to the east. Their enemies were the Mojave and Quechan, who were allied with the Chemehuevi and other Yuman groups to the east.

Worldview and Ritual Practice

Much of what we know about Halchidhoma ritual life comes from interviews conducted by Spier (1933) of a Halchidhoma man named Kutox, who lived with the Maricopa during the early twentieth century. More recently, Laylander (2001) summarized some of the stories that were shared throughout southern California and southwestern Arizona. In the creation story, humans were created through a sexual union of the earth and sky. Following this, one or two “heroes,” usually brothers, emerged from a place of creation. Among the Yumans, this was usually a prominent mountaintop in or near the home territory. The two hero brothers are often depicted as rivals, with one tricking the other and causing him to go blind. In most versions of the story, one of the heroes is killed by Frog, who is usually described as a female. Her motivations for killing the hero vary, sometimes because the hero has acted poorly, or because others were jealous of him.

Another story shared among the Yuman tribes was the Flute Lure Myth (Laylander 2001:161). In this story, two boys are mysteriously born to an unwed mother. The two brothers go on a series of journeys and when they return home, they begin playing flutes. Two sisters from a far-away land hear the music and travel to find the boys. Upon meeting them, one of the girls sleeps with one of the brothers and becomes pregnant, and the four journey back to the girls' village. The two brothers are killed and eaten by the girls' father, but the child born by one of the sisters avenges their death, eventually killing all of the members of his mother's family, including his mother and aunt.

One of the repeated themes in both of these stories is the relationship between the different tribes and linguistic groups in southern California. In many versions of the creation story, multiple tribes are described as emerging from the same origin place, all of which were part of the sphere of interaction in the region. Also present in many versions of the stories are the military alliances that make up the Northern Sonoran Amity-Enmity System, indicating the importance of these relationships.

The Quechan

The southernmost of the three River Yuman groups discussed here, the Quechan occupied the land around the Gila River. Beginning in about 1825, the Quechan, along with their Mojave allies, ousted the Halchidhoma from their territory and occupied the land up to the area around Blythe, California. In 1776, Spanish chronicler Father Francisco Garcés estimated the Quechan population at around 3,000 (Coues 1900), although the prehistoric population was likely larger. The Quechan today are affiliated with the Fort Yuma Quechan Tribe in Yuma, Arizona, located along the Colorado River south of the project area (see Figure 2.1).

Subsistence and Settlement

Like the other River Yuman groups, the Quechan were floodplain horticulturists. The annual flooding of the Colorado River deposited rich soils along the margins of the river. The Quechan grew corn and several varieties of beans, squash, and melons throughout the year; wheat was probably introduced during the early eighteenth century. The Quechan probably relied heavily on wild plants and animals to supplement their diet. Estimates of the diets of other Yuman groups suggest that agricultural products made up 30–50 percent of the Quechan diet (Castetter and Bell 1951:238).

Wild foods included a variety of seeds, including mesquite and screwbean (Castetter and Bell 1951:179), but ironwood seeds and wild grasses and cacti were also eaten. The seeds and seed pods were usually crushed into a flour and used to make cakes or a porridge. Wild animals were another important part of the diet; however, the extreme aridity of the area made large game such as deer and mountain sheep rare. Rabbits and other small game were hunted with rabbit sticks or snares. Fishing was also important. Fish were caught with lures or forced into weirs along the banks of the river. Most fish were either broiled or eaten in a stew.

Quechan settlements were separated into a series of dispersed villages, or *rancherías*, scattered across the floodplain of the Colorado River (Bee 1983:87–88). These *rancherías* were very dynamic, and the boundaries and sizes of each changed throughout the year. During the winter months, people congregated on the high points of the floodplain while the river was in flood stage. When the river subsided and planting season began, people dispersed into bottomlands to tend to their crops. During harvest time, people once again aggregated into denser concentrations. Because the landscape of the floodplain also changed year to year, the locations of the *rancherías* could also vary through time.

Several hundred people lived in each *ranchería* (Bee 1983:88). Although tribal identity was strong, local identity was also important. Each *ranchería* was composed of several extended family groups. Marriage was in practice bilocal, although moving in with the male's family was the preferred alternative. Marriage was also exogamous—people married outside their *rancherías*.

Sociopolitical Organization

Like all River Yuman groups, the Quechan had a strong sense of tribal unity and saw themselves as living in a well-defined territory. Quechan society was composed of patrilineal clan groups. Membership in a particular clan was not necessarily tied to membership in a specific *ranchería*, although at some of the more isolated *ranchería*s, everyone was like part of the same clan (Bee 1983:91).

At the time of European contact, there were two main leadership positions within Quechan tribes: civil leaders and war leaders (Bee 1983:92; Forde 1931:133). It is unclear what exact roles these two positions played, and there is some evidence that their power may have been exaggerated or misunderstood by early ethnographers. Within each *ranchería*, there was also at least one headman, who likely did most of the day-to-day administration and met in councils with other headmen to discuss larger issues.

Although leadership positions were, in theory, achieved through good judgment and proper dreaming, in practice, some lineages were more prestigious than others, with many inherited positions. Furthermore, having the "right" dreams was essential if a person was to be selected for a leadership position (Forde 1931:136). A group of elders listened to a candidate describe their dreams, and they judged whether or not these dreams were "good" dreams. If a person was selected for a position, they still had to show good judgment and have success at handling affairs.

Material Culture

Houses and Other Structures

Quechan houses and other structures were generally simple ramadas or dome-shaped structures made with arrowweed and other bushes. Higher-status households were larger, rectangular structures with a pitched, thatched roof. Most roofs were also covered with a layer of earth and mud for insulation and protection from the occasionally violent summer rainstorms.

Hunting, Fishing, Farming, and Gathering Implements

Because hunting was not a major subsistence activity, the Quechan used relatively simple hunting implements, such as rabbit sticks and the bow-and-arrow. The bows were fairly weak, and often the arrows had no stone projectile point at the tip. Fishing implements include nets, traps, weirs, and basketry scoops. Grain was ground with stone or wooden metates.

Baskets and Pottery

Baskets were less-finely woven than in other parts of California. This is likely due in part to the role pottery played in food preparation and storage—tightly woven baskets were not needed. Basketry was used primarily for fishing, but also as carrying devices.

Yuman ceramics are common at late prehistoric period sites in the Colorado Desert—the technology was likely adopted around A.D. 1000. Pottery vessels came in a variety of types and included water jars, cook pots, ladles or spoons, flat bowls, oval platters, open bowls, and parchers for corn. Pottery was tempered with sandstone and painted with yellow ochre, which turned red after firing. By the late nineteenth century, geometric designs were incorporated into surface treatments.

Trade and Conflict

Warfare was an important component of Quechan life (Forbes 1965). Battle reenactments and stories of heroic deeds were part of many Quechan ceremonies (Bee 1983:93). The Quechan were allied with the Mojave and Chemehuevi, and often fought with other Yuman groups, particularly the Cocopa and Maricopa. Beginning at about 1825, the Mojave and Quechan allied and forced the Halchidhoma out of their traditional lands.

In contrast to the relatively low degree of sociopolitical organization, warfare in Quechan society was a highly organized affair. As with the Mojave, there were two types of battles, raids and war parties. Raids were conducted by small numbers of men, usually from one *ranchería*. These were usually surprise attacks, aimed at stealing horses or obtaining captives (Forde 1931:161–162), and generally stirring up trouble. War parties were more formal affairs, with battles taking place at specific locations during agreed-upon times. War parties were structured with several lines of battle. In front was the war leader, along with spearmen and clubmen. Archers made up the second line, followed by spearmen on horses. A fourth line often included women, who would finish off any wounded warriors they came upon (Bee 1967:16; Forde 1931:167). Combat was usually called off before too many warriors were killed, but in some cases entire war parties were destroyed (Bee 1983:93).

Worldview and Ritual Practice

The Quechan believe their ancestors came from Spirit Mountain, also known as Newberry Mountain, located in southern Nevada. They, along with the ancestors of the Mojave, Cocopa, Maricopa, and eastern Tipai were created by Kwikamat, who later was murdered by his daughter, the sorceress Frog Woman (Bee 1983:86). The main ceremony for the tribe was the mourning ceremony, usually held following the death of an important leader, or sponsored by families wishing to commemorate their dead (Halpern 1997). During the ceremony, accounts of battles were retold, and the original mourning ceremony for Kwikamat was reenacted (Halpern 1984).

Dreaming was a pivotal concept to all River Yuman groups. It was through dreams that stories and songs were passed down to shamans, success in future endeavors could be divined, and individuals could secure success with women or in gaming. As noted above, having the correct dreams helped a candidate win a leadership office; it was also important for singers, dancers, and others to maintain their positions (Bee 1983:92–93).

Historical-Period Background

The historical period in the study area began in the sixteenth century with the earliest European explorers, followed by a disruption of Native American lifeways in the following centuries, and continued into the late nineteenth and early twentieth centuries with American land uses.

Exploration

At the time of European contact, the Native American tribes along the lower Colorado River were connected with coastal tribes to the west and pueblo tribes to the east by extensive trade networks. Two of the most important were the Yuma and Coco-Maricopa Trails (Farmer 1935:155–157; Johnston 1983; McCarthy 1982; Stewart 1983b). These trails merged with the equally important Mojave Trail that traversed the Mojave Desert and the Cajon Pass, where it entered the San Bernardino Valley (Robinson 2005:7–8; Walker 1986). The Halchidhoma Trail crossed the Colorado Desert from the Palo Verde Valley area near today's

Blythe, passing water sources such as Mule Spring (located midway between Wiley's Well and Chuckwalla Spring [Gunther 1984:341–343]), Chuckwalla Spring, Tabaseca Tank, and Canyon Spring, then continuing on through the Coachella Valley and the San Gorgonio Pass (Robinson 2005:9). The Spanish built missions along the coast of California but none in the Colorado Desert area, thus much of the chaotic demographic disruptions suffered by the groups along the coast were not felt immediately by the tribes farther inland.

The extreme aridity of the Colorado Desert acted as a deterrent to many early explorers. The earliest known European traveler to enter the lower Colorado River region was Hernando de Alarcón, who sailed up the Colorado River in 1540, penetrating at least as far north as Yuma, Arizona (Forbes 1965:83–111; Sherer and Stillman 1994:1–8; Smith 1977:55–56). In 1604, Juan de Oñate visited several of the tribes along the river and made notes about the inhabitants of the villages he passed (Kroeber 1925:802). Other notable Spanish explorers passed through the region, including de Anza, Garcés, and Romero (Bean and Mason 1962; Bolton 1930; Coues 1900). Many of these early travelers wrote detailed descriptions of their journeys, providing a unique glimpse of early southern California.

The lower Colorado River was of strategic importance to the Spanish, Mexicans, and Americans during the eighteenth and nineteenth centuries. The confluence of the Gila and Colorado Rivers, in Quechan territory, was particularly important, as it provided an easy crossing of the Colorado River. Not surprisingly, the Spanish government made friendly overtures to the Quechan in order to attain safe passage through the region. In the late 1770s, however, the Spanish built two small settlements near the confluence of the two rivers as a way to secure more-direct control over the territory. The Quechan rebelled and destroyed both settlements. The Quechan effectively closed off the Yuma Trail to Spanish travelers from 1781 to the 1820s (Phillips 2010:82). Spanish military expeditions were sent to punish the Quechan immediately following the rebellion, including one commanded by Pedro Fages in 1781–1782 (Bee 1983:94), but these were unsuccessful, and the Quechan remained relatively free from Euroamerican ingress until the mid-nineteenth century.

Within the inland deserts, the situation was similar. Garcés passed through Chemehuevi territory in 1776 and noted little evidence of European contact (Bolton 1950; Coues 1900). The earliest recorded European visit to the Coachella Valley, west of the study area, was by José Romero, the leader of an expedition attempting to reach the Colorado River by a new route, in the winter of 1823–1824 (Bean and Mason 1962); the route was determined impractical for overland use (Bean and Mason 1962; Lech 2004:29–30).

European-Native American Relations

By the early nineteenth century, Native American groups along the Colorado River were dealing with pressures from expanding Mexican and American frontiers. Slave trading in the Southwest and California had serious impacts on Native American groups. The Chemehuevi and other Southern Paiute groups saw their populations fall steeply, and already endemic warfare among Yuman groups was further fueled by the trade of captives to the Spanish (Bean and Vane 1978:5-25; Brugge 1968).

The fur trade also brought increasing numbers of Euroamericans into the area. Jedediah Smith came through the area in 1826 and again in 1827. The first visit passed without incident, but during the second trip, 10 of his men were killed in a confrontation with the Mojave, brought about by an earlier slaughter of Mojave men by the Ewing Young expedition (Casebier 1975:23–27; Earle 2005:24; Morgan 1953:240).

By the mid-nineteenth century, the Southwest and California had come under the control of the United States with the U.S. Army taking up positions along the Colorado River. Following a series of battles, approximately 800 Mojave were taken to the Colorado River Indian Reservation, which was established in 1865. In 1890, Fort Mohave was converted to an Indian school, and young children were taken from their families to be instructed by Euroamerican teachers.

By the late 1800s, Yuma was a thriving center of trade (CSRI 1987:69), and Euroamerican settlement was rapidly increasing, creating conflicts with the Quechan. In 1884, the Fort Yuma Reservation was established, and the Quechan were relocated and granted 10 acres of land per person (Bee 1983:94). Between 1893 and 1912, a large portion of the reservation was taken back and allotted to Euroamerican farmers and ranchers. It was not until 1978 that the land was fully restored to the reservation (Swope et al. 2013:55).

Yuman people who had not been taken to reservations found work in the expanding Euroamerican settlements of Fort Mohave, Needles, and Fort Yuma. By the 1880s, the railroad had come through southern California. The tracks of the Atlantic and Pacific Railroad line had been laid to Needles, California, and from there south to connect with Yuma by 1893. The Parker Spur—connecting Cadiz, California, and Topock, Arizona, and crossing the Colorado River at Parker, north of Blythe—was built in 1883. By the early twentieth century, most of the Native Americans living along the Colorado River were no longer farming; instead, they worked as wage laborers on the railroad and other developing industries.

Mining

The history of mining in Riverside County is characterized by sporadic, small-scale mining of precious metals, and later, large-scale exploitation of quarry products such as sand, gravel, and clay (Pabst 1938; Vredenburgh et al. 1981:24). In general, precious metals were mined in the region from the 1860s to the 1930s; recovery of iron ore and other commodities followed during the second half of the twentieth century.

The first discoveries of gold in the desert portion of Riverside County were in the Mule Mountains (just southwest of the project area) and at Picacho (about 48 km [30 miles] south of the project area) in 1861 (Love 1974:57). Famed trapper, scout, and guide Paulino Weaver (Gunther 1984:562) made the Mule Mountains discovery (Merrill 1919:81), and copper was also recovered in that location (Clark 1970:161). Copper ores were discovered in the Palen Mountains (approximately 29 km [18 miles] northwest of the project area) in the 1880s (Vredenburgh et al. 1981:24). The late-1880s gold-silver discovery in the Chuckwalla Mountains (about 40 km [25 miles] west of the project area) led to the largest gold rush in Riverside County history (Vredenburgh et al. 1981:24). Work in the Mule Mountains Mining District continued into the 1940s (Tucker and Sampson 1945:142–143; Vredenburgh et al. 1981:24–25). Local uranium discoveries in the 1950s led to additional mining development and a veritable “uranium fever” in the Blythe area (Vredenburgh et al. 1981:26–27).

Transportation

The project area is situated between important travel corridors and on the terrace above the critical Colorado River waterway corridor. None of the important, historical-period transportation routes in the region crossed the project APE, but they are discussed below, as they provide context for regional land use and other historical-period activities. We also review the circumstances related to the construction of historical-period roads and trails within the project area.

The Bradshaw Road (also known as the Bradshaw Trail and the Gold Road to La Paz) was established ca. 1863 and carried stagecoaches and freight wagons from the Colorado River crossing at present-day Ehrenberg, Arizona, westerly through Indio and San Bernardino to Los Angeles, largely following old Native American trails shared with William Bradshaw by Cahuilla Chief Cabazon (Johnston 1987; Love 1974). The trail figured prominently in supplying the gold mines at La Paz, Arizona, between ca. 1862 and 1877. The route passed through the project vicinity in an east–west alignment (Figure 2.2), passing stagecoach stations and water sources in varying alignments over time (Johnston 1987:113–126). Modern local governments have designated an alignment approximately 6.0 km (3.75 miles) south of the project area as the Bradshaw Trail (Johnston 1987:116); it is labeled on modern maps, and the BLM recognizes it for off-highway vehicle (OHV) visitor activities (BLM 2012). During the early years of the twentieth century, the Glamis Road ran from that town to Blythe, stopping at Midway Well on the 10-hour route (Pigniolo et al. 2007:12).

From the 1850s into the early twentieth century, paddle-wheel steamboats carried travelers and freight up the Colorado River, at one time reaching as far as the area of today’s Hoover Dam (Lingenfelter 1978). The boats also carried supplies for surveying parties and for U.S. Army posts in Arizona (Palo Verde Irrigation District 2012) and were the primary means of transportation to and from Blythe until 1908 (Pigniolo et al. 2007:12). The first Colorado River crossing at Ehrenberg was a cable ferry, which was replaced by a toll bridge in 1928 (Faigin 2012a).

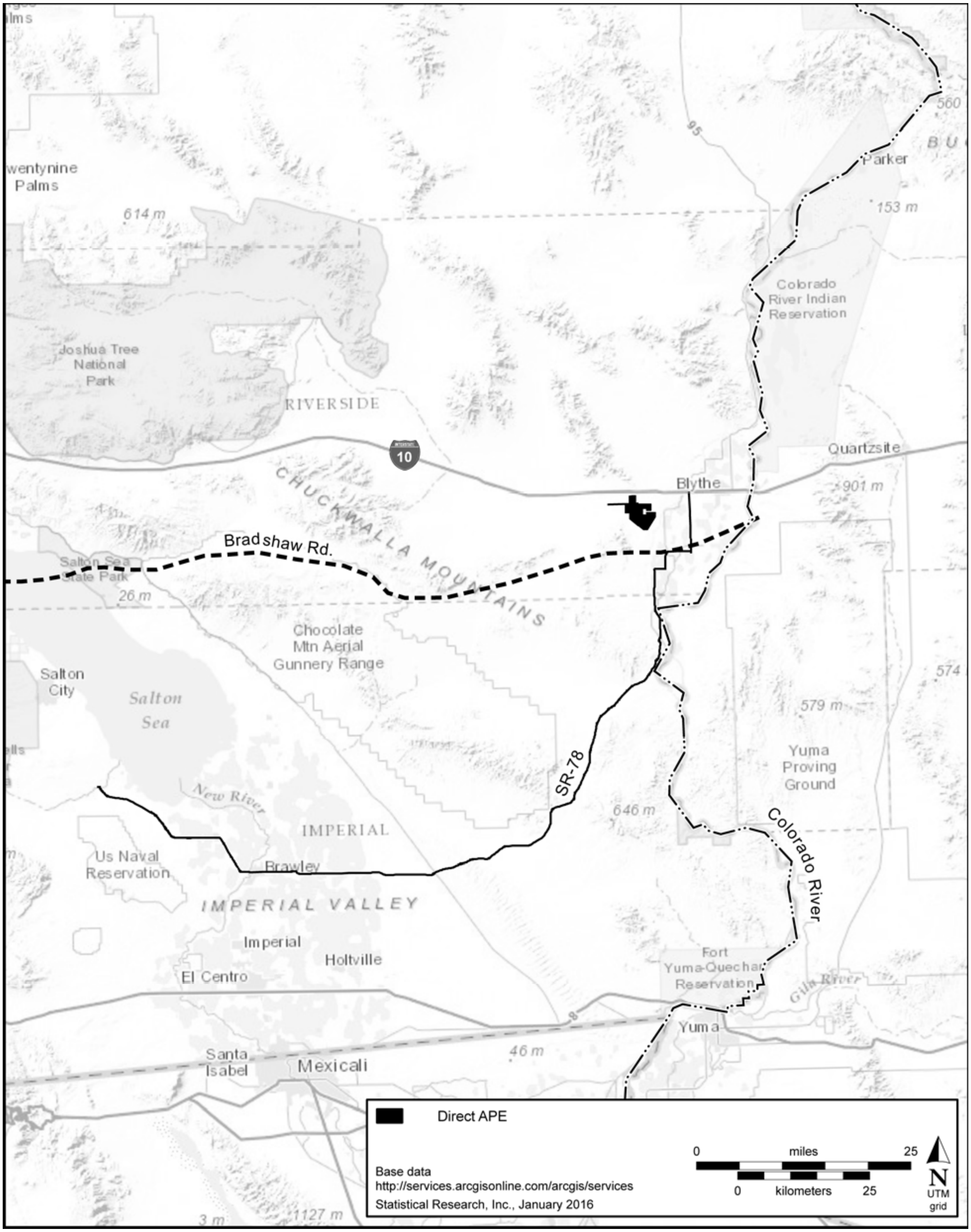

Twentynine Palms
Joshua Tree National Park
RIVERSIDE
10
CHUCKWALLA MOUNTAINS
Bradshaw Rd.
Salton Sea State Park
Chocolate Mtn Aerial Gunnery Range
Salton City
Salton Sea
SR-78
New River
IMPERIAL
Us Naval Reservation
Brawley
IMPERIAL VALLEY
Imperial
Holtville
El Centro
Santa Isabel
Mexicali
Parker
Colorado River Indian Reservation
Quartzsite
Blythe
Yuma Proving Ground
Colorado River
Fort Yuma-Quechan Reservation
Gila River
Yuma
95
8
614 m
26 m
560
153 m
901 m
574
579 m
646 m
46 m
3 m
1127 m
Direct APE
Base data
http://services.arcgisonline.com/arcgis/services
Statistical Research, Inc., January 2016
0 miles 25
0 kilometers 25
N
UTM grid

Figure 2.2. Major historical-period transportation routes in the project region.

Transportation improvements became one of the most significant agents of change in Riverside County in the early twentieth century, especially in communities relatively isolated from main population hubs. In 1900, most southern Californians lived close to work and not too far from friends and families. People got around by walking, riding horses and bicycles, and in horse-drawn wagons and buggies. After the turn of the twentieth century, automobiles quickly increased in popularity and soon became common sights on old wagon roads. Southern California railroad development had created a radiating pattern of settlement characterized by dispersed population centers. The automobile provided maximum freedom of mobility, ideal in such a landscape. The ability to travel long distances between cities connected the region and the country like never before. A 3-mile-long plank road was built between Mesaville and Blythe Junction (present-day Rice), serving only for about 1 year (Pigniolo et al. 2007:13).

Southern California roads, however, were not prepared for the automobile, and increasing automobile use brought the condition and suitability of southern California roads into relief. Few roads were paved, save for 230 miles of paved streets in the city of Los Angeles. Beyond the city, rutted tracks led to the far-flung communities of southern California, and many areas were reached only by traversing circuitous local road segments. The poor state of many of the roads at the time limited travel by automobile to an average speed of under 20 miles per hour (Belasco 1979:23). In 1910, fewer than 500,000 vehicles were on American roads (Belasco 1979:8), but the automobile was becoming increasingly common, and California was no exception to this trend. By 1912, the number had doubled, with more than 1 million motor vehicles registered in the United States.

During the 1910s and 1920s, "road associations" were created to promote the development of automobile routes in rural California (Lyman 1999). In 1920, more than 8 million passenger cars were registered in the United States (Belasco 1979:8), and automobiles were just beginning to permeate every part of society, particularly in southern California, where garages were added to older residential properties, and new homes were built with garages. In 1923, the number again nearly doubled, with 15.2 million cars registered in the United States; 19 million were registered the following year (Mark 1998); that year, California registered its millionth motor vehicle (Talley-Jones 2000:58).

In the 1930s, despite the economic depression, more people settled in California, and the number of motorists taking to the roads increased. It was during this decade that automobile camping and the development of the automobile culture first emerged, with the appearance of automobile camps and roadside motels. The Civil Aeronautics Administration established Blythe Airport (2.9 km [1.8 miles] northeast of the project area) during the 1930s; commercial operations began there in 1940.

The impact of World War II on the southern California car owner was instantaneous and severe. Blackout and dimout regulations were put into effect. Tires, gasoline, and finally, cars themselves were all strictly rationed, and speed limits were reduced (Wilson 1950:131). All but essential travel was prohibited, and carpooling became an important cog in the transportation scheme. For most Americans, automobile use was limited, and luxury travel was curtailed during that time. Following the war, however, the economy boomed, and demand for automobiles frequently outran supply. During the war, road construction had essentially ceased, and once the restrictions were lifted, more cars traveled more miles than ever before (Tomlinson 1975).

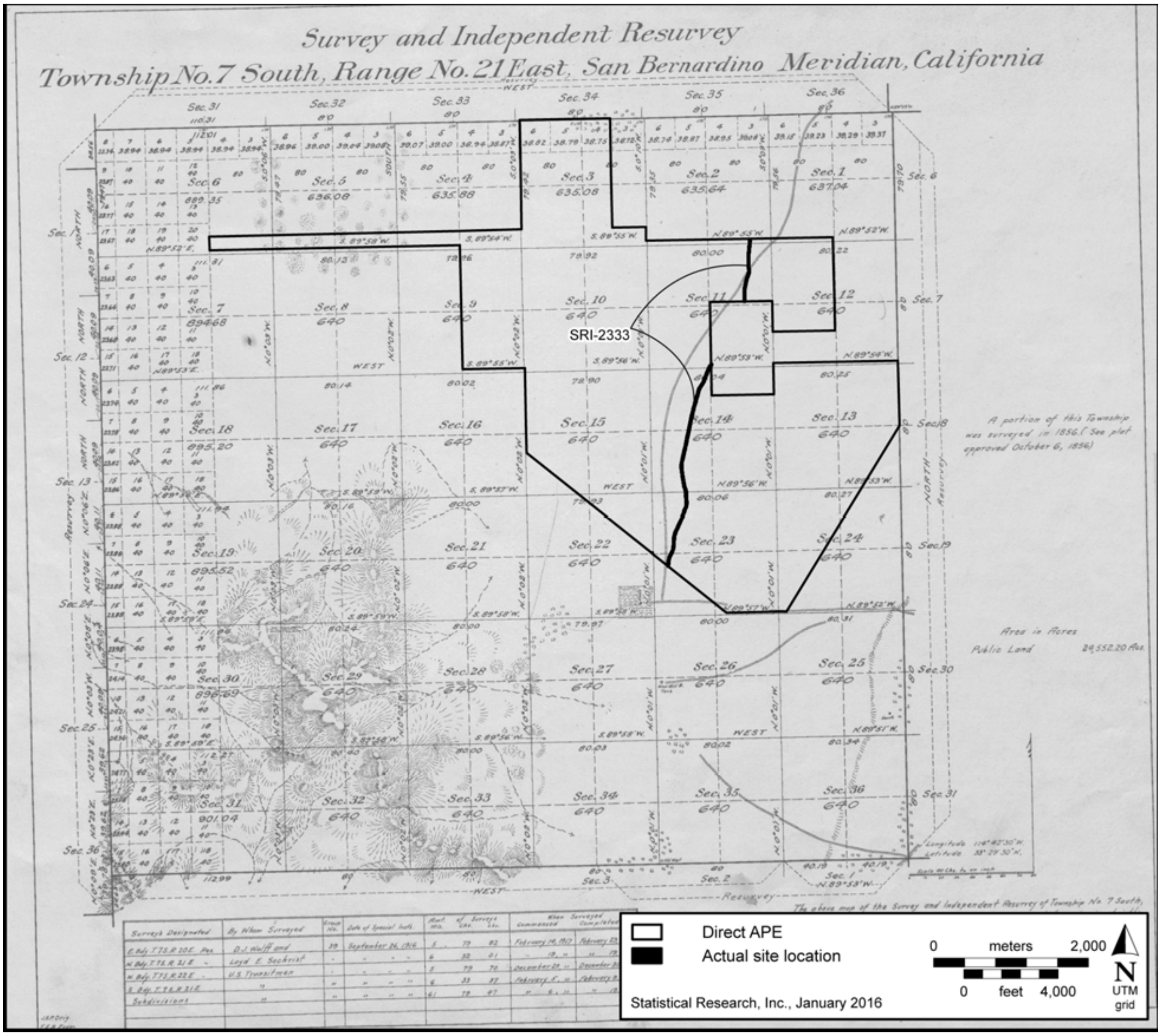
California State Route 78 follows local roads as it passes near the south and east sides of the project area (see Figure 2.2). This portion of the route, designated in 1963, is officially named the Ben Hulse Highway, after a state senator who served between 1933 and 1958 (Faigin 2012b). The route that was to become Interstate 10, running east–west at a distance of less than 0.6 km (0.4 miles) north of the project area, was defined in 1919 as Legislative Route Number 64 (as well as U.S. 60/70) (Faigin 2012a) and was paved from Indio to Blythe in 1936 (Pigniolo et al. 2007:13).

By the mid-1950s, it became clear that the existing national highway system was insufficient. Road deterioration, congestion, safety, and civil defense needs were all cited when talk of a modern system began to gain momentum under the Eisenhower administration. Further legislation in 1956 (the Federal Aid Highway Act) provided for the construction of a system of highways to be finished by 1972 at a cost of $26 billion. The interstate highway system, as it came to be known, was not completed until well into the 1980s and cost more than 10 times the projected amount.

The railroad impacted the development of transportation in the Palo Verde Valley. Receiving a charter in 1914, the California Southern Railroad Company began construction on a spur line in 1915. Operations from Rice to Blythe began in 1916; a southern extension to Ripley was completed in 1920, with operation beginning in 1921 (Cleland and McCorkle Apple 2003:86). In Rice, the railroad spur connected to the

Atchison, Topeka & Santa Fe Railway (AT&SF). The Blythe-Ripley branch of the AT&SF provided access to the gypsum mines in Midland (about 32 km [20 miles] north of Blythe) (Myrick 1992:840). It also provided a means to ship agricultural products to Los Angeles, as well as overnight passenger access to the city. In 1991, this segment of the railroad was sold to the Arizona and California Railroad, but it was abandoned nearly two decades later, in 2009.

Our review of historical maps yielded information about a single road (recorded as SRI-2333) that crossed the project APE during the historical period. This southwest–northeast–trending road appears on the 1918 General Land Office (GLO) plat map, drawn from survey data collected in 1917 (Figure 2.3). At that time, the road ended just south of the project area, in the southwest quarter of Section 23 near a house and agricultural field outside the direct APE. From that point, the road followed its current alignment northeasterly through Sections 23 and 14 but branched northeasterly from the current alignment in the northeast quarter of Section 11. More-recent 7.5-minute topographic quadrangles dated 1952 (drawn from 1948 aerial photographs and 1952 survey data) depict section-line roads running from the road recorded as SRI-2333 toward the east, in the center of the township, and between Sections 12 and 13 (recorded as SRI-9020 and P-33-014173).


Survey and Independent Resurvey
Township No. 7 South, Range No. 21 East, San Bernardino Meridian, California
Sec. 1
Sec. 2
Sec. 3
Sec. 4
Sec. 5
Sec. 6
Sec. 7
Sec. 8
Sec. 9
Sec. 10
Sec. 11
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Sec. 25
Sec. 26
Sec. 27
Sec. 28
Sec. 29
Sec. 30
Sec. 31
Sec. 32
Sec. 33
Sec. 34
Sec. 35
Sec. 36
SRI-2333
A portion of this Township was surveyed in 1856. (See plat approved October 6, 1856)
Area in Acres
Public Land 24,552.20 Acs.
Direct APE
Actual site location
0 meters 2,000
0 feet 4,000
N
UTM grid
Statistical Research, Inc., January 2016

Figure 2.3. 1918 GLO plat of 1917 survey of Township 7 South, Range 21 East, SBBM, showing location of SRI-2333.

The first survey of Township 7 South, Range 21 East, in 1856, provided little topographical detail, and the surveyors likely had little physical impact on the land. The 1917 survey, however, mapped much detail within the township and established many section markers that remain in place today. Field notes for the survey (Wolff and Sechrist 1917) indicated that it was completed between February 6 and 19, 1917. The notes indicated that work had been performed variously over "level mesa," "gently rolling mesa," "level bottom land," "crest of spur," "broken malpai [*sic*] hills," and "dry wash," and "through greasewood [creosote bush] and scattering palo verde," in "salt sage," "ironwood timber," and "mesquite." The surveyors reported setting 85 iron posts with brass caps; this would account for exactly 1 post and cap for every section corner and center in the township. They also constructed numerous mounds of stone. The 1917 survey effort may account for many of the segmented roads, trails, and disturbances that follow section lines, half-sections, and quarter-sections within the township (recorded in this study as SRI-8085). Cut stumps within the APE may represent clearing activities performed by members of the 1917 survey crew to facilitate chaining and mapping.

Settlement and Agriculture

As previously mentioned, the history of agriculture in the Palo Verde Valley area extends back to the Patayan I period (ca. 1500–1000 B.P.). It was not until the mid-1870s, however, that the possibilities for commercial agriculture were explored. In 1850, the federal government had ceded to the state of California over 2 million acres of public swamp and overflow lands (lands that were subject to overflow and that could not be profitably used for raising crops without benefit of drainage or embankment) under the Swamp Land Act (Robinson 1948:191; USGS 2013). Under this provision, individuals could file for up to 160 acres of land to be reclaimed for agricultural development. The GLO completed a survey of Township 7 South, Range 21 East, in 1856. No cultural features were mapped within the project APE, and in fact, the only cultural feature depicted in the entire township was a "trail" running southwest–northeast across the southeast corner of Section 36, in the floor of Palo Verde Valley. The only individual for which archival information was found was H. M. C. Brown, who performed the 1856 survey of the township. Brown appears in a number of newspaper articles related to his involvement in the 1859 attempt to mark the location of the 100th meridian (*The New York Times*, 9 November 1859:2; *The Guthrie Daily Leader*, 9 February 1907:6). At that time, Brown had reportedly been a U.S. Surveyor for 20 years (*The New York Times*, 9 November 1859:2). The accuracy of the location remained in dispute (*Los Angeles Times*, 12 October 1926:19; *The Perry Journal*, 11 October 1926:1) until 1930, when 2,000 acres of Oklahoma land was given to Texas, and it was said that "2,000 persons who believed they lived in Oklahoma now find themselves citizens of the Lone Star state" (*Lincoln Evening Journal,* 18 March 1930:15). No sites related to the 1856 GLO survey were identified during this project.

In 1874, when the project area was within the boundaries of San Diego County, Oliver P. Calloway, a "noted engineer," completed field survey for a road between San Diego and Yuma (Lech 2004:209). Near present-day Ehrenberg, Calloway observed the agricultural potential of the Palo Verde Valley and, after enlisting financial support from real estate tycoon Thomas Blythe, began amassing a land base for his plans. Together, the men recruited individuals to claim 160-acre parcels then convey ownership to Calloway and Blythe. Eventually, Blythe controlled over 303 km^2 (117 square miles) of land fronting the west side of the Colorado River and centering roughly on Ehrenberg, and Calloway engineered a water-conveyance system to irrigate the land (Lech 2004:211–214). Regional agricultural pursuits were delayed by the deaths of both men in the early stages of the scheme, but the area's farming potential had been demonstrated (Lech 2004:215–217). In some cases, local land ownership became a hotly contested issue, with claimants applying the provisions of the California Swamp Land Act pitted against homesteaders citing federal land rights.

Arizona cattlemen visited Palo Verde Valley in 1904, and in partnership with the Hobson brothers of Ventura County, California, formed the Palo Verde Land and Water Company, assuming water rights for the entire valley. Our research resulted in some historical details concerning settlement within the project APE. Available archival evidence revealed much speculative attention to land within the APE, but no evidence was found that any of the land claims were ever patented. The earliest claim information is a Desert

Land Entry in Sections 12, 13, and 24 dated May 22, 1877. The claim was cancelled on April 20, 1896; no further details were available. Between January and March, 1909, a total of 17 Desert Land Entry claims was made for lands within the APE in Sections 3, 4, 9–11, 13–15, 22, and 23. Most of these were relinquished or cancelled in 1910 and 1911, and the remaining few were cancelled in 1949 and 1950.

During the first half of the twentieth century, a number of unsuccessful plans were drafted to develop an estimated 18,000 acres of irrigable land on the Palo Verde Mesa (Kleinsorge 1941:36). The town of Mesaville (so named for its location on Palo Verde Mesa, at a railroad siding on the Ripley branch line about 14 km [9 miles] northeast of the project area) was established in 1909 (Gunther 1984:322) but was short lived because of brackish well water and the inability to bring water to the mesa from low-lying canals nearer the river (Dekens 1962). In 1910, the *Imperial Valley Press* (29 January 1910:3) reported that “a large force of men and teams [are] at work in clearing off desert growth and leveling land for desert entrymen on the mesa lands,” and that a well was “being sunk” on the northern portion of the mesa. Land on Palo Verde Mesa was opened for homesteading in 1911 (Pigniolo et al. 2007:12). Interest in development on the mesa was likely the impetus for the 1917 GLO survey of Township 7 South, Range 21 East. The Palo Verde Irrigation District was formed in 1923 to manage the valley’s irrigation and drainage, and various irrigation schemes were proposed for mesa lands (AECOM 2015:38).

In the 1920s, receding Colorado River water levels and the subsequent attempts at remediation resulted in an overall drop in water level in the river while simultaneously increasing the chance of flooding in the irrigation canals (Bickell 1999:5). Local residents supported construction of Boulder Dam (now Hoover Dam), completed in 1935, because it would regulate river flow and prevent flooding; subsequent agricultural pursuits were more certain (Palo Verde Irrigation District 2012).The Great Depression brought many dustbowl refugees to the river crossing at Blythe. The newcomers sought work in agriculture, mining, and regional water projects, such as the All-American Canal, and some remained in the desert when the work was completed (Pigniolo et al. 2007:13).

In 1941, land atop the Palo Verde Mesa was said to “lie unreclaimed” (Kleinsorge 1941:36). Attempts at improving the valley’s irrigation system were made during World War II, but because of a lack of funding, only a temporary rock weir was constructed. The permanent structure, Palo Verde Diversion Dam, was authorized in the 1950s (Bickell 1999:6), and a network of water-conveyance features, including levees, canals, and drains in the Palo Verde Valley bottom appear on historical-period maps as early as 1952.

Interest in land on the Palo Verde Mesa continued after World War II. A soils study of the Palo Verde Mesa, completed in 1946, concluded that most of the land within the project APE was Grade 3 (Weir and Storie 1946:6), indicating “fair” soils that “may give good results with certain specialized crops” (University of California 1978:3). Small pockets of soil in Sections 10 and 15 were determined to be of Grade 4, indicating “poor” with “a narrow range in their agricultural possibilities” and Grade 5, “very poor” and “of very limited use except for pasture, because of adverse conditions such as shallowness, roughness, and alkali content.” An island running roughly from the northwest to southeast corners of Section 22 was found to be Grade 2, “good,” and “suitable for most crops” (University of California 1978:3). A 1953 assessment of agricultural potential stated

> in general, the mesa lands are suitable for a large variety of farm production and should be especially suitable for grapes, tomatoes, alfalfa, cotton, wheat, barley, rye, oats, beans, corn and melons. The possibility of growing tangerines and grapefruit should not be overlooked, as these citrus fruits would make profitable permanent income, and the soils are especially adaptable to citrus.
>
> Pasture land, together with stock feeding, would be suitable and the raising of hogs and feed in combination has been practiced very successfully in the Yuma area [about 89 km (55 miles) south of the project APE] by at least one good farm operator, who has successfully overcome the heat problem in summer by specially designed pens and cooling ponds [Harrison & Woolley 1953:10].

Records on file in the National Records and Archives Administration (NARA) listed 32 claimants for parcels within the project APE during the 1950s (Table 2.2). The claims ranged in size from 40 to 320 acres, and all were either Desert Land Applications or Desert Land Entries. "Some time prior to 1951, some of the Desert Land Entries in the area commonly referred to as the Blythe Lower Mesa organized a group known as the Blythe Mesa Preorganization Association in order to lend mutual assistance to each other in obtaining water from the Colorado River" (Jenney 1955). A. E. Nicholls, who had claimed land on the mesa since as early as 1909 (New Town on Palo Verde Mesa, 13 June1950:35) and held one of the claims within the APE during the 1950s, was reportedly "one of the prime movers in the effort to obtain irrigation water" for the mesa (Desert Owners Seek Water, 14 January 1951:36) and "head of the property owners [*sic*] group" (*San Bernardino County Sun*, 9 December 1950:12). During his early tenure on the mesa, he had planned a community to be named Palowalla about 1.6 km (1 mile) north of the project area, but development was delayed until about 1950, when he created Nicholls Warm Springs at the location (see Figure 1.2). Potter B. Hueth, who had cleared brush on the mesa in 1910 (*Imperial Valley Press* 1910), also had a claim within the APE during the 1950s.

The group drew plans to bring water to the 16,000 arable acres on the mesa via a pumping station and new canal. This canal was to run generally north–south across the project APE, through Sections 10, 15, and 22 (Figure 2.4). The cooperative group hoped to annex the mesa lands to the Palo Verde [Valley] Irrigation District and pooled funds for the proposed pumping station and canal. The claimants maintained that because their objective was to irrigate their claims, their investment in Association payments for irrigation improvements should suffice as their annual proof. Hundreds of documents on file at NARA related the claimants' further assertion that the time period for proving up on their claims should be extended in light of their continued efforts to irrigate the land. They hired legal representation, retained engineers and soil experts to assess the land, sought the support of legislators, and implored government officials regarding their case. Archival documents showed that negotiations continued between claimants and the federal government until at least 1959. Claimants Esther Cassell and Ruby Thurnherr were particularly prolific correspondents on behalf of the entire group. A BLM memorandum, dated March 19, 1959, named 20 of the 32 individuals who had entries within the project APE on a list of entries that "can probably be rejected on the basis of the Regional Solicitor's opinion of February 9, 1959" (Best 1959). Archival research did not disclose a final cancellation of the various land claims, but the lack of patent documents on the GLO Web site suggests that none of the claims within the project APE was ever patented. It is clear that the pumping station and canal were not constructed.

Jojoba domestication presented a unique agricultural pursuit in the region during more-recent decades. During the 1970s, Native Americans collected and processed jojoba seed and produced oil from native plants on reservation lands in California and Arizona, providing an impetus for research and commercialization of the product (Randazzo 2014; U.S. National Research Council 1985:3). Jojoba (*Simmondsia chinensis*) is a "perennial woody shrub native to the semiarid regions of southern Arizona, southern California and northwestern Mexico" (Undersander et al. 1990). Jojoba domestication was explored as an alternative to sperm whale oil products and fossil fuels and "made the move from obscurity into the real world of agriculture with unprecedented speed" (Yermanos 1979:4, 11). In California, 1,500 acres of small jojoba plots were planted in 1977 and 1978, large plantations were established by 1979 (Yermanos 1979:6), and farms were yielding harvests by 1982 (U.S. National Research Council 1985:v). By 1990, 40,000 acres of jojoba were under cultivation in the southwestern United States (Undersander et al. 1990). In response to unpredictable yields, however, only approximately 4,000 acres remain in production today in California and Arizona (Randazzo 2014). Within the DQSP, the 160-acre private land portion of the project area located in the NE $^{1}/_{4}$ of Section 15 was formerly a jojoba farm and is now abandoned.

The climate of the Palo Verde Valley is ideal for agriculture, and crops are harvested year-round. According to the Palo Verde Irrigation District, as of 2003, crops consist largely of grains, grasses, melons, cotton, and various vegetables and citrus. With a gross return of over $37 million, alfalfa is currently the leading cultivar in the valley (Palo Verde Irrigation District 2012). Today, the economy of the CRIT is focused largely on agriculture, reservation land is leased for agricultural production, and cotton, alfalfa, and sorghum are grown (Colorado River Indian Reservation 2009; Eargle 2008:225).

Table 2.2. Land Claimants Associated with the Direct APE

Name
Allen, Don A.
Allen, Margaret
Anderson, Prudence B.
Bergstrom, Gristan Eric (possibly Erin)
Bergstrom, Pearl
Billson, H. L.
Brinkman, Gerald A.
Cain, Elmer
Callender, Frank A., Jr.
Cassell, Esther M.
Cassell, Ida May
Cassell, Ralph W.
Cehms, Judge (spelling uncertain)
Cunningham, Arva
Cunningham, Virginia L.
Gates, L. S. (Leon)
Geier, John H.
Gudzunas, Victor A.
Hueth, Potter B. (P. B.)
Miller, A. (Agnes A.)
Newman, R. (Raymond)
Newman, S. L. (Sol L.)
Nicholls, A. E.
Parker, Fred H.
Scott, John T.
Thomason, Mary E.
Thorp, Daisy (Thorpe)
Thurnherr, Frank H. (Thornherr)
Thurnherr, Ruby H. (Mrs.) (Thornherr)
Van Reid, Minnie
Wernsing, A. A.
Zeiler, Joseph

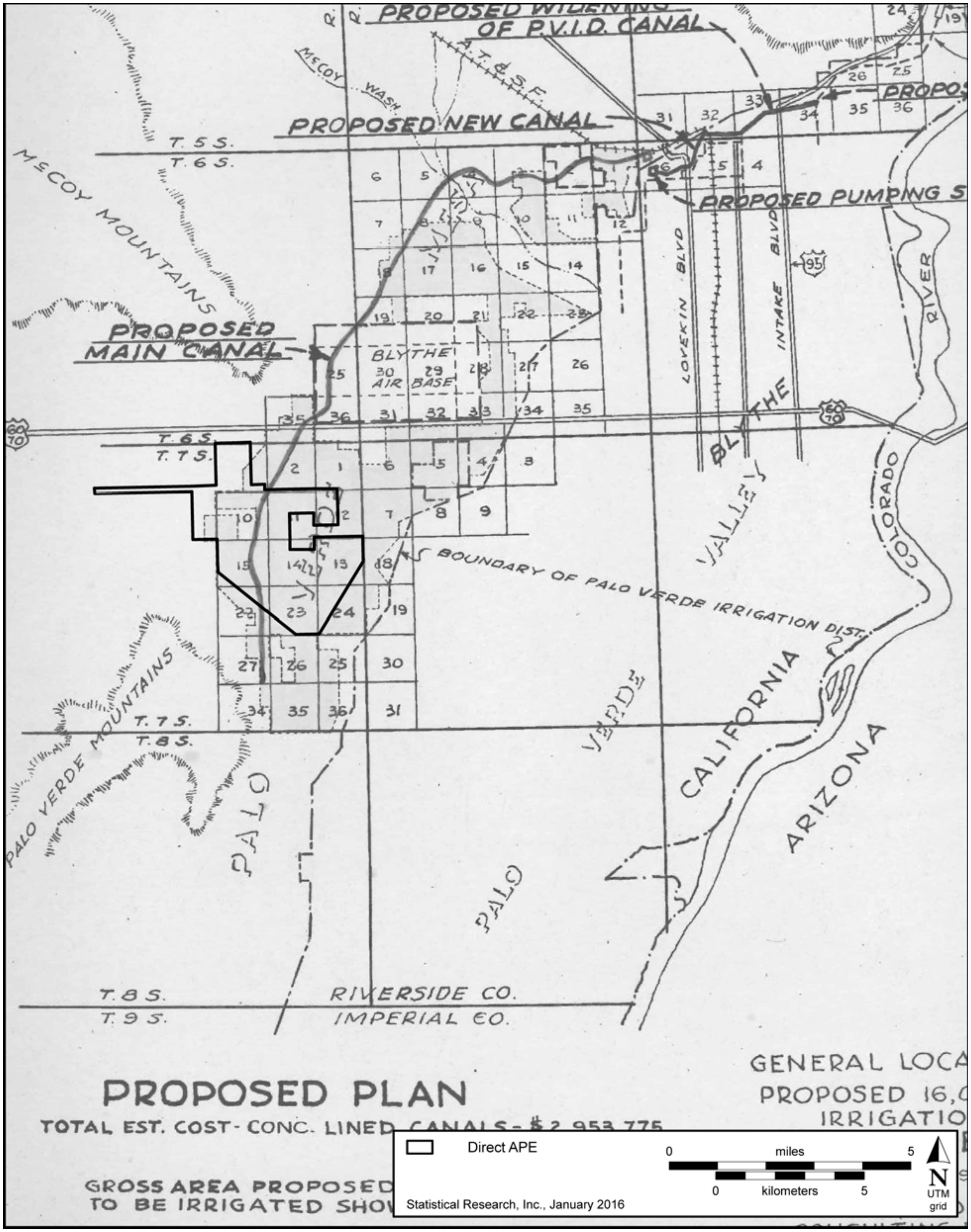
PROPOSED WIDENING OF P.V.I.D. CANAL
A.T.&S.F.
McCOY WASH
PROPOSED NEW CANAL
T. 5 S.
T. 6 S.
McCOY MOUNTAINS
PROPOSED PUMPING S
LOVEKIN BLVD
INTAKE BLVD
95
PROPOSED MAIN CANAL
BLYTHE AIR BASE
60 70
T. 6 S.
T. 7 S.
BLYTHE
VALLEY
COLORADO RIVER
BOUNDARY OF PALO VERDE IRRIGATION DIST.
PALO VERDE MOUNTAINS
T. 7 S.
T. 8 S.
PALO
VERDE
PALO
CALIFORNIA
ARIZONA
T. 8 S.
T. 9 S.
RIVERSIDE CO.
IMPERIAL CO.
PROPOSED PLAN
TOTAL EST. COST - CONC. LINED CANALS - $2,953,775
GROSS AREA PROPOSED TO BE IRRIGATED SHOW
GENERAL LOCA
PROPOSED 16,0
IRRIGATIO
Direct APE
0 miles 5
0 kilometers 5
N
UTM grid
Statistical Research, Inc., January 2016

Figure 2.4. 1953 map showing proposed Palo Verde Mesa irrigation canal. Source: Harrison & Woolley 1953:Plate I.

Military Activities

Fort Yuma

The Mexican War and the California Gold Rush brought Euroamericans to the region in increasing numbers, along with increasing regional hostilities. In response, the U.S. Government established the military post that became Fort Yuma between 1849 and 1851 (Frazer 1970; State of California 2015). In 1858, the U.S. Army's defeat of the combined forces of the Mojave and Quechan proved to be the last major conflict between Native Americans and Euroamericans in the region (Pigniolo et al. 2007:11).

World War II and the Desert Training Center

During the opening days of World War II, more than 81,585 km^2 (31,500 square miles) of the Arizona and California desert were identified and developed by U.S. Army ground forces as a training facility for infantry and armored units known as the Desert Training Center (DTC) (Bischoff 2009a, 2009b; BLM 2013). The facility was originally intended to train and prepare armored units for desert warfare in the planned invasion of North Africa; however, during its years of operation, between 1942 and 1944, the training center expanded far beyond this original scope and incorporated a variety of new training exercises. In 1943, the area became known as the Desert Training Center/California-Arizona Maneuver Area (DTC/C-AMA) to reflect this new role. Of the total 85 army divisions that served in World War II, 23 trained at the DTC/C-AMA (Pew 1985:28). This translates to more than 1 million soldiers, roughly 10 percent of all U.S. personnel who served in World War II.

The Blythe Army Air Base (BAAB) was built in 1942 at the location of the Blythe Municipal Airport and served as a transportation and supply hub, as well as a training base for bombardment crews through late 1944, after which it became a refueling location. It was deactivated in 1945 (Pigniolo et al. 2007:13).

Today, across much of southeastern California and western Arizona, the remains of the training area can still be found. In California, surviving features include training camps, airfields, bivouacs, and maneuver areas, as well as more-ephemeral features, such as foxholes, machine-gun positions, and tank tracks. The complex represents a significant event and period in U.S. history, and many of these elements are considered eligible for listing in the NRHP.

The project APE lies within the DTC/C-AMA (Figure 2.5), but no DTC camps were located in the project vicinity. Considerable evidence was encountered during this investigation to indicate that training activities were performed in the immediate area.

Operation Desert Strike

In 1964, another set of military maneuvers called Operation Desert Strike was undertaken by the U.S. Army and U.S. Air Force in the same basic location as the DTC/C-AMA, in an area approximately one-third the size (Bischoff 2009a:49, 129). The exercise lasted 2 weeks and was designed to train various units in desert warfare and improve coordination among different military branches. Like sites associated with the DTC/C-AMA, Operation Desert Strike sites consist of temporary camp sites and training areas with associated artifacts dating to the 1960s, but none of the campsites is located within the project APE (Bischoff 2009a:30, 129).

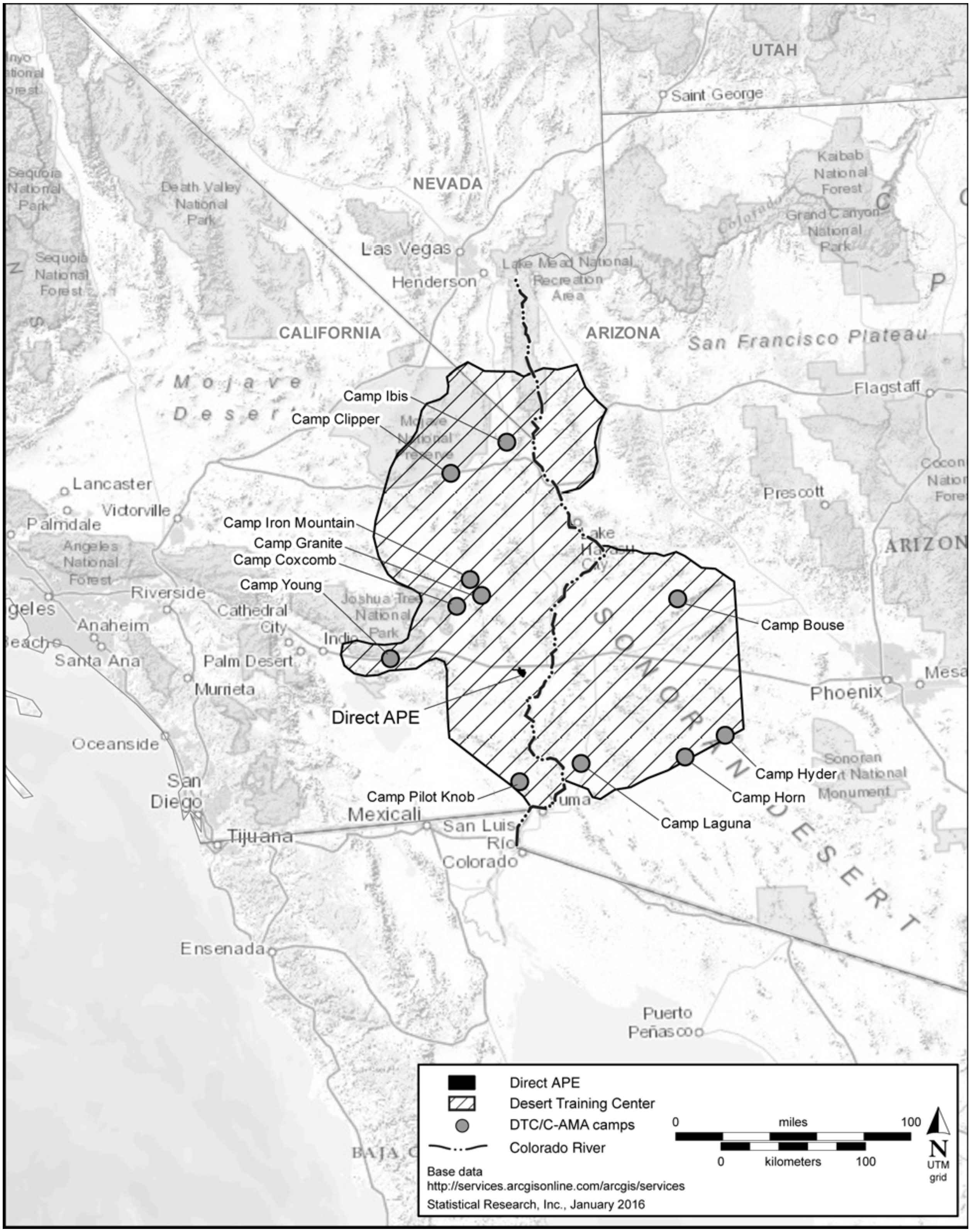
UTAH
Saint George
NEVADA
Las Vegas
Henderson
Lake Mead National Recreation Area
Death Valley National Park
Sequoia National Park
Sequoia National Forest
Kaibab National Forest
Grand Canyon National Park
Colorado
CALIFORNIA
ARIZONA
San Francisco Plateau
Flagstaff
Mojave Desert
Mojave National Preserve
Camp Ibis
Camp Clipper
Lancaster
Victorville
Palmdale
Angeles National Forest
Camp Iron Mountain
Camp Granite
Camp Coxcomb
Camp Young
Riverside
Cathedral City
Joshua Tree National Park
Indio
Anaheim
Santa Ana
Palm Desert
Murrieta
Lake Havasu City
Prescott
SONORAN DESERT
Camp Bouse
Phoenix
Mesa
Direct APE
Oceanside
San Diego
Camp Pilot Knob
Yuma
Mexicali
Tijuana
San Luis Rio Colorado
Camp Hyder
Camp Horn
Camp Laguna
Sonoran Desert National Monument
Ensenada
Puerto Peñasco
BAJA C
Direct APE
Desert Training Center
DTC/C-AMA camps
Colorado River
Base data
http://services.arcgisonline.com/arcgis/services
Statistical Research, Inc., January 2016
0 miles 100
0 kilometers 100
N
UTM grid

Figure 2.5. Location of the DQSP in relation to DTC/C-AMA camps in the region. Sources: Bischoff 2009a, 2009b; BLM 2013.

CHAPTER 3

Research Design and Methods

Scott H. Kremkau, Karen K. Swope, Mark Q. Sutton, and Michael K. Lerch

This chapter includes a research design that addresses both prehistoric and historical-period themes with their respective research questions and data requirements, followed by a discussion of site types and field methods.

Research Design

As lead agency, the BLM required that SRI develop a research design prior to the start of fieldwork, as a tool to evaluate the eligibility of any cultural resources within the direct APE for listing in the NRHP. A research design is an explicit statement of the theoretical and methodological approaches to be used in an archaeological study (Office of Historic Preservation [OHP] 1990:9). The research design provided here was used to guide field methods and evaluations of any cultural resources identified within the direct APE. The following sections address both the prehistoric and historical-period occupation of the APE and address various research themes important to both of these eras. This chapter is drawn from the research design and work plan for the DQSP archaeological survey submitted to BLM in March 2014 and provided to SHPO by BLM on August 21, 2014 (Wakefield 2014). On September 30, 2014, SHPO concurred with BLM that the APE was consistent with the Section 106 regulations at 36 CFR 800.16(d) and that the proposed work plan represented a reasonable and good-faith effort to identify historic properties located within the APE, as required by 36 CFR 800.4(b)(1) (Roland-Nawi 2014).

Prehistoric and Protohistoric Research Themes

Eastern Riverside County is part of the Colorado Desert, a vast desert that runs along the Colorado River westward to the Peninsular Ranges and represents the northwestern extent of the Sonoran Desert. Despite the limited resources available, humans have occupied the Colorado Desert beginning soon after they entered North America beginning some 12,000 years ago and possibly several thousand years earlier, based on evidence at sites such as Meadowcroft Rockshelter in Pennsylvania and Monte Verde in Chile, as well as data in California from coastal and island sites (Erlandson et al. 2007:55–56), as well as the widespread presence of fluted points (Rondeau et al. 2007). However, archaeological information on prehistoric cultures in the Colorado Desert remains relatively scant, and most of our current understanding of the nature of aboriginal settlement and subsistence in the area has been modeled using ethnographic data. Thus, the following research topics are proposed to tackle some of the outstanding research issues pertaining to the Colorado Desert. These topics build on the research design proposed by Schaefer (1994b), incorporating more-recent information from excavations and ethnohistoric studies.

Research Questions and Data Requirements

We pose general questions focused on topics of chronology, trade and regional interaction, ceremonial landscapes, technology, and settlement and subsistence. The research questions and the data needed to address each topic are discussed below.

Chronology

Adequate temporal control in archaeological deposits is crucial if researchers are to generate meaningful inferences from data or to address specific research questions with any degree of analytical confidence. Crucial to the current study is the timing of the prehistoric occupation of the project area. The Colorado Desert has been home to prehistoric aboriginal populations for at least 10,000 years (Rogers 1929, 1945; Schaefer and Laylander 2007). In contrast to neighboring regions, however, the antiquity of prehistoric occupations in the Colorado Desert is only recently coming into focus.

Absolute radiocarbon dates are relatively rare in this region, compared to other parts of the southwestern United States. Few stratified sites with good preservation have been identified within the Colorado Desert (Love and Dahdul 2002; McDonald 1992; Schaefer 1994b; Schaefer and Laylander 2007); of these, some of the best-preserved were found in rockshelters (McDonald 1992; Schaefer 2002; Wilke et al. 1986). Sites within the APE are confined to open-air, temporary-use campsites and activity areas. Although not as ideal as rockshelters, these sites could still contain intact subsurface deposits and features, and an increasing number of these sites have been identified within the Colorado Desert, particularly in dune environments (see Drover 1982, 1988; Hogan et al. 2010; Love and Dahdul 2002).

Among the questions about chronology we addressed are the following:

1. When were sites within the APE occupied? What is the full temporal extent of the occupation of the APE?
2. What was the intensity of prehistoric use of the APE over time?
3. How do data from sites within the APE compare with data from other regional settlement pattern studies? Do the sites within the APE represent the full occupational history of the Colorado Desert or just a subset of that history?

Data Requirements

The types of data needed to establish a chronological framework for any site include absolute dates from intact midden deposits with hearths, roasting pits, or other features that can be radiocarbon-dated and relative dates from temporally sensitive artifacts with well-established age ranges. Several previously recorded sites in and around the APE contained diagnostic projectile points and pottery (e.g., P-33-001821, P-33-001822, and P-33-021371), which would help to date the sites to general time periods. Obsidian artifacts could yield relative chronological information through the measurement of hydration rims, although variables affecting the rate of hydration are as yet imperfectly understood. In addition, the presence of sites on otherwise dated landforms may be useful in dating the sites.

Trade and Regional Interaction

The study of trade and exchange networks reveals how humans acquire material goods, technologies, and ideas. In some cases, the identification of trade goods is straightforward—for example, marine shells at inland sites hundreds of miles from the coast. In other cases, sourcing studies, which allow researchers to see where materials came from, are necessary. For widely traded items, it can be difficult to determine whether their appearance in certain areas is the result of long-distance contact with the groups who originally acquired or produced them or if the items were traded “down the line,” passing through several groups before arriving at their final destinations. In these cases, multiple lines of evidence from a variety of material or artifact classes can help show patterns in the distribution of certain goods. The resolution of these issues is also dependent on sufficient data sets from excavated contexts from several different sites along trade routes.

The Colorado Desert area borders the territories of several known prehistoric cultural groups, and evidence of trade with these groups has been documented at sites across the desert (Bean 1972:68–70; Bean et al. 1995). Several prehistoric trails pass through and near the APE, including portions of the Coco-Maricopa Trail and the Xam Kwitcan Trail, which pass just north and east of the direct APE (Bean 1972; Bean and Vane 1978; Laylander and Schaefer 2010). Prehistoric trail systems within the APE may be difficult to discern because of land-surveying activities and World War II–era use of the area for tank maneuvers. However, several recent studies have been able to differentiate prehistoric trails from animal trails and more-recent construction (Becker and Altschul 2003, 2008; Laylander and Schaefer 2010; Slaughter et al. 2000; Stone 1991).

There are several potential archaeological sources of information relating to trade and exchange, including lithics, shell, and ceramics. The exchange of lithic materials between the Colorado Desert and other areas has been documented at several sites (Bean et al. 1995; Grenda 1998; McFarland 2000; Pigniolo 1995). The two major lithic sources are Obsidian Butte, on the southern shore of the present-day Salton Sea, and the Wonderstone West Rainbow Rock Locality (CA-IMP-6300), on the western shore of ancient Lake Cahuilla (Pigniolo 1995). In a more local example of lithic procurement, a set of lithic flakes made of felsite from a quarry located at the foot of the Chuckwalla Mountains (P-33-001814) were found to refit with those from another workshop (P-33-001819) at the foot of the Mule Mountains 63 km (39 miles) away and just west of the project area (Singer 1984); similar lithic material is found in localized outcrops at Dragon Wash near Desert Center and along the eastern slopes of the Eagle Mountains of Joshua Tree National Park (George E. Kline, personal communication 2015). This is one of many sources of cryptocrystalline silicate (CCS) sources in the Chuckwalla Springs area, among others in the Palo Verde and Mule Mountains (Strong 1971:72–76). Other lithic sources in the region include northern Baja California (San Felipe obsidian), the California coast (steatite), and central Arizona (argillite).

Likewise, marine shells have been found at sites in the Colorado Desert, with the Coachella Valley functioning as a trade route between the Gulf of California and the southern California coast (Ahlstrom 2000; Rosen 1995). Ceramic figurine types from both the Great Basin and the lower Colorado River were found at sites in Tahquitz Canyon (Bean et al. 1995), Mission Creek (Altschul 1986), and Yucaipa (Grenda 1998), suggesting that the inhabitants were part of larger areas of interaction in the southwestern United States.

In addition to trade, the prehistoric groups within the Colorado Desert would have interacted in other ways. The APE is located just west of the Colorado River floodplain, in an area that was attributed to the Halchidhoma (Kendall 1983:8). Halchidhoma territory was bordered by that of the Mojave to the north, the Quechan to the south, the Cahuilla to the west, and the Chemehuevi to the northwest. These groups had complex relationships with one another, and the borders of these territories were constantly in flux. The Mojave and Quechan had an alliance and raided into Halchidhoma territory, and by 1829, the Halchidhoma had left the Colorado River and moved to the east to live with another Yuman tribe, the Maricopa (Stewart 1983a:2).

Questions pertaining to trade and interaction include:

1. What evidence is there that prehistoric and protohistoric peoples within the project area engaged in trade with areas of coastal California, the U.S. Southwest, and other neighboring culture regions?
2. What types of materials were traded prehistorically? Were finished goods or raw materials more likely to be traded? How did this change through time?
3. Are trail systems present within the APE? Where did these trails go, and when were they used?
4. Is there evidence for extensive cultural interaction (e.g., intermarriage, warfare, and trade) between different tribes at sites within the APE?

Data Requirements

The basic types of data required to address trade are those regarding the presence of lithic and ceramic artifacts, shell ornaments, and other elements of material culture that are easily transportable. Food items, such as meat, shellfish, acorns, and pinyon nuts may also have been important resources that were traded. Trade can be inferred from the distribution of nonlocal materials, such as marine shell and certain types of obsidian. Analyses of trade and exchange also require representative samples from other areas that can be used to show what materials were traded out of the study area. Sourcing studies and other chemical analyses would be required during further phases of research to determine the origins of marine shell, obsidian, and ceramic artifacts found during survey. Fortunately, the Obsidian Butte source has been well studied, and its specific mineral signature can be easily recognized in sourcing studies (Hughes 1986). Pottery can also contain abundant information about exchange and interaction. The analysis of paste inclusions (small pieces of temper added to the clay prior to firing) can provide insights into the refinement of paste recipes, as well as identify possible traded or exotic goods.

Identification of prehistoric trails has improved greatly over the last few years. Becker and Altschul (2003, 2008) noted that animal trails tend to follow the path of least resistance, whereas human trails follow the shortest route between two points. Furthermore, Laylander and Schaefer (2010) identified several metrics of prehistoric trails that should be visible during survey. For example, trails are generally 15–30 cm (6–12 inches) wide and just 2–5 cm (1–2 inches) deep. Pot drops and other artifact scatters may also be common along prehistoric trails. This differs from historical-period trails, which may share some characteristics with prehistoric trails but most often were used less intensively and for shorter periods of time and, consequently, are less distinct. For example, trails used a single time during land surveys by the survey crew generally follow section or quarter-section lines and are oriented to cardinal directions between survey monuments, as well as being less embedded and lacking associated artifacts.

Finding evidence of cultural interaction can be more challenging. Changes in tool manufacture or design can help us to identify changing social relations among occupants of a site or change through time in social connections among different social groups. The appearance of novel manufacturing techniques, such as changes in projectile point or pottery styles, can signal the arrival of a different group of people within the project area.

Ceremonial Landscapes

Rock art and intaglios (geoglyphs) are currently the primary archaeological conveyors of religion and ritual along the Colorado River. These features are associated with areas sacred to contemporary Native Americans, and they are the primary means of identifying spaces that were sacred in the past. Rock art and intaglios are common throughout the Colorado Desert; at least 20 major intaglio complexes have been identified, and dozens of rock art sites are known (Ezzo and Altschul 1993; Ezzo 1994). The Mule Tank Discontiguous Rock Art District (containing sites P-33-000504 and P-33-000773) is located within the indirect APE, southwest of the project area. Two other intaglio sites, P-33-000661 and P-33-000662, are located in the northern portion of the indirect APE. These sites are made of alignments of waterworn cobbles. In addition to large constructions like intaglios, smaller cairns, rock alignments, and trails may have been important elements of the ceremonial landscape of the project area and its surroundings. Becker and Altschul (2008), Ezzo and Altschul (1993), and Rogers (1966) have described some of the types of cairns and other features present within the wider region. Trails, in particular, although important for trade and communication, were also important elements of ceremonial landscapes (Becker and Altschul 2003, 2008).

Questions pertaining to the ceremonial landscape include:

1. What types of ceremonial sites are present within the direct and indirect APEs?
2. How and when were these sites used?
3. How do ceremonial sites within or near the APE relate to other prehistoric uses of the project region?

Data Requirements

The study of ceremonial landscapes within the APE includes a number of different artifact types. Rock art sites are not likely to be found within the APE, given the lack of large rock outcroppings, but intaglios are possible. Moreover, a spatial analysis of how trails, cairns, and other landscape features relate to habitation sites and intaglios or rock art sites in or near the APE can help to show how these different sites are interconnected.

Technology

The by-products of stone tool manufacturing are some of the most ubiquitous remains in the archaeological record. Stone was the primary source of raw material until the arrival of Euroamerican into the Colorado Desert during the eighteenth and nineteenth centuries. The earliest stone tool assemblages in the Colorado Desert were identified by Malcolm Rogers in the early twentieth century (Rogers 1929, 1945, 1966); these became known as the Lake Mojave complex (Warren 1984; Sutton 2013). If such early sites are present within the direct APE, they may be able to help refine the Lake Mojave assemblage and adaptation. The stone technologies of later cultural complexes are also poorly known.

The materials used to make flaked stone and ground stone artifacts were all obtained from bedrock outcrops or secondary gravel sources. However, specific material types were required to meet the functional requirements of the various tool types. Therefore, the prehistoric inhabitants of the region had to solve the problem of obtaining lithic raw materials that were differentially distributed across the landscape, sometimes at great distances. The result is a complex process involving the acquisition of raw materials, tool production, tool use, and the subsequent discard of expended tools. Stone tools, therefore, offer a direct link to understanding how people coped with the uncertainties of living in the arid Colorado Desert.

Quarries can include primary quarries, where actual outcroppings of stone were exploited, or secondary quarries, where boulders and cobbles of tool-quality stone are present, primarily eroding from alluvial-fan deposits. Secondary quarries have been recorded elsewhere in the Colorado Desert (e.g., CA-SBR-12263 [Linder and Powell 2006]) and can consist of considerable expanses and numbers of lithic-reduction loci and small to large workshops. Secondary quarries are frequently aggregates of lithic-reduction loci, each essentially a single reduction event dating to a specific time and unmixed with other such events. This provides the opportunity to classify and understand specific reduction events and strategies and to examine trends through time and space. Similar studies have been conducted in the Mojave Desert, to the north (Bamforth 1992; Byrd et al. 2005; Stanton et al. 2013).

Pottery was apparently first introduced in the Colorado Desert in the middle of the first millennium A.D., but the timing of this is still debated. The appearance of pottery is tied to the emergence of the Patayan culture, but a preceramic Patayan period was also present. In addition to pottery, the emergence of the Patayan culture also coincided with the appearance of arrow points (e.g., Cottonwood Triangular) and floodplain agriculture. Various ceramic typologies have been proposed (Rogers 1945; Schroeder 1957, 1979; Waters 1982a, 1982b), but these have been based primarily on surface collections and not from stratified excavation contexts. As a result, many researchers have had difficulty applying these typologies to other sites in the region, and further research is needed.

Questions pertaining to technology include:

1. What late Archaic period lithic technologies are present within the APE?
2. Were tool stone sources present within the project area? How were these sources exploited? Did the intensity and methods of exploitation change through time?
3. When did pottery appear within the project area? Can a preceramic Patayan occupation be identified?
4. Can a more definitive ceramic chronology be developed from controlled testing and associated absolute and relative dating techniques?

Data Requirements

The basic types of data required to address questions regarding technology are obvious—data regarding lithic and ceramic artifacts and the remains of their production. As determined from excavations conducted at other sites in area, the artifact types that are most likely to be encountered are flaked and ground stone tools and pottery. With regard to flaked stone tools, different technological and production techniques can be studied through the analysis of formal tools and debitage from tool manufacture. By comparing different attributes of these artifacts, we can infer how they were designed, made, used, and discarded. On the basis of these data, we can infer the intensity of tool use (expedient vs. formal tool production), the relative importance of particular technologies, and the relationship of these factors to specific activities and practices (e.g., see Parry and Kelly 1987; but see also Railey 2010). The identification of disparate or common practices can help us to identify social relations among occupants of a site or different sites or change through time in historical or social connections among people.

Although not as common as lithic artifacts, ceramics—specifically pottery—can contain abundant information about function, technology, and exchange. Various formal and stylistic data can be recorded during survey without more-intrusive chemical analyses. For example, different manufacturing and decorating technologies (such as slip and painted designs) can be deduced from studies of the interior and exterior surfaces and the vessel cross section. The analysis of paste inclusions can provide insights into the refinement of paste recipes, as well as identify possible traded or exotic goods.

Settlement and Subsistence

Issues of settlement and subsistence form the backbone of many archaeological investigations. These lines of inquiry often focus on the most basic types of questions archaeologists can ask, such as who lived here, how was the use of space organized at the site level, what did people eat, and what time of the year were they here? Although these questions may be simple, to answer them, researchers must draw on a number of disparate data sets, such as chronology, cultural affiliation, and technology. Settlement-pattern studies investigate the ways in which people organize themselves in relation to their surroundings. This includes not only environmental factors, such as access to food, water, and other important resources, but also cultural factors, such as sacred landscapes and other elements of an interactive natural world. Subsistence studies investigate how people acquired food and other necessities and how they organized themselves to meet these daily needs. Together, settlement-pattern and subsistence studies help to form a backdrop of basic archaeological knowledge that researchers can draw from to answer broader questions about cultural change within particular study areas.

The DQSP APE is located just west of the Colorado River, on a terrace above the well-watered Colorado River floodplain. The Colorado River provided a large, dependable water source, as well as habitat for a variety of plants and animals, and despite its aridity, the surrounding desert provided important sources of food as well. Although the River Yuman tribes were well known for their practice of agriculture on the river floodplain (Castetter and Bell 1951), archaeologists have tended to see the prehistoric inhabitants of the uplands away from the river as foragers (see Binford 1980), groups who lived in seasonal camps and used logistically based task groups to exploit specific resources and then return to these camps. Specific strategies varied, based on the distribution of resources across the landscape, taking into account elevation, hydrology, and soil conditions.

However, reasonable examples of intermediate lifestyles have been demonstrated in California, including the replanting of geophyte propagules prior to the gathering of the mature bulbs for food (Anderson 1997). The use of previously unavailable plant foods such as geophytes was, in turn, presumably prompted by the introduction of earthen-oven technology, which allowed for the processing of complex plant foods, primarily those containing inulins and complex carbohydrates that required long periods of baking in order to render them edible (Black and Thoms 2014). The use of such ovens has been recognized globally and is often discussed in terms of a phenomena of increased intensification culminating in a transition to settled agricultural lifestyles (Thoms 2009). In the northern Mojave Desert, patterns in the use of thermal features suggests a transition from processing geophytes between 1000 and 300 B.P. to intensive seed processing after 300 B.P. (Eerkens and Rosenthal 2002; Eerkens et al. 2009).

Ground stone implements from the early Archaic period are rare in sites in the Colorado Desert (Rogers 1966), although ethnographic sources have noted that wooden milling slabs could also be used in place of stone, and the apparent lack of such artifacts could be the result of poor preservation (Pendleton 1984:68–74). However, ground stone artifacts become more and more common as the Archaic period progresses. Many have seen this as reflecting an adaptation to a more diverse diet, with a growing reliance on seeds and nuts. During Patayan times, cultigens were adopted by people living in the floodplain. Although cultigens never replaced wild plants and animals as the primary food source, they did play an increasingly important role in local subsistence practices. Thus, paralleling lithic technologies in the region, there appears to have been a tendency toward greater subsistence diversity through time (e.g., increasing diet breadth), with people relying on a greater and greater variety of foods in order to survive. This increasing diversity should be visible archaeologically, both through the introduction of ground stone artifacts, and through an increasing diversity of faunal and plant remains.

Questions pertaining to subsistence and settlement patterns include:

1. How well does site patterning conform to the settlement models posed for prehistoric societies in the area?
2. What evidence is there for habitation? Were sites within the APE occupied year round, or were they seasonal camps? How many people were living at these sites, and how did population size change through time?
3. What types of food were consumed at the sites? What environments were people exploiting to acquire their foods?
4. What locally available raw materials were utilized?
5. Did the exploitation of certain resources change through time? If so, how?
6. When did ground stone implements first appear in the area?
7. Were domesticated plants or animals used at the sites? If so, which species were used, and when did they appear at the sites?

Data Requirements

Studies of settlement patterns require not only intensively investigated individual sites but also enough regional comparative data to construct a complete model of site types. Given the large size of the direct APE and the relatively well-surveyed indirect APE around it, there should be sufficient comparative data. Several large sites have been recorded in and around the direct APE, and these may contain archaeological deposits. Midden deposits found elsewhere in the Colorado Desert have recovered large quantities of domestic refuse (Hogan et al. 2010; Love and Dahdul 2002; Sutton 1993, 1998; Wilke 1978), and the arid environment of the project area should help preserve organic materials such as botanical and faunal remains. There may be adequate data at sites within the direct APE to study the types of activities that took place during the prehistoric and historical periods, what times of the year they took place, and whether they conform to various models of prehistoric settlement patterns for the region.

Features and artifacts, as well as faunal and botanical remains, can give clues to the types of activities that occurred at the sites, as well as the times of year the activities took place. Comparisons between the types of activities found at sites within the direct APE and at other, previously studied sites in the vicinity can place the project area in a regional context. These comparisons can also help determine whether the project sites represent the full range of activities documented in the surrounding region or a particular subset of activities.

Historical-Period Research Themes

Research Questions and Data Requirements

We pose general questions focused on the topics of European–Native American contact and historical-period interactions, mining, transportation, settlement and agriculture, and military use of the region. The research questions and the data needed to address each topic are discussed below.

European–Native American Contact and Historical-Period Interactions

The arrival of European explorers and colonists to the Americas had profound impacts on every facet of Native American societies. As noted in Chapter 2, the earliest documented European explorer of the Lower Colorado River was Hernando de Alarcón, who sailed up the Colorado River in 1540. Contact between Native American tribes and Europeans was intermittent until the late eighteenth century, when Spanish authorities attempted to exert more control over the region. For the next century—until the creation of the Fort Mojave, Colorado River, and Quechan Indian Reservations in the late nineteenth and early twentieth centuries—Native American tribes living along the Lower Colorado River interacted with increasing numbers of European and American explorers, trappers, miners, and military forces. These interactions changed many aspects of Native Americans' lives and brought them into contact with new technologies, as well as disease and violent conflict.

Ethnographic studies of River Yuman groups in the late nineteenth and early twentieth centuries have provided a great deal of information on Native American lifeways during this period, but relatively little is known about European–Native American relations during the first few centuries after European contact. The consequences of contact would have impacted Native American groups in a number of ways. Disease, along with slave trading in the early nineteenth century, would have led to serious population declines. According to Forbes (1965:343) the Quechan had a population of at least 4,000 people at the time of Spanish contact, but that number had dwindled to 1,100 to 1,200 by the time of the creation of the Quechan Indian Reservation in 1884. European goods such as ceramics, glass, and metal may have replaced traditional cooking and hunting equipment.

Questions pertaining to European-Native American contact and historical-period interactions include the following:

1. How did contact with European and American explorers and settlers impact Native American groups in the project area? Is there evidence for declining populations, disease, or conflict in the study area? Did use of resource areas or resource types change following contact?
2. How was European technology incorporated into River Yuman lifeways? Is there evidence for local use of European or American ceramics, metal items, or other introduced technologies?
3. What time frame is represented for the appearance of European and/or American artifacts within the APE?

Data Requirements

Given the ephemeral nature of Yuman settlements and the apparent population migrations that took place between the sixteenth and nineteenth centuries, understanding population dynamics requires more-nuanced data sets. However, by examining the distribution of time-sensitive artifacts such as Patayan II and III ceramics, it may be possible to see how sites dating from before and after European contact map onto the landscape.

The appearance of European or American artifacts in Native American sites, or lack thereof, is an indicator of whether, and how, foreign technology was incorporated into Yuman lifeways. The types of artifacts found give some indication of the types of social transformations taking place in the region. For example, crosses, rosary beads, and other Christian symbols would indicate exposure to Christianity. The years during which many European artifact types, such as beads, ceramics and glassware, were produced are well documented, so the dating of any European artifacts may help in determining when foreign goods were introduced into the area.

Mining

Early mining activities in Riverside County are characterized by sporadic, small-scale extraction of precious metals; later mining activities included large-scale exploitation of quarry products such as sand, gravel, and clay (Pabst 1938; Vredenburgh et al. 1981:24). Mining sites represent one or more of the phases of mining activity: prospecting, ore extraction, or ore processing and transportation. The first reflects the search for an ore body and is most often represented by hand-dug or mechanically excavated prospect pits, trenches, or other voids. The second, reflecting removal of overburden and ore bodies, is typically represented by shafts, adits, waste-rock piles, and low-grade ore dumps. The third reflects milling, smelting, refining, and transportation to and from facilities related to those activities. In some cases, related sites and features, such as residential loci, domestic refuse, and support facilities, such as mess halls or administrative offices, are identified in association with mine locations.

Current guidance regarding the inventory and evaluation of historical-period mining sites (e.g., California Department of Transportation [Caltrans] 2008; Hardesty 1990; Noble and Spude 1997) were used for context development and evaluations of significance. Government publications provide a wealth of information on historical-period mines and mining districts. Some that contain information on this part of Riverside County include Merrill (1917, 1919), Tucker and Sampson (1945), and Clark (1970). A few historical studies of mining in eastern Riverside County and along the Colorado River in both California and Arizona have been prepared, including Love (1974), Keane and Rogge (1992), and Canty and Greeley (1987); these documents may provide useful comparative information. Data gleaned from these primary and secondary sources provide the necessary framework for evaluating the significance of mining features and sites. Swope and Vredenburgh (2003) prepared a document that serves as a tool for identifying and interpreting mining-claim markers. Guidance from these documents were used in the interpretation and evaluation of any mining-related sites identified during this investigation.

Questions pertaining to mining include:

1. Are sites related to mining present within the APE? What phase of mining activity (prospecting, extraction, processing) are represented by the sites?
2. Can any mining activities be associated with specific documented mining claims, mines, or mining districts?
3. What evidence indicates how mining sites were linked to outside markets and supply networks? Are there roads, telegraph lines, or other elements of the built environment related to mining present within the APE?

Data Requirements

In order to address these questions pertaining to mining, data from archaeological sites related to one or more of the three mining phases, such as prospects, adits, shafts, rock dumps, ore bins, assay equipment, processing tanks, or access roads are required. Mining camps are frequently visible by the accumulation of historical-period refuse, such as can dumps, as well as industry-related artifacts. Roads and telegraph lines can be mapped within the APE, and the use of aerial photography and historical maps can help identify the origin and destination of these features.

Transportation

In this isolated desert region with limited water sources, the success of human activity relied on the presence of transportation networks, including footpaths, river transport/crossings, and wagon roads; later, these also included automobile roads, railroads and airports. Recognizing the evidence of historical-period transportation features is critical to the appropriate identification and interpretation of historical-period activities and the interconnectivity between the project area, the desert region, and points beyond.

Questions pertaining to transportation include:

1. Do historical-period transportation sites or features (e.g., footpaths, wagon roads, or automobile roads) remain within the direct APE?
2. How do transportation sites within the direct APE connect to areas beyond the project area, and what does that reveal about supply networks and travel within the region and to points outside the region?

Data Requirements

Historical maps and aerial photographs can be used to identify the locations and changes in transportation alignments within the APE. The origin and destination of transportation alignments are then identified to the extent possible. Roadside refuse scatters typically represent casual, dispersed disposal, but more concentrated roadside dumping can sometimes reveal the location of overnight camping or automobile repairs.

Settlement and Agriculture

Historical-period settlement in the Palo Verde Valley is inextricably connected with regional water management and agricultural speculation and development. Detailed information on these topics is available in

Palo Verde Diversion Project (Bickell 1999) and *Palo Verde Irrigation District History* (Palo Verde Irrigation District 2012), and *Blythe and the Palo Verde Valley* (Palo Verde Historical Museum and Society 2005). General information on homesteading, particularly in desert environments, was also consulted.

Historical-period agricultural properties have the potential to address important research themes including site layout and land-use patterns, economic behavior, demographics and ethnicity, and agricultural technology. The guidance document entitled *A Historical Context and Archaeological Research Design for Agricultural Properties in California* (Caltrans 2007) provides a wealth of information of use in the identification and evaluation of cultural resources representing agricultural pursuits.

Questions pertaining to settlement and agriculture include:

1. What was the nature of land occupation or ownership at the site, and what period of agricultural development, homesteading, or other settlement is represented by the sites?
2. What pending land use is indicated by the 1917 GLO survey monuments present within the APE?
3. What coping strategies were used to adjust agricultural practices to the local climate and environment? Can the relative success of a homestead or agricultural enterprise be inferred from material remains?
4. Did site occupants subsist on the products of their homestead/ranch, or did wage labor supplement their income? Where did site occupants obtain goods and supplies? What local, regional, national, and international spheres were included in the economic arrangement of this operation?
5. What was the demographic makeup of site occupants? Did site demography change over time?

Data Requirements

Physical evidence and primary GLO data regarding land surveys within the APE can be used to reconstruct details regarding past land use and speculative land planning in the project area. Pertinent information can be gleaned from both of these sources to develop a regional context within which related cultural resources can be evaluated. Land claim documents and maps, particularly GLO records, can provide information regarding dates of acquisition, nature of activities, and names of claimants. Once claimants' names have been gleaned from land records, primary documentation (including census data) can be consulted for further details regarding individuals connected with the APE. That information can be instrumental in compiling a historical narrative for the project area.General information, including homesteading regulations (Ainsworth 1955; Allen 1987; Ganoe 1937a, 1937b; Layton 1987; Norris 1982; Robbins 1962; Robinson 1948; Roet 1982), secondary reports of desert homesteading (Bagley 1978; Campbell 1961; Lee 1963; McKinney 1996; Odell 1999; Olds 1978; Peterson 1954; Rimmington 1992, 1999; Robertson 1958), and comparative archaeological studies (Guerrero et al. 1998; Panelli 1984; Stein 1988; Sterner and Majewski 1998; White et al. 2009) may provide contextual resource material. Although prepared for Arizona sites, Stein's (1990) guidance on the study and evaluation of desert homesteads is useful.

The archaeological remains of homesteads and agricultural activities can represent either or both domestic and industrial activity. Domestic features include dwellings, bunkhouses, privies, and refuse dumps, whereas agricultural features include barns and other outbuildings, fencing, corrals, irrigation features, windmills, tanks, access roads, etc.

World War II and the DTC

As noted in Chapter 2, during World War II, more than 31,500 square miles of the Arizona and California desert were used by the U.S. Army for the DTC/C-AMA, a training facility for armored units and infantry (Bischoff 2009a, 2009b; BLM 2013). In California, surviving features include training camps, airfields, bivouacs, and maneuver areas, as well as more-ephemeral features, such as foxholes, machine-gun positions, and tank tracks.

SRI created a historical and archaeological context for identifying and evaluating elements of the DTC/C-AMA (Bischoff 2009a, 2009b). Although none of the main elements of the DTC/C-AMA (e.g., divisional camps or rifle ranges) is located within the APE (see Figure 2.5), the area was likely used for maneuvers and may contain a number of different feature types. Questions pertaining to the DTC/C-AMA include:

1. What evidence is there for DTC/C-AMA–related activities within the APE? Are any camps or other logistical or operations facilities within the APE?
2. What elements of the built environment are related to the DTC/C-AMA? Are there barracks, roads, airfields, telegraph or power lines, or other parts of the built environment within the APE?
3. How are military-related features clustered? Can the types of maneuvers conducted within the APE be determined based on the types of features present?

Data Requirements

During the infiltration courses, men would dig trenches from which they would attack an "enemy" position. The position was often a battery of machine guns that would fire live ammunition over their heads. Company- and platoon-level exercises took place often and undoubtedly left traces. Although more ephemeral than larger-scale activities, these small unit-training areas may still be located. Artifacts and features associated with them most likely include shell casings, grenade containers, foxholes, C-and K-ration cans, and other refuse.

Tank tracks dating to the World War II era have been reported throughout California's Mojave Desert. Obviously, tanks featured largely in the DTC/C-AMA, and countless operations and maneuvers were conducted throughout the facility. The M3 medium tank's tracks (the belts on the vehicle) were 11.5 inches wide and could be fitted with a variety of tread materials, including rubber and steel; those on the M4 medium tank were generally 23 inches wide. Tank tracks are distinguishable on the ground from automobile tracks not only by their width but also by the marks they leave when the vehicles make turns.

Refuse deposits from the DTC/C-AMA period are identifiable by the military-related artifacts present, as well as by their location in relation to other DTC/C-AMA features. Large trash dumps, for example, have been found in direct association with several of the divisional camps and airfields. Smaller trash scatters have also been found in association with training areas, such as defensive positions, ranges, and infiltration courses. Reports indicate that the activity areas in the DTC/C-AMA were cleaned up, to varying extents, by the departing soldiers, thus many of the surface artifacts were removed. This was clearly the case at many of the divisional camps, as well as in temporary campsites and bivouacs. It may also have been the case for many of the training areas. The large trash dumps used by divisional camps and airfields, however, are clearly still in existence, as cleanup would have been impossible. They were in use for several months at a time, and large quantities of refuse accumulated.

Operation Desert Strike

In 1964, another set of military maneuvers called Operation Desert Strike was undertaken by the Army and Air Force in the same basic area as the DTC/C-AMA. Features and artifacts related to this event may also be present within the APE; these need to be distinguished from earlier military artifacts and features. Like sites associated with the DTC/C-AMA, Operation Desert Strike sites consist of temporary campsites and training areas with associated artifacts dating to the 1960s (Bischoff 2009a:129).

1. Are remnants of later military maneuvers, such as Operation Desert Strike, present within the APE? How are they different from DTC/C-AMA sites?
2. How are military-related features clustered? Can the types of maneuvers conducted within the APE be determined based on the types of features present?
3. What elements of the built environment are related to Operation Desert Strike? Are there barracks, roads, airfields, telegraph or power lines, or other parts of the built environment within the APE?

Data Requirements

Because the exercises associated with Operation Desert Strike lasted only 2 weeks, the identification of sites associated with these maneuvers may be more difficult to identify. Artifacts and features associated with them most likely include shell casings; grenade containers; foxholes; Meal, Combat, Individual ration cans; and other refuse. One potential problem in the identification of Operation Desert Strike sites is the use of earlier military surplus, especially ammunition.

Refuse deposits from the Operation Desert Strike period are identifiable by the military-related artifacts present, as well as by their location in relation to other Operation Desert Strike features. Large trash dumps, for example, have been found in direct association with several of the divisional camps and airfields. Smaller trash scatters have also been found in association with training areas, such as defensive positions, ranges, and infiltration courses.

Resources of Tribal or Cultural Significance

As lead agency, the BLM is required to

> ensure that consultation in the section 106 process provides the Indian tribe. . . a reasonable opportunity to identify its concerns about historic properties, advise on the identification and evaluation of historic properties, including those of traditional religious and cultural importance, articulate its views on the undertaking's effects on such properties, and participate in the resolution of adverse effects (36 CFR 800.2[c][2]).

In this section, several types of resources that may be considered to have cultural or religious significance to Native American tribes living near the project area are outlined. These resources may, after in-depth research and discussion with tribal representatives, be evaluated as TCPs. These property types are similar to those described by Bean and Vane (1978), CSRI (1987), and Stone (1991). To be considered a historic property under 36 CFR 800, a TCP must be eligible for listing in the NRHP, i.e., meet one or more of the four criteria for evaluation and retain integrity.

Burial Sites

Burial areas are of the utmost importance for all Native American groups in California. For the Cahuilla, Chemehuevi, Mojave, Halchidhoma, and Quechan, cremation was the most common burial practice. Formal cemeteries are present in most reservations in the area, but during the prehistoric period and into the twentieth century, cremated remains could be deposited anywhere. Although small bone fragments left exposed to the elements may deteriorate quickly, there is potential for human remains to be located within the APE. As such, field personnel were especially attentive to any discovered bone (burned or unburned) or thermal features within previously recorded or newly identified sites for signs of human remains. Project Director Patrick Stanton is a trained human osteologist and was present throughout the survey and site-recording phases of the project.

Federal law requires immediate reporting when Native American remains are discovered on public lands (Native American Graves Protection and Repatriation Act (NAGPRA) (Public Law 101-601; 104 *U.S. Statutes at Large* [Stat.] 3048; 25 *U.S. Code* 3001). The identification of human remains during any phase of the project requires that the location of the remains be recorded and the Riverside County Coroner and BLM archaeologist George Kline notified immediately. If the coroner determines the remains to be Native American in origin and not subject to a criminal investigation, the BLM, as the lead federal agency, follows the measures set forth in NAGPRA. All NAGPRA-related consultation is conducted by the BLM.

Intaglios/Geoglyphs

Three intaglio sites are located within the indirect APE. One site, P-33-000773, is part of the Mule Tank Discontiguous Rock Art District, which is listed in the NRHP. The site consists of 8 horseshoe-shaped clusters of 10 small cleared circles, each approximately 1 m in diameter; two groups of 20 cleared circles, organized into two rows of 10 circles in each group, with each circle approximately 1 m in diameter; an area with 5 larger cleared circles, which may be "house circles" (Whitley 2001); a cleared ring area approximately 33 m (110 feet) in diameter that may have been a "dance circle"; and numerous petroglyphs in small shielded drainage approximately 0.8 km (0.5 miles) west of the geoglyphs. A prehistoric trail, P-33-000343, also passes through the site.

The intaglios at P-33-000773 are most likely an example of pilgrimage art, placed on the landscape to mark the location of an important mythic event and used in rituals commemorating the activities of the gods and spirits during the mythic past (Whitley 2001). Although the mythic cycle and specific mythic events that may have been associated with this site are unknown, the presence of a dance circle and an aboriginal trail running alongside the site support this conclusion.

The location of the site provides a commanding view of portions of the Palo Verde Mesa and the northern portion of the project area. Because the site is located within the indirect APE, assessment of the visual impact of the installation of the solar facility from this vantage point is addressed in Chapter 5.

Two other sites, P-33-000661 and P-33-000662, consist of piles of waterworn cobbles arranged into circular features. These two sites are located just south of the McCoy Mountains, on the north side of the indirect APE. P-33-000661 is a simple circular feature approximately 39 by 20 m across; P-33-000662 is more complex, with two semicircular designs connected by a thin row of cobbles; it measures 71 by 15 m. The sites are located approximately 8 and 11 km west of the western edge of the Palo Verde Valley, respectively. Waterworn cobbles would not be common on the desert pavement where the sites are located, so the rocks may have been brought in from closer to the Colorado River, where cobbles terraces are common.

Resource Collection Areas

Native American groups have used the resources present in the Colorado Desert for both subsistence and ritual or ceremonial purposes for thousands of years. Of particular importance are mineral sources and plants used for medicinal purposes and basketry. Plant sources include desert lily (*Hesperocallis undulata*), Mormon tea (*Ephedra viridis*), willow (*Salix laevigata*), greasewood, and many others. Mineral resources include clay sources for ceramic production and crystal sources used for ceremonial purposes. Defining the boundaries of these resource collection areas can be difficult, but any such areas within the direct APE need to be defined and evaluated as part of a cultural resources study.

Sacred Places and Places of Power

Traditional sacred places are found throughout the Colorado Desert. Along the Colorado River, some of the more well-known sites include rock art sites and intaglios. Rock art sites include images both pecked (petroglyphs) and painted (pictographs) onto rock surfaces, whereas intaglios, or geoglyphs, are images created on the ground surface by removing a darker colored surface layer to expose a lighter colored soil layer beneath (von Werlhof 1995). At least 20 major intaglio complexes have been identified, and dozens of rock art sites are known between Blythe and the mouth of the Gila River (Ezzo 1994; Ezzo and Altschul 1993). Many sacred places were the locations of past mythic events. Ceremonies were conducted at these locations to commemorate these events and the beings and ancestors who took part in them. Often, these sacred locations are marked by intaglios depicting the mythic events and actors (Bourke 1889; Johnson n.d.) and also contain dance circles and dance paths (Kroeber 1925).

In addition to these large-scale ceremonial areas, small intaglios are often found, including what are called sleeping circles and vision circles. Sleeping circles most likely functioned as temporary campsites for travelers or for people attending ceremonies. Visions circles, sometimes called "power circles" (Johnson 1985:37), are considerably smaller than sleeping circles and tend to be found in dusters and along trails. They are intended for dreaming or meditation by an individual attempting to acquire knowledge and wisdom from the supernatural world (Ezzo 1994; Ezzo and Altschul 1993:17).

Other intaglios were apparently made by shamans for other purposes. One account identifies a large anthropomorph as a self-portrait by a shaman. Other accounts link some of these ground images to shamanic sorcery (Forde 1931:195; Harrington 1986; Trippel 1889).

Other places across the landscape may be important spiritual or ceremonial sites but lack concrete evidence of human use. These places, such as origin points or places associated with traditional stories, can include mountains, canyons, water sources, or other points on the landscape. These places can be included in songs, or associated with gods, ancestors, or other beings. An important area of concern for these sites is vandalism and destruction caused not by development but through improved access to previously inaccessible areas.

Traditional-Event Sites

In addition to the sacred places described above, other points across the landscape may be associated with traditional events or ceremonies. These can include areas where rites of passage were conducted or where mourning ceremonies or other events took place. In some cases, there may be obvious physical evidence of these events and practices, such as cleared circles on the desert pavement. However, other areas may be less visible archaeologically.

Trails

The Cahuilla, Chemehuevi, and River Yuman tribes that lived in and near the project area had a complex system of trails. Some of these trails, such as the Coco-Maricopa Trail, were part of long-distance exchange networks that connected the tribes within the project area with the wider world. Other trails led to mountains, canyons, or other important or sacred sites. Shrines or other important places may be located along the trails themselves (Bean and Vane 1978:6-40).

An important form of ritual among the River Yumans was the ceremonial pilgrimage. An important pilgrimage trail was the Xam Kwatcan Trail (Forbes 1965; Forde 1931), which ran from the mountain Avikwalal, at the southern end of the Colorado River, to Avikwa'ame, also known as Spirit Mountain or Newberry Peak, in southern Nevada, more than 300 km (186 miles) to the north. Avikwalal was believed to be a spirit house containing the ghosts of departed ancestors. Thus, the pilgrimage began at the land of the dead and terminated at the point of creation, following the mythic path of the creator deity, Mastamho, and stopping at a number of sacred locations along the way for ceremonial dancing and recitations of stories. Concerns over the destruction of trail systems as part of earth-moving construction activities have been expressed by various tribes near the project area (Bean and Vane 1978; CSRI 1987).

The Coco-Maricopa Trail was an important east–west trading route; it connected the groups of the Los Angeles Basin to the Maricopa, who lived along the Gila and Salt Rivers near modern-day Phoenix. The trail was first noted by Euroamericans in the early 1800s as a route used by the Halchidhoma and was used to carry mail from the Los Angeles area to the Colorado River (Bean and Mason 1962; Ezell 1963). The importance of the trail was documented by several early explorers to the region. Garcés, for example, noted that the Halchidhoma traded with the Gabrielino, who lived along the coast near modern-day Los Angeles (Bolton 1930:242; Forbes 1965:109). In 1823, Captain Jose Romero and his entourage may have traveled the trail while attempting to reach the Colorado River from San Diego (Bean and Mason 1962). He apparently became lost, but it is clear which sections of the trail he passed along (McCarthy 1982:C-1).

Although much of the route has not been described, it generally followed the modern route of Interstate 10 and passed just north of the direct APE. It should be noted that the trail was not a single linear path but a system of trails that connected with other north–south- and east–west-trending trails. A portion of the trail has been recorded as P-33-000053, which passes through the indirect APE on the north side of the project area.

At least 10 other trail segments have been recorded within the direct and indirect APE, although several may be segments of a smaller number of trails. Eight were recorded as prehistoric trails; the ages of the other 2 trails were ambiguous. McCarthy (1982) identified several segments of the trail system in and around the Blythe area. P-33-000343 is a trail segment that, although incompletely recorded, passes between the Palm Springs area and the Mule Mountains. This trail intersects the southwestern portion of the direct APE. The extrapolated projection of this trail intersects with another, P-33-000650, a north–south-oriented trail. Only a segment of P-33-000650 has been recorded. P-33-000772 and P-33-000775 run east–west at the south side of the direct APE and connect with P-33-000773, the intaglio site, although their complete routes have not been formally recorded (McCarthy 1982:C-8).

In addition to these known and recorded trail systems, the project area is within the general area described by the Chemehuevi Salt Song. As noted in Chapter 2, song series were important elements of many of the cultures in the Colorado Desert. Each song series could include 100–200 individual but related songs. The Chemehuevi had four main song series: Bird, Salt, Deer, and Mountain Sheep (Laird 1976:38). Each of these song series mentions specific points across the landscape and recounts important mythical events that happened at each location. These points across the landscape were linked by metaphoric trails that were followed through the course of the song series.

The Salt Song tells the story of a flock of birds traveling across the Chemehuevi territory. The trail begins near Las Vegas and continues south through the Mojave Desert until it reaches Twentynine Palms, where the trail heads east and crosses the Colorado River near Blythe. The trail then follows the river north until it reaches the Grand Canyon (Laird 1976). The songs that make up the Salt Song were sung over the course of an entire evening, ending just before sunrise. Although the Salt Song Trail is metaphysical, real places associated with the trail may be located in or near the APE.

Habitation Sites

Native consultants to Bean and Vane (1978) and CSRI (1987) noted that ethnohistoric-period villages and habitation sites are considered to be important cultural resources for current members of the River Yuman tribes. Although most large villages were located on the Colorado River floodplain, to the east of the project area, temporary camps were also scattered across the desert uplands. These sites could have been used for a variety of purposes, including plant gathering, hunting, or mineral extraction.

Four open-air habitation sites are currently known to be present within APE—one within the direct APE and three within the indirect APE. Habitation sites contain both thermal features and artifact concentrations and appear to have been primarily temporary campsites. Little in the way of archaeological work has been done at these sites, but most have pottery, which date the sites to the last 1,500 years. One site, P-33-001822, has potsherds identified as belonging to the Patayan II (ca. 1000–500 B.P.) and Patayan III (after ca. 500 B.P.) periods (Waters 1982a, 1982b). The site is located at the southern part of the indirect APE, near trail P-33-000650. Patayan III pottery was made up until the early twentieth century, so any site containing such pottery may have been used in the very recent past.

Methods of Data Collection

Data collected for this study included background and archival research, as well as a cultural resource search, the results of which were previously reported in the research design and work plan (Kremkau, Stanton, et al. 2014) and the ethnographic literature review (Kremkau, Whelan, et al. 2014). The results of these preliminary studies have been incorporated into the background sections presented above in Chapter 2 and in the research design in this chapter.

Background and Archival Research Methods

Background and archival research was necessary to correctly interpret and evaluate historical-period sites within the APE, particularly those possibly associated with homesteading, as well as to consider indirect effects that construction and operation of the DQSP may have on prehistoric NRHP-eligible sites within the direct and indirect APE. This research has resulted in a framework for evaluating historical-period sites within the applicable historic contexts. SRI consulted a number local, regional, and online repositories (Table 3.1) in order to obtain historical information specific to the project APE. Sources included historical maps (including GLO plat maps), historical aerial photographs, land patents, and land-entry files. Secondary materials, including local and regional histories and government mining reports provided a background historic context, and are cited, as appropriate.

Table 3.1. Repositories Consulted for Archival Information

Repository/Agency	Collection	Comments
Ancestry.com	U.S. federal census data, California Death Index, California Voter Registers	online subscription database
Bureau of Land Management	General Land Office records (plat maps, land patents, land-entry files)	online database
California Historical Resources Information System, Eastern Information Center	archaeological site records, historical data	by request
California State Office of Historic Preservation	historical landmarks	online database
County of Riverside, Transportation Survey Division	surveyor’s field notes	in person
Los Angeles Public Library	historical *Los Angeles Times*, California index	online subscription database
Nationwide Environmental Title Research	historical aerial photographs	online database
Newspapers.com	historical California newspapers	online subscription database
Palo Verde Irrigation District	historical information	online database
U.S. Geological Survey	Historical Topographic Map Explorer	online database
	National Water Information System	online database
U.S. National Archives and Records Administration, National Archives at Riverside, California	Los Angeles District Land Office, Serialized Land Entry Case Files	

Records-Search Methods

A records search was conducted for the 5,010-acre direct APE and the initially proposed 1-mile-wide indirect APE surrounding the direct APE. The records search was conducted at the CHRIS EIC, Department of Anthropology, University of California, Riverside. The goal of the records search was to review any previous archaeological surveys that may have been conducted within or adjacent to the project area and to identify any previously recorded archaeological resources located on the property. Previously recorded resources within the indirect APE that were listed in or had been determined eligible for listing in the NRHP were identified as subject to potential adverse effects from the DQSP.

The records search involved reviewing all reports from archaeological surveys conducted within a 1-mile radius of the project area. As noted above, the indirect APE was subsequently extended to include the NRHP-listed Mule Tank Discontiguous Rock Art District, based on BLM consultation with interested tribes. USGS topographic maps held by the EIC indicating the locations of all previous cultural resource surveys and known archaeological sites and isolates were examined, and the associated survey reports and site records were photocopied. Historical maps, the NRHP, and the National Historic Landmarks and California Historical Landmarks lists were also reviewed. Although none was found to be recorded within the APE, the records search also included consideration of historical-period built-environment resources.

Native American Coordination

Part of the records search and literature review involved contacting the Native American Heritage Commission (NAHC) for a list of traditional-use areas or sacred sites within the project area and for a list of specific Native American groups or individuals who could provide additional information on cultural resources within the project area. The NAHC Sacred Lands File Search did not indicate the presence of any known Native American TCPs within the project area. However, the NAHC provided a list of 36 contacts that could provide additional information on cultural resources within the project area. The BLM also provided a contact list of tribal chairs and cultural resource staff for 15 federally recognized tribes with traditional-use areas that included the DQSP site. Letters describing the project and requesting information regarding Native American cultural resources were sent to all individuals on the contact lists, and responses were received from four of them. No specific resources were identified in the project area, although 3 tribes requested follow-up information and further consultation. A summary of Native American contacts and responses was provided in the ethnographic literature review prepared prior to the field survey of the DQSP direct APE (Kremkau, Whelan, et al. 2014:4.1, Appendix A). Government-to-government consultation with the 15 federally recognized tribes on the BLM tribal contact list has been initiated by the BLM and is ongoing.

Prior the field survey of the direct APE, the BLM provided copies of the research design (Kremkau, Stanton, et al. 2014) and the ethnographic literature review (Kremkau, Whelan, et al. 2014) to all tribes consulting with the BLM. On September 10, 2014, Michael Lerch of SRI and James Cook of First Solar met with representatives of the CRIT Office of the Attorney General and CRIT Museum in Parker, Arizona, and arranged for participation of tribal representatives in the DQSP archaeological field survey. The following day, SRI attended the second pre-application meeting for the project held by BLM in Palm Desert, California. Members of the CRIT Office of the Attorney General and the Mohave Elders Group were in attendance, and information regarding the planned archaeological survey of the project was provided by BLM and SRI. A tribal representative from CRIT accompanied SRI crews for all survey and prehistoric site recording activities during the archaeological field survey conducted during October–December 2014.

Pedestrian Archaeological Survey Methods

Archaeological fieldwork during the survey was divided into two phases: survey and site recording. An intensive pedestrian survey was performed within the direct APE, and all cultural resources over 45 years of age were mapped (the 45-year criterion recognizes that there can be a lag of up to 5 years between resource identification and the date that planning decisions are made [OHP 1995:2]) and recorded using Global Positioning System (GPS) units. Following the completion of the survey, all new and previously recorded sites were formally recorded. If any historically significant built-environment resources were identified within the indirect APE, architectural historians would perform a reconnaissance-level survey for these resources. All archaeological sites and built environment resources were to be evaluated according to the criteria for NRHP listing outlined in 36 CFR 60 (see Chapter 5).

Pedestrian survey and site-recording phases identifying, recording, and evaluating both prehistoric and historical-period archaeological resources within the direct APE was conducted between October 13 and December 11, 2014, with a follow-up visit to selected sites with BLM archaeologists on February 3, 2015. All survey methods followed the BLM guidelines outlined in the BLM Manual 8110 (BLM 2004). A crew of seven archaeologists and one Native American tribal representative surveyed the entire 5,010-acre direct APE, and three 3-person crews conducted site recording. The tribal representative was from the CRIT and accompanied the survey crew for the duration of the survey and site-recording fieldwork.

The survey was conducted by walking straight-line transects at 15-m intervals. The progress of the survey was monitored using Trimble Geo XT/XH GPS units and high-resolution aerial photographs. Waypoints were mapped at the starting and ending locations for each transect. This method was adapted from previous survey work by SRI at Fort Irwin National Training Center (Stanton et al. 2013). Crewmembers used the GPS units to record all cultural resources encountered within each transect. At each potential find, a crewmember recorded the location of the object, the type of artifact or feature, number, material, size, and any diagnostic attributes. Each point received a provenience designation (PD) number unique to each GPS device and to the survey project. The PD numbers are unique designations of space that prohibited discoveries from being incidentally duplicated.

Cultural resources identified during the survey were classified as sites or isolates. When an artifact was encountered during survey, a brief examination of the immediate area was conducted to locate any associated features or artifacts. The criteria used to define sites and isolated finds followed the guidelines set by the California OHP (1989, 1995:2). A new site was defined as any three or more artifacts found in association with one another or a single feature recorded more than 40 m from an existing site. Isolated finds were defined as one or two artifacts or any group of artifacts more than three, if these artifacts could refit (e.g., a ceramic “pot drop” or a broken glass bottle), or from a cluster of shell casings from emptying a clip. One or two artifacts found in association with one another were treated as isolated finds. Once the discovery was determined to be either a site or an isolated find, the location of the area was recorded with a GPS unit and assigned a temporary isolated-artifact or site number. Location information and a brief description were recorded on standard archaeological site forms. All isolated finds were recorded using DPR 523 forms, and at least one photograph was taken of each. Because of the limited data potential and to reduce strain on the EIC, for each topographic quadrangle, a single set of DPR forms and maps were used to record isolated historical-period cans. No artifacts were collected during the survey.

SRI staff accessed the various areas of the project area by vehicle via designated BLM open routes. All routes across the project area were provided on GPS units and printed maps. All previously recorded sites and resources were also provided on GPS units and printed maps for reference.

Because of the history of military activity within the project area, there was a potential for unexploded ordnance (UXO). SRI did not handle or disturb any UXO during survey or recording of sites. Whenever possible and safe, staff members recorded the location and photographed any UXO. This information was then reported to the BLM for remediation.

A Health and Safety Plan with appropriate contact information for emergency services was provided with the research design and work plan (Kremkau, Stanton, et al. 2014:Appendix B). The Health and Safety Plan was made available to crewmembers throughout the project. Personnel were updated and made aware of potential hazards on a continual basis by the Site Safety Officer.

Site Recording Methods

Following the pedestrian survey, 3-person crews revisited and formally recorded each new site identified during the survey. Each site was fully assessed to confirm its merit, its size, and the number and characteristics of features and artifacts within its boundaries. During recording, each site was intensively surveyed to locate all features and artifacts and to determine the site boundary. All diagnostic artifacts were analyzed in the field. Two of the survey crews recorded historical-period sites, and the third crew recorded prehistoric and multicomponent sites. A representative from CRIT accompanied the prehistoric-site-recording crew.

Previously recorded site boundaries were laid over survey data to confirm the boundaries' accuracy. If features or artifacts identified during survey were near previously recorded boundaries, those boundaries were expanded to incorporate the artifacts or features. Newly recorded sites were created from concentrations of artifacts and features identified during survey. Once the boundaries were created, crews revisited each new and previously recorded site to conduct formal site recording. Each site was fully assessed to confirm its merit, its size, and the number and characteristics of features and artifacts within its boundaries.

All previously recorded sites were reexamined to document any changes in condition since their previous recording. During recording, each site was intensively surveyed to locate all features and artifacts and to verify the site boundaries created from the survey data. All recordation followed California OHP guidelines. Written descriptions of the sites were recorded on small laptop computers using proprietary software; these descriptions were used to automatically fill in the DPR 523 forms. Artifact and feature attributes were recorded in handheld personal digital assistants (PDAs). The PDA system was designed to replace many of the previously used paper forms, such as feature- or artifact-recording forms. For example, once a feature was discovered, attributes such as feature type, dimensions, and condition were recorded. In addition, attributes could be recorded for any artifacts associated with any site or feature. Any artifacts present were entered into the PDA using predetermined artifact attributes. Once fieldwork was complete, the data stored on the PDA were downloaded into SRI's database, and the information recorded in the field was immediately available for examination, quality-assurance queries, analysis, and write-up. The locations of site boundaries, features, tools, and other artifacts were recorded with Trimble GeoXT GPS units.

Diagnostic artifacts were photographed using 10-megapixel digital cameras. Additional photographs were used to document the appearance of specific site areas, as well as the general survey area. Photographs were also used to document modern disturbances to existing archaeological resources. When previously recorded sites were revisited, copies of the associated DPR site-record forms were reviewed for comparison, and site information was updated as needed. During fieldwork, any non-archaeological points of potential concern—e.g., paleontological resources or evidence of protected animal species—identified by the crews were also photographed and their locations recorded with a GPS unit.

Isolated finds were not revisited during site recording; all pertinent information for these artifacts had been recorded during survey.

Site Types within the APE

A wide variety of prehistoric and historical-period site types were identified within the direct APE. The following section outlines the recording methods used at specific site types, in addition to the methods described above. The sites types described below are purely descriptive and are not representative of site function. Interpretive site types, such as habitation area or quarry, that imply possible site function are summarized in the records-search results (see Chapter 4) and reflect information and interpretations presented in the site records. Because interpretations may change based on available data, sites types are initially presented in a descriptive format; the functions are interpreted in Chapter 4.

Prehistoric Site Types

Four types of prehistoric sites were identified within the direct APE during the archaeological survey. These included artifact concentrations, isolated or clustered rock features, rock features with artifact concentrations, and trails.

Artifact Concentrations

Prehistoric artifact concentrations identified during the survey consisted of lithic scatters and ceramic scatters. Although in some instances, lithic material may have been found in a ceramic scatter and vice versa, these scatter types were identified by their primary artifactual components.

Lithic scatters were largely associated with the lag gravel terraces in the northern portion of the project area and are primarily composed of lithic debitage, tested cobbles, and hammerstones. These sites were associated with tool stone procurement and testing and may represent single events or repeated use of the area by the prehistoric population. Lithic material associated with these sites included quartzite and CCS (primarily chert with some chalcedony).

Ceramic scatters, on the other hand, were found throughout the central and southern portion of the project area. These scatters were associated with single or multiple vessels. The vessels were represented by several ceramic types, including Topoc Buff (Patayan II), Salton Buff (Patayan II), Parker Buff (Patayan II/III), and Colorado Buff (Patayan III). All diagnostic artifacts were analyzed in the field. If a site contained a large number of non-diagnostic artifacts, observation units measuring 5 m in diameter were placed throughout the site to characterize the artifacts and determine their approximate densities.

Rock Feature Sites

Several sites were composed of isolated or clustered rock features. These rock features primarily consisted of fire-affected cobbles in a small surface or partially buried concentration (Figure 3.1). One of these sites was entirely composed of manuports that were not thermally affected. Lithic material associated with these features was primarily quartzite with some chert and other miscellaneous materials (e.g., rhyolite, basalt, limestone, and granite). These sites were generally located in the central and southwestern portion of the project area. No charcoal or burned bone were observed on the ground surface for the sites with thermal features only. Some of these sites also may have a small number of prehistoric or historical-period artifacts. If a site contained a large number of non-diagnostic artifacts, observation units measuring 5 m in diameter were placed throughout the site to characterize the artifacts and approximate their densities. Any features were recorded with a GPS unit, and hand-drawn maps were created, when appropriate.

Rock Features with Artifact Scatters

A few prehistoric sites identified within the APE consisted of one or more rock features associated with prehistoric artifact scatters consisting of three or more artifacts. These features suggested that a site was used for a variety of tasks and may indicate at least a temporary occupation. As with the artifact concentrations, all diagnostic artifacts were analyzed in the field. If a site contained a large number of non-diagnostic artifacts, observation units measuring 5 m in diameter were placed throughout the site to characterize the artifacts and approximate their densities. Any features were recorded with a GPS unit, and hand-drawn maps were created, when appropriate.

Trails

A small number of prehistoric trails have also been identified within the APE. These trails were generally 15–30 cm (6–12 inches) wide. Some were well traveled, with about 2–5 cm (1–2 inches) of compacted sediment (Figure 3.2). Prior to survey, the recorded routes of known trails were extrapolated into the direct APE. These extrapolated routes were loaded onto GPS units so that survey crews were able to check those areas while in the field. If trails were identified during survey, the entire length of the trail within the direct APE was recorded with a GPS unit. Any artifacts, such as pot drops, located along the trail were recorded with the trail.

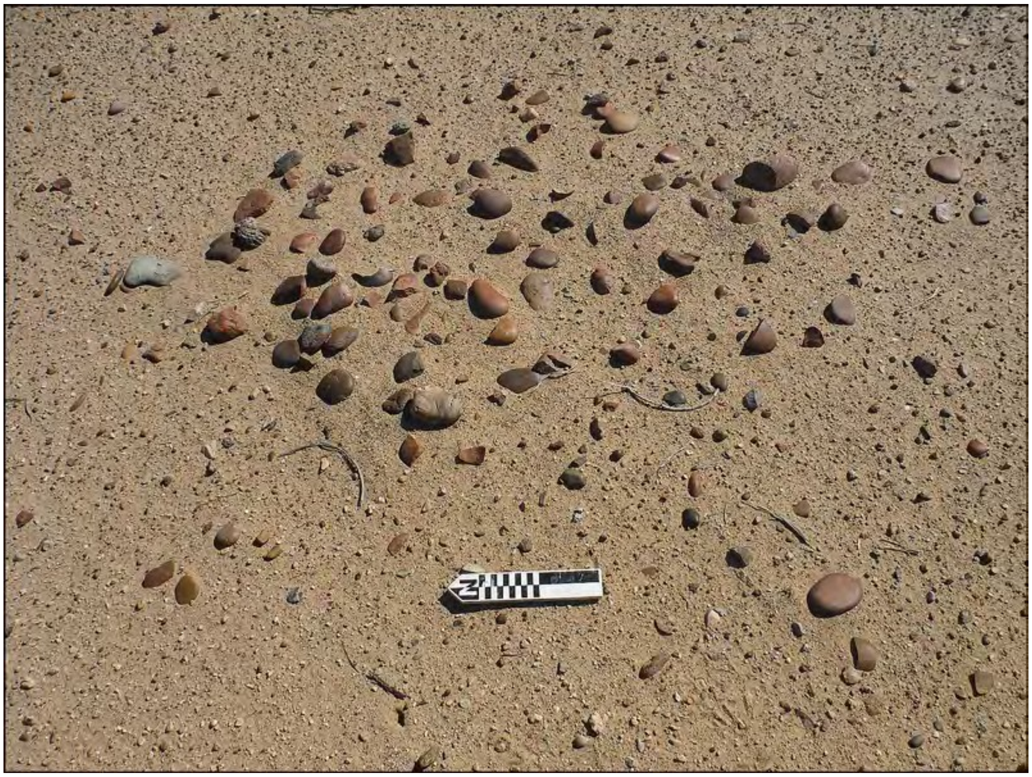

Figure 3.1. Fire-affected rock feature.

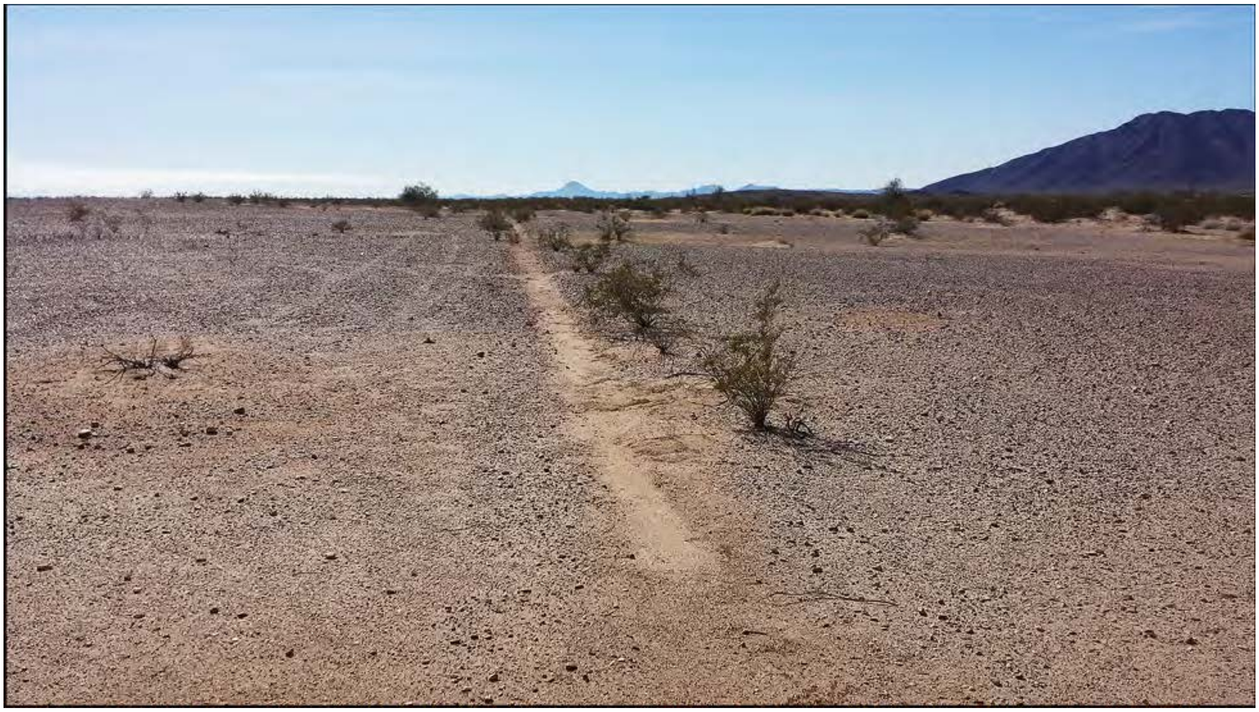

Figure 3.2. Well-traveled prehistoric trail exhibiting compacted surface.

Historical-Period Site Types

Five types of historical-period sites were identified within the direct APE during the archaeological survey. These include artifact concentrations, roads/trails, military sites, water wells, and survey markers. With the exception of water wells and survey markers, no sites related to historical-period settlement or agriculture were encountered within the direct APE. An abandoned jojoba farm located on the private parcel in the NE $^1/_4$ of Section 15 is less than 45 years of age and was not recorded as a cultural resource.

Artifact Concentrations

The most common historical-period site type identified in the records search and during the archaeological survey was the artifact concentration. These sites generally consisted of refuse deposits or scatters associated with three time periods associated with homesteading, troop activity at the DTC/C-AMA, and civilian land-use following the closure of the DTC/C-AMA. The *Field Manual for Documenting the Desert Training Center and California Maneuver Area* (Allen et al. 2011) was consulted for recording historical-period refuse deposits associated with the DTC/C-AMA. All diagnostic artifacts were analyzed in the field. If a site contained a large number of non-diagnostic artifacts, observation units measuring 5 m in diameter were placed throughout the site to characterize the artifacts and determine their approximate densities.

Roads/Trails

A small number of historical-period roads were identified that appear to be related to nineteenth- and early-twentieth-century mining and homesteading and possibly troop activity at the DTC/C-AMA. Most of the trails within the project area are north–south or east–west linear disturbances that terminate near 1917 GLO survey markers and follow section or quarter-section lines. These trails are all single tracks and have similar widths as the prehistoric trails (approximately 50–60 cm). In contrast, however, these trails are comparatively less distinct than prehistoric trails, which tend to be more well established, indicating these historical-period trails were likely used infrequently (Figure 3.3). Historical-period trails were also distinguished from prehistoric trails by the presence of associated historical-period artifacts and with reference to documentary evidence in the form of historical maps, survey notes, and other archival records.

As with the prehistoric trails, if roads/trails were identified during survey, the entire length of the resource within the direct APE was recorded with a GPS unit. Any artifacts located along the trail were recorded with the trail.

Military Sites

A wide variety of sites related to training exercises conducted on the DTC/C-AMA were identified within the APE. Sites identified during the survey included communication wire placements, vehicle tracks, and tank emplacements. Ration-can scatters and concentrations, which were far more numerous than any other type of DTC-C-AMA–associated sites, were placed under the artifact concentration types to avoid obscuring the less-common site types. None of the DTC/C-AMA camps (see Figure 2.5) is located in or near the APE for the DQSP. The *Field Manual for Documenting the Desert Training Center and California Maneuver Area* (Allen et al. 2011) was consulted for recording historical-period sites associated with the DTC/C-AMA. Features and artifacts associated with these sites were recorded with a GPS unit. Any diagnostic artifacts associated with these sites were analyzed in the field.

Water Well Sites

Water well sites are associated with activities involved with extraction of ground water. The three sites of this type within the direct APE, SRI-42, SRI-9016, and SRI-9018, appear to be associated with drilling of water wells, perhaps in anticipation of agricultural development. All diagnostic artifacts and features were analyzed and recorded in the field.

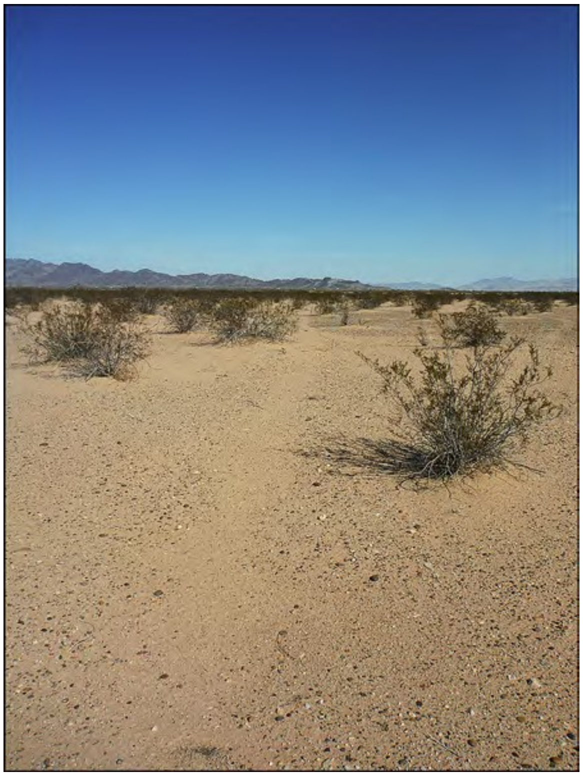

Figure 3.3. 1917 GLO survey trail.

Survey Markers

Numerous survey markers and linear disturbances associated with these survey markers were identified during site recording. All but one of these survey markers were associated with the 1917 GLO survey of the area. A single USGS survey marker was also identified. The 1917 GLO markers and associated linear disturbances were recorded as a single site with multiple discontiguous features. Any artifacts associated with the components of these sites were recorded with a GPS unit and analyzed in the field.

Multicomponent Sites

Numerous sites within the project area had artifacts associated with two or more temporal periods. For many of these sites, this overlap was the result of a small number of artifacts that became incidentally associated with the site, usually as the result of erosion from nearby sites. In these instances, the site type or temporal period that was most representative of the site was used to describe the site. For instance, a site containing a large concentration of historical-period refuse associated with the 1950s and a single C-ration can or ceramic sherd was identified as a post-DTC/C-AMA artifact concentration. These intrusive artifacts were recorded and included in the site description but have limited bearing on overall site type or temporal period associations.

For a small number of sites, however, a single distinction could not be made. Artifact and features types from different temporal periods may be evenly represented or overlap to a degree that a single temporal association could not be made. These sites were considered multicomponent sites. As with other sites, features and artifacts associated with these sites were recorded with a GPS unit. Any diagnostic artifacts associated with these sites were analyzed in the field.

CHAPTER 4

Results

*Patrick B. Stanton, Dean M. Duryea, Jr., Karen K. Swope, Jason D. Windingstad,
and Michael K. Lerch*

The results of the DQSP archaeological inventory are presented in this chapter. Information collected during the records search at the CHRIS EIC and previously reported in the research design and work plan (Kremkau, Stanton, et al. 2014) is presented first, followed by the results of the field survey of the direct APE of the project and a consideration of NRHP-listed or -eligible sites located within the indirect APE. The chapter concludes with a geoarchaeological buried-site sensitivity model based on a review of geological and soils data for the project area. Previously recorded sites are mapped and discussed below according to their primary numbers or trinomial designations; newly recorded sites are listed by their SRI field numbers. A full concordance of all site numbers is contained in Appendix B.

Records-Search Results

The results of the records search conducted prior to the field survey include a review of previous studies conducted within the records-search area, which consisted of the direct APE and a 1-mile radius around it (constituting the indirect APE as initially defined), as well as a consideration of previously recorded cultural resources for the study area. The records-search results guided the development of the research design and formulation of expected site types presented in Chapter 3. Two sites listed within the Mule Tank Discontiguous Rock Art District and located outside of the 1-mile radius associated with the records search were determined to merit consideration within the indirect APE. The indirect APE was expanded to include these sites so that indirect effects to the viewshed for these sites may be addressed.

Previous Cultural Resource Studies

In total, 40 previous cultural resource studies have been conducted within or near the project area—20 within the direct APE and 20 within the indirect APE (Table 4.1; see Figure C.1). Two additional studies, Bean and Vane (1978) and Rogers (1953), were a regional ethnographic overview of the Colorado Desert area for a transmission line project and unpublished field notes based on early reconnaissance of the region, respectively. Of the 37 studies conducted specifically within the APE, 32 were archaeological surveys, 3 included site evaluations, 1 was a records search and literature review, and 1 was a special study.

The 20 projects within the direct APE studied 22 percent (1,102 acres) of the 5,010-acre direct APE. The majority of the studies were archaeological surveys, but ethnographic studies, management plans, and site evaluations were also conducted. Two of the studies that included test excavations examined cultural resources within the direct APE. No sites evaluated within the direct APE were found eligible for listing in the NRHP. Approximately 28 percent (5,070 acres) of the 18,060-acre indirect APE has been surveyed.

Table 4.1. Previous Cultural Resources Studies within the APE

EIC Report No.	Location	Project Name or Type	Year	Citation
2	regional overview	miscellaneous field notes	1953	Rogers 1953
92	direct APE	Oklahoma City–Los Angeles “A” Cable Route	1973	King et al. 1973
160	indirect APE	West Coast Mid-Continent Pipeline	1977	Greenwood 1977
161	indirect APE	West Coast Mid-Continent Pipeline	1975	Greenwood 1975
220	indirect APE	Southern California Edison Palo Verde–Devers Transmission Line	1977	Cowan and Wallof 1977a
221	indirect APE	Southern California Edison Palo Verde–Devers Transmission Line	1982	Carrico et al. 1982
222	indirect APE	Southern California Edison Palo Verde–Devers Transmission Line	1977	Cowan and Wallof 1977b
243	direct APE	Mesa Drive into Sundesert	1977	von Werlhof and Pritchett 1977
284	direct APE	Sundesert Nuclear Project	1977	Weaver 1977
982	indirect APE	Archaeological survey of geothermal drilling locations	1980	Crew and Fitting 1980
991	regional overview	Southern California Edison Palo Verde–Devers Transmission Line	1978	Bean and Vane 1978
1211	direct APE	Cultural resources overview of Colorado Desert planning units	1981	von Till Warren et al. 1981
1249	direct APE	Big Maria Planning Unit	1978	Bureau of Land Management 1978
1814	direct APE	NRHP assessment on Colorado Desert terraces	1984	Reed 1984
2210	indirect APE	US Telecom fiber-optic cable project	1986	Underwood et al. 1986
3029	direct APE	Southern California Gas Company Line 5000	1990	Padon et al. 1990
4061	direct APE	Palo Verde Mesa and Palo Verde Valley Catellus/BLM Land Exchange	1998	McDonald and Schaefer 1998
5245	indirect APE	Blythe–Eagle Mountain 161-Kv Deteriorated Pole Replacement Project	2005	Schmidt 2005
5264	indirect APE	Sprint PCS Facility RV33XC270B	2000	White 2000
6180	indirect APE	North Baja Gas Pipeline Project	2002	Wahoff and Cleland 2002a
6181	indirect APE	North Baja Gas Pipeline Project	2002	Wahoff and Cleland 2002b
6182	indirect APE	North Baja Gas Pipeline Project	2002	Wahoff and McCorkle Apple 2002
6184	indirect APE	North Baja Gas Pipeline Project	2001	McCorkle Apple 2001
6185	indirect APE	North Baja Gas Pipeline Project	2000	Underwood 2000
6186	indirect APE	North Baja Gas Pipeline Project	2000	Kirkish et al. 2000
6187	indirect APE	North Baja Gas Pipeline Project	2001	McCorkle Apple et al. 2001
6707	direct APE	Devers–Palo Verde 2 Transmission Project—Alternative Routes	2006	McDougall et al. 2006
7790	direct APE	Desert Southwest Transmission Line	2003	Schaefer 2003
7967	indirect APE	Mesa Ranch Water Pipeline	2009	Dalu 2009
8373	direct APE	OPV2 Colorado River Switchyard Project	2009	Wilson and Eckhardt 2009

EIC Report No.	Location	Project Name or Type	Year	Citation
8410	indirect APE	Devers–Palo Verde 2 Transmission Project	2004	Carrico et al. 2004
8411	direct APE	Blythe Energy Project Transmission Line	2009	Ferrell et al. 2009
8439	direct APE	Blythe Solar 1 Project	2008	Leftwich 2008a
8440	direct APE	Blythe Solar 1 Project	2008	Leftwich 2008b
8730	direct APE	Colorado River Substation Alternatives Analysis	2011	Enright and Mirro 2011
8740	direct APE	Assessor's Parcel Nos. 274-120-012, -017, -030, and 274-140-036 survey	2012	Tang et al. 2012
8786	indirect APE	Chanslor 33-kV Circuit Pole Replacement	2010	Vargas et al. 2010
--	direct APE	Blythe Solar Power Project	2010	Keller 2010
--	direct APE	Rio Mesa Electric Generating Facility	2011	Nixon et al. 2011
--	direct APE	McCoy Solar Energy Project	2011	Jordan and Tennyson 2011
8823	indirect APE	Devers–Palo Verde 2 Fiber Optic/Optical Ground Wire (FO/OPGW) Routes	2012	DeCarlo and Eckhardt 2012
--	direct APE	Blythe Mesa Solar Project	2013	Austerman et al. 2013

Key: APE = area of potential effects; EIC = Eastern Information Center, University of California, Riverside.

One particularly important project identified in the records-search results was a 1,542-acre Class II survey of part of the Palo Verde Mesa and Palo Verde Valley Catellus/BLM Land Exchange project conducted by ASM Affiliates, Inc. (ASM) (McDonald and Schaefer 1998). The project area for this report covered most of the current direct APE and portions of indirect APE. The purpose of the project was to consolidate BLM lands to increase overall management efficiency and to acquire lands with NRHP-eligible resources to better protect the resources from encroachment. This project was part of an approximately 10,652-acre land exchange with the Catellus Development Corporation. As part of this project, a site sensitivity model was created, based on geomorphology and overall site density from available records-search information. The results of this project are presented below in conjunction with the buried-site sensitivity model prepared for the DQSP.

Supplementing the records-search results provided by the EIC are the results of a Class II cultural resource sample inventory recently completed for the entire Riverside East SEZ (Millington et al. 2013). This sample inventory examined approximately 5 percent (6,000 acres) of the nearly 120,000 acres of the SEZ and was designed to create an archaeological sensitivity model for the entire SEZ. The 5,948 acres of the sample survey were divided into 42 survey quadrats, each between 85 and 160 acres. Solar projects with existing or expected ROW permit applications, such as the DQSP, were excluded from the study, and no areas within the direct APE were surveyed as part of that study. However, parts of 2 survey quadrats are located within the indirect APE, and 3 additional survey quadrats are located within 2 km of the indirect APE. The results of these studies are included in the discussions below.

Previously Recorded Cultural Resources

The records search at the EIC resulted in the identification of 252 archaeological sites and 96 isolated artifacts within the APE (see Figures C.2–C.4). Review of the Riverside East SEZ study resulted in the identification of 10 additional resources within the indirect APE: 1 historical-period site, 1 prehistoric site, 1 historical-period isolated artifact, and 7 prehistoric isolated artifacts (Millington et al. 2013). Of the resources within the records-search area, 33 archaeological sites and 12 isolated artifacts are located within the direct APE, and another 220 archaeological sites and 84 isolated artifacts have been found within indirect APE (Tables 4.2 and 4.3). Sites within the direct APE include 17 prehistoric sites, 15 historical-period sites, and 1 site with both prehistoric and historical-period components. Isolates within the direct APE include 10 prehistoric artifacts and 2 historical-period isolates. Within the indirect APE, there are 95 prehistoric sites, 89 historical-period sites, and 36 sites with both prehistoric and historical-period components. The isolates within the indirect APE include 54 prehistoric artifacts, 27 historical-period artifacts, and 3 isolated finds with both prehistoric and historical-period artifacts.

Table 4.2. Previously Recorded Archaeological Sites within the APE

Age	Site Type	Direct APE	Indirect APE	Total
Prehistoric	artifact concentration	11	69	80
	habitation area	2	2	4
	intaglio/geoglyph	—	3	3
	rock art	—	1	1
	quarry	2	6	8
	thermal feature	—	7	7
	trail	2	7	9
Subtotal		17	95	112
Historical period	artifact concentration	11	79	90
	military activity	2	2	4
	road	2	3	5
	survey marker	—	2	2
	transmission line	—	3	3
Subtotal		15	89	104
Multicomponent	artifact concentration	—	32	32
	artifact concentration; historical-period structure	—	1	1
	habitation area	—	1	1
	quarry; military activity	—	1	1
	trail	1	1	2
Subtotal		1	36	37
Total		33	220	252

Table 4.3. Previously Recorded Isolated Artifacts within the APE

Age	Direct APE	Indirect APE	Total
Prehistoric	10	54	64
Historical period	2	27	29
Multicomponent	—	3	3
Total	12	84	96

The three other survey quadrats belonging to the Riverside East SEZ located near the indirect APE included six historical-period and two prehistoric sites, as well as six prehistoric isolated artifacts (Millington et al. 2013). These study areas are located in similar terrain as the direct APE, including mountain pediment uplands and lowlands created from recent alluvium. Based on the results of the records search of the previously surveyed portions of the APE, and assuming an equal distribution of sites across the area, the density of sites within the direct APE should be approximately one site per every 22.6–46.9 acres, for an expected total of approximately 103–214 sites within the direct APE.

The gen-tie lines associated with four additional solar projects—Blythe, McCoy, Rio Mesa, and Blythe Mesa—include portions of the gen-tie portion of the DQSP direct APE and connect with the Colorado River Substation located at the west end of the gen-tie corridor (Austerman et al. 2013; Jordan and Tennyson 2011; Keller 2010; Nixon et al. 2011). Additional resources discovered during these projects were located within the DQSP records-search area, including the direct APE.

NRHP-Listed Sites within the Indirect APE

Of the sites located within the indirect APE, two are listed in the NRHP and several others have characteristics that suggest they could be considered NRHP eligible. P-33-000773, the Mule Canyon site, is located approximately 1 mile west of the direct APE and, along with P-33-000504, the Mule Tank site farther to the west, is listed in the NRHP as the Mule Tank Discontiguous Rock Art District, based on Criteria c and d. P-33-000504 is a petroglyph locus within the district and P-33-000773 is a geoglyph/intaglio component.

Sites within the indirect APE that are not listed in the NRHP but could be considered eligible include two other intaglio sites, P-33-000661 and P-33-000662, located north of Interstate 10. These sites are made of alignments of waterworn cobbles. Several prehistoric trails are also located within the indirect APE. Among these is the Coco-Maricopa Trail (McCarthy 1982; 1993:70–84, 193–194), a system of trails that connected with other north–south- and east–west-trending trails. A portion of the trail has been recorded as P-33-000053, which passes through the indirect APE on the north side of the project area and was determined NRHP eligible for the McCoy Solar Project. At least eight other trail segments (P-33-000343, P-33-000650, P-33-000673, P-33-000772, P-33-000775, P-33-003803, P-33-004568, and P-33-010822) have been recorded within the indirect APE (see Table 4.2), although several may be segments of a smaller number of trails. Two of these trails extend into the direct APE (see below).

P-33-001821, a large previously recorded site containing multiple rock features, as well as lithic and ceramic artifact scatters, is crossed by two trails and is located within the indirect APE very close to the boundary of the direct APE. During a visit to the site by BLM archaeologists and tribal representatives for a previous project, a suspected cremation locus that had not been previously recorded was observed in the site vicinity. During a field visit for the DQSP by SRI and BLM archaeologists, the locus was relocated and formally recorded, and other portions of the site were found to extend into the DQSP direct APE (see below).

Archaeological Survey Results

In total, 278 archaeological sites and 620 isolated artifacts were identified during the survey of the direct APE. These are briefly discussed below. In the following sections, the different site types found within the APE are briefly discussed. Maps detailing the location of sites and isolates can be found in confidential Appendix C; complete descriptions of individual sites are provided in DPR 523 site forms found in confidential Appendix D.

Prehistoric Sites

In total, 89 prehistoric sites were discovered during the archaeological survey of the direct APE; 15 of these sites were previously recorded (see Figures C.5 and C.6). Four different site types were identified within the direct APE: artifact concentrations, rock feature sites, rock features with artifact scatters, and trails.

Artifact Concentrations

There are 25 artifact concentrations within the direct APE (Table 4.4; see Figures C.5 and C.6). These sites vary in size from small sites with a handful of artifacts to several hundred artifacts spread over 80,000–85,000 m^2. Artifact concentrations identified during the archaeological survey consist of two main types: ceramic scatters and lithic scatters. Each of these subdivisions is defined by their primary artifact components.

Ceramic Scatters

Nine artifact concentrations that can be best defined as ceramic scatters were discovered during the archaeological survey (see Table 4.4; Figures C.5 and C.6). Two of these sites, P-33-008134 and P-33-014151, were previously recorded. The number of ceramic sherds associated with these sites range from approximately 10 to nearly 200 sherds. Small ceramic scatters (single pot drops) within the project area were generally considered isolated resources. These nine ceramic scatters, however, were given site designations, because they were associated with other artifacts or consisted of multiple vessels. The majority of these sites are located in the central and southern portion of the project area. Generally speaking, these sites appear to be surface manifestations. Some of the scatters located within areas of substantial windblown sediment, however, may have buried components, as illustrated by Isolates 5093 and 7088 (see the section Isolated Resources below).

Sherds associated with these ceramic scatters were identified as Colorado Beige, Topoc Buff, Salton Buff, Tumco Buff, Parker Buff, and Colorado Buff types (Table 4.5). Other sherds associated with these scatters, however, could not be identified to a specific type, but some diagnostic traits did allow placement within general time periods (Patayan I–III). Three of the ceramic scatters are associated with the Patayan I/II period, two are associated with the Patayan II period, and the remaining four date to the Patayan II/III period.

The largest number of ceramic sherds was found at SRI-3186, a 65-by-23-m scatter located in the central portion of the project area. At this site, nearly 200 sherds arranged in four discrete clusters associated with at least two ceramic types (Topoc Buff and Colorado Buff) were recorded. A two-track road extends east–west through the site toward a historical-period well (SRI-42), the formation of which likely resulted in dispersal and damage to the sherds.

Table 4.4. Previously Recorded and Newly Discovered Artifact Concentrations within the Direct APE, by Site Type

Site No.	Temporal Association	Features						Historical-Period Artifacts					Prehistoric Artifacts				
		Artifact Concentration	Ceramic Scatter	Lithic Scatter	Rock Feature	Thermal	Trail	Faunal Bone	Glass	Cans	Ammunition	Miscellaneous	Ceramic	Manuport	FAR	Flaked Stone	Ground/ Battered Stone
Ceramic Scatter																	
SRI-52	Patayan I/II	—	1	—	—	—	—	—	—	—	—	—	67	—	—	3	—
SRI-1061	Patayan I/II	—	1	—	—	—	—	—	—	8	—	—	49	—	—	—	1
SRI-2136	Patayan I/II	—	—	—	—	—	—	—	—	2	—	—	105	—	—	—	—
SRI-3059	Patayan II/III	—	1	—	—	—	—	—	—	—	—	—	22	—	—	1	—
SRI-3186	Patayan II/III	—	4	—	—	—	—	—	—	6	—	—	187	—	—	—	—
SRI-3228	Patayan II/III	—	2	—	—	—	—	—	—	—	—	—	80	—	—	5	—
SRI-4078	Patayan II	—	—	—	—	—	—	—	—	—	—	—	170	—	—	—	—
P-33-008134	Patayan II	—	—	—	—	—	—	—	—	—	—	—	30	—	—	—	—
P-33-014151	Patayan II/III	—	—	—	—	—	—	—	—	—	—	—	12	—	—	—	—
Lithic Scatter																	
SRI-2042	prehistoric	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	—
SRI-3057	prehistoric	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7	—
SRI-3135	prehistoric	—	—	—	—	—	—	—	—	2	—	—	—	—	—	27	—
SRI-3147	prehistoric	—	—	—	—	—	—	—	—	3	—	—	—	—	—	53	—
SRI-3306	prehistoric	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22	—
SRI-4024	prehistoric	—	—	—	—	—	—	—	—		—	—	—	—	—	6	1
SRI-6491	prehistoric	—	—	—	—	—	—	—	—	—	—	—	—	—	—	94	—
SRI-7019	prehistoric	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6	—
P-33-002795	prehistoric	—	—	9[a]	—	—	—	—	—	1	—	—	—	—	—	>0[b]	—
P-33-002796	prehistoric	—	—	2	—	—	—	—	—	1	—	—	—	—	—	71	—
P-33-008133	prehistoric	—	—	—	—	—	—	—	—	—	—	—	—	—	—	31	—
P-33-017317	prehistoric	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	—

continued on next page

Site No.	Temporal Association	Features						Historical-Period Artifacts					Prehistoric Artifacts				
		Artifact Concentration	Ceramic Scatter	Lithic Scatter	Rock Feature	Thermal	Trail	Faunal Bone	Glass	Cans	Ammunition	Miscellaneous	Ceramic	Manuport	FAR	Flaked Stone	Ground/ Battered Stone
P-33-019021	prehistoric	1[c]	—	—	—	—	—	—	—	13	1	—	—	—	—	37	—
P-33-019733	prehistoric	—	—	—	—	—	—	—	—	—	—	—	—	—	—	39[a]	—
P-33-019735	prehistoric	—	—	—	—	—	—	—	—	—	—	—	—	—	—	18[a]	—
P-33-019739	prehistoric	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16[a]	—

Key: FAR = fire-affected rock.

[a] Includes data from site records.

[b] Site record indicated flaked stone artifacts were found but did not specify number of artifacts.

[c] Historical period.

Table 4.5. Sherd Types Associated with Ceramic Scatters

Site No.	Temporal Association	Patayan I	Patayan I/II		Patayan II			Patayan II/III		Patayan III		Total
		Colorado Beige	Indeterminate	Indeterminate	Salton Buff	Topoc Buff	Tumco Buff	Indeterminate	Parker Buff	Indeterminate	Colorado Buff	
SRI-52	Patayan I/II	53	—	—	—	14	—	—	—	—	—	67
SRI-1061	Patayan I/II	—	7	42	—	—	—	—	—	—	—	49
SRI-2136	Patayan I/II	—	105	—	—	—	—	—	—	—	—	105
SRI-3059	Patayan II/III	—	—	—	—	9	—	3	—	10	—	22
SRI-3186	Patayan II/III	—	—	—	—	5	—	—	—	—	182	187
SRI-3228	Patayan II/III	—	—	—	—	1	31	2	46	—	—	80
SRI-4078	Patayan II	—	—	—	—	170	—	—	—	—	—	170
P-33-008134	Patayan II	—	—	—	30	—	—	—	—	—	—	30
P-33-014151	Patayan II/III	—	—	—	—	—	—	—	12	—	—	12
Total		53	112	42	30	199	31	5	58	10	182	722

Lithic Scatters

Sixteen sites identified as lithic scatters were found within the direct APE; 8 of these sites were previously recorded (see Table 4.4; Figures C.5 and C.6). These sites largely consist of core-reduction flakes and angular debris fragments or tested cobbles. A smaller number of artifacts consisting of bifaces, choppers, cobble unifaces, cores, edge-modified or utilized flakes, and hammerstones were also discovered at some of these sites. Chert or other CCS materials and quartzite are the primary material types that were used. Other types of materials, such as basalt and rhyolite, were less commonly targeted for tool stone. No artifacts made of the felsite materials previously noted at quarry sites west of the study area (Singer 1984) were noted, nor were any items made of obsidian found during the survey. The identified lithic scatter sites were primarily associated with the large lag gravel terraces in the northern portion of the project area and the intermittently scattered areas of desert pavement. As with the ceramic scatters, these sites generally appear to be surface scatters.

Rock Feature Sites

Thirty of the newly identified prehistoric resources are isolated or clustered rock feature sites (Table 4.6; see Figures C.5 and C.6). All but one of these sites (SRI-29) consist of concentrations of fire-affected cobbles and cobble fragments. Quartzite and chert are the primary material types used in these features, with granite, rhyolite, basalt, limestone, and other stones used to a lesser degree. The choice of stone used in these sites is likely related to desert pavement composition and material type availability, because quartzite and chert cobbles were generally more abundant than other material types. Many of the rock features were heavily eroded or deflated surface or partially buried scatters. Roughly half of these sites are composed of an isolated fire-affected rock feature with around a dozen to over 100 pieces of fire-affected rock. All of these site are located in the central and southern portions of the project area. No charcoal, burned bone, or midden was identified at any of these sites. Fifteen of these sites have small numbers of associated prehistoric and historical-period artifacts. These artifacts are generally limited to one or two flaked stone artifacts. One site (SRI-4085) has two Colorado Buff ceramic jar sherds.

SRI-29 is particularly noteworthy in that it is the only rock feature site that consists entirely of nonthermally affected stones. This site consists of a small concentration of stones composed of rhyolitic tuff. Although these stones are not fire affected, the lack of other similar material types in the vicinity of the site indicates the site is composed entirely of manuports. The majority of the rocks associated with this site are partially buried. Because there are no associated diagnostic artifacts, this site was provisionally given an age of prehistoric.

Four rock feature sites (SRI-3039, SRI-3237, SRI-4085, and SRI-7009) exhibit characteristics that make them possibly eligible for recommendation for listing in the NRHP (see Chapter 5 for NRHP-eligibility discussions). Three of these features consist entirely of one to four fire-affected rock features and no additional artifacts. Most of the rock features in these sites are partially buried, indicating potential depth to the sites.

SRI-4085 is the largest site of this type within the direct APE and consists of six rock features and two loci of thermally altered rock scatters located in the southwestern portion of the direct APE. The western half of the site is located in a dunal area, whereas the eastern half of the site is located on desert pavement. Two of the rock features were partially buried. The composition of the rock features and loci is similar to other rock feature sites, i.e., small concentrations of thermally altered cobbles and cobble fragments composed of quartzite, schist, granite, chert, rhyolite, quartz, and other unidentified rock. The loci with rock scatters may have actually once been rock features similar to those found on this site that have deflated over time. Two Colorado Buff ceramic sherds were found on the surface in the extreme northwestern portion of the site among substantial windblown sand deposits, suggesting the site may date to the Patayan III time period. An intrusive friction-lid coffee can also was found in the eastern portion of the site.

Table 4.6. Previously Recorded and Newly Discovered Rock Feature Sites within the Direct APE

Site No. (SRI-)	Temporal Association	Features						Historical-Period Artifacts					Prehistoric Artifacts				
		Artifact Concentration	Ceramic Scatter	Lithic Scatter	Rock Feature	Thermal	Trail	Faunal Bone	Glass	Cans	Ammunition	Miscellaneous	Ceramic	Manuport	FAR	Flaked Stone	Ground/ Battered Stone
29	prehistoric	—	—	—	1	—	—	—	—	—	—	—	—	23	—	—	—
58	prehistoric	—	—	—	—	3	—	—	—	—	—	—	—	—	88	2	—
61	prehistoric	—	—	—	—	1	—	—	—	—	—	—	—	—	9	1	—
75	prehistoric	—	—	—	—	2	—	—	—	—	—	—	—	—	69	1	—
1025	prehistoric	—	—	—	—	—	—	—	—	—	—	—	—	—	36	—	—
1043	prehistoric	—	—	—	—	1	—	—	—	—	—	—	—	—	21	1	—
2034	prehistoric	—	—	—	—	1	—	—	—	—	—	—	—	—	28	—	—
3017	prehistoric	—	—	—	—	1	—	—	—	—	—	—	—	—	34	—	—
3022	prehistoric	—	—	—	—	1	—	—	—	—	—	—	—	—	50	1	—
3039	prehistoric	—	—	—	—	2	—	—	—	—	—	—	—	—	126	—	—
3045	prehistoric	—	—	—	—	1	—	—	—	—	—	—	—	—	45	2	—
3047	prehistoric	—	—	—	—	1	—	—	—	—	—	—	—	—	17	—	—
3175	prehistoric	—	—	—	—	2	—	—	—	—	—	—	—	—	94	—	—
3205	prehistoric	—	—	—	—	1	—	—	—	—	—	—		—	68	—	—
3211	prehistoric	—	—	—	—	3	—	—	—	—	—	—		—	181	1	—
3224	prehistoric	—	—	—	—	1	—	—	—	1	—	—		—	38	—	—
3237	prehistoric	—	—	—	—	4	—	—	—	—	—	—		—	66	—	—
3331	prehistoric	—	—	—	—	1	—	—	—	—	—	—	—	—	52	—	—
3487	prehistoric	—	—	—	—	3	—	—	—	—	—	—	—	—	84	1	—
4014	prehistoric	—	—	—	—	2	—	—	—	—	—	—	—	—	97	—	—
4054	prehistoric	—	—	—	—	1	—	—	13	8	—	—	—	—	107	2	—
4063	prehistoric	—	—	—	—	1	—	—	—	—	—	—	—	—	63	1	—
4079	prehistoric	—	—	—	—	2	—	—	—	—	—	—	—	—	65	1	—
4085	Patayan III	—	—	—	—	8	—	—	—	1	—	—	2	—	327	—	—

Site No. (SRI-)	Temporal Association	Features						Historical-Period Artifacts					Prehistoric Artifacts				
		Artifact Concentration	Ceramic Scatter	Lithic Scatter	Rock Feature	Thermal	Trail	Faunal Bone	Glass	Cans	Ammunition	Miscellaneous	Ceramic	Manuport	FAR	Flaked Stone	Ground/ Battered Stone
5034	prehistoric	—	—	—	—	1	—	—	—	4	—	—	—	—	36	2	—
5054	prehistoric	—	—	—	—	1	—	—	—	—	—	—	—	—	19	1	—
6471	prehistoric	—	—	—	—	—	—	—	—	—	—	—	—	—	46	—	—
7009	prehistoric	—	—	—	—	1	—	—	—	—	—	—	—	—	64	—	—
7029	prehistoric	—	—	—	—	1	—	—	—	—	—	—	—	—	56	—	—
7040	prehistoric	—	—	—	—	1	—	—	—	1	—	—	—	—	43	1	—

Key: FAR = fire-affected rock.

Rock Features with Artifact Scatters

Thirty-one sites found within the project area were identified as rock features with artifact scatters (Table 4.7; see Figures C.5 and C.6). Two sites, P-33-001821 and P-33-013660, were previously recorded. The rock features associated with these sites are similar to the other rock features found during the archaeological survey, i.e., concentrations of primarily fire-affected quartzite and chert cobbles with a smaller number of cobbles composed of other material types. However, in these sites, one or more rock features were found in association with additional artifacts. In many instances, these artifacts were located in a discrete concentration. Mostly, however, these additional artifacts were scattered across the surface of the site. As with other rock features in the project area, these features vary in terms of their degree of preservation and lack any observable midden or charcoal. With the exception of P-33-001821, no bone was observed in association with these features.

Artifacts associated with these sites consist of ceramic sherds, flaked stone, battered stone, and historical-period cans and bottles and were similar to artifact concentrations found within the project area that were not associated with rock features.

Most of these sites are temporally ambiguous with no associated diagnostic artifacts. Seventeen of these sites, however, have a small number of temporally diagnostic ceramic sherds associated with them. As with the ceramic scatters described above, these sherds consist of several ceramic types associated with the Patayan I–III periods. Identified ceramic types include Colorado Beige (Patayan I), Tumco Buff (Patayan II), Topoc Buff (Patayan II), Parker Buff (Patayan II/III), and Colorado Buff (Patayan III). Additionally, the rock feature sites with associated with Patayan II or II/III ceramic types were primarily located in the central portion of the project area, whereas those associated with the Patayan I/II or III ceramic types were located in the south or southwestern portions of the project area.

Although most of these sites only have fewer than four rock features associated with them, several sites (P-33-001821, SRI-17, SRI-83, SRI-1058, SRI-1059, SRI-6033, and SRI-6034) have upward of 6 rock features; SRI-83 has the largest number, with 14 rock features. These sites are located in the west-southwest portion of the project area, with three (SRI-83, SRI-1058, and SRI-1059) located in a large cluster in the extreme southwestern edge of the project toward the Mule Mountains.

Nine rock feature sites with artifact scatters (P-33-001821, SRI-17, SRI-83, SRI-1059, SRI-2021, SRI-3019, SRI-4241, SRI-6033, and SRI-6034) exhibit characteristics that make them possibly eligible for recommendation for listing in the NRHP (see Chapter 5 for NRHP-eligibility discussions).

P-33-001821

This site consists of a previously recorded series of lithic and ceramic artifact scatters and thermal features. First recorded in 1980 during a survey for the Devers–Palo Verde transmission line corridor (Carrico et al. 1982), P-33-001821 was described initially as “a large but dispersed lithic and ceramic scatter” with “at least two distinct ceramic loci and four lithic scatters” but “no features were located” (Day et al. 1980). According to the first site record, most of the site area was located within the indirect APE, although a small portion of it extended into the direct APE. Subsequent to the initial recording, the site was tested, and six 1-by-2-m units were excavated to depths of 50 cm, and all surface artifacts were mapped and collected, including 133 pottery sherds of Tumco Buff belonging to two vessels, 1 quartzite core, and 13 flakes (Carrico et al. 1982:106–109). Based on the ceramics, the site was dated to the Patayan II period, from A.D. 1000 to 1500 (Waters 1982a:287–290).

The site record was updated in 2004 for a second transmission line project, known as Devers–Palo Verde II (Carrico et al. 2004). During the 2004 site recording, the boundaries were redefined from the previous oblong shape, which extended slightly into the DQSP direct APE, to a boomerang shape, which was located completely within the indirect APE and outside the direct APE (Way and Eckhardt 2004:2–3). Newly identified site components included several thermal features and numerous artifacts, as well as fragments of calcined bone, scattered across the site surface, along with two previously recorded intersecting trails (P-33-000343 and P-33-000650), in addition to the previously mentioned ceramic and lithic scatters. Subsequently, because of the newly reported hearth features with calcined bone fragments, the site was subject to a field review and resurvey in March–April 2005. No loci of calcined bone sufficient to warrant forensic examination were observed, although four bone elements, including one calcined bone fragment, were noted in association with a thermal feature recorded as “Hearth Feature 1” (Wilson et al. 2005:3–4). The site record for P-33-001821 was again updated in 2008 for a proposed substation project and found unchanged from the 2004 and 2005 site visits (Eckhardt et al. 2008).

Table 4.7. Previously Recorded and Newly Discovered Rock Feature Sites with Artifact Scatters within the Direct APE

		Features							Historical-Period Artifacts					Prehistoric Artifacts					
Site No.	**Temporal Association**	**Artifact Concentration**	**Ceramic Scatter**	**Lithic Scatter**	**Rock Feature**	**Thermal**	**Bone Scatter**	**Trail**	**Faunal Bone**	**Glass**	**Cans**	**Ammunition**	**Miscellaneous**	**Ceramic**	**Manuport**	**FAR**	**Flaked Stone**	**Ground/ Battered Stone**	**Total**
SRI-17	Patayan II	—	—	1	—	6	—	—	—	—	5	—	—	12	—	402	17	—	436
SRI-65	Patayan III	—	—	—	—	4	—	—	—	—	—	—	—	2	—	113	1	—	116
SRI-83	Patayan II/III	2	2	—	—	14	—	—	—	—	4	—	—	61	—	465	7	—	537
SRI-124	Patayan II	—	—	—	—	1	—	—	—	—	—	—	—	6	—	21	—	—	27
SRI-133	Patayan III	—	—	1	—	1	—	—	—	—	—	—	—	1	—	48	96	—	145
SRI-134	prehistoric	—	—	—	—	1	—	—	—	1	—	—	—	—	—	69	14	—	84
SRI-1014	Patayan II	—	—	—	—	1	—	—	—	—	—	—	—	5	—	15	—	1	21
SRI-1053	Patayan III	—	—	—	—	3	—	—	—	—	—	—	—	4	—	191	4	—	199
SRI-1058	Patayan I/II	1[a]	—	—	—	6	—	—	—	13	—	—	4	42	—	195	9	1	264
SRI-1059	prehistoric	—	—	—	—	12	—	—	—	35	—	—	—	—	—	355	41	—	431
SRI-2021	Patayan II/III	—	1	1	—	5	—	—	—	—	—	—	—	24	—	220	72	—	316
SRI-2329	Patayan II	—	—	—	—	—	—	—	—	—		—	—	3	—	38	—	—	41
SRI-3019	Patayan II	—	1	—	—	3	—	—	—	—	—	—	—	27	—	182	1	—	210
SRI-3040	prehistoric	—	—	—	—	3	—	—	—	—	—	—	3	—	—	142	9	—	154
SRI-3041	prehistoric	—	—	—	—	2	—	—	—	—	—	—	—	—	—	68	19	1	88
SRI-3042	prehistoric	—	—	—	—	2	—	—	—	—	—	—	—	—	—	62	8	1	71
SRI-3101	Patayan I/II	—	—	—	—	1	—	—	—	—	—	—	—	9	—	36	—	—	45
SRI-4016	Patayan II	—	1	—	—	1	—	—	—	—	—	—	—	25	—	63	1	—	89
SRI-4056	prehistoric	—	—	—	—	1	—	—	—	—	—	—	—	—	—	22	13	—	35
SRI-4084	prehistoric	—	—	—	—	—	—	—	—	—		—	—	—	—	13	3	—	16
SRI-4241	prehistoric	—	—	1	—	3	—	—	—	—	—	—	—	—	—	85	46	—	131
SRI-5067	prehistoric	—	—	—	—	1	—	—	—	—	—	—	—	—	—	8	6	—	14

continued on next page

Site No.	Temporal Association	Features							Historical-Period Artifacts					Prehistoric Artifacts					Total
		Artifact Concen-tration	Ceramic Scatter	Lithic Scatter	Rock Feature	Ther-mal	Bone Scatter	Trail	Faunal Bone	Glass	Cans	Ammu-nition	Miscella-neous	Ceramic	Manu-port	FAR	Flaked Stone	Ground/ Battered Stone	
SRI-6023	Patayan II	—	—	—	—	2	—	—	—	—	—	—	—	1	—	161	2	—	164
SRI-6033	prehistoric	—	—	—	—	6	—	—	—	—	1	—	—	—	—	253	9	—	263
SRI-6034	Patayan II/III	—	—	—	—	11	—	—	—	—	—	—	—	5	—	555	1	2	563
SRI-7008	Patayan II	—	1	—	—	2	—	—	—	—	—	—	—	16	—	106	15	—	137
SRI-7010	prehistoric	—	—	—	—	1	—	—	—	—	—	—	—	—	—	33	7	1	41
SRI-7031	Patayan II	—	—	—	—	2	—	—	—	—	—	—	—	6	—	55	3	—	64
SRI-7066	prehistoric	—	—	1	—	3	—	—	—	—	—	—	—	—	—	199	39	—	238
P-33-013660	prehistoric	—	1[b]	—	—	4	—	—	—	—	—	—	—	7[b]	—	—	—	—	—
P-33-001821	prehistoric	—	2[b]	4[b]	1	2[b]	1	—	4[b]	—	—	—	—	136[b]	—	—	19[b]	—	4,940

Key: FAR = fire-affected rock.

[a] Historical period.

[b] Includes data from site records.

Subsequent to the 2004–2008 Devers–Palo Verde II studies, P-33-001821 was visited by BLM archaeologists, California Energy Commission staff, tribal representatives, and applicant contractor staff as part of the onsite review for the Rio Mesa solar project (Nixon et al. 2011). During that visit, a previously unidentified locus containing calcined bone and believed to be a cremation was found on or near the site but not formally recorded (George Kline, personal communication June 2, 2015). Although this locus was believed to be located outside the DQSP direct APE, it was unclear at the time if that locus was the same or different from the thermal feature recorded as “Hearth Feature 1” in the 2004 and 2005 site record updates.

During the SRI field survey of the direct APE for the DQSP in October–December, 2014, along with a follow-up site visit by SRI and BLM on February 3, 2015, P-33-001821 was found to be larger than mapped in the 2004, 2005, and 2008 updates and to straddle the project boundary. SRI carefully surveyed the site and located the various previously noted features, which were examined, recorded, and mapped with a GPS unit to establish precise locations relative to the DQSP boundary. Although only a small portion of the site is located within the direct APE, the entirety of the site was examined because of the aforementioned calcined bone associated with a thermal feature (“Hearth Feature 1”) indicated in the site records (Way and Eckhardt 2004; Wilson et al. 2005:3). During the latest site visit by SRI and BLM archaeologists George Kline and Tiffany Arend, “Hearth Feature 1” was found to be located outside the DQSP direct APE boundaries and to contain small fragments of unburned faunal bone but no calcined bone. The calcined remains may have become buried by sediment or transported away from the site during a flood event. The “Hearth Feature 1” was recorded as Feature 9010 on the updated site record (Stanton 2015).

However, further investigation of the site, beyond the recorded boundary from 2004, 2005, and 2008, in the nearby adjoining areas of the DQSP direct APE revealed two fragments (PDs 9000 and 9006) of a chalcedony biface (Figure 4.1), a quartzite bifacially tested cobble (PD 9007), and a buried rock feature composed of non-thermally affected quartzite and chert cobbles (PD 9001). The fragments of the biface were located approximately 50 m apart from one another but could be successfully refit. The biface appears to be an Elko series point that broke while it was being made. At the request of BLM archaeologist George Kline, the artifact was collected and will be transferred to the BLM Palm Springs headquarters. The chalcedony used for this tool appears to be heat-treated and is not a material from the local area, suggesting the raw material was imported using one of the many trails in the regional prehistoric trade network. The discovery of an Elko series dart point on the site pushes the age of the site back into the Gypsum complex of the Archaic period, which extended from 4000 years B.P. to the beginning of the Patayan I period about 1500 years B.P., when ceramics first appeared in the archaeological record and arrowheads replaced dart points as the favored projectile point. This suggests that use of P-33-001821 extended from the mid–late Archaic period into the Patayan II period (A.D. 1000–500) and, thus, spans the transition from atlatl-and-dart to bow-and-arrow hunting technology and from foraging to agricultural subsistence patterns.

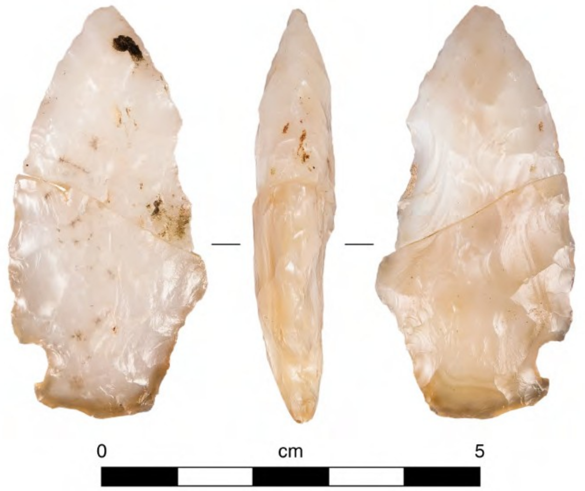

Figure 4.1. Chalcedony biface fragments associated with P-33-001821.

The scatter of calcined bone observed during the Rio Mesa project site visit was relocated west-southwest of the previously recorded boundary from 2004, 2005, and 2008. This locus is situated within the indirect APE on the opposite side of a transmission line access road, away from the DQSP boundary. The feature consists of approximately a dozen completely and partially calcined long-bone fragments that are scattered across a 13-by-15-m area. Evidence of sandblasting on the bone indicates these fragments were located on the ground surface for an extensive amount of time. The largest fragment is approximately 2.5 cm in length. The cortical bone is about 3–4 mm thick. Unlike the previously recorded thermal feature ("Hearth Feature 1"/PD 9010), no fire-affected rock was in association with these bones, which were recorded by SRI as Feature 9008 (see updated site map in Stanton 2015:5). Although no diagnostic skeletal elements were identified, the remains are from a medium- to medium–large-sized mammal and are consistent with an interpretation of this feature as a human cremation locus.

SRI-17

This site consists of five fire-affected rock features clustered in a 30-by-10-m area, a lithic-reduction locus, and a sparse artifact scatter throughout the site. The rock features are similar to other rock features in the project area, although in one of the features, five ceramic sherds from a Colorado Beige vessel and a quartzite tested cobble were found on the surface. Several of the features are partially buried. The rock features range in size from about 2–4 m in diameter. The lithic-reduction locus is located roughly 30 m to the north of the features and consists of a quartzite tested cobble and three quartzite core-reduction flakes. Scattered about the site are chert and quartzite core-reduction flakes, a Topoc Buff ceramic sherd, six Tumco Buff body sherds, and two quartzite tested cobbles. Historical-period artifacts include a medium-sized solvent/paint-thinner can, a C-ration can bottom, two hole-in-top cans, and a sanitary can.

SRI-83

This site is a cluster of 14 fire-affected rock features, 4 artifact concentrations, and 1 sparse artifact scatter located throughout the site. The rock features are similar to other rock features in the project area and range in size from 1 to 4 m in diameter. Two chert core-reduction flakes and 18 ceramic sherds from a Colorado Beige jar are located within one of these features. Two of the rock features have adjacent lithic and ceramic scatters, and most of the features exhibit a high potential for buried cultural deposits. The features in the western portion of the site are more deflated. The site is located in an area with a considerable amount of windblown sand and dune formation.

The artifact concentrations are 2–6-m-diameter scatters of four to nearly two dozen lithic and ceramic artifacts. Ceramics associated with these concentrations consist of Colorado Buff and Topoc Buff ceramic types. In one artifact concentration, a large buried ceramic sherd was found when the concentration was probed for subsurface deposits.

Scattered about the site are chert and quartzite core-reduction flakes, Topoc Buff ceramic sherds, a quartzite tested cobble, and three historical-period cans.

SRI-1059

This site is located on poorly formed desert pavement and consists of seven fire-affected rock features, five fire-affected rock loci, a historical-period bottle concentration dating to 1942, and a sparse lithic scatter with a small amount of amber glass fragments. The rock features all have a similar composition as other fire-affected rock features in the project area and measure 2–8 m in diameter. These rock features are deflated. The loci consist of more-dispersed scatters of fire-affected rock and are likely thermal features that have become scattered over the years. These loci have compositions similar to the rock features. The lithic scatter consists of nearly two dozen chert and quartzite core-reduction flakes and almost 20 quartzite tested cobbles. A 1-by-1-m nonexcavation, surface observation unit was placed in the fire-affected rock loci and two of the rock features to help quantify their constituents. In addition, an intact amber glass beer bottle and 20 fragments of another amber glass beer bottle were recorded at the site. These glass fragments are contemporaneous with the bottle concentration.

SRI-2021

This site consists of five fire-affected rock features, a ceramic locus, and a lithic debitage locus located among a large artifact scatter composed of ceramics, lithic debitage, tested cobbles, and retouched flaked tools. The composition of the rock features is similar to other rock features in the project area. Some of the rock features are partially buried, indicating that there may be some cultural deposition within and around the features.

The ceramic locus consists of 11 sherds from a Topoc Buff jar vessel. Twelve additional sherds from Topoc Buff or Colorado Buff vessels were recorded throughout the site, including the 4 sherds within one of the rock features.

The lithic locus consists of hundreds of core-reduction and biface-reduction flakes and covers an approximately 382-by-223-m area. The majority of the lithic artifacts associated with this locus are core-reduction flakes, biface thinning flakes, and angular debris composed of chert. Three 4-by-4-m nonexcavation, surface observation units were placed within the locus to sample the lithic debitage. Nineteen chert flakes (6 biface thinning flakes, 9 core-reduction flakes, and 4 indeterminate type flakes) were found in Observation Unit (OU) 3425. Eight chert flakes (4 biface thinning flakes, 3 core-reduction flakes, 1 indeterminate type flake) were found in OU 3441. Thirty-seven pieces of debitage (4 quartzite core-reduction flakes, 3 chert biface thinning flakes, 24 chert core-reduction flakes, 3 chert angular debris fragments, 2 chert indeterminate type flakes, and 1 chalcedony angular debris fragment) were found in OU 3444.

The site around the loci and features consists of a sparse scatter of 8 ceramic sherds (identifiable ceramic types being Topoc Buff and Colorado Buff), 2 retouched flake tools, 1 possible scraper, and over 100 chert and quartzite core-reduction flakes, angular debris, and tested cobbles.

SRI-3019

This site consists of three fire-affected rock features and a ceramic scatter. The rock features range in size from 2 to 4 m in diameter and have a composition similar to other rock features in the project area. The ceramic scatter consists of 20 body sherds from a Topoc Buff jar vessel and is located adjacent to a northeastern rock feature (Feature 3481). In total, seven ceramic sherds from a Topoc Buff jar were recorded on the southwest side of one of the rock features and may have eroded from the ceramic scatter. A single quartzite core-reduction flake was also found at the site.

SRI-4241

This site consists of a sparse lithic scatter, a fire-affected rock locus, two fire-affected rock features, and a lithic-reduction locus. The site is located on a gravel surface truncated by rills. The composition of the rock features and locus are similar to the other rock features in the project area. The fire-affected rock locus, which measures approximately 3 m in diameter, may be a heavily disturbed thermal feature. The rock features are approximately 1 m in diameter. The lithic-reduction locus consists of 22 angular debris fragments, 11 core-reduction flakes, and 7 biface thinning flakes located in a 3-m-diameter area. The lithic debris in this feature is all composed of chert. A previously recorded tested cobble (P-33-019189) was recorded in this area but could not be relocated. Two quartzite core-reduction flakes and 3 chert core-reduction flakes were recorded outside of the features.

SRI-6033

This site consists of four thermally affected rock features and two scatters of fire-affected rock. The composition of the rock features is similar to the other rock features in the project area. Two of the features are partially buried. Quartzite tested cobbles were found within at least one of the features. In addition, thermally altered rock was found scattered to the north and south of the features and may have been features that have since become disturbed. Three quartzite core-reduction flakes, one quartzite tested cobble, and a historical-period sanitary can were also recorded.

SRI-6034

SRI-6034 is particularly interesting, because the only two pieces of ground stone found in the project area were found within this site. This site consists of 11 fire-affected rock features and an associated artifact scatter consisting of several ceramic sherds, a few quartzite flakes, and a large schist ground stone fragment. The composition of the rock features is similar to the other rock features in the project area. Some of the features are partially buried; others are deflated with no apparent depth. The rock features measure between

1 and 3 m in diameter. A ground stone fragment composed of schist was found in one of the feature, and two sherds from a Colorado Buff vessel were found in another rock feature.

A second schist ground stone fragment was found in the middle of the site. Ceramic sherds from untyped Patayan II/ III, Parker Buff, and Topoc Buff vessels were found near the center of the rock feature cluster; a single sherd was discovered for each of these types.

Trails

Three sites recorded in the project area, P-33-000343, P-33-000772 and SRI-3255, are prehistoric trails (Table 4.8; see Figures C.2, C.5, and C.6). P-33-000343 is a previously recorded trail segment that extends west from P-33-001821 toward P-33-000773, one of two sites within the Mule Tank Discontiguous Rock Art District. Unrecorded portions of the trail appear to continue westward to P-33-000504, the second site in the district, also located within the indirect APE. P-33-000343 is a trail that appears to have once extended farther into the direct APE but is currently no longer visible after it enters the direct APE from the west. P-33-000772 is also a previously recorded prehistoric trail segment that extends roughly east–west through the southern portion of the project area. This site was recorded as a portion of the Coco-Maricopa Trail system and continues toward the Mule Mountains to the west. SRI-3255 is located in the east-central portion of the project area and consists of a north-northeast to south-southwest trail segment. No other prehistoric sites or artifacts are associated with SRI-3255. P-33-000772, on the other hand, passes near two prehistoric rock feature and artifact scatter sites (SRI-3101 and P-33-013660) and P-33-000343 passes through P-33-001821 and P-33-001822 (located outside the APE). All three trails exhibit characteristics that make them possibly eligible for recommendation for listing in the NRHP (see Chapter 5 for NRHP-eligibility discussions). A north–south trail (P-33-000650) that runs through P-33-001821 within the indirect APE does not appear to extend into the direct APE (i.e., evidence of it is no longer extant within the direct APE).

Historical-Period Sites

In total, 181 historical-period sites were identified within the direct APE, including artifact concentrations, roads/trails, military sites, water-well sites, and survey markers. Sixteen of these sites were previously recorded. These historical-period sites are divided into three specific temporal periods (pre-DTC/C-AMA/Homesteading, DTC/C-AMA, and post-DTC/C-AMA) and a non-temporally specific general and multitemporal period for those possible historical-period sites consisting entirely of temporally ambiguous artifacts. The majority of the historical-period sites consist of artifact scatters, primarily of bottles and cans, with some historical-period ceramics also present. These sites are generally small and range in size from less than 20 to over 30,000 m^2. A smaller number of sites are associated with roads/trails, military activities, and survey markers.

Pre-DTC/C-AMA/Homesteading (Pre-1942) Sites

Fifteen historical-period sites within the direct APE are associated with land use prior to the establishment of the DTC/C-AMA (Table 4.9; see Figures C.7–C.10). All but two of these sites are artifact concentrations associated with dumping of domestic refuse and consist largely of hole-in-cap and hole-in-top cans, sun-colored amethyst glass fragments, lard pails, and whiteware fragments. Two of these sites, P-33-014198 and P-33-017328, were previously recorded. Based on artifact composition, most of the artifact concentrations date to the early twentieth century (pre-1920s), with SRI-63 and SRI-69 possibly representing the earliest historical-period sites within the direct APE. Earlier variants of hole-in-top can technology with double solder dots and hand-soldered seams around one end of the can were discovered at these two sites. One site (SRI-1024), however, has a component associated with the early 1930s.

Table 4.8. Previously Recorded and Newly Discovered Trails within the Direct APE

Site No.	Temporal Association	Features						Historical-Period Artifacts					Prehistoric Artifacts				
		Artifact Concentration	Ceramic Scatter	Lithic Scatter	Rock Feature	Thermal	Trail	Faunal Bone	Glass	Cans	Ammunition	Miscellaneous	Ceramic	Manuport	FAR	Flaked Stone	Ground/ Battered Stone
SRI-3255	prehistoric	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—
P-33-000772	prehistoric	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—
P-33-000343	prehistoric	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—

Key: FAR = fire-affected rock.

Table 4.9. Previously Recorded and Newly Discovered Pre-DTC/C-AMA/Homesteading (Pre-1942) Sites within the Direct APE, by Site Type

	Feature				Historical-Period Artifacts							Prehistoric Artifacts				
Site No.	**Artifact Concentration**	**Survey Marker**	**Campfire/ Burn Area**	**Road/ Trail**	**Faunal Bone**	**Glass**	**White Ware**	**Cans**	**Ammunition**	**Construction Material**	**Miscellaneous**	**Ceramic**	**Manuport**	**FAR**	**Flaked Stone**	**Ground/ Battered Stone**
	Artifact Concentration															
SRI-63	—	—	—	—	—	1	—	6	—	—	—	—	—	—	—	—
SRI-69	—	—	—	—	—	1	—	16	—	—	—	1	—	—	—	—
SRI-1024	1	—	1	—	—	30	—	62	14	—	4	—	—	—	—	—
SRI-1037	—	—	—	—	—	80	46	55	—	—	18	—	—	—	—	—
SRI-1049	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—
SRI-2035	—	—	—	—	—	—	—	17	—	—	—	—	—	—	—	—
SRI-2128	—	—	—	—	—	—	—	7	—	—	1	—	—	—	—	—
SRI-2333	—	—	—	1	—	—	—	3	—	—	—	—	—	—	—	—
SRI-3014	—	—	1	—	20	—	—	10	1	7	—	—	—	—	—	—
SRI-4045	1	—	—	—	—	5	—	43	—	—	—	—	—	—	—	—
SRI-4185	—	—	—	—	—	—	—	13	—	—	1	—	—	—	—	—
SRI-5073	—	—	—	—	—	—	—	13	—	—	—	—	—	—	—	—
SRI-8085	—	22	—	13	—	—	—	—	—	—	1	14	—	—	3	—
P-33-014198	—	—	—	—	—	3	—	102	—	—	3	—	—	—	—	—
	Road/Trail															
P-33-017328	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1

Key: FAR = fire-affected rock.

The sites appear to represent secondary dumping activity from outlying settlements and/or activity loci. Consequently, the sites cannot be positively associated with their source or specific land use, beyond representing general settlement and agricultural activities in the general region.

In addition to artifact concentrations, a northeast–southwest-oriented dirt road (SRI-2333) and an array of the survey markers and linear disturbances associated with the 1917 GLO survey of the area (SRI-8085 and P-33-017328) were also identified within the direct APE. SRI-2333 appears in a GLO map from 1918, and subsequent USGS maps and aerial photographs show the road during the mid-twentieth century. In the 1918 GLO map, this road extends to a homestead located outside the southwestern edge of the direct APE.

SRI-8085 consists of 22 survey markers and 10 linear disturbances associated with the survey markers (see Figures C.11 and C.12). These disturbances are approximately 2 feet wide, oriented north–south or east–west along section or quarter-section lines, and intersect at the survey markers. These disturbances may be related to survey crews clearing areas and walking the alignments during placement of the markers. GLO survey field notes indicated that a steel tape was used to set up the survey markers (GLO 1917). Located within the site boundary of SRI-1058, a prehistoric rock feature site with artifact scatters, are several tree stumps. GLO survey field notes indicated that one member of the crew was an axman (GLO 1917). These stumps may be associated with that activity.

P-33-017328 was previously recorded as a prehistoric trail component. Further investigation revealed that the site follows a quarter-section line on a north–south alignment and is likely a linear disturbances associated with the 1917 GLO survey, based on its similarity with the disturbances associated with SRI-8085.

Three artifact concentrations (SRI-1024, SRI-3014, and SRI-4045) exhibit characteristics that make them possibly eligible for recommendation for listing in the NRHP (see Chapter 5 for NRHP-eligibility discussions).

SRI-1024

This site consists of a possible campfire with scattered refuse associated with the early twentieth century (pre-1920s) and a domestic refuse deposit from the 1930s.

The possible campfire measures approximately 7 by 5 feet in size. Associated with this feature are 1 metal harmonica sleeve, 3 all-brass-head 16-gauge shotgun shells, 11 all-brass-head 12-gauge shotgun shells, 1 small brass buckle, and 1 brass leather rivet. The 16-gauge shells are U.M.C. Co. Majestic shells; the 12-gauge shells are 1901 Winchester shells. Based on the information embossed on the harmonica sleeve, the harmonica was a Dictator brand Subway model harmonica. This portion of the site may be a campsite associated with the 1917 GLO survey.

The 1930s domestic refuse concentration measures approximately 16 by 13 feet and consists primarily of sanitary cans in a variety of sizes, a clear drinking glass base, a sardine can, four hole-in-top cans, two paint cans, two external friction lids, a clear glass bottle, and five clear glass jars.

SRI-3014

This site consists of a small number of diffusely scattered historical-period cans from the early twentieth century. These cans consist largely of hole-in-cap cans, along with a single tobacco can. An approximately north–south-oriented two-track road passes near the eastern portion of the site and is likely associated with recent development in the area.

A 12-by-9-foot area of burned wood and bone is the only feature associated with this site. This feature consists of a lens of charcoal pieces with a small amount of partially calcined and calcined medium–large-sized animal bone, a .22-caliber rim-fired short round casing embossed with /U/, a tobacco-can lid, and at least seven wire nails. The feature is located approximately 20 feet west of the can scatter. As none of the cans appears to be burned, this burn area may be a campfire, possibly associated with the 1917 GLO survey of the area.

SRI-4045

This site consists of a large concentration of knife-opened hole-in-cap cans and glass fragments, as well as a light scatter, located to the southeast, of contemporaneous artifacts (hole-in-cap cans, sun-colored-amethyst glass, aqua and clear glass, and a lard pail). The artifact concentration measures 14 by 12-feet and consists of at least 15 hole-in-cap cans, along with at least 9 cans that were too deteriorated to identify and 1 fragment of clear glass. Although many of the artifacts were visible on the ground surface, several are nearly completely buried. Some of the hole-in-cap cans have machine-soldered seams.

DTC/C-AMA (1942–1944) Sites

There are 102 historical-period sites associated with troop activity at the DTC/C-AMA (Table 4.10; see Figures C.7, C.8, C.13, and C.14). The majority of these sites consist of artifact concentrations composed of K- and C-ration cans, friction-lid soluble coffee ration cans, .50- and .30-06-caliber ammunition casings, beer and nonalcoholic-beverage bottles and cans, and communication wire fragments. In some instances, sardine cans, evaporated-milk cans, and sanitary food cans were found in association with these sites. These cans may be nonstandard resources used for rations to fill supply gaps. Five of the artifact concentration sites were previously recorded.

Nine military-activity sites were identified within the direct APE. These sites primarily consist of lengths of communication wire or, in one instance (SRI-4180), an unspooled pile of steel guy wires. One site, SRI-2135, is an array of subrectangular/circular pits that are arranged in a line in the western portion of the direct APE. These pits appear to be tank emplacements that were dug into the ground to provide a defensive line during maneuvers. Two of these sites, P-33-014147 (communication wire) and P-33-021264 (tank tracks) were previously recorded.

Post-DTC/C-AMA (Post-1942) Sites

Thirty-six historical-period sites within the direct APE are associated with post-DTC/C-AMA land use (Table 4.11; see Figures C.7, C.8, C.15, and C.16). All but one of these sites are artifact concentrations composed of domestic refuse from the 1950s and 1960s. Artifacts associated with these sites consist of an array of sanitary, meat, beverage and hole-in-top cans; glass bottles and jars associated with beverages, food, and cleaning fluids; whiteware vessel fragments; aerosol cans; construction material; toys; and other various artifacts associated with domestic or automotive activities.

One site, SRI-42, is associated with a water-well installation. Several spoils piles and vehicle washout areas were identified at the site, along with a steel pipe that extends several feet into the ground. Artifacts associated with the site are related to industrial use (e.g., motor-oil cans, 50-gallon drums, and tool and hardware fragments), food or beverages, or recreational use of firearms. The site is associated with at least the early 1960s. Archival research indicates that the eastern half of Section 14, where the well is located, was claimed at different times during the 1950s by Gerald A. Brinkman and Victor A. Gudzunas.

Two other water wells also dating to the early 1960s consist solely of the well casings, with no other associated features or artifacts. The “BLM North” well, recorded as SRI-9016, is located at the intersection of four sections, two of which (Sections 11 and 12) are partially within the APE. The “BLM South” well, recorded as SRI-9018, is located in the western half of Section 23. No land claim information dating from the time the wells were built was discovered during this research.

General and Multitemporal Historical-Period Sites

Twenty-six sites (Table 4.12; see Figures C.7, C.8, C.17, and C.18) discovered during archaeological survey could not be attributed to a specific historical period, because they lack any temporally diagnostic artifacts and archival research did not disclose specific activities at the site locations. The artifact composition of these sites is similar to other historical-period sites in the project area—e.g., corroded collections of sanitary cans and other refuse—but the lack of maker’s marks and temporally diagnostic traits prevents determining a more-precise temporal association. These sites include 17 artifact concentrations, 1 USGS survey marker that lacks a date stamp, and 8 roads/trails.

Table 4.10. Previously Recorded and Newly Discovered DTC/C-AMA (1942-1944) Sites within the Direct APE, by Site Type

	Feature					Historical-Period Artifacts							Prehistoric Artifacts				
Site No.	**Artifact Concentration**	**Military Pits**	**Tank Tracks**	**Guy Wire**	**Communication Wire**	**Faunal Bone**	**Glass**	**White Ware**	**Cans**	**Ammunition**	**Construction Material**	**Miscellaneous**	**Ceramic**	**Manuport**	**FAR**	**Flaked Stone**	**Ground/Battered Stone**
	Artifact Concentration																
SRI-3	—	—	—	—	—	—	—	—	13	—	—	—	—	—	—	—	—
SRI-7	—	—	—	—	—	—	—	—	4	—	—	1	—	—	—	—	—
SRI-9	—	—	—	—	—	—	—	—	25	1	—	4	—	—	—	—	—
SRI-21	—	—	—	—	—	—	—	—	7	—	—	—	—	—	—	—	—
SRI-26	—	—	—	—	—	—	—	—	6	—	—	1	—	—	—	—	—
SRI-27	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	—
SRI-36	—	—	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—
SRI-120	—	—	—	—	—	—	—	—	15	—	—	—	—	—	—	—	—
SRI-137	—	—	—	—	1	—	—	—	2	—	—	2	—	—	—	—	—
SRI-1001	—	—	—	—	—	—	—	—	13	—	—	—	—	—	—	—	—
SRI-1011	—	—	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—
SRI-1035	—	—	—	—	—	—	1	—	16	—	—	2	—	—	—	—	—
SRI-1076	—	—	—	—	—	—	—	—	43	—	—	2	—	—	—	—	—
SRI-2001	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—
SRI-2009	—	—	—	—	—	—	—	—	7	—	—	—	—	—	—	—	—
SRI-2023	—	—	—	—	—	—	—	—	4	—	—	3	—	—	—	—	—
SRI-2029	—	—	—	—	—	—	—	—	27	—	—	7	—	—	—	—	—
SRI-2030	—	—	—	—	—	—	1	—	12	—	—	—	—	—	—	—	—
SRI-2066	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	—
SRI-2067	—	—	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—
SRI-2082	—	—	—	—	—	—	—	—	9	—	—	—	—	—	—	—	—

	Feature					Historical-Period Artifacts							Prehistoric Artifacts				
Site No.	**Artifact Concentration**	**Military Pits**	**Tank Tracks**	**Guy Wire**	**Communication Wire**	**Faunal Bone**	**Glass**	**White Ware**	**Cans**	**Ammunition**	**Construction Material**	**Miscellaneous**	**Ceramic**	**Manuport**	**FAR**	**Flaked Stone**	**Ground/Battered Stone**
SRI-2088	—	—	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—
SRI-2094	—	—	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—
SRI-2098	—	—	—	—	—	—	—	—	8	—	—	4	—	—	—	—	—
SRI-2100	—	—	—	—	—	—	1	—	12	—	—	—	—	—	—	—	—
SRI-2582	—	—	—	—	—	—	—	—	1	—	—	1	—	—	—	—	—
SRI-3020	—	—	—	—	—	—	—	—	7	—	—	—	—	—	—	—	—
SRI-3027	—	—	—	—	—	—	87	—	7	—	—	1	—	—	—	—	—
SRI-3031	—	—	—	—	—	—	—	—	12	—	—	—	—	—	—	—	—
SRI-3037	—	—	—	—	—	—	—	—	5	—	—	1	—	—	—	—	—
SRI-3038	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—
SRI3078	—	—	—	—	—	—	56	—	9	—	—	—	4	—	—	—	—
SRI-3108	—	—	—	—	—	—	36	—	—	—	—	18	—	—	—	—	—
SRI-3115	—	—	—	—	—	—	—	—	13	—	—	12	—	—	—	—	—
SRI-3116	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—
SRI-3119	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	—
SRI-3123	—	—	—	—	—	—	2	—	12	—	—	—	—	—	—	—	—
SRI-3124	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—
SRI-3127	—	—	—	—	—	—	—	—	5	—	—	5	—	—	—	—	—
SRI-3155	—	—	—	—	—	—	3	—	2	—	—	—	—	—	—	—	—
SRI-3156	—	—	—	—	—	—	5	—	5	—	—	—	—	—	—	—	—
SRI-3158	—	—	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—
SRI-4004	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—	—	—
SRI-4019	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	—
SRI-4034	—	—	—	—	—	—	—	—	7	—	—	—	—	—	—	—	—

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Site No.	Feature					Historical-Period Artifacts							Prehistoric Artifacts				
	Artifact Concentration	Military Pits	Tank Tracks	Guy Wire	Communication Wire	Faunal Bone	Glass	White Ware	Cans	Ammunition	Construction Material	Miscellaneous	Ceramic	Manuport	FAR	Flaked Stone	Ground/Battered Stone
SRI-4041	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—
SRI-4116	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—
SRI-4145	—	—	—	—	—	—	—	—	7	—	—	—	—	—	—	—	—
SRI-4160	—	—	—	—	—	—	3	—	1	—	—	4	—	—	—	—	—
SRI-4167	—	—	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—
SRI-4175	—	—	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—
SRI-4182	—	—	—	—	—	—	2	—	5	—	—	1	—	—	—	—	—
SRI-4191	—	—	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—
SRI-4196	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—
SRI-4217	—	—	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—
SRI-4222	1	—	—	—	—	—	90	—	44	—	—	50	—	—	—	—	—
SRI-4229	—	—	—	—	—	—	93	—	14	—	—	3	—	—	—	—	—
SRI-4231	—	—	—	—	—	—	13	—	2	—	—	—	—	—	—	—	—
SRI-4235	—	—	—	—	—	—	1	—	8	—	—	8	—	—	—	—	—
SRI-4236	—	—	—	—	—	—	22	—	19	—	—	15	—	—	—	—	—
SRI-4242	—	—	—	—	—	—	—	—	12	—	—	—	—	—	—	—	—
SRI-5000	—	—	—	—	—	—	—	—	12	—	—	—	—	—	—	—	—
SRI-5003	—	—	—	—	—	—	—	—	13	—	—	—	—	—	—	—	—
SRI-5006	—	—	—	—	—	—	9	—	9	—	—	—	—	—	—	—	—
SRI-5008	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	—
SRI-5029	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	—
SRI-5035	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—
SRI-5070	—	—	—	—	—	—	—	—	7	—	—	6	—	—	—	—	—

Site No.	**Feature**					**Historical-Period Artifacts**							**Prehistoric Artifacts**				
	Artifact Concen-tration	**Military Pits**	**Tank Tracks**	**Guy Wire**	**Communication Wire**	**Faunal Bone**	**Glass**	**White Ware**	**Cans**	**Ammunition**	**Construction Material**	**Miscellaneous**	**Ceramic**	**Manuport**	**FAR**	**Flaked Stone**	**Ground/Battere d Stone**
SRI-5076	—	—	—	—	—	—	—	—	14	—	—	—	—	—	—	—	—
SRI-5083	—	—	—	—	—	—	—	—	6	—	—	—	—	—	—	—	—
SRI-5099	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	—
SRI-5135	1	—	—	—	—	—	2	—	4	—	—	10	—	—	—	—	—
SRI-6003	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—
SRI-6046	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—
SRI-6053	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—
SRI-6059	—	—	—	—	—	—	—	—	12	—	—	—	—	—	—	—	—
SRI-6075	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—	—	—
SRI-6081	—	—	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—
SRI-6096	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—
SRI-6100	—	—	—	—	—	—	15	—	3	—	—	1	1	—	—	—	—
SRI-6104	—	—	—	—	—	—	—	—	6	—	—	—	—	—	—	—	—
SRI-6114	—	—	—	—	—	—	1	—	2	—	—	—	—	—	—	—	—
SRI-6115	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—
SRI-7018	—	—	—	—	—	—	—	—	16	—	—	—	—	—	—	—	—
SRI-7020	—	—	—	—	—	—	—	—	6	—	—	—	—	—	—	—	—
SRI-7065	—	—	—	—	—	—	1	—	3	—	—	2	—	—	—	—	—
SRI-7072	—	—	—	—	—	—	—	—	12	—	—	—	—	—	—	—	—
SRI-7074	—	—	—	—	—	—	—	—	28	—	—	—	—	—	—	—	—
P-33-018675	—	—	—	—	—	—	4[a]	—	3[a]	—	—	30	—	—	—	—	—
P-33-018916	—	—	—	—	—	—	—	—	21	—	—	—	—	—	—	—	—
P-33-019741	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—
P-33-019742	—	—	—	—	—	—	—	—	18[a]	—	—	—	—	—	—	—	—

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Site No.	Feature					Historical-Period Artifacts							Prehistoric Artifacts				
	Artifact Concentration	Military Pits	Tank Tracks	Guy Wire	Communication Wire	Faunal Bone	Glass	White Ware	Cans	Ammunition	Construction Material	Miscellaneous	Ceramic	Manuport	FAR	Flaked Stone	Ground/Battered Stone
P-33-019743	—	—	—	—	—	—	—	—	12[a]	—	—	—	—	—	—	—	—
	Military Activity																
SRI-119	—	—	—	—	4	—	—	—	—	—	—	—	—	—	—	—	—
SRI-2135	—	4	—	—	—	—	—	—	6	—	—	4	—	—	—	—	—
SRI-3054	—	—	—	—	—	—	—	—	1	6	—	—	—	—	—	—	—
SRI-4162	—	—	—	—	1	—	—	—	3	—	—	1	—	—	—	—	—
SRI-4180	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—
SRI-7076	—	—	—	—	1	—	—	—	4	—	—	1	—	—	—	—	—
SRI-7087	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
P-33-014147	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
P-33-021264	—	—	2[a]	—	—	—	—	—	4	—	—	—	—	—	—	—	—

Key: FAR = fire-affected rock.

[a] Includes data from site records.

Table 4.11. Previously Recorded and Newly Discovered Post-DTC/C-AMA (Post-1944) Sites within the Direct APE, by Site Type

Site No.	Feature			Historical-Period Artifacts							Prehistoric Artifacts				
	Artifact Concentration	Water Well	Burn Area	Faunal Bone	Glass	White Ware	Cans	Ammunition	Construction Material	Miscellaneous	Ceramic	Manuport	FAR	Flaked Stone	Ground/ Battered Stone
	Artifact Concentration														
SRI-2	2	—	—	—	15	1	108	—	—	68	—	—	—	—	—
SRI-18	1	—	—	—	7	—	90	9	3	24	—	—	—	—	—
SRI-19	1	—	—	—	—	—	11	—	—	—	—	—	—	—	—
SRI-25	1	—	—	—	1	—	23	4	—	—	—	—	—	—	—
SRI-71	—	—	—	—	3	—	6	—	1	2	—	—	—	—	—
SRI-81	1	—	—	—	—	—	23	—	—	17	—	—	—	—	—
SRI-125	1	—	—	—	1	—	14	—	—	—	—	—	—	—	—
SRI-132	—	—	—	—	1	—	7	—	—	—	—	—	—	—	—
SRI-147	—	—	—	—	—	—	7	—	—	—	—	—	—	—	—
SRI-1009	2	—	—	1	10	2	196	—	—	8	1	—	—	—	—
SRI-1056	1	—	—	1	566	29	51	1	18	9	—	—	—	—	—
SRI-1070	—	—	—	—	—	—	11	—	—	—	—	—	—	—	—
SRI-2007	—	—	—	—	11	—	4	—	—	—	—	—	—	—	—
SRI-2008	—	—	—	—	—	—	11	—	—	—	—	—	—	—	—
SRI-2014	—	—	—	—	—	—	10	—	—	—	—	—	—	—	—
SRI-2017	1	—	—	—	2	—	34	—	—	—	—	—	—	—	—
SRI-3007	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—
SRI-3010	—	—	—	—	—	—	8	—	—	—	—	—	—	—	—
SRI-3029	—	—	—	—	1	—	3	—	5	1	—	—	—	—	—
SRI-4005	—	—	—	—	6	—	1	—	—	—	—	—	—	—	—
SRI-4080	—	—	—	—	2	—	10	—	—	—	—	—	—	—	—
SRI-4208	—	—	—	—	1	—	9	—	—	—	—	—	—	—	—
SRI-4250	3	—	—	9	325	5	280	—	—	36	—	—	—	—	—

Site No.	Feature			Historical-Period Artifacts							Prehistoric Artifacts				
	Artifact Concentration	Water Well	Burn Area	Faunal Bone	Glass	White Ware	Cans	Ammunition	Construction Material	Miscellaneous	Ceramic	Manuport	FAR	Flaked Stone	Ground/ Battered Stone
SRI-5106	3	—	—	—	—	—	59	—	—	—	—	—	—	1	—
SRI-6011	2	—	—	—	1	—	83	1	—	2	—	—	—	—	—
SRI-6017	1	—	—	—	2	—	50	—	1	1	—	—	—	—	—
SRI-6018	—	—	—	—	141	—	3	—	—	58	—	—	—	—	—
SRI-6021	1	—	—	—	1	3	19	—	—	2	—	—	—	—	—
SRI-6022	1	—	—	—	30	2	53	—	—	1	—	—	—	—	—
SRI-6119	—	—	—	—	29	—	36	—	—	2	—	—	—	1	—
SRI-7024	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—
SRI-7060	—	—	—	—	—	—	15	—	—	—	—	—	—	—	—
P-33-018852	2	—	1	—	35[a]	—	166[a]	—	—	12[a]	1	—	—	—	—
P-33-019740	—	—	—	—	—	—	9[a]	—	—	—	—	—	—	—	—
P-33-021132	1[a]	—	—	—	—	—	—	—	—	—	—	—	—	—	—
							Water-Well Site								
SRI-42	1	7	—	—	4	1	20	53	5	66	—	—	—	—	—
SRI-9016	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—
SRI-9018	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—

Key: FAR = fire-affected rock.

[a] Includes data from site records.

Table 4.12. Previously Recorded and Newly Discovered General Historical-Period/Multitemporal Sites within the Direct APE, by Site Type

Site No.	Temporal Association	Feature			Historical-Period Artifacts							Prehistoric Artifacts				
		Artifact Concentration	Benchmark	Road/ Trail	Faunal Bone	Glass	White Ware	Cans	Ammunition	Construction Material	Miscellaneous	Ceramic	Manuport	FAR	Flaked Stone	Ground/ Battered Stone
Artifact Concentration																
SRI-138	historical period	—	—	—	—	1	—	5	—	—	—	—	1	—	—	—
SRI-1021	DTC/ post-DTC	—	—	—	—	3	—	53	—	—	4	—	—	—	—	—
SRI-3103	historical period	1	—	—	—	—	—	7	—	—	—	—	—	—	—	—
SRI-3117	historical period	—	—	—	—	—	—	7	—	—	1	—	—	—	—	—
SRI-4028	historical period	—	—	—	—	16	—	2	—	—	—	—	—	—	—	—
SRI-4098	historical period	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—
SRI-4127	historical period	—	—	—	—	3	—		—	—	—	—	—	—	—	—
SRI-4151	historical period	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—
SRI-4178	historical period	—	—	—	—	7	—	6	—	—	—	—	—	—	—	—
SRI-4186	historical period	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—
SRI-4248	historical period	—	—	—	—	—	—	3	—	1	5	—	—	—	—	—
SRI-5087	historical period	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—
SRI-5132	historical period	—	—	—	—	—	—	10	—	—	—	—	—	—	—	—
SRI-6005	historical period	—	—	—	—	—	—	3	—	—	—	—	—	—	—	—
SRI-6087	historical period	1	—	—	—	—	—	15	—	—	—	—	—	—	—	—
P-33-018853	DTC/ post-DTC	2	—	—	—	48	—	18	—	—	23	—	—	—	—	—
P-33-019736	historical period	1[a]	—	—	—	—	—	—	—	53[a]	2[a]	—	—	—	—	—
Road/Trail																
SRI-96	historical period	—	—	1	—	—	—	—	1	—	—	—	—	—	—	—
SRI-121	historical period	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
SRI-122	historical period	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
SRI-129	historical period	—	—	1	—	—	—	—	1	—	—	—	—	—	—	—

Site No.	Temporal Association	Feature			Historical-Period Artifacts							Prehistoric Artifacts				
		Artifact Concentration	Benchmark	Road/ Trail	Faunal Bone	Glass	White Ware	Cans	Ammunition	Construction Material	Miscellaneous	Ceramic	Manuport	FAR	Flaked Stone	Ground/ Battered Stone
SRI-2051	historical period	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
SRI-9020	historical period	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
P-33-014173	historical period	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
P-33-014199	historical period	—	—	1	—	—	—	—	1	—	—	—	—	—	—	—
	Survey Marker															
SRI-5063	historical period	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—

Key: FAR = fire-affected rock.

[a] Includes data from site records.

Three of the roads/trails (SRI-121, SRI-122, and SRI-2051) are similar to the linear disturbances associated with the 1917 GLO survey (see Pre-DTC/C-AMA/Homesteading [Pre-1942] Sites section above)—i.e., they are narrow and lightly used single path trails—although they are slightly out of the alignment with the linear disturbances at SRI-8085. However, when compared to the Public Land Survey System base map, they are roughly in line with quarter-quarter section lines, albeit with an approximately 7° error—much less precise than those associated with SRI-8085. This diminished precision suggests that these trails were made during another survey, possibly by another surveyor hired by a landowner, speculative owner, or claimant, or even for military purposes. The level of disturbance could correspond with individuals or small groups clearing and/or repeatedly walking linear alignments imprecisely reflecting land boundaries.

P-33-014199 is a north–south-oriented section road. SRI-96 and SRI-129, the remaining historical-period trails, are 2-foot-wide ephemeral trails similar to those associated with the 1917 GLO survey. The trails associated with the GLO survey, however, follow section or quarter-section lines. SRI-96 is located approximately 400 feet east of one of these trails (P-33-017328). These two trails may represent an error made during the GLO survey, or they may have been created intentionally for an unknown purpose. These trails are unlikely to be prehistoric, based on their rather ephemeral nature and the precise nature of the orientation (SRI-96 is perfectly oriented north–south for nearly 1 km). P-33-04173 and SRI-9020 are both east–west-oriented roads that are depicted on the USGS 1952 7.5-minute quadrangles for the project area, based on aerial photographs from 1948. However, it is unknown how long the roads had been in place prior to that date. Both roads are aligned along section lines and presumably are no older than the 1917 GLO survey.

Multitemporal sites are historical-period sites that consist of two or more identifiable temporal components. During survey, there were only two multitemporal sites, both of which are artifact concentrations (SRI-1021 and P-33-018853) consisting of a scatter of artifacts that can be associated with troop activity at the DTC/C-AMA, as well as post-DTC/C-AMA civilian land use (see Figures C.13–C.16).

Multicomponent Sites

Unlike multitemporal sites, multicomponent sites consist of both prehistoric and historical-period components. Although many sites found during the archaeological survey of the direct APE were found to have minor multicomponent aspects (e.g., a site that is primarily a lithic scatter with a couple of isolated historical-period cans), eight sites have a more even distribution of historical-period and prehistoric artifacts and features (Table 4.13; see Figures C.7 and C.8). These sites consist of DTC/C-AMA or post-DTC/C-AMA artifact concentrations associated with a prehistoric ceramic scatters, lithic scatters, or rock features. Some of the prehistoric components have ceramic sherds associated with the Patayan II or II/III periods.

One of these site, P-33-019618, exhibits characteristics that make it possibly eligible for recommendation for listing in the NRHP (see Chapter 5 for NRHP-eligibility discussions). This site was previously recorded in 2009 by AECOM for the proposed Blythe Solar Power Project (Kry 2009); at the time, it was considered to be a lithic scatter and opportunistic lithic-procurement and assaying site located on a desert pavement terrace. As a result of the current project, SRI staff considerably expanded the previously recorded site boundary to include an adjacent terrace to the west, as well as a concentration of historical-period artifacts. A small rill separates the previously recorded area from the expanded site area.

Much as it was described when first recorded, the adjacent terrace consists of a sparse scatter of lithic debitage and tested cobbles located on the desert pavement terrace surface. The lithic debitage is consistent with opportunistic lithic procurement and assaying of chert and quartzite lag gravels. Numerous artifacts were recorded throughout the site, including nearly 200 flakes, approximately 30 tested cobbles, 3 cores, and 2 lithic-reduction loci. All of the lithic debitage consists of quartzite and chert. One Colorado Buff sherd was found in the rill between the two terrace landforms that constitute the site.

Table 4.13. Previously Recorded and Newly Discovered Multicomponent Sites within the Direct APE, by Site Type

Site No.	Temporal Association	Features					Historical-Period Artifacts			Prehistoric Artifacts				Total Artifacts
		Artifact Concentration	Ceramic Scatter	Lithic Scatter	Unknown Disturbance	Thermal	Glass	Cans	Miscellaneous	Ceramic	FAR	Flaked Stone	Ground/ Battered Stone	
Artifact Concentration/Ceramic Scatter														
SRI-2068	Patayan II–III/ DTC	—	—	—	—	—	—	16	—	36	—	1	—	53
SRI-3256	Patayan II/DTC	—	—	—	—	—	—	2	2	1	—	—	—	5
SRI-3260	Patayan II/DTC	—	1	—	—	—	2	24	8	49	—	—	—	83
Artifact Concentration/Rock Feature														
SRI-4017	prehistoric/DTC	—	—	—	—	1	—	12	—	—	27	2	—	41
Artifact Concentration/Lithic Scatter														
SRI-3015	prehistoric/DTC	—	—	—	—	—	1	2	—	—	—	1	—	4
SRI-4060	prehistoric/ pre-DTC	—	1	—	—	—	32	5	—	11	—	4	1	53
P-33-019734	prehistoric/DTC	—	—	—	—	—	—	4[a]	—	—	—	8[a]	—	—

Key: DTC = Desert Training Center; FAR = fire-affected rock.

[a] Includes data from site records.

In addition to the prehistoric components, a large concentration of historical-period domestic refuse is located at the toe of the terrace slope, with several scattered historical-period artifacts located in a drainage downslope and adjacent to the terrace. Two cans, a ration can lid, and small cleared area were observed on the terrace slopes. Although most of the historical-period artifacts are domestic refuse, the ration can components, an amber glass bottle from the early 1940s, and a training variant M1A1 landmine are all associated with troop activity at the DTC/C-AMA during World War II. The remaining historical-period artifacts associated with this site date to the early 1950s. In January 2015, UXO specialists monitored by BLM archaeologists removed the landmine from the site and disposed of it.

A 17-by-15-foot cleared area was also discovered within the site. The northern end of the cleared area has been pushed up, creating a small (9-by-2.5-foot) berm composed of sediment and cobbles from the desert pavement. Although this berm is only about 6 inches in height, it may have acted as a low windbreak or cover for a fighting position. There are no artifacts associated with this feature. Rodent burrowing is evident throughout the feature. The nature of the cleared area is unknown and may be related to military activity or disturbance caused by OHV traffic through the area.

Sites That Could Not Be Relocated

One previously recorded site (P-33-014387) could not be previously recorded. This site is a small lithic scatter composed of tested cobbles and flakes on weak desert pavement that was recorded in 2004 by Mooney Jones & Stokes during a survey for the proposed Blythe Energy Transmission Project (Craft et al. 2005) and updated in 2008 by ICF Jones & Stokes (Chmiel et al. 2008). The location of the site and nearby area was visited during the survey and revisited during site recording. Although the description of the landscape in the site record was consistent with the visited location, no resources were relocated during either visit. The Blythe Energy Transmission Project corridor bordered the DQSP along its southeastern boundary. This resource may be misplotted.

Isolated Resources

In total, 620 isolated resources were identified during survey (see Appendix E). The majority of these resources (n = 380) are associated with the historical period (see Figures C.19–C.21) and are primarily ration cans associated with the DTC/C-AMA and food and beverage cans, with associated date ranges from the early twentieth century to the 1960s. Forty-one isolated jars or bottles were also discovered. As with the cans, these artifacts are associated with troop activity at the DTC/C-AMA, as well as land use by civilians following the closure of the training center. Ammunition (n = 28) found during survey consists of .50-caliber and .30-06-caliber rounds, as well as a grenade and an ammunition door from a Sperry ball turret (Figure 4.2), possibly from the B-24 bombers stationed at the BAAB. The two buttons (Figure 4.3) that were discovered are two-holed shell shirt buttons. Finally, 20 miscellaneous-type historical-period artifacts were discovered. These artifacts consist of tools, pieces of wire, eating utensils, and parts of oil filters.

In addition to the historical-period isolated resources, 157 prehistoric isolated resources were discovered (see Figures C.22–C.24), including 86 pot drops and 71 flaked stone artifacts (i.e., flakes, tested cobbles, and cobble choppers). The pot drops range in size from only a few ceramic sherds to over 80 sherds. Nine ceramic types were identified among the isolated resources (Table 4.14). These include three Patayan I types (Black Mesa, Colorado Beige, and Colorado Red), three Patayan II types (Tumco Buff, Topoc Buff, and Topoc Red-on-Buff), one Patayan II/III type (Parker Buff), and two Patayan III types (Colorado Buff and Colorado Red-on-Buff). Slightly more than one-third of the isolated resources with ceramics were associated with the Topoc Buff type.

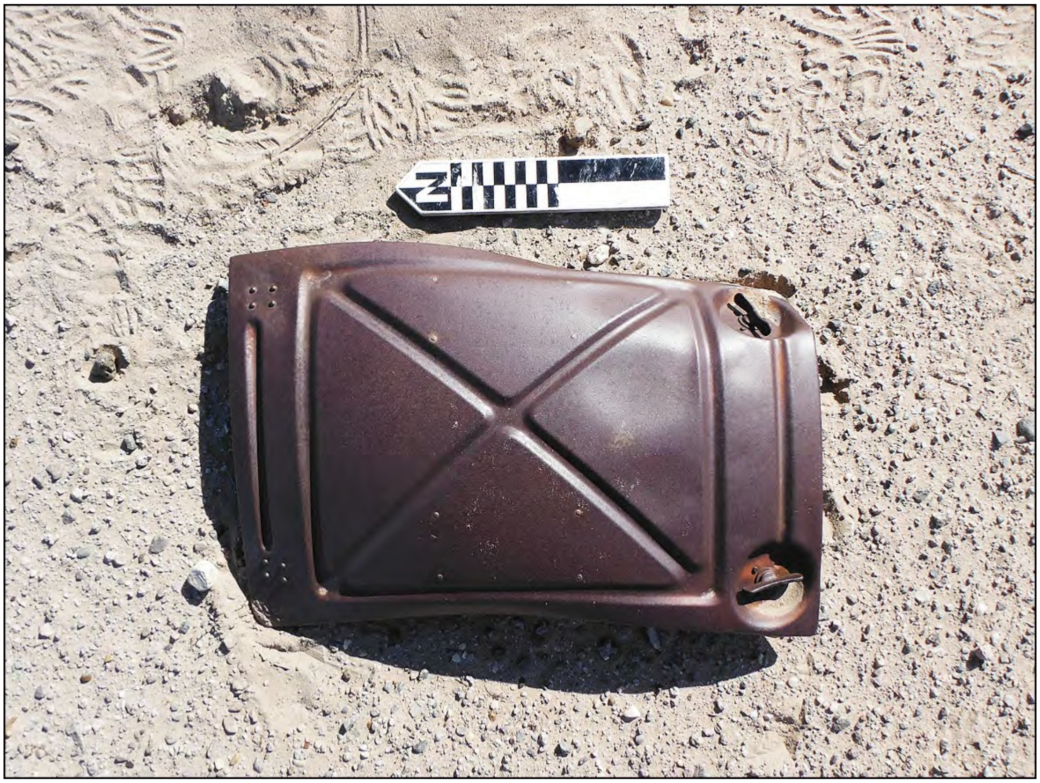


Figure 4.2. Sperry ball turret ammunition door.

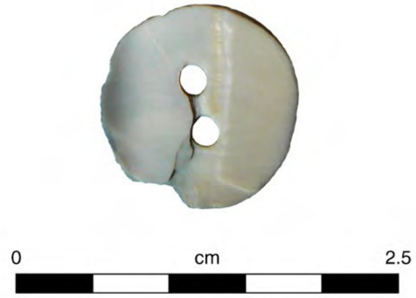


Figure 4.3. Shell shirt button.

Table 4.14. Distribution of Ceramic Types among Isolated Resources within the Direct APE

PD No.	Patayan I				Patayan I/II		Patayan II				Patayan II/III		Patayan III		
	Indeterminate	Black Mesa Buff	Colorado Beige	Colorado Red	Indeterminate	Black Mesa or Tumco Buff	Indeterminate	Tumco Buff	Topoc Buff	Topoc Red-on-buff	Indeterminate	Parker Buff	Indeterminate	Colorado Buff	Colorado Red-on-buff
11	—	6	—	—	—	—	—	—	—	—	—	—	—	—	—
32	—	9	—	—	—	—	—	—	—	—	—	—	—	—	—
38	—	—	—	—	—	—	—	15	—	—	—	—	—	—	—
39	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—
40	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—
43	—	—	—	—	—	—	—	4	—	—	—	—	—	—	—
45	—	6	—	—	—	—	—	—	—	—	—	—	—	—	—
47	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
49	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—
57	—	—	—	—	—	—	—	10	—	—	—	—	—	—	—
62	—	—	20	—	—	—	—	—	—	—	—	—	—	—	—
66	—	—	—	—	—	—	—	—	—	—	—	—	—	74	—
76	—	—	50	—	—	—	—	—	—	—	—	—	—	—	—
77	—	—	12	—	—	—	—	—	—	—	—	—	—	—	—
80	—	—	—	—	—	—	—	10	—	—	—	—	—	—	—
106	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—
109	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—
111	—	—	—	—	—	—	—	—	—	—	31	—	—	—	—
113	—	—	—	—	—	—	—	—	—	—	—	—	3	—	—
126	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—
131	—	—	—	—	—	—	—	—	—	—	29	—	—	—	—
1052	—	—	—	—	—	—	—	87	—	—	—	—	—	—	—
2015	—	—	—	—	—	—	—	—	—	—	—	—	—	—	12
2031	—	—	—	—	—	—	—	2	2	—	—	—	—	—	—

PD No.	Patayan I				Patayan I/II		Patayan II				Patayan II/III		Patayan III		
	Indeterminate	Black Mesa Buff	Colorado Beige	Colorado Red	Indeterminate	Black Mesa or Tumco Buff	Indeterminate	Tumco Buff	Topoc Buff	Topoc Red-on-buff	Indeterminate	Parker Buff	Indeterminate	Colorado Buff	Colorado Red-on-buff
2071	—	—	—	—	—	—	—	—	7	—	—	—	—	—	—
2079	—	—	—	—	—	—	—	—	12	—	—	—	—	—	—
2093	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—
2101	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—
2175	—	—	—	—	—	—	—	—	—	—	6	—	—	—	—
2379	—	—	—	—	—	—	—	—	—	—	—	—	7	—	—
2417	—	—	—	—	—	—	—	—	—	—	—	—	4	—	—
2697	—	—	—	—	—	—	—	—	—	—	16	—	—	—	—
3008	—	—	—	—	—	—	28	—	—	—	—	—	—	—	—
3013	—	—	—	—	—	—	—	—	13	—	—	—	—	—	—
3043	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—
3060	—	—	—	—	—	—	—	17	—	—	—	—	—	—	—
3086	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
3098	—	—	—	8	—	—	—	—	—	—	—	—	—	—	—
3099	—	—	—	—	—	—	—	—	—	—	38	—	—	—	—
3104	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8
3107	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—
3183	—	—	—	—	—	—	—	—	—	39	—	—	—	—	—
3407	—	—	41	—	—	—	—	—	—	—	—	—	—	—	—
3412	—	—	—	—	—	—	—	—	—	—	—	33	—	—	—
4010	—	—	—	—	—	42	—	—	—	—	—	—	—	—	—
4035	—	—	—	—	—	5	—	—	—	—	—	—	—	—	—
4039	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—
4040	—	—	—	—	—	—	—	—	22	—	—	—	—	—	—

continued on next page

PD No.	Patayan I				Patayan I/II		Patayan II				Patayan II/III		Patayan III		
	Indeterminate	Black Mesa Buff	Colorado Beige	Colorado Red	Indeterminate	Black Mesa or Tumco Buff	Indeterminate	Tumco Buff	Topoc Buff	Topoc Red-on-buff	Indeterminate	Parker Buff	Indeterminate	Colorado Buff	Colorado Red-on-buff
4055	—	—	—	—	—	—	—	—	—	—	6	—	—	—	—
4069	—	—	—	—	—	—	—	—	—	—	3	—	—	—	—
4070	—	—	—	—	—	—	—	—	6	—	—	—	—	—	—
4072	—	—	—	—	—	—	—	—	17	—	—	—	—	—	—
4113	—	—	—	—	—	—	—	—	5	—	—	—	—	—	—
4115	—	—	—	—	—	—	—	—	30	—	—	—	—	—	—
4125	—	—	—	—	—	—	—	—	—	—	18	—	—	—	—
4136	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—
4141	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—
4212	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—
5049	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—
5052	—	—		—	—	7	—	—	—	—	—	—	—	—	—
5074	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
5093	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—
6035	—	—	—	35	—	—	—	—	—	—	—	—	—	—	—
6063	—	—	—	—	—	—	—	—	9	—	—	—	—	—	—
6073	—	—	—	—	—	—	—	—	—	—	7	—	—	—	—
6097	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—
6102	—	—	—	—	—	—	—	—	—	—	—	—	14	—	—
6295	—	—	—	—	—	—	—	—	—	—	—	5	—	—	—
6323	—	—	70	—	—	—	—	—	—	—	—	—	—	—	—
6324	—	—	—	—	—	—	75	—	—	—	—	—	—	—	—
6331	—	—	—	—	—	—	—	—	—	—	—	7	—	—	—
7000	—	—	—	—	—	—	—	—	7	—	—	—	—	—	—
7003	—	—	—	—	—	—	—	—	9	—	—	—	—	—	—

PD No.	Patayan I				Patayan I/II		Patayan II				Patayan II/III		Patayan III		
	Indeterminate	Black Mesa Buff	Colorado Beige	Colorado Red	Indeterminate	Black Mesa or Tumco Buff	Indeterminate	Tumco Buff	Topoc Buff	Topoc Red-on-buff	Indeterminate	Parker Buff	Indeterminate	Colorado Buff	Colorado Red-on-buff
7011	—	—	—	—	—	—	—	—	12	—	—	—	—	—	—
7017	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—
7023	5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7025	—	—	—	—	18	—	—	—	—	—	—	—	—	—	—
7026	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—
7028	—	—	—	—	—	—	—	—	14	—	—	—	—	—	—
7033	—	—	—	—	—	—	—	—	25	—	—	—	—	—	—
7048	35	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7049	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
7050	—	—	—	—	—	—	—	—	7	—	—	—	—	—	—
7051	—	—	—	—	—	—	—	23	—	—	—	—	—	—	—
7088	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—
8092	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—

Key: PD = provenience designation.

Four of the pot drops are somewhat noteworthy in comparison to other ceramics in the project area. Although most of the vessels associated with these pot drops are incomplete, three vessels (Isolates 3104, 5093, and 7088) are relatively complete. The observable sherds for Isolate 3104 are large and consist of rim, body, and base sherds that could be refit into at least one-third of a vessel. Isolates 5093 and 7088 (previously recorded as P-33-019390) consist of large, partially buried body sherds. These two isolated resources are located within the dunes that stretch across the north-central portion of the project area within the Gen-Tie corridor. Based on the size of the sherds and their location within an area of extensive wind-blown sediment, additional large fragments of these vessels may be present below the surface of the dunes. The final pot drop of note is Isolate 7048, which is decorated with a punctated pattern (Figure 4.4). Although relatively common along the Colorado River, it is one of the few fragments found within the direct APE that features this decoration style. The relative uniqueness and completeness of these four resources may warrant further investigation and possible collection.

One projectile point, a possible Gypsum point made of chert (Figure 4.5), and one quartzite hammerstone were also discovered. The projectile point (Isolate 108) was found along the southeastern boundary of the project area. The isolated lithic artifacts are largely composed of chert or quartzite; none are composed of obsidian.

One isolated resource (Isolate 7000) consists of a historical-period can and a small cluster of pot sherds.

Architectural Resources

No new or previously recorded architectural resources were identified within the direct APE, and no NRHP-eligible or listed architectural resources were identified within the indirect APE as a result of the records search.

Buried-Site Sensitivity

Because identification of archaeological resources in a pedestrian survey is limited to sites and isolates visible on the ground surface, there is the possibility that resources obscured by soil deposition over time or recent aeolian sand distributions could be overlooked. In the following section, we address the potential for buried sites to be located within the direct APE and provide a model to anticipate where in the project area such buried resources may be located.

Buried-Site Sensitivity Models

All buried-site sensitivity models are based on the relationship between landform age and the accepted dates of human habitation in North America. Put simply, buried archaeological resources are not possible in landforms that developed prior to the colonization of the continent, which based on our present understanding, occurred sometime in the latest Pleistocene. Using this concept as a methodological framework, the first step in model construction is to delineate relict Pleistocene landforms (low potential) from those that aggraded coeval with potential human habitation (latest Pleistocene–present). This can be accomplished by several means but generally involves the use of surficial geologic maps, soil surveys, aerial or satellite imagery, and correlation of project landforms/soils with regional geochronologies. More-robust models will also include field verification via subsurface testing and absolute (i.e., radiocarbon) dating of stratigraphic sequences.

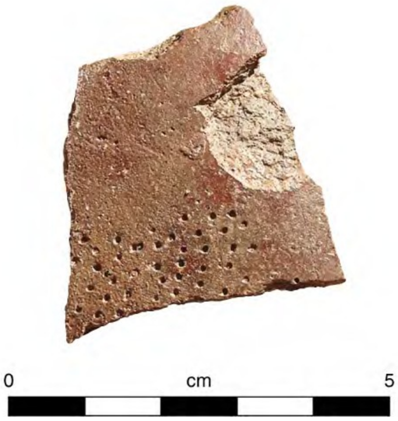


Figure 4.4. Close-up view of punctated pattern on ceramic bodysherd.

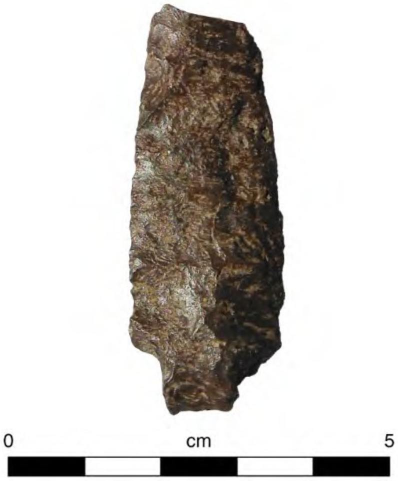


Figure 4.5. Possible Gypsum point.

Limitations of Sensitivity Models

It is important to note that discrepancies will exist between the "geologic potential" and the actual "probability" for buried archaeology (Meyer et al. 2010a:142). Whereas geologic potential is based simply on relative landform age (i.e., young surfaces have higher sensitivity than older surfaces), the probability of finding buried sites is dependent on multiple factors, including the precise age of the landform/geomorphic surface, slope gradient, the depositional environment of the sediments underlying the landform, the presence or absence of buried soils, proximity to water, and indeterminate cultural influences. Although some of these variables can be incorporated into models based on existing data sources, others will require field study and postfield analysis.

Inaccuracies can also be a result of the limitations inherent to soil and geologic maps that, in most instances, form the foundation of the sensitivity models. Map scale and the generalizations used to define mapping units are the most common source of error (Holliday 2004). If soil survey maps are used, it is important to recognize that, unlike many geologic units, soil boundaries do not have abrupt contacts. Soils more commonly grade from one type to another over relatively long distances. As defined in soil taxonomy, a soil mapping unit (soil series) may include up to 10 percent of a contrasting soil type or up to 50 percent, if the inclusion is similar to the primary mapping unit (Soil Survey Staff 1975). As a result, most mapped soil series will include other soil types, including soils significantly different from the mapped unit. It is also important to note that the minimum size delineated on county soil maps ranges from 1–4 hectares or 10,000–40,000 m^2 (Soil Survey Staff 1993). Most archaeological sites are significantly smaller than this (Holliday 2004).

Model Construction

The potential for buried intact archaeological resources within the APE is assessed here using relative landform age, depositional environments, the presence or absence of buried soils, and proximity to potential ephemeral water sources. Although slope is an important environmental characteristic to consider, applying this variable to the low-relief surfaces of the DQSP area has little effect on the distribution of sensitive landforms. It is also recognized that cultural factors often have a strong influence on site location; however, these are difficult to quantify and are not taken into account here. All of the information used to construct this model was extracted from existing soil surveys, geologic maps, and high-resolution satellite imagery. This model has not been verified in the field.

Landform age was determined by examining geomorphic surface characteristics visible in high-resolution satellite imagery and the analysis of 1:24,000-scale soil survey maps (Soil Survey Staff 2015). 1:100,000-scale geologic maps of eastern Riverside County were also reviewed (Hayhurst and Bedrossian 2010; Stone 2006); however, the small scale of these maps made them less useful as a base for the predictive model. The soil taxonomic classification for each of the soil series provided information on relative soil age and the soil-forming environment (see Appendix A). Soils are considered an accurate predictor of age, because soil development is time dependent (Birkeland 1999; Holliday 2004; Jenny 1941). Older landforms have well-developed soils (if not severely eroded) with diagnostic subsurface horizons (B horizons), whereas younger landforms have weakly developed soils with simple A-C horizons (no B horizon). Soil formation in arid environments is characterized by the accumulation of soluble salts, because there is insufficient moisture to leach the salt from the soil profile (Birkeland 1999; Schaetzl and Anderson 2005). Studies of soil development on desert piedmonts in the eastern Mojave suggest the accumulation of salts (namely calcium carbonate) in subsurface horizons is controlled by dust influx rather than the lithology or particle size of the soil parent material (Harden et al. 1991; McFadden et al. 1989). Because dust influx is largely controlled by climate, soil formation can be used to differentiate late Quaternary landforms over broad areas of the Mojave Desert (McFadden et al. 1989).

Landform age was further estimated by the presence or absence of desert pavement and rock varnish in satellite imagery. Like soils, desert pavement and the accumulation of varnish on surface clasts is time dependent (Bull 1991; Helms et al. 2003; McFadden et al. 1989). In the eastern Mojave, desert pavements are largely restricted to middle Holocene or older surfaces, with the strongest pavements requiring 20,000–35,000 years to develop (McFadden et al. 1989). Moderate to strongly developed rock varnish is also restricted to middle Holocene or older surfaces, although incipient varnish may be associated with deposits less than 2,000 years old (Dorn 1984; McFadden et al. 1989).

Depositional environments and the presence or absence of buried soils were assessed based on the soil series descriptions (Soil Survey Staff 2015). Gravelly alluvial-fan deposits such as those associated with the Carrizo series are less likely to contain intact buried archaeological resources, because the depositional environment has sufficient tractive force to displace artifacts (Waters 1992). Generally, artifacts recovered from very gravelly alluvium are displaced from their primary contexts.

Buried soils represent former stable land surfaces that were available for cultural use for long periods of time (Holliday 2004). Discrete periods of climatically induced alluvial-fan and aeolian sedimentation have resulted in soil burial in distal alluvial-fan settings across a broad region of the Mojave and western Sonoran Deserts (Bacon et al. 2010; McDonald et al. 2003; Miller et al. 2010; Rendell et al. 1994). As discussed by Waters (1992), distal alluvial-fan settings are favorable to the preservation of archaeological resources, because of the low-energy depositional environment and because older surfaces are often buried by younger alluvium.

Finally, several potential arroyo-mouth pans or playas were identified in satellite imagery in the northeastern and southwestern portion of the APE. It is possible that aeolian sand has blocked natural drainage at these locations. Although infiltration of runoff is high, surface water may have been available for short periods of time following large precipitation events. Areas of high geologic potential within or adjacent to these areas should be of special concern during future cultural resource investigations.

Model Explanation

The soils in the project area have been grouped into low, moderate, and high potential, based on the age of the geomorphic surface, presence or absence of buried soils, and depositional environment. The information presented here allows resource managers to make informed decisions concerning the level of effort needed to locate buried archaeological resources. Although there are a number of caveats associated with buried-site sensitivity models based on existing soil/geologic maps, this model provides a solid foundation for future geoarchaeological research in the project area.

Low-potential areas are restricted to a relict piedmont surface in the north-central direct APE mapped as the Chuckawalla soil series (Table 4.15; Figures 4.6 and 4.7). Although this surface has been mapped as Holocene fan alluvium by Hayhurst and Bedrossian (2010), strong soil development coupled with a moderate to strong desert pavement with rock varnish suggests a late Pleistocene age (Harden et al. 1991; McFadden et al. 1989). Regional geoarchaeological sensitivity models in areas west of the project area also correlated the Chuckawalla soil series with late Pleistocene landforms (Meyer et al. 2010b:28). The alluvium underlying this surface was deposited prior to the arrival of humans in North America and, therefore, has a low sensitivity for intact buried archaeology. However, localized aeolian and sheetwash deposits do have some potential to shallowly bury cultural resources and should be taken into consideration.

Areas of moderate potential within the APE include the Carrizo and Aco soil series (see Table 4.15; Figure 4.6). The Carrizo series is mapped on late Holocene and active or recently active alluvial fans in the north-central project area. Unfortunately the boundary between the Carrizo and Chuckawalla soil series is highly complex (see Figure 4.6). Owing to this complexity, a significant level of overlap can be expected between these two series. To correct for this, the boundary has been adjusted so that only those piedmont surfaces with visible desert pavement are included in the Chuckawalla series (Figure 4.8). This should increase the accuracy of the model to some degree.

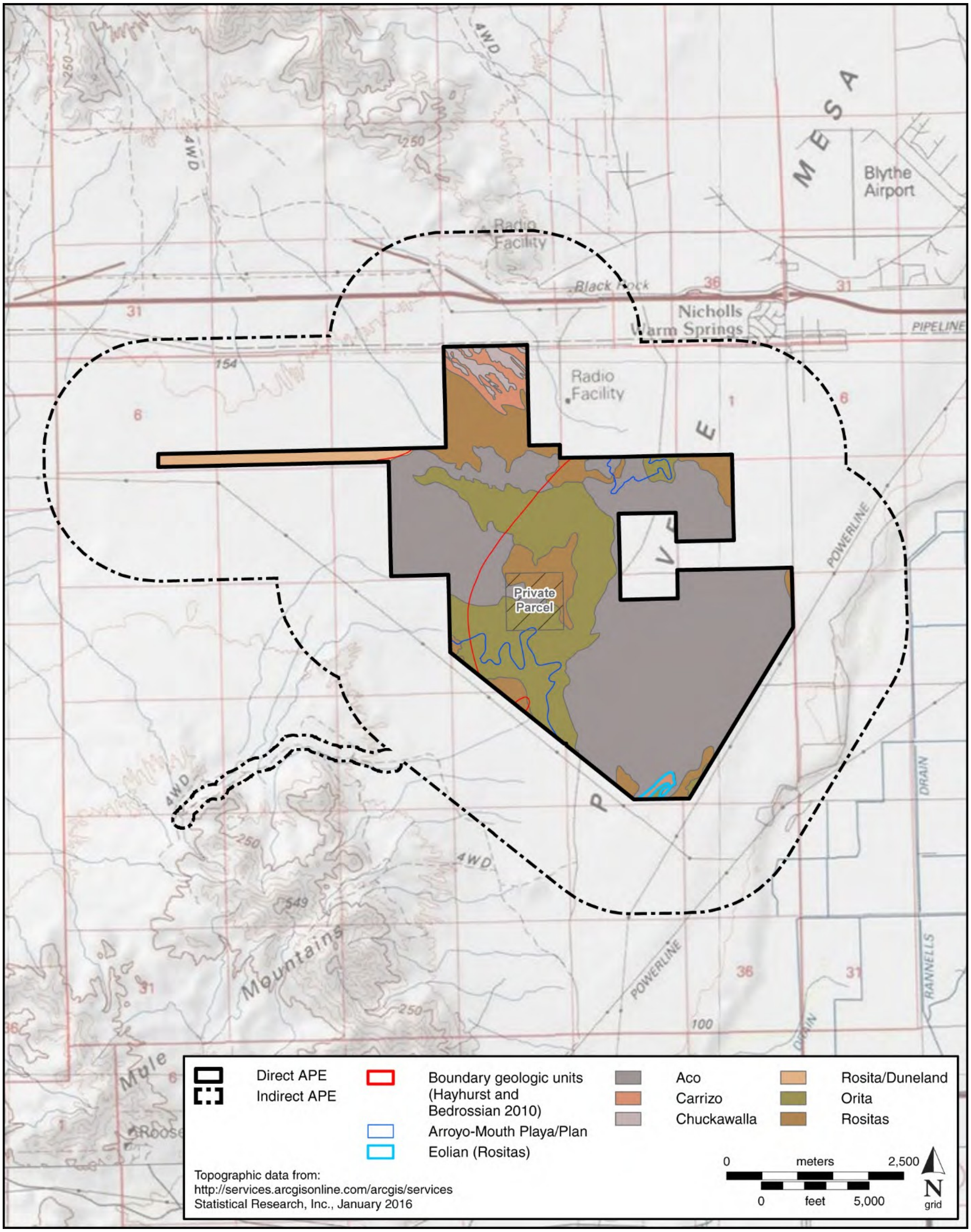
Although the Carrizo series is mapped on young piedmont surfaces, the potential for buried archaeology is considered to be moderate. The extremely gravelly alluvium described for this series was deposited in a high-energy channel and/or debris-flow environment. Buried cultural resources, if present, have likely been displaced from their original contexts. Some potential does exist, however, because these deposits bury older landforms (buried soils are likely). Incipient buried soils within the gravelly late Holocene alluvium can also not be ruled out. Field study of these deposits is needed before a more accurate assessment of sensitivity can be made.

Table 4.15. Sensitivity Model Summary and Explanation

Soil Series (Map Color)	Landform(s)	Geologic Mapping Unit[a]	B Horizon	Depth to B Horizon (cm)	Pavement/ Varnish	Soil Texture	Regional Correlations[b]	Geologic Potential	Surface Age	Potential Depth of Culture-Bearing Strata (cm)
Aco (greenish gray)	distal fan/alluvial plain	Qot and Qf (late Holocene and early–middle Pleistocene)	Bk	8	moderate pavement/ weak varnish	sandy loam to coarse sandy loam	early Holocene or older fan alluvium	moderate	early Holocene-undifferentiated	<50
Carrizo (tan)	incised channels and active fans	Qf (late Holocene		150+		gravelly sand	late Holocene fans	moderate	late Holocene	150+
Chuckawalla (dark grey)	alluvial fan	Qf (late Holocene)	Bk and Btk	4	moderate to strong pavement/ moderate to strong varnish	silt loam and gravelly silty clay loam	late Pleistocene fans	low	late Pleistocene	0 (local burial by thin aeolian deposits)
Orita (olive green)	distal fan/alluvial plain	Qot and Qf (late Holocene and early–middle Pleistocene)	Bt and Btk	55	none	gravelly fine sandy loam, gravelly clay loam	late Holocene over Pleistocene fan	high	late Holocene	50–60
Rositas (brown and green)	dunes, sand sheets, and blowouts	Qe, Qf, and Qot (late Holocene and early–middle Pleistocene)		150+	none	fine sand	Holocene and late Pleistocene aeolian	high	late Holocene (dunes and Sand sheets), older deposits (blowouts/deflated areas)	150+

[a] From Hayhurst and Bedrossian (2010).

[b] From Bacon et al. (2010); Harden (1991); Lancaster and Tchakerian (2003); McFadden et al. (1989); Miller et al. (2010); Rendell et al. (1994).


MESA
Blythe Airport
Radio Facility
Black Rock
Nicholls Warm Springs
PIPELINE
Radio Facility
Private Parcel
POWERLINE
POWERLINE
4WD
4WD
4WD
4WD
Mule Mountains
DRAIN
DRAIN
RANNELLS
250
549
154
100
31
36
6
1
Direct APE
Indirect APE
Boundary geologic units (Hayhurst and Bedrossian 2010)
Arroyo-Mouth Playa/Plan
Eolian (Rositas)
Aco
Carrizo
Chuckawalla
Rosita/Duneland
Orita
Rositas
0
meters
2,500
0
feet
5,000
N
grid

Topographic data from:
http://services.arcgisonline.com/arcgis/services
Statistical Research, Inc., January 2016

Figure 4.6. Distribution of soil types within the direct APE.

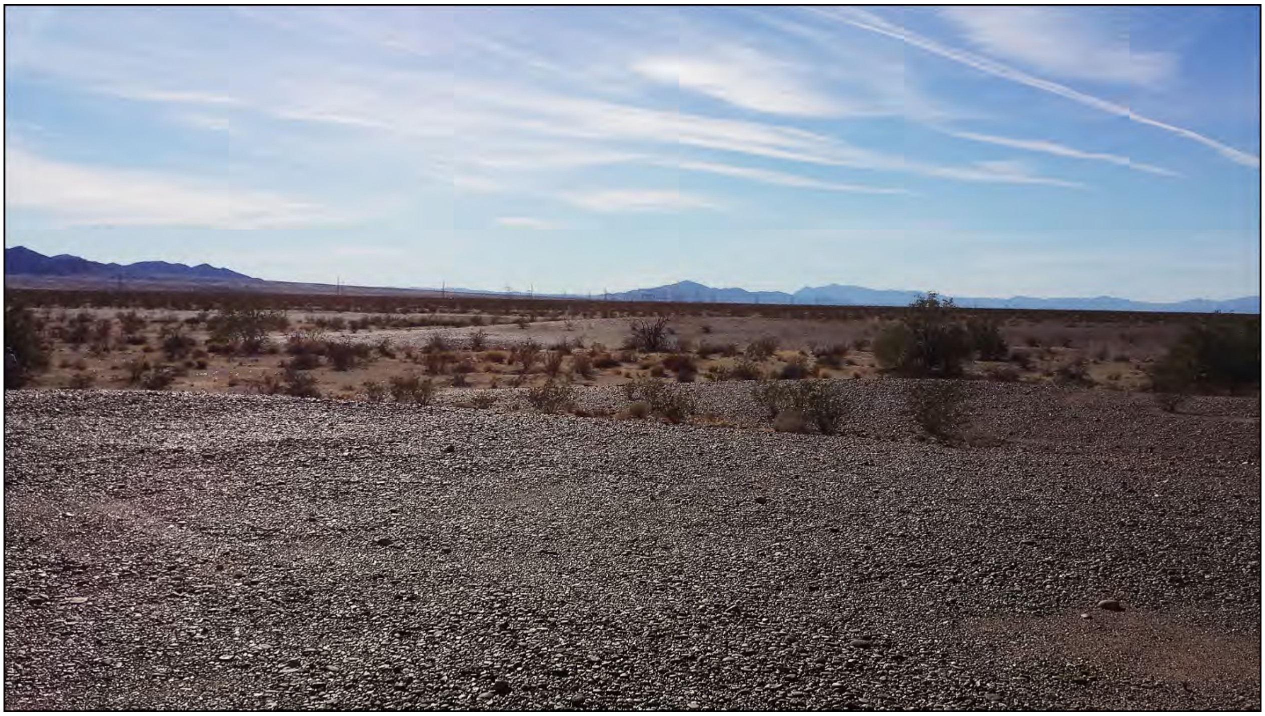


Figure 4.7. Overview of Chuckawalla soil series in the northern portion of the direct APE.

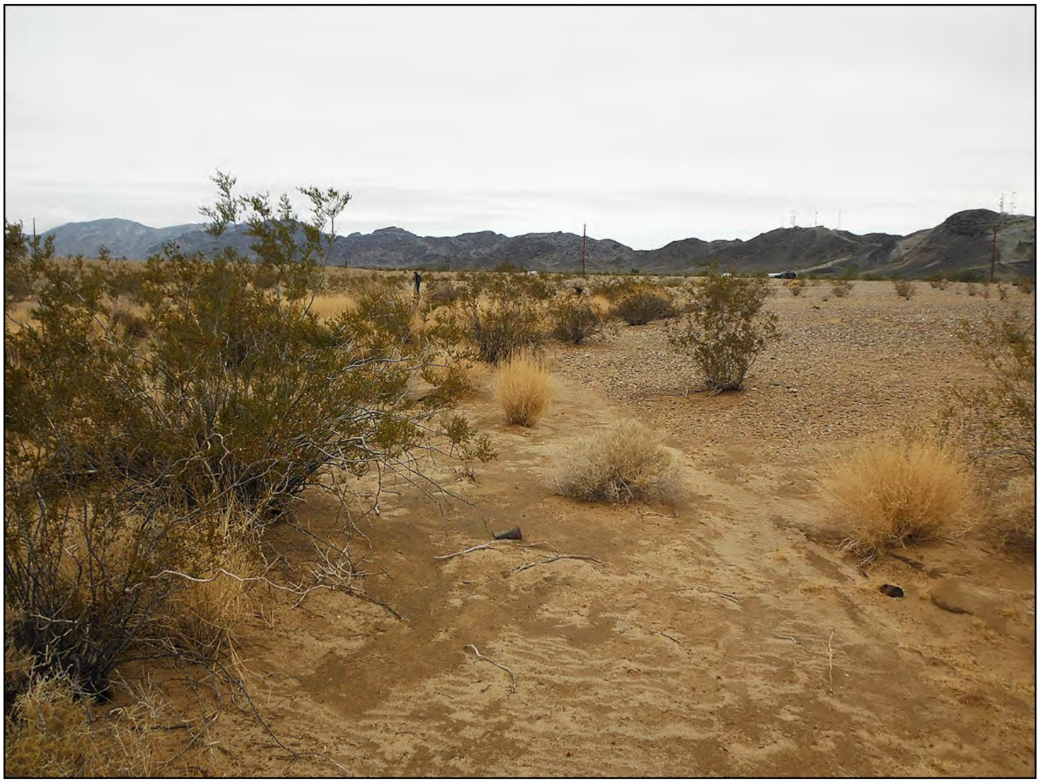


Figure 4.8. Intersection of Chuckawalla (desert pavement on right) and Carrizo (drainage on left) soil series in northwestern portion of project area.

The Aco soil series is mapped over broad areas of the eastern and west-central project area (see Figure 4.6). This series overlaps with both the Qot (early–middle Pleistocene Colorado River deposits) and the Qf (Holocene alluvium) geologic mapping units of Hayhurst and Bedrossian (2010) (see Table 4.15). The presence of Bk subsurface horizons indicates at least moderate levels of soil development. Weak to moderately developed desert pavement with rock varnish further suggests longer periods of landform stability. Based on regional correlation with dated landforms, the Aco series likely represents an early Holocene or older surface (Harden et al. 1991; McFadden et al. 1989). Locally, the Aco series may signify a mantle of younger alluvium over relict Pleistocene Colorado River deposits, where it overlaps with the Qot surface of Hayhurst and Bedrossian (2010). Although the window of potential human occupation is relatively narrow, latest Pleistocene–early Holocene, buried cultural resources are still possible.

High-potential landforms are mapped as the Rositas and Orita soil series (see Table 4.15; Figure 4.6). The official soil series description for the Orita series identifies a buried soil mantled by 55 cm of late Holocene fan alluvium. Similar to the Carrizo series, however, the late Holocene alluvium is very gravelly, indicating a high-energy depositional environment. Strong soil development in the buried soil suggests a Pleistocene age; therefore, deeply buried archaeology is not expected.

The Rositas series represents soils developed in locally thick sequences of aeolian sand (Figure 4.9). Regionally, at Dale Lake-Palen Dry Lake west of the project area, Rendell et al. (1994) dated major periods of aeolian deposition from 35–25 kya (thousand years ago) and 15–10 kya. Smith (1967) also identified a possible depositional episode from 7–4 kya. Lancaster and Tchakerian further identified buried soils within the aeolian sand marking periods of nondeposition and stability from 20–15, 14, and 4 kya. A similar sequence may be present in the project area; however, this would require field verification.

The source of aeolian sand within the direct APE is distal alluvial-fan and playa settings (Ford Dry Lake) immediately to the west in Chuckwalla Valley. According to the distribution of the Rositas series, aeolian sand mantles the western arm and the northern and southern boundaries of the APE (see Figure 4.6). An isolated pocket of aeolian sand is also present near the center of the project area. The official soil series description indicates aeolian sand in these areas extends to a depth of 150+ cm (see Table 4.15). The actual thickness of dunes and sand sheets across the APE will vary considerably, however.

In other areas of the Chuckwalla Valley, migrating aeolian sand has blocked natural drainages forming small playa lakes or pans (Kenney 2010). Aeolian sand in the southwestern direct APE may have blocked several drainages coming off the Mule Mountains, forming a small playa (see Figure 4.6). A similar situation may exist at the mouth of an ephemeral drainage in the northeastern direct APE (see Figure 4.6). These areas represent a potential water source and should be investigated more closely in the future.

Catellus/BLM Land Exchange Project Sensitivity Study

As previously indicated, in 1998, ASM conducted a 1,542-acre Class II survey as part of the Palo Verde Mesa and Palo Verde Valley Catellus/BLM Land Exchange project (McDonald and Schaefer 1998). As part of this project, a site sensitivity model was created, based on geomorphology and overall site density from available records-search information. The results of that study divided its project area into four sensitivity categories: high, medium, low, and none. Areas with high site potential consisted of upland areas with a potential for exposed volcanic or metavolcanic stone that might have been used as tool stone, as well as springs and historical-period roads and wells. Medium-sensitivity areas focused on the slopes below higher-sensitivity areas. Low-sensitivity areas were those locations within late Holocene alluvial formations. Areas without sensitivity were those located in active dunes or those areas subjected to recent agriculture.

When this sensitivity model was applied to the DQSP direct APE, only the most-northern portion of the direct APE fell within the high-sensitivity area. This area corresponds to the Chuckawalla and Carrizo soils associated with alluvial fans and channels. The northwestern portion of the direct APE overlapped with an area defined as having no sensitivity. The DQSP buried-site sensitivity analysis shows this area as being associated with Aco and Rositas soils (see Figure 4.6). This area was likely identified as having no sensitivity in 1998 because of the presence of several active dunes. The remainder of the DQSP direct APE overlapped with areas defined during the 1998 project as having low sensitivity. During the current project, however, this area was found to be more complex than initially reported, containing at least four different soil series with differing degrees of sensitivity.

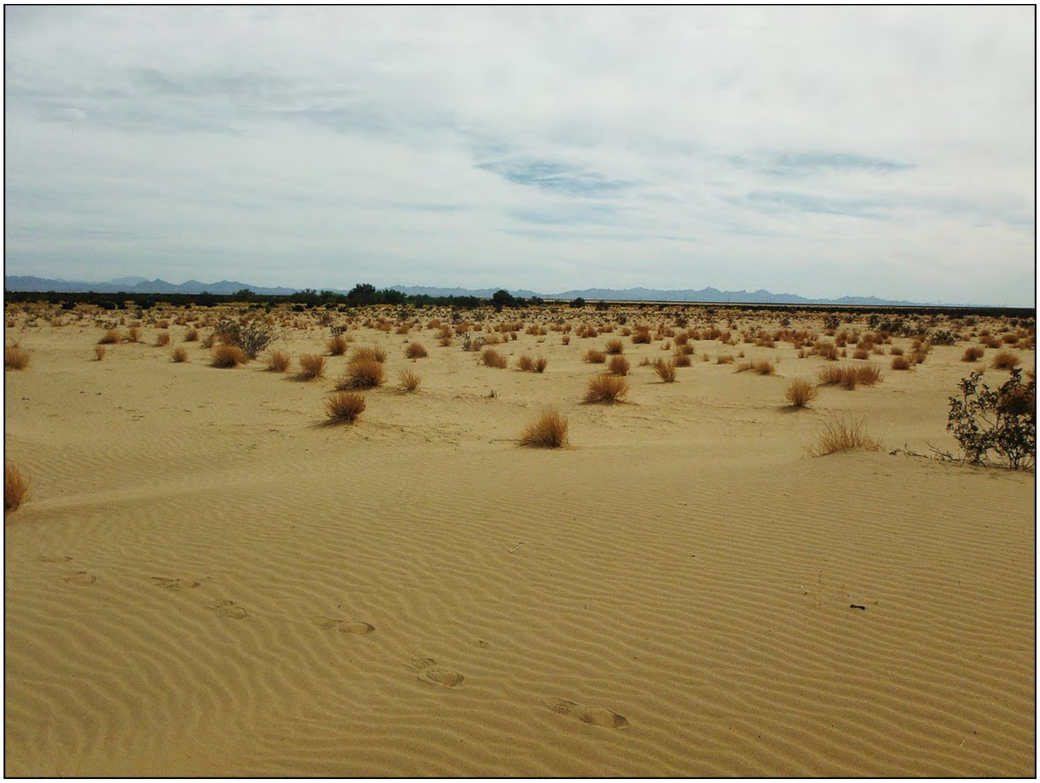


Figure 4.9. Overview of aeolian sand deposits within the Rositas soil series.

Summary and Interpretation

In total, 278 sites and 620 isolated finds were recorded during the DQSP survey. Of these 278 sites, 181 sites are historical-period, 89 are prehistoric, and 8 are multicomponent. The majority (n = 463) of the isolated finds are historical-period and are primarily cans. The remaining 157 isolated finds are prehistoric and largely consist of flaked stone and ceramic artifacts.

Although temporally diagnostic artifacts of early use of the project area are scant, an Elko series dart point discovered at site P-33-001821 (see Figure 4.1) and an isolated Gypsum point (Isolate 108; see Figure 4.5), both located in the southernmost portion of the project area (see Figures C.6 and C.23), indicate that prehistoric use of the study area began in the mid–late Archaic period (8500–1500 B.P.) and continued until the time of historic contact. There is abundant evidence of aboriginal use of the area during the Patayan period (1500–200 B.P.) in the form of ceramic sherds (see Tables 4.5 and 4.14). The project area continued to be used during the historical period by the ethnographic River Yuman tribes. The primary use of the DQSP area appears to have been as a resource-procurement area for lithic materials in the northern portion of the project site and for plant resources such as desert lily in the southern portion. The area also served as a travel corridor for trails, such as P-33-000343, between villages along the Colorado River and ceremonial areas in Mule Mountains west of the project area, with a suggestion of stops along the way at sites such as P-33-001821 and SRI-1822 at the western edge of the direct APE.

Nearly half of the prehistoric sites identified as lithic scatters are located in the northern part of the direct APE. These sites are directly associated with the well-defined desert pavement that covers the alluvial fans of the Chuckawalla soil series and, to a lesser degree, the channels and fans associated with the Carrizo soil series that interdigitate with the Chuckawalla soils (see Figures C.25 and C.26). Because lithic raw material (e.g., chert or quartzite cobbles) is abundant there, these lithic scatters tend to be largest within the direct APE. These sites are likely pavement quarries with the abundant lithic material representing one prolonged or multiple excursions to the alluvial fans to exploit the readily available resources. These lithic scatters primarily consist of core flakes, indicating that the cores were prepared at this location and transported to another location for tool manufacturing. Similar behavior was observed in the pavement quarry sites located on at the Fort Irwin National Training Center in the central Mojave Desert (Stanton et al. 2013).

In addition to these sites, four prehistoric sites located in the northern direct APE were identified as rock features with associated artifact scatters. The artifact scatters associated with these sites are almost entirely composed of substantial lithic scatters. Ceramics are very rare in this portion of the direct APE and only one sherd was found in association with a site (SRI-133). These sites were generally located off the slopes of the larger alluvial fans and were found among the more-level fans and channels of the Carrizo soil series as well as the Rositas soils (see Figures C.5 and C.25). These sites may represent small temporary campsites associated with groups visiting the desert pavement quarries.

The majority of the prehistoric sites are located within the central and southwestern portion of the direct APE and are associated with the Orita and Rositas soils (see Figures C.6 and C.26), both of which also have high potential for containing buried resources at depths to 150 cm or more (see Table 4.15). Compared to the lithic scatters in the northern portion of the APE, these sites are generally small in size but represent all prehistoric site types found within the direct APE, indicating a broader range of activities were conducted in this area.

Furthermore, although rock feature sites are common in this area, most of these sites are small and are composed of three or fewer rock features. Even so, a small number of rock feature sites in the southwestern portion of the direct APE are larger in area and feature numbers, with sites such as SRI-83 and SRI-1059 consisting of a dozen or more rock features and the largest rock feature site, SRI-1059, covering an area of approximately 31,000 m^2. Additionally, one of the larger sites within the indirect APE, P-33-001821, also extends into the southwestern part of the direct APE. This site covers approximately 52,000 m^2 and not only consists of several lithic-scatter loci and a ceramic-scatter locus but also contains at least one concentration of calcined bone (located off the project site within the indirect APE), which may be associated with a possible human cremation. At least two prehistoric trails are associated with this site, including P-33-000343, which extends westerly to the Mule Tank Discontiguous Rock Art District (P-33-000504 and P-33-000773), and the north–south-trending P-33-000650.

These sites in the central and southwestern portion of the direct APE may be associated with intensive harvesting of food sources, such as desert lily corms, as well as exploitation of smaller, less-developed areas of desert pavement. Furthermore, because several of these sites are located along established trails that connect with ceremonial locations, these sites may represent places where ritual attendees could stop and restock supplies. None of these sites appears to be represent prolonged habitation of the area; they were likely temporary camps.

No prehistoric sites were encountered along the gen-tie corridor. This area is covered with sediments in the Rositas soil series, which is associated with a high level of sensitivity. Much of this area is covered with windblown sediment and, as such, any archaeological resources present may be buried and not visible during a surface survey.

Historical-period land use of the project area was divided into three broad periods that cover the years prior to, during, and after use of the DTC/C-AMA during World War II. The project area was surveyed by the GLO in 1917, and numerous survey markers and trails associated with this survey are still present. Prior to the area being used as a U.S. Army training area, the land within the direct APE was unsettled but at least one homestead (not yet formally recorded) was located south-southwest of the southern portion of the direct APE and within the indirect APE. Though the DQSP direct APE was undeveloped, several refuse deposits dating to the 1920s or earlier and one refuse deposit dating to the 1930s were identified. These refuse deposits appear to primarily represent clandestine domestic refuse dumping, although in at least two instances, burned wood fragments were found in association. Although this may suggest that the sites are associated with a burn pile, none of the artifacts showed evidence of being thermally-affected (e.g., melted glass). The remains of shotgun shells and small-caliber rounds were found in association with the scatters, suggesting at least some of the earlier refuse may be associated with camping or hunting trips, possibly generated during the trip or brought with the hunters or campers and then discarded while on the trip.

Between 1942 and 1944, the project area was part of the DTC/C-AMA. Sites associated with this time period primarily consist of refuse deposits composed of K- and C-ration cans, as well as nonstandard-issue food cans that were requisitioned by the government to fill gaps in the supply line. Sites associated with communication wire segments, tank pits, and vehicle tracks, in addition to the isolated remains of ammunition (.30-06 and .50 caliber rounds) and explosives (a grenade and antitank mine) were also discovered.

Following the closing of the DTC/C-AMA, the land was once again open to the public. Sites associated with this time period almost entirely consist of domestic refuse deposits. Three sites, SRI-42, SRI-9016, and SRI-9018, consist of water wells and represent an era of attempted development of the area for agricultural uses in the 1950s and 1960s.

CHAPTER 5

Evaluations and Recommendations

Michael K. Lerch, Karen K. Swope, Scott Kremkau, and Patrick B. Stanton

NRHP-Eligibility Recommendations

SRI has developed preliminary NRHP-eligibility recommendations for all 278 sites within the direct APE (see Appendix B). Evaluation recommendations were made following the guidelines and eligibility criteria established in 36 CFR 60.4. The research questions and data requirements outlined in the research design (Kremkau, Stanton, et al. 2014) and presented above in Chapter 3 were used as the references for determining site eligibility. The 278 sites were classified as either eligible, not eligible, or possibly eligible, the last category denoting sites that require additional research before an eligibility recommendation can be provided. In the following section, we briefly discuss the NRHP eligibility of the resources within the APE. None of the historical-period sites nor any of the 620 isolated finds met any of the eligibility criteria, and all are recommended not eligible for listing in the NRHP. The single isolated artifact that is located on the 160-acre privately owned parcel within the direct APE and is thus subject to compliance with CEQA is also recommended not eligible for listing in the CRHR; no prehistoric or historical-period sites are located on the private parcel.

NRHP-Eligibility Criteria

Section 106 of the NHPA requires the BLM to take into account the effects of an undertaking on historic properties, defined as cultural resources listed in or eligible for listing in the NRHP (36 CFR 800). Determination of NRHP eligibility for cultural resources prior to making a finding of effect is made according to the following criteria:

> The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association and
>
> (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
> (b) that are associated with the lives of persons significant in our past; or
> (c) that embody the distinctive characteristics of a type, period, method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
> (d) that have yielded, or may be likely to yield, information important in prehistory or history [36 CFR 60.4].

If cultural resources do not possess integrity or do not meet the above criteria, they are not considered historic properties and are not further considered in the Section 106 process.

In addition to the above criteria, there is a general stipulation that a historic property must be 50 years old or older (for exceptions, see 36 CFR 60.4, Criteria Considerations). The importance of information in prehistory or history is measured by a resource's ability to answer research questions (McClelland 1997). In addition to research potential, both Native American and Euroamerican historic properties may have general-public and culture-specific values. Historic properties may also have broader public significance, such as serving to educate the public about important aspects of national, state, or local history. Below, we discuss our evaluations, in terms of the above-listed NRHP-eligibility criteria, of the archaeological resources we identified within the APE during survey, with attention focused on two particular aspects of evaluation: research potential and integrity.

Research Potential

The research potential of any particular historic property is assessed with reference to a specific historic context or research design and themes. Historic contexts form the framework according to which much of the federal historic-preservation process is structured. A historic context is a body of information about a property, organized by three basic elements: theme, place, and time (McClelland 1997:1). Theoretically, all the historic contexts of a particular geographic area together constitute a comprehensive history of the area that could be broken down into a series of historically meaningful segments, each of which would constitute an individual historic context. Therefore, grouped together, the various historic contexts of an area form a comprehensive summary of all aspects of the area's history.

Integrity

Another key determination regarding NRHP eligibility involves the concept of integrity, which refers to the physical condition of a historic property. If the physical condition of a site considered eligible for listing in the NRHP under Criterion d is such that important information about the past potentially can be derived from it, then it is said to possess good integrity. If various processes of disturbance—environmental or cultural, intentional or unintentional—have impacted the property such that the cultural essence of the site has been lost or severely damaged, then the property is said to lack integrity. The critical aspect of evaluating integrity is assessment of the nature and extent of disturbance processes. Extensive impacts by recent human activity, such as vandalism or vehicular traffic, are relatively easy to recognize and assess, but other forms of disturbance are more subtle. For example, consider an artifact concentration. If environmental processes, such as erosion, have displaced artifacts and altered the geomorphological context, the condition of the scatter today might be considerably different from what it was when it was first created. Many of the artifacts may have been redeposited and those that remain may no longer be in primary context. If subsurface deposits are present, they may no longer be spatially associated with the surface artifacts.

Criteria of Adverse Effect

If a project alters the character-defining elements of an NRHP-eligible property, such as features relevant to its environment or its use, in a manner that affects the property's eligibility for the NRHP, such an alteration, is considered an adverse effect. Adverse effects can include

- physical destruction, damage, or alteration of all or part of the property;
- isolation of the property from its setting or alteration of the character of its setting when that character contributes to the property's qualification for listing in the NRHP;

- introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- neglect of a property resulting in its deterioration or destruction; or
- transfer, lease, or sale of a federally owned property without adequate conditions or restrictions regarding its preservation, maintenance, or use (36 CFR 800.5[a][2]).

If a historic property within the APE were subject to any of the above, it would be considered an adverse effect to the property.

NRHP Site Evaluations

SRI's NRHP-eligibility recommendations are presented below. The discussions are organized by the site types presented in Appendix B. These eligibility recommendations are preliminary and may change following additional research at some sites and consultation by the BLM with the tribes and the public. Ultimately, formal determinations of eligibility will be made by BLM, with concurrence by the SHPO.

Historical-Period Sites

Historical-period sites are classified as artifact concentrations, military-activity sites, water-well sites, roads/trails, and survey markers.

Artifact Concentrations

In total, 157 historical-period artifact concentrations were recorded within the direct APE. Generally, the artifact concentrations can be divided into three main time periods: pre-DTC/C-AMA/Homesteading, DTC/C-AMA, and post-DTC/C-AMA.

The artifact concentrations dating to the DTC/C-AMA operations consist of small scatters of C- and K-ration cans and other historical-period refuse, such as beverage bottles or cans or nonstandard food cans, and are likely associated with training and maneuvers within the APE. The historic and archaeological contexts prepared for DTC/C-AMA sites identified refuse deposits as one of the property types associated with the resource. The guidance document indicated that DTC/C-AMA refuse deposits can range from "isolated artifact scatters to large trash dumps, used for long periods of time. Refuse deposits from the DTC/C-AMA period will be identifiable by the military-related artifacts present, as well as by their location" (Bischoff 2009a:127). The small scatters identified within the project APE were likely associated with temporary campsites and bivouacs and were not "cleaned up by the departing soldiers," as many others were. The DTC/C-AMA is "particularly relevant to several broad, important themes in American history," was "the largest training facility and the only one of its kind in American military history," and was "associated with several preeminent figures in the American Army" (Bischoff 2009a:133–134). Nevertheless, the guidance went on to state that "whereas these resources have the potential to be considered significant under any or all of the four criteria, more often than not they will be considered primarily eligible under Criterion d for their ability to yield information important in history" (Bischoff 2009a:134). Although the small sites retain aspects of integrity, it is not possible to relate them to specific military activities or units. They do not contain sufficient quantity or variety of materials to support statistically valid analyses, nor do they contain further data potential. The DTC/C-AMA sites were thoroughly documented during this investigation, including background and archival research, field recordation, collection of a photographic record, and detailed mapping. The artifact concentrations dating to the DTC/C-AMA period are recommended not eligible for listing in the NRHP under any criteria.

The artifact concentrations associated with the mid–late twentieth century represent small “wildcat” dumps, likely associated with residential areas north of the direct APE and with use of the project area for OHV or other recreational activity. The artifact concentrations are surficial deposits, lacking stratigraphic integrity and the quantity and variety of materials that would allow statistically valid analyses. These sites were thoroughly documented during this investigation, including background and archival research, field recordation, collection of a photographic record, and detailed mapping. The dumps cannot be associated with specific households or individuals and otherwise lack context. The mid–late-twentieth-century artifact concentrations are thus recommended not eligible for listing in the NRHP.

A dozen artifact concentrations date to the early twentieth century. These concentrations contain a variety of domestic refuse, as well as other artifact types. Most of these scatters are highly disturbed, but three are in good condition: SRI-1024, SRI-3014, and SRI-4045. No homesteads or other historical-period residential areas were identified within the direct APE. SRI-1024, SRI-3014, and SRI-4045 cannot be associated with a particular activity, residence or individual. SRI-1024 and SRI-3014 contain burn areas or campfires, and a potential association with the 1917 GLO survey crew was considered. The historic context and research design for work-camp properties in California (Caltrans 2013:97, 112, 114, 123, 169) listed surveyors’ camps as a potential work camp property type. It is not possible, however, to make a conclusive association of these sites with activities of the 1917 survey crew. The artifact concentrations are surficial deposits, lack stratigraphic integrity, and do not contain the quantity and variety of materials that would allow statistical analyses. These sites were thoroughly documented during this investigation, including background and archival research, field recordation, collection of a photographic record, and detailed mapping. The early-twentieth-century artifact concentrations are recommended not eligible for listing in the NRHP under any criteria.

Military-Activity Sites

The nine sites associated with military activity are all related to the use of the APE as part of the DTC/C-AMA. None of these sites appears to be related to the activities of Operation Desert Strike in 1964. The sites consist of small features, including tank emplacements, vehicle tracks, or lengths of communications wire. The historic and archaeological contexts prepared for DTC/C-AMA sites identified tank tracks as one of the property types associated with the resource. The guidance document indicated that tanks were a “primary aspect of the DTC/C-AMA, and countless operations and maneuvers were conducted throughout the facility” (Bischoff 2009a:127). Tank tracks, therefore, have been reported throughout the DTC/C-AMA.

Despite the relevance of the DTC/C-AMA “to several broad, important themes in American history,” its role as “the largest training facility and the only one of its kind in American military history” and its association with “several preeminent figures in the American Army” (Bischoff 2009a:133–134), the guidance also stated that “whereas these resources have the potential to be considered significant under any or all of the four criteria, more often than not they will be considered primarily eligible under Criterion d for their ability to yield information important in history” (Bischoff 2009a:134). Although the tank emplacements, vehicle tracks, and lengths of communications wire retain aspects of integrity, it is not possible to relate them to specific military activities or units. They do not contain sufficient identifiable association, nor do they contain further data potential. The nine military-activity sites are recommended not eligible for listing in the NRHP under any criteria.

Water-Well Sites

Three abandoned water well sites were recorded within the direct APE. One site (SRI-42) consists of a well casing surrounded by a disturbed area and artifact scatter. Archival research failed to disclose an association with a particular residence, agricultural use, or individual, although it was determined that the well dates to the early 1960s. The artifacts at the site date to the mid–late twentieth century. The artifact concentrations are surficial deposits, lack stratigraphic integrity, and do not contain the quantity and variety of materials that would allow statistical analyses. Two other sites (SRI-9016 and SRI-9018) each consist of a single well casing with no associated artifacts or other features. These two sites also date to the early 1960s. These wells may be associated with activities during the 1950s and 1960s related to possible development of the Palo Verde Mesa area for agricultural activities by the Palo Verde Irrigation District. The water-well sites were thoroughly documented during this investigation, including background and archival research, field recordation, collection of a photographic record, and detailed mapping. These three sites are recommended not eligible for listing in the NRHP under any criteria.

Survey Markers

Two survey marker sites were identified within the direct APE. The first site, SRI-8085, consists of 22 survey markers and 10 linear disturbances associated with a 1917 survey by the GLO. They are small, bronze markers set on pipes or other foundations, set into the ground. The linear disturbances are approximately 2-foot-wide north–south or east–west ephemeral trails along section or quarter-section lines that were created during the survey for and placement of the markers. The number and array of markers and disturbances is related to the 1917 survey, which included setting markers at 85 locations (all section corners and centers). Although government surveys are associated with events that have contributed significantly to broad historical patterns, early-twentieth-century survey markers are common through the California desert and elsewhere, and their purpose and morphology are well documented; SRI-8085 does not meet Criteria a or c. The names of all the surveyors for the 1917 survey (GLO 1917) were reviewed and researched, and none was found to be significant in our past (Table 5.1). Based on the results of our archival research, SRI-8085 is not associated with the lives of persons significant in our past and does not appear eligible under Criterion b. Documentation of the site included background and archival research, field recordation, collection of a photographic record, and detailed mapping. The site was thoroughly documented during this investigation and has no further research potential under Criterion d. SRI-8085 is recommended not eligible for listing in the NRHP.

The other survey marker site, SRI-5063, consists of an undated USGS marker. Individual survey markers are ubiquitous features that can be found throughout California and the United States as a whole. Therefore, this site is not eligible under Criteria a, b, or c. Documentation of the site included background and archival research, field recordation, collection of a photographic record, and detailed mapping. The site was thoroughly documented during this investigation, and has no further research potential under Criterion d. Although this site is in good condition, SRI recommends it not eligible for listing in the NRHP.

Roads/Trails

Ten historical-period roads/trails were identified within the direct APE and are of sufficient age and integrity for consideration as historic properties. One of the sites, SRI-2333, is depicted on an early twentieth-century map. This southwest–northeast-trending road appears on the 1918 GLO plat map, drawn from survey data collected in 1917 (see Figure 2.3). At that time, the road ended just south of the project APE, in the southwest quarter of Section 23 near a house and agricultural field outside the direct APE. From that point, the road followed its current alignment northeasterly through Sections 23 and 14 but branched northeasterly from the current alignment in the NE $^1/_4$ of Section 11. Its northern terminus at that time remains unknown. By 1952, the road continued northerly to a network of roads accessing mines in the Little Maria Mountains and had been extended southerly to connect with the Bradshaw Trail.

Table 5.1. Survey Crewmembers on the 1917 GLO Survey of Township 7 South, Range 21

Name	Date of Involvement	Nature of Involvement
Atchison, Harold	1917	survey crew cornerman
Beckwith, Elmo	1917	survey crew 1st chainman
Brown, H. M. C.	1856	surveyor
Henry, George	1917	survey crew 2nd chainman
Hill, Bradley L.	1917	survey crew axman
Hutton, Willard	1917	survey crew cornerman
Lightfoot, Edward	1917	survey crew flagman
Murtaugh, Tim	1917	survey crew 2nd chainman
Pecore, C. W.	1917	survey crew 1st chainman
Sechrist, Loyd E.	1917	U.S. transitman
Thomas, Ollie	1917	survey crew transitman
Wolff, D. J.	1917	U.S. transitman

Note: From Wolff and Sechrist 1917:250.

In addition to SRI-2333, a two-track section road (P-33-014199) and two ambiguous trails (SRI-96 and SRI-129), were also discovered. Although these linear sites played roles in local and regional history as specific cultural resources related to settlement and industrial development, they did not make significant contributions to history in terms of culture, economics, politics, or technology. Another of these sites, P-33-017328, was previously recorded as a prehistoric trail segment. Further investigation revealed that this site is longer than originally recorded, is located precisely along a quarter-section line, and is likely associated with the 1917 GLO land survey and with the other features recorded as SRI-8085.

Three linear sites (SRI-121, SRI-122, and SRI-2051) appear to be associated with surveys that further subdivide the section and quarter-section subdivisions mapped by the 1917 GLO survey. The fact that these subdivisions are slightly oblique in relation to the official section divisions suggests these sites were made during another survey, possibly by a surveyor hired by a landowner, speculative owner, or claimant.

Finally, a map dated 1952 (drawn from aerial imagery dated 1948) shows a road in an east–west alignment along the north side of Section 13 that was recorded in this study as SRI-9020. Archival data from that decade shows three claimants for land in the northern part of Section 13: Don A. Allen, Elmer Cain, and Frank A. Gallender, Jr. Previously recorded road P-33-014173, which is also depicted on the 1952 map, runs east–west along the boundary between Sections 13, 14, 23, and 24. Adjacent land was claimed at that time by Ida May Cassell, Esther M. Cassell, Ralph W. Cassell, Victor A. Gudzunas, Prudence B. Anderson, Gerald A. Brinkman, John T. Scott, Minnie Van Reid, and H. L. Billson.

The roads and trails do not meet any of the NRHP-eligibility criteria. Despite background and archival research, origin and destination points for the linear features were not identified, nor do any of the names associated with adjacent land claims appear to be important in local or regional history. The sites were thoroughly documented during this investigation through field recordation, collection of a photographic record, and detailed mapping. However, the sites could not address any of the research questions in the research design (Kremkau, Stanton, et al. 2014), and further research at the sites will not yield additional information important to history. Therefore, SRI recommends the historical-period road/trail sites not eligible for listing in the NRHP.

Architectural Resources

There are no historical-period built environment resources identified within the direct or indirect APE that require evaluation regarding direct or indirect effects resulting from construction of the DQSP.

Prehistoric Sites

The prehistoric sites are classified as artifact concentrations, rock feature sites, rock feature with artifact scatter sites, and trails.

Artifact Concentrations

Artifact concentrations are groups of artifacts scattered across the ground surface that lack features such as pits or thermal features. Two types are artifact concentrations, lithic scatters and ceramic scatters, were discovered. In total, 9 ceramic and 16 lithic scatters were identified within the direct APE. The majority of these sites are sparse scatters (with less than 50 artifacts) that do not retain any integrity and lack diagnostic artifacts. These artifact concentrations are recommended not eligible for listing in the NRHP.

Rock Feature Sites

Thirty of the prehistoric sites in the project area are rock feature sites. These sites consist of one or more rock features, usually with no associated artifacts. The majority of the rock features appear to be thermal features (earth ovens used for food preparation) and contain a mix of fire-altered and unaltered rock. The features vary greatly in size and integrity. Most intact features measure between 1 and 3 m in diameter and consist of between 20 and 50 pieces of rock. Most of the rock feature sites are deflated, and the rock features retain no integrity. SRI recommends these sites not eligible for listing in the NRHP, because they lack integrity and cannot address any research questions.

Four sites (SRI-3039, SRI-3237, SRI-4085, and SRI-7009), however, retain some integrity and are possibly eligible for listing in the NRHP under Criterion d, pending formal evaluation. Such sites may contain important datable materials that can answer chronological questions, as Eerkens and Rosenthal (2002) have demonstrated in the northern Mojave Desert, and they may also be able to provide important information related to questions of settlement and subsistence. Although the use of earth ovens is conventionally correlated with the baking of agave or other succulent species (Castetter 1935), the scale of these particular features suggests that they may have served for the baking of small-scale plants such as geophytes (Thoms 2009). Ethnographic literature indicates that bulbs, corms, tubers, or rhizomes were traditionally gathered and subsequently processed in small earth ovens (Havard 1895). Scholze (2010) has noted that, in northern California alone, 85 percent of 73 ethnographic sources make reference to root crops, suggesting subsistence reliance. Moreover, Anderson (1993), among others, has noted that some California tribes gathered edible bulbs, corms and even replanted cormlets, bulblets, and sections of root for future use (Anderson 1993). In the anthropological literature, these plants have often been reported as “Indian potatoes” or “root-crops” (Anderson 1997:150). One geophyte plant species in particular, desert lily, was identified as common within the current survey area (see Table 2.1) and is known to have been utilized ethnographically. Ethnographic information indicates the bulbs were eaten raw or baked in a pit oven pit by the Cahuilla (Bean and Saubel 1972:77) or eaten raw, baked, or boiled by the River Yumans (Castetter and Bell 1951:207). A geographical study of the Palo Verde Mesa noted that “during the spring months large fields of desert day lilies (*Hesperocallis undulata*) are to be found growing profusely in localized areas throughout the lower terrace” (Rumage 1956:40).

Overall, California is extremely rich in geophyte species, in comparison to the rest of the United States (Rundel 1996). Archaeobotanical investigations of earth-oven technology, as well as the study of prehistoric utilization of geophytes, are still in their infancy, and few sites have produced archaeological remains of geophytes. However, recent studies in central Texas have succeeded in developing pioneering methods for detecting archaeobotanical evidence of geophytes within earth ovens (Dering 2003). These newly introduced methods elevate the potential of these types of sites for future research, particularly for establishing links between hunter-gatherer lifestyles and settled agriculture. The gathering, replanting, and processing of wild-plant species, should this be demonstrable, may offer evidence as to why prehistoric peoples eventually adopted a sedentary lifestyle.

Rock Features with Artifact Scatters

These sites consist of one or more rock features with an associated artifact scatter. The diversity of artifacts and feature types among these sites imply that the site type was used for a variety of tasks and may indicate at least a temporary occupation. Of the 31 sites associated with this site type, 9 rock features with artifact scatter sites retain some level of integrity, and excavations at the sites may be able to address some of the research questions outlined in Chapter 3. Four of these sites, SRI-83, SRI-2021, SRI-6034, and P-33-001821, have several intact rock features. A large scatter of calcined bone that may be a human cremation is associated with P-33-001821, and SRI-6034 is the only site within the direct APE that yielded pieces of ground stone. SRI recommends these four sites eligible for listing for the NRHP under Criterion d, and in the case of P-33-001821, under Criteria a and b as well. Five other sites—SRI-17, SRI-1059, SRI-3019, SRI-4241, and SRI-6033—retain some integrity and are possibly eligible for listing in the NRHP, pending formal evaluation.

Trails

Three prehistoric trails were identified within the APE. The trails consist of narrow, linear features and were not associated with any artifact scatters. P-33-000343 and P-33-000772 were both previously recorded, and the current survey found them to be in generally the same condition as originally recorded. The third trail, SRI-3255, runs southwest–northeast though the direct APE. All three sites are recommended eligible for listing in the NRHP under Criterion d and possibly under Criteria a and b, depending on the results of tribal consultation by the BLM. Ethnographic studies based on literature review and interviews with tribal representatives have consistently noted that trails are important for both economic and spiritual reasons and were used well into the historical period (Bean and Vane 1978:6-54, 7-13–7-14; CSRI 1987:132–134).

Multicomponent Sites

All eight of the multicomponent sites within the direct APE are artifact concentrations. These sites contain a mix of prehistoric and historical-period artifacts. The prehistoric component of one of the larger multicomponent sites, P-33-019618, contains the largest number of flaked stone artifacts (primarily flakes and tested cobbles), has the potential to contain subsurface deposits, and may be able to address research questions. Therefore, SRI recommends P-33-019618 eligible for listing in the NRHP under Criterion d.

NRHP-Eligibility Summary

Four prehistoric rock feature with artifact scatter sites (P-33-001821, SRI-83, SRI-2021, and SRI-6034), three trail sites (P-33-000343, P-33-000772, and SRI-3255), and the prehistoric component only of one multicomponent artifact concentration site (P-33-019618) are recommended eligible for listing in the NRHP under Criterion d (Table 5.2). Because of their possible significance to tribes in the region, four of those sites (P-33-000343, P-33-000772, P-33-001821, and SRI-3255) may also be eligible under Criteria a and b, pending further consultation with the tribes by BLM. Nine additional sites, including 4 prehistoric rock feature sites (SRI-3039, SRI-3237, SRI-4085, and SRI-7009), and 5 prehistoric rock feature sites with

Table 5.2. Summary of NRHP-Eligible Sites and Recommendations

Primary No. (Trinomial)	SRI No.	Site Type	Age	NRHP Eligibility Recommendation and Criteria	Testing and Treatment Recommendations
P-33-000343 (CA-RIV-343T)	9003	trail	prehistoric	recommended eligible, Criterion d, possibly Criteria a or b	avoid; consult with tribes regarding Criteria a and b
P-33-000772 (CA-RIV-772T)	110	trail	prehistoric	recommended eligible, Criterion d, possibly Criteria a or b	avoid; consult with tribes regarding Criteria a and b
P-33-001821 (CA-RIV-1821)	8020	rock feature with artifact scatter	prehistoric	recommended eligible, Criterion d, possibly Criteria a or b	avoid; consult with tribes regarding Criteria a and b
P-33-019618 (CA-RIV-009935)	127	multicomponent artifact concentration	prehistoric component only	recommended eligible, Criterion d	avoid
P-33-024719 (CA-RIV-012240)	17	rock feature with artifact scatter	prehistoric	possibly eligible, Criterion d	conduct formal testing to evaluate NRHP eligibility
P-33-024283 (CA-RIV-011937)	83	rock feature with artifact scatter	prehistoric	recommended eligible, Criterion d	avoid
P-33-023456 (CA-RIV-011990)	1059	rock feature with artifact scatter	prehistoric	possibly eligible, Criterion d	conduct formal testing to evaluate NRHP eligibility
P-33-024361 (CA-RIV-011995)	2021	rock feature with artifact scatter	prehistoric	recommended eligible, Criterion d	avoid, if feasible, or conduct data recovery
P-33-024377 (CA-RIV-012011)	3019	rock feature with artifact scatter	prehistoric	possibly eligible, Criterion d	conduct formal testing to evaluate NRHP eligibility
P-33-024385 (CA-RIV-012019)	3039	rock feature	prehistoric	possibly eligible, Criterion d	conduct formal testing to evaluate NRHP eligibility
P-33-024393 (CA-RIV-012027)	3237	rock feature	prehistoric	possibly eligible, Criterion d	conduct formal testing to evaluate NRHP eligibility
P-33-024394 (CA-RIV-012028)	3255	trail	prehistoric	recommended eligible, Criterion d, possibly Criteria a or b	avoid; consult with tribes regarding Criteria a and b
P-33-024459 (CA-RIV-012091)	4085	rock feature	prehistoric	possibly eligible, Criterion d	conduct formal testing to evaluate NRHP eligibility
P-33-024476 (CA-RIV-012108)	4241	rock feature with artifact scatter	prehistoric	possibly eligible, Criterion d	conduct formal testing to evaluate NRHP eligibility
P-33-024496 (CA-RIV-012128)	6033	rock feature with artifact scatter	prehistoric	possibly eligible, Criterion d	conduct formal testing to evaluate NRHP eligibility
P-33-024497 (CA-RIV-012129)	6034	rock feature with artifact scatter	prehistoric	recommended eligible, Criterion d	avoid, if feasible, or conduct data recovery
P-33-024511 (CA-RIV-012143)	7009	rock feature	prehistoric	possibly eligible, Criterion d	conduct formal testing to evaluate NRHP eligibility

Key: NRHP = National Register of Historic Places; SRI = Statistical Research, Inc.

artifact scatters (SRI-17, SRI-1059, SRI-3019, SRI-4241, and SRI-6033), are possibly eligible for listing in the NRHP, but additional research is needed (see Table 5.2; Appendix B). No sites recommended NRHP eligible are located in the 160-acre private parcel located within the APE. Figure C.27 shows the location of the eligible and possibly eligible sites within the project area, as well as the relationship superimposed on the map of the proposed DQSP facility (solar arrays, fence lines, etc.).

None of the sites within the direct APE appear to be eligible for listing in the NRHP as contributors to a district. Two previously recorded sites within the indirect APE, however, are listed in the NRHP as the Mule Tank Discontiguous Rock Art District.

Management Recommendations

Results from the archaeological survey have yielded a wealth of information that demonstrates the rich and diverse cultural landscape within the project area. This section provides management recommendations for mitigating adverse effects to cultural resources within the direct APE and within the viewshed of the project area, as well as addresses the results of the buried-site-sensitivity model presented in Chapter 4 (see Table 5.2).

Recommended Eligible Sites

As previously mentioned, four prehistoric rock feature with artifact scatter sites (P-33-001821, SRI-83, SRI-2021, and SRI-6034) and the prehistoric component of one multicomponent site (P-33-019618) are recommended eligible for listing in the NRHP under Criterion d, and in the case of P-33-001821, possibly under Criteria a and b. To lessen adverse effects to these five cultural resources, the area where these sites are located should be avoided, along with a buffer area of at least 30 m. If avoidance of these areas is not practical, archaeological data recovery and/or mitigative treatment should occur within portions of the sites that will be affected by development of the DQSP to confirm the potential data yield of the sites, as well as recover any data that may address research questions pertaining to prehistoric themes, such as settlement and subsistence, presented in Chapter 3.

The three prehistoric trails (P-33-000343, P-33-000772, and SRI-3255) are related to prehistoric trade networks and, in the case of P-33-000343 and P-33-000772, which extend to the Mule Tank Discontiguous Rock Art District (P-33-000773) outside of the project area, the overall ceremonial landscape of the region. For these sites, further investigation is recommended to trace the trail alignments on high-resolution aerial photographs and examine them carefully on the ground to document them more completely using GPS and digital photography. Decisions regarding their ultimate determinations of NRHP eligibility and treatment should be based on the results of tribal consultation by the BLM.

Possibly Eligible Sites

Nine prehistoric sites were identified as being possibly eligible for listing in the NRHP because of overall site integrity and their potential for providing information that may help address the research questions presented in Chapter 3. As with the recommended eligible sites, these sites should be avoided to lessen adverse effects to these resources during construction of the DQSP; if avoidance is not practical, then appropriate mitigative treatments should be implemented. For the four prehistoric rock feature sites (SRI-3039, SRI-3237, SRI-4085, and SRI-7009) and five prehistoric rock feature sites with artifact scatters (SRI-17, SRI-1059, SRI-3019, SRI-4241, and SRI-6033), testing and/or data recovery of the sites to confirm eligibility and to capture any information that may help address research questions is warranted.

Additional Testing of Rock Feature Sites

Fire-affected rock features are one of the more common features within the direct APE as well as within the landscape in the vicinity of the project (Jordan and Tennyson 2011; Keller 2010). Many of the rock features associated with the sites within the direct APE appear deflated or scattered. Those with observable good integrity are indicated above as recommended eligible or possibly eligible for listing in the NRHP. Usually for sites recommended not eligible, no additional testing or mitigative treatments are recommended. However, many of these features are located in areas associated with the Orita and Rositas soil series, where there is a high potential for buried resources (see Chapter 4). Additional testing is recommended at a sample of these sites to confirm their scattered and surficial nature, as well as provide comparative information for the intact sites where testing and data recovery will occur.

Mule Tank Discontiguous Rock Art District Viewshed

Although located within the indirect APE and more than 1 mile from the direct APE, the Mule Tank Discontiguous Rock Art District (P-33-000504 and P-33-000773) is located at a higher elevation and looks out over the project area. P-33-000504 is the petroglyph locus within the district, and P-33-000773 is the geoglyph/intaglio component. These sites are listed in the NRHP and were recommended eligible, based on Criteria c and d. Therefore, any visual adverse effect the DQSP may have on the viewshed of the district must be addressed and mitigated. Using geographic information system data and aerial photography of the area, the viewshed of the district will be identified. If the DQSP area is found to create a visual adverse effect, mitigation of the adverse effect in the form of an intensive and detailed site update involving recordation of the geoglyphs and petroglyphs within the site should occur.

Buried-Site Sensitivity

The buried-site sensitivity model (see Chapter 4) identifies the Orita and Rositas soil series as having high potential for buried archaeological resources at depths of up to 150 cm or more below the ground surface. These two soils cover a southwest–northeast swath through the central portion of the direct APE as well in the northern portion of the direct APE and along the gen-tie corridor. Smaller pockets of the soils are also located in the southern, eastern, and northeastern portion of the project area. Because of the sensitivity of these areas and the unknown nature of the subsurface deposits, test excavation and trenching is recommended to confirm the potential depths where buried resources may be present, especially along the gen-tie corridor and in the smaller pockets where fewer surface discoveries were made. Furthermore, although archaeological monitoring is recommended for the entirety of the direct APE, earthmoving activities in areas associated with the Orita and Rositas soil series are particularly sensitive and should especially be monitored.

APPENDIX A

Soil Descriptions

(Source: https://soilseries.sc.egov.usda.gov/osdname.asp, accessed)
Note: Values in English units of measurement are those in the original soil-series description.

Aco Series

The Aco series consists of very deep, well-drained to somewhat excessively drained soils that formed in mixed alluvium on terraces slightly above the floodplain. Slopes are 0–8 percent. The mean annual precipitation is approximately 4 inches, and the mean annual air temperature is approximately 72°F.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, hyperthermic Typic Haplocalcids

TYPICAL PEDON: Aco sandy loam—native shrubs. (Colors are for dry soil unless otherwise noted.) Surface pavements of very coarse sand and gravel up to 3 inches in diameter. Some pebbles have weak desert varnish, and some are embedded to $^1/_2$ inch into the soil surface.

A1: 0–3 inches; pinkish gray (7.5YR 7/2) sandy loam, brown (7.5YR 5/4) moist; strong fine medium, thick and very thick platy structure; slightly hard, very friable, nonsticky, nonplastic; few fine roots; many very fine discontinuous vesicular pores; few colloidal coatings on sand grains; slightly effervescent; moderately alkaline (pH 8.4); clear wavy boundary. (2–5 inches thick)

Bk1: 3–18 inches; Light brown (7.5YR 6/4) coarse sandy loam, strong brown (7.5YR 5/6) moist; massive; soft, very friable, nonsticky, nonplastic; few very fine and medium roots; few very fine open vesicular pores in upper portion of horizon and common very fine tubular pores throughout; few colloidal coatings and stains on mineral grains; violently effervescent with approximately 7 percent by volume of medium to large, irregular lime concretions; moderately alkaline (pH 8.2); diffuse irregular boundary. (12–18 inches thick)

Bk2: 18–46 inches; light brown (7.5YR 6/4) sandy loam, brown (7.5YR 5/4) moist; massive; slightly hard, very friable, slightly sticky, nonplastic; common very fine pores; few colloidal coatings and stains on mineral grains; violently effervescent with approximately 9 percent by volume of medium to large, irregular lime concretions; moderately alkaline (pH 8.2); gradual wavy boundary. (26–30 inches thick)

C: 46–60 inches; very pale brown (10YR 7/4) fine sand, light yellowish brown (10YR 6/4) moist; single grained; loose; violently effervescent, lime on bottoms of some rock fragments near top of the horizon; moderately alkaline (pH 8.0).

TYPE LOCATION: Riverside County, California; approximately 1,180 feet south and 335 feet west of monument in northeast corner of Section 2, Township 6 South, Range 22 East.

GEOGRAPHIC SETTING: Aco soils are on terraces slightly above the floodplain at elevations of 30 to approximately 1,000 feet. Slopes are less than 8 percent and usually less than 2 percent. The soils formed in relatively young coarse- and moderately coarse-textured alluvium from a wide variety of rocks. The climate is arid with an average annual precipitation of approximately 4 inches that occurs as gentle winter rains or as erratic, high-intensity summer storms. The average July temperature is approximately 92°F, the average January temperature is approximately 53°F, and the mean annual temperature is approximately 72°F. The frost-free season is approximately 290 days.

Chuckawalla Series

The Chuckawalla series consists of very deep, well-drained soils formed in stratified mixed alluvium. Chuckawalla soils are on fan terraces and have slopes of 0–15 percent. The mean annual precipitation is 4 inches, and the mean annual air temperature is 73°F.

TAXONOMIC CLASS: Loamy-skeletal, mixed, superactive, hyperthermic Typic Calciargids

TYPICAL PEDON: Chuckawalla very gravelly silt loam—rangeland. (Colors are for dry soil unless otherwise noted). Surface pavement of closely fitted subangular and rounded gravels that are 0.5–3 inches in diameter and have strong desert varnish on exposed surfaces. (0.5–1.5 inches thick)

E: 0–1.375 inches; pale brown (10YR 6/3) silt loam, brown (10YR 5/3) moist; weak thick platy structure; soft, very friable, slightly sticky and slightly plastic; many very fine and medium vesicular pores; slightly effervescent on tops of plates, strongly effervescent on sides and bottoms; moderately alkaline (pH 8.2); abrupt wavy boundary. ($^{1}/_{4}$–$1^{1}/_{2}$ inches thick)

BAt: 1.375–2.5 inches; light brown (7.5YR 6/4) gravelly silty clay loam, brown (7.5YR 4/4) moist; weak very thick platy structure parting to weak fine and medium subangular blocky; slightly hard, friable, sticky and plastic; many very fine, fine, and medium vesicular pores; few faint clay films in pores; clean silt grains on peds; 15 percent gravel; strongly effervescent; strongly alkaline (pH 8.6); clear smooth boundary. (0–3 inches thick)

Bt: 2.5–4 inches; light reddish brown (5YR 6/4) gravelly silty clay loam, reddish brown (5YR 4/4) moist; weak and moderate medium angular blocky and weak fine prismatic structure; slightly hard, friable, moderately sticky and moderately plastic; common very fine, fine, and medium vesicular pores; few faint clay films in pores; clean silt grains on peds; 15 percent gravel; strongly effervescent; strongly alkaline (pH 8.6); clear smooth boundary. (0–3 inches thick)

Btk1: 4–7 inches; light reddish brown (5YR 6/4) gravelly silty clay loam, yellowish red (5YR 5/6) moist; weak fine subangular blocky structure parting to granular; soft, very friable, moderately sticky and moderately plastic; many very fine irregular pores; 25 percent gravel; colloidal staining on sand grains, few calcium carbonate–coated sand grains and rounded calcium carbonate nodules; violently effervescent; moderately alkaline (pH 8.4); clear wavy boundary. (1–4 inches thick)

2Btk2: 7–16 inches; reddish yellow (7.5YR 6/6) extremely gravelly clay loam, strong brown (7.5YR 5/6) moist; massive; soft, very friable, moderately sticky and moderately plastic; many very fine irregular pores; 70 percent gravel; colloidal staining on sand grains; strongly effervescent in matrix; violently effervescent on bottoms of gravel; strongly alkaline (pH 8.6). (4–10 inches thick)

2Ck: 16–60 inches; light brown (7.5YR 6/4) stratified extremely cobbly fine sandy loam, brown (7.5YR 5/4) moist; massive; many fine and medium irregular pores; 80 percent gravel and cobble; thick calcium carbonate coating on bottoms and sides of rock fragments; moderately alkaline (pH 8.4); weakly cemented in some parts.

TYPE LOCATION: Riverside County, California; on jeep trail north of Palo Verde Valley; approximately 525 feet south and 300 feet east of the W 1/4 corner of Section 24, Township 5 South, Range 23 East; 33° 43′ 35″ north latitude, 114° 32′ 16″ west longitude.

GEOGRAPHIC SETTING: Chuckawalla soils are on fan terraces. Slopes are 0–15 percent. The soils formed in stratified mixed gravelly alluvium. They typically have a well-developed desert pavement with a thick varnish (patina). The climate is arid with very hot, dry summers and cool, slightly moist winters. Mean annual precipitation is 2–7 inches. Most storms occur in the winter months, but some rainfall occurs as erratic, high-intensity summer thundershowers. There are also occasional severe wind and dust storms. Elevation ranges from 400 to 1,800 feet. Mean January temperature is 53°F; mean July temperature is 92°F; mean annual air temperature is 70°F–74°F. Frost-free period is 240–350 days.

Carrizo Series

The Carrizo series consists of very deep, excessively drained soils formed in mixed igneous alluvium. Carrizo soils are on numerous landforms on floodplains, fan piedmonts, and bolson floors. Slopes range from 0 to 15 percent. The mean annual precipitation is approximately 100 mm (4 inches), and the mean annual air temperature is approximately 21.5°C (71°F).

TAXONOMIC CLASS: Sandy-skeletal, mixed, hyperthermic Typic Torriorthents

TYPICAL PEDON: Carrizo extremely gravelly sand—rangeland and wildlife habitat. (Colors are for dry soil unless otherwise noted.) The soil surface is covered by approximately 70 percent gravel, 6 percent cobbles, and 4 percent stones.

A: 0–5 cm (0–2 inches); pale brown (10YR 6/3) extremely gravelly sand, brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common very fine interstitial pores; 55 percent gravel, 6 percent cobbles, and 4 percent stones; slightly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary. (2.5–10 cm thick)

C: 5–152 cm (2–60 inches); pale brown (10YR 6/3) stratified extremely gravelly and very gravelly coarse sand, brown (10YR 4/3) moist; massive to single grain; soft, slightly hard, or loose, very friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine and few fine and medium interstitial pores; averages 55 percent gravel, 10 percent cobbles, and 5 percent stones; very slightly effervescent and slightly effervescent; moderately alkaline (pH 8.4) and slightly alkaline (pH 7.8).

TYPE LOCATION: San Bernardino County, California; approximately 18.5 km (11.5 miles) southwest of Amboy; approximately 610 m (2,000 feet) south and 305 m (1,000 feet) west of the northeast corner of Section 18, Township 4 North, Range 11 East, San Bernardino Base and Meridian; U.S. Geological Survey Lead Mountain Northeast, California, 7.5-minute topographic quadrangle; 34° 26′ 11.1″ north latitude, 115° 51′ 47.8″ west longitude; Universal Transverse Mercator (UTM) 11S, 0604440E 3810938N (Digital Terrain Model: North American Datum 1983 [NAD83]).

GEOGRAPHIC SETTING: Carrizo soils are on numerous landforms on floodplains, fan piedmonts, and bolson floors. Slopes range from 0 to 15 percent. The soils formed in mixed igneous alluvium. Elevations are -82–793 m (-270–2,600 feet). The climate is arid with hot, dry summers and warm, moist winters. Precipitation is greatest in the winter with a lesser secondary peak in the summer. The mean annual precipitation is 75–175 mm (3–7 inches); mean January temperature is 12°C (53°F); mean July temperature is 35°C (95°F); mean annual air temperature is 20°C–23°C (68°F–73.5°F); the frost-free season is 300–340 days.

Orita Series

The Orita series consists of very deep, well-drained soils that formed in alluvium from mixed sources. Orita soils are on fan remnants and terraces. Slopes are 0–2 percent. The mean annual precipitation is approximately 4 inches, and the mean annual air temperature is approximately 72°F.

TAXONOMIC CLASS: Fine-loamy, mixed, superactive, hyperthermic Typic Haplargids

TYPICAL PEDON: Orita gravelly fine sandy loam—desert. (Colors are for dry soil unless otherwise noted.) The soil surface is covered with a continuous pavement of fine gravel of leucogranite and some schist and quartz; some gravel is weakly varnished by dark coatings, some by calcium carbonate.

C1: 0–4 inches; light brown (7.5YR 6/4) gravelly fine sandy loam, brown (7.5YR 4/4) moist; moderate and strong thick platy structure; soft, very friable; few fine roots; many very fine vesicular pores; approximately 15 percent gravel; slightly effervescent, lime disseminated; moderately alkaline (pH 8.2); clear smooth boundary. (3–12 inches thick)

C2: 4–10 inches; light brown (7.5YR 6/4) gravelly sand, brown (7.5YR 5/4) moist; weak and moderate thick platy structure; soft, loose; few fine roots; many very fine pores; approximately 25 percent gravel; slightly effervescent, lime disseminated; moderately alkaline (pH 8.2); abrupt smooth boundary. (0–6 inches thick)

2A: 10–22 inches; brown (7.5YR 5/4) fine sandy loam, dark brown (7.5YR 4/4) moist; massive; slightly hard, very friable, slightly sticky; few fine roots to 18 inches; many very fine tubular pores; strongly effervescent, fine lime mycelia; moderately alkaline (pH 8.2); gradual smooth boundary. (10–15 inches thick)

2Bt: 22–42 inches; reddish yellow (5YR 6/6) gravelly clay loam, yellowish red (5YR 4/6) moist; massive; hard, friable, sticky, plastic; many very fine and fine tubular pores; approximately 15 percent gravel; thin clay films line a few pores; strongly and violently effervescent; fine and medium soft bodies of lime; moderately alkaline (pH 8.2); gradual irregular boundary. (10–20 inches thick)

2Btk1: 42–60 inches; light reddish brown (5YR 6/4) gravelly clay loam, reddish brown (5YR 4/4) moist; massive; hard, friable, sticky, plastic; many very fine and fine tubular pores; 20 percent gravel; clay bridges between mineral grains; common stains on mineral grains; strongly and violently effervescent; lime segregated into medium and large soft bodies and concretions; moderately alkaline (pH 8.2); gradual irregular boundary. (6–10 inches thick)

2Btk2: 60–68 inches; reddish yellow (5YR 7/6) gravelly clay loam, yellowish red (5YR 4/6) moist; massive; slightly hard, very friable, sticky, slightly plastic; many very fine and fine tubular pores; approximately 25 percent gravel; clay bridges and coatings on mineral grains; strongly and violently effervescent; lime in fine concretions and soft bodies; moderately alkaline (pH 8.2); clear smooth boundary. (0–10 inches thick)

2C: 68–80 inches; light brown (7.5YR 6/4) gravelly fine sandy loam, brown (7.5YR 5/4) moist; massive; soft, very friable; many fine and very fine pores; approximately 40 percent gravel; few dark coats on mineral grains; strongly effervescent in matrix, violently effervescent on carbonate-coated gravel; moderately alkaline (pH 8.2).

TYPE LOCATION: Riverside County, California; approximately 7 miles west and 5 miles north of Blythe; approximately 55 feet west and 5 feet north of brass-capped monument at southeast corner of Section 36, Township 5 South, Range 21 East; 33° 41′ 24″ north latitude, 114° 43′ 41″ west longitude; UTM Zone 11 710567E and 3730099N (NAD83).

GEOGRAPHIC SETTING: The Orita soils are on fan remnants and terraces at elevations of 300–1,600 feet. Slopes are 0–2 percent. The soils formed in somewhat stratified and gravelly alluvium derived from many kinds of rock. The climate is arid. Mean annual precipitation is approximately 3–5 inches. The average January temperature is approximately 53°F, the average July temperature is approximately 90°F, and the average annual temperature is 70°F–73°F. The frost-free season is approximately 270–360 days.

Rositas Series

The Rositas series consists of very deep, somewhat excessively drained soils formed in sandy aeolian material. Rositas soils are on dunes and sand sheets. Slope ranges from 0 to 30 percent with hummocky or dune microrelief. Mean annual precipitation is approximately 4 inches, and the mean annual air temperature is approximately 72°F.

TAXONOMIC CLASS: Mixed, hyperthermic Typic Torripsamments

TYPICAL PEDON: Rositas fine sand—rangeland and wildlife habitat. (Colors are for dry soil unless otherwise noted.)

C1: 0–9 inches; reddish yellow (7.5YR 7/6) fine sand, strong brown (7.5YR 5/6) moist; single grained; loose, nonsticky and nonplastic; common fine and medium roots; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary. (4–10 inches thick)

C2: 9–60 inches; reddish yellow (7.5YR 7/6) fine sand, strong brown (7.5YR 5/6) moist; single grained; loose, nonsticky and nonplastic; few fine roots; strongly effervescent; moderately alkaline (pH 8.0).

TYPE LOCATION: Imperial County, California; approximately 17 miles east of Holtville; approximately 4,000 feet west and 300 feet south of the main entrance to Imperial Irrigation District, Experiment Farm No. 2; northwest 1/4 of Section 5, Township 17 South, Range 19 East.

GEOGRAPHIC SETTING: Rositas soils are on dunes and sand sheets. Slope ranges from 0 to 30 percent. These soils formed in sandy aeolian material. Elevations are 270 feet below sea level to 2,000 feet. The climate is low-latitude desert, with mild winters and very hot summers. Precipitation is greatest in the winter with a lesser secondary peak in the summer. The mean annual precipitation is 0–8 inches. The mean January temperature is approximately 53°F, mean July temperature is 92°F, and the mean annual air temperature is 70°F–77°F. The frost-free period is approximately 250–365 days.

APPENDIX B

Site Evaluations and NRHP Eligibility

Site No.	Age	Site Type	NRHP Eligibility
P-33-000343	prehistoric	trail	eligible
P-33-000772	prehistoric	trail	eligible
P-33-001821	prehistoric	features with artifact concentration	eligible
P-33-002795	prehistoric	lithic scatter	not eligible
P-33-002796	prehistoric	lithic scatter	not eligible
P-33-008133	prehistoric	lithic scatter	not eligible
P-33-008134	prehistoric	ceramic scatter	not eligible
P-33-013660	prehistoric	features with artifact concentration	not eligible
P-33-014147	historical period	military activity	not eligible
P-33-014151	prehistoric	ceramic scatter	not eligible
P-33-014173	historical period	road	not eligible
P-33-014198	historical period	artifact concentration	not eligible
P-33-014199	historical period	road/trail	not eligible
P-33-017317	prehistoric	lithic scatter	not eligible
P-33-017328	historical period	trail	not eligible
P-33-018675	historical period	artifact concentration	not eligible
P-33-018852	historical period	artifact concentration	not eligible
P-33-018853	historical period	artifact concentration	not eligible
P-33-018916	historical period	artifact concentration	not eligible
P-33-019021	prehistoric	lithic scatter	not eligible
P-33-019618	multicomponent	artifact concentration/lithic scatter	eligible
P-33-019733	prehistoric	lithic scatter	not eligible
P-33-019734	historical period	artifact concentration/lithic scatter	not eligible
P-33-019735	prehistoric	lithic scatter	not eligible
P-33-019736	historical period	artifact concentration	not eligible
P-33-019739	prehistoric	lithic scatter	not eligible
P-33-019740	historical period	artifact concentration	not eligible
P-33-019741	historical period	artifact concentration	not eligible
P-33-019742	historical period	artifact concentration	not eligible
P-33-019743	historical period	artifact concentration	not eligible
P-33-021132	historical period	artifact concentration	not eligible
P-33-021264	historical period	military activity	not eligible
SRI-2	historical period	artifact concentration	not eligible
SRI-3	historical period	artifact concentration	not eligible
SRI-7	historical period	artifact concentration	not eligible
SRI-9	historical period	artifact concentration	not eligible
SRI-17	prehistoric	features with artifact concentration	possibly eligible
SRI-18	historical period	artifact concentration	not eligible
SRI-19	historical period	artifact concentration	not eligible
SRI-21	historical period	artifact concentration	not eligible

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Site No.	Age	Site Type	NRHP Eligibility
SRI-25	historical period	artifact concentration	not eligible
SRI-26	historical period	artifact concentration	not eligible
SRI-27	historical period	artifact concentration	not eligible
SRI-29	prehistoric	rock features	not eligible
SRI-36	historical period	artifact concentration	not eligible
SRI-42	historical period	water well site	not eligible
SRI-52	prehistoric	ceramic scatter	not eligible
SRI-58	prehistoric	rock features	not eligible
SRI-61	prehistoric	rock features	not eligible
SRI-63	historical period	artifact concentration	not eligible
SRI-65	prehistoric	features with artifact concentration	not eligible
SRI-69	historical period	artifact concentration	not eligible
SRI-71	multicomponent	artifact concentration	not eligible
SRI-75	prehistoric	rock features	not eligible
SRI-81	historical period	artifact concentration	not eligible
SRI-83	prehistoric	features with artifact concentration	eligible
SRI-96	historical period	road/trail	not eligible
SRI-119	historical period	military activity	not eligible
SRI-120	historical period	artifact concentration	not eligible
SRI-121	historical period	road/trail	not eligible
SRI-122	historical period	road/trail	not eligible
SRI-124	prehistoric	features with artifact concentration	not eligible
SRI-125	historical period	artifact concentration	not eligible
SRI-129	historical period	road/trail	not eligible
SRI-132	historical period	artifact concentration	not eligible
SRI-133	prehistoric	features with artifact concentration	not eligible
SRI-134	prehistoric	features with artifact concentration	not eligible
SRI-137	historical period	artifact concentration	not eligible
SRI-138	historical period	artifact concentration	not eligible
SRI-147	historical period	artifact concentration	not eligible
SRI-1001	historical period	artifact concentration	not eligible
SRI-1009	historical period	artifact concentration	not eligible
SRI-1011	historical period	artifact concentration	not eligible
SRI-1014	prehistoric	features with artifact concentration	not eligible
SRI-1021	historical period	artifact concentration	not eligible
SRI-1024	historical period	artifact concentration	not eligible
SRI-1025	prehistoric	rock features	not eligible
SRI-1035	historical period	artifact concentration	not eligible
SRI-1037	historical period	artifact concentration	not eligible
SRI-1043	prehistoric	rock features	not eligible
SRI-1049	historical period	artifact concentration	not eligible

Site No.	Age	Site Type	NRHP Eligibility
SRI-1053	prehistoric	features with artifact concentration	not eligible
SRI-1056	historical period	artifact concentration	not eligible
SRI-1058	prehistoric	features with artifact concentration	not eligible
SRI-1059	prehistoric	features with artifact concentration	possibly eligible
SRI-1061	prehistoric	ceramic scatter	not eligible
SRI-1070	historical period	artifact concentration	not eligible
SRI-1076	historical period	artifact concentration	not eligible
SRI-2001	historical period	artifact concentration	not eligible
SRI-2007	historical period	artifact concentration	not eligible
SRI-2008	historical period	artifact concentration	not eligible
SRI-2009	historical period	artifact concentration	not eligible
SRI-2014	historical period	artifact concentration	not eligible
SRI-2017	historical period	artifact concentration	not eligible
SRI-2021	prehistoric	features with artifact concentration	eligible
SRI-2023	historical period	artifact concentration	not eligible
SRI-2029	historical period	artifact concentration	not eligible
SRI-2030	historical period	artifact concentration	not eligible
SRI-2034	prehistoric	rock features	not eligible
SRI-2035	historical period	artifact concentration	not eligible
SRI-2042	prehistoric	lithic scatter	not eligible
SRI-2051	historical period	road/trail	not eligible
SRI-2066	historical period	artifact concentration	not eligible
SRI-2067	historical period	artifact concentration	not eligible
SRI-2068	multicomponent	artifact concentration/ceramic scatter	not eligible
SRI-2082	historical period	artifact concentration	not eligible
SRI-2088	historical period	artifact concentration	not eligible
SRI-2094	historical period	artifact concentration	not eligible
SRI-2098	historical period	artifact concentration	not eligible
SRI-2100	historical period	artifact concentration	not eligible
SRI-2128	historical period	artifact concentration	not eligible
SRI-2135	historical period	military activity	not eligible
SRI-2136	prehistoric	ceramic scatter	not eligible
SRI-2329	prehistoric	features with artifact concentration	not eligible
SRI-2333	historical period	Road/trail	not eligible
SRI-2582	historical period	artifact concentration	not eligible
SRI-3007	historical period	artifact concentration	not eligible
SRI-3010	historical period	artifact concentration	not eligible
SRI-3014	historical period	artifact concentration	not eligible
SRI-3015	multicomponent	artifact concentration	not eligible
SRI-3017	prehistoric	rock features	not eligible

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Site No.	Age	Site Type	NRHP Eligibility
SRI-3019	prehistoric	features with artifact concentration	possibly eligible
SRI-3020	historical period	artifact concentration	not eligible
SRI-3022	prehistoric	rock features	not eligible
SRI-3027	historical period	artifact concentration	not eligible
SRI-3029	historical period	artifact concentration	not eligible
SRI-3031	historical period	artifact concentration	not eligible
SRI-3037	historical period	artifact concentration	not eligible
SRI-3038	historical period	artifact concentration	not eligible
SRI-3039	prehistoric	rock features	possibly eligible
SRI-3040	prehistoric	features with artifact concentration	not eligible
SRI-3041	prehistoric	features with artifact concentration	not eligible
SRI-3042	prehistoric	features with artifact concentration	not eligible
SRI-3045	prehistoric	rock features	not eligible
SRI-3047	prehistoric	rock features	not eligible
SRI-3054	historical period	military activity	not eligible
SRI-3057	prehistoric	lithic scatter	not eligible
SRI-3059	prehistoric	ceramic scatter	not eligible
SRI-3078	historical period	artifact concentration	not eligible
SRI-3101	prehistoric	features with artifact concentration	not eligible
SRI-3103	historical period	artifact concentration	not eligible
SRI-3108	historical period	artifact concentration	not eligible
SRI-3115	historical period	artifact concentration	not eligible
SRI-3116	historical period	artifact concentration	not eligible
SRI-3117	historical period	artifact concentration	not eligible
SRI-3119	historical period	artifact concentration	not eligible
SRI-3123	historical period	artifact concentration	not eligible
SRI-3124	historical period	artifact concentration	not eligible
SRI-3127	historical period	artifact concentration	not eligible
SRI-3135	prehistoric	lithic scatter	not eligible
SRI-3147	prehistoric	lithic scatter	not eligible
SRI-3155	historical period	artifact concentration	not eligible
SRI-3156	historical period	artifact concentration	not eligible
SRI-3158	historical period	artifact concentration	not eligible
SRI-3175	prehistoric	rock features	not eligible
SRI-3186	prehistoric	ceramic scatter	not eligible
SRI-3205	prehistoric	rock features	not eligible
SRI-3211	prehistoric	rock features	not eligible
SRI-3224	prehistoric	rock features	not eligible
SRI-3228	prehistoric	ceramic scatter	not eligible
SRI-3237	prehistoric	rock features	possibly eligible
SRI-3255	prehistoric	trail	eligible

Site No.	Age	Site Type	NRHP Eligibility
SRI-3256	historical period	artifact concentration	not eligible
SRI-3260	multicomponent	artifact concentration/ceramic scatter	not eligible
SRI-3306	prehistoric	lithic scatter	not eligible
SRI-3331	prehistoric	rock features	not eligible
SRI-3487	prehistoric	rock features	not eligible
SRI-4004	historical period	artifact concentration	not eligible
SRI-4005	historical period	artifact concentration	not eligible
SRI-4014	prehistoric	rock features	not eligible
SRI-4016	prehistoric	features with artifact concentration	not eligible
SRI-4017	multicomponent	artifact concentration/rock features	not eligible
SRI-4019	historical period	artifact concentration	not eligible
SRI-4024	prehistoric	lithic scatter	not eligible
SRI-4028	historical period	artifact concentration	not eligible
SRI-4034	historical period	artifact concentration	not eligible
SRI-4041	historical period	artifact concentration	not eligible
SRI-4045	historical period	artifact concentration	not eligible
SRI-4054	prehistoric	rock features	not eligible
SRI-4056	prehistoric	features with artifact concentration	not eligible
SRI-4060	multicomponent	artifact concentration/lithic scatter	not eligible
SRI-4063	prehistoric	rock features	not eligible
SRI-4078	prehistoric	ceramic scatter	not eligible
SRI-4079	prehistoric	rock features	not eligible
SRI-4080	historical period	artifact concentration	not eligible
SRI-4084	prehistoric	features with artifact concentration	not eligible
SRI-4085	prehistoric	rock features	possibly eligible
SRI-4098	historical period	artifact concentration	not eligible
SRI-4116	historical period	artifact concentration	not eligible
SRI-4127	historical period	artifact concentration	not eligible
SRI-4145	historical period	artifact concentration	not eligible
SRI-4151	historical period	artifact concentration	not eligible
SRI-4160	historical period	artifact concentration	not eligible
SRI-4162	historical period	military activity	not eligible
SRI-4167	historical period	artifact concentration	not eligible
SRI-4175	historical period	artifact concentration	not eligible
SRI-4178	historical period	artifact concentration	not eligible
SRI-4180	historical period	military activity	not eligible
SRI-4182	historical period	artifact concentration	not eligible
SRI-4185	historical period	artifact concentration	not eligible
SRI-4186	historical period	artifact concentration	not eligible
SRI-4191	historical period	artifact concentration	not eligible

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Site No.	Age	Site Type	NRHP Eligibility
SRI-4196	historical period	artifact concentration	not eligible
SRI-4208	historical period	artifact concentration	not eligible
SRI-4217	historical period	artifact concentration	not eligible
SRI-4222	historical period	artifact concentration	not eligible
SRI-4229	historical period	artifact concentration	not eligible
SRI-4231	historical period	artifact concentration	not eligible
SRI-4235	historical period	artifact concentration	not eligible
SRI-4236	historical period	artifact concentration	not eligible
SRI-4241	prehistoric	features with artifact concentration	possibly eligible
SRI-4242	historical period	artifact concentration	not eligible
SRI-4248	historical period	artifact concentration	not eligible
SRI-4250	historical period	artifact concentration	not eligible
SRI-5000	historical period	artifact concentration	not eligible
SRI-5003	historical period	artifact concentration	not eligible
SRI-5006	historical period	artifact concentration	not eligible
SRI-5008	historical period	artifact concentration	not eligible
SRI-5029	historical period	artifact concentration	not eligible
SRI-5034	prehistoric	rock features	not eligible
SRI-5035	historical period	artifact concentration	not eligible
SRI-5054	prehistoric	rock features	not eligible
SRI-5063	historical period	survey marker	not eligible
SRI-5067	prehistoric	features with artifact concentration	not eligible
SRI-5070	historical period	artifact concentration	not eligible
SRI-5073	historical period	artifact concentration	not eligible
SRI-5076	historical period	artifact concentration	not eligible
SRI-5083	historical period	artifact concentration	not eligible
SRI-5087	historical period	artifact concentration	not eligible
SRI-5099	historical period	artifact concentration	not eligible
SRI-5106	multicomponent	artifact concentration	not eligible
SRI-5132	historical period	artifact concentration	not eligible
SRI-5135	historical period	artifact concentration	not eligible
SRI-6003	historical period	artifact concentration	not eligible
SRI-6005	historical period	artifact concentration	not eligible
SRI-6011	historical period	artifact concentration	not eligible
SRI-6017	historical period	artifact concentration	not eligible
SRI-6018	historical period	artifact concentration	not eligible
SRI-6021	historical period	artifact concentration	not eligible
SRI-6022	historical period	artifact concentration	not eligible
SRI-6023	prehistoric	features with artifact concentration	not eligible
SRI-6033	prehistoric	features with artifact concentration	possibly eligible
SRI-6034	prehistoric	features with artifact concentration	eligible

Site No.	Age	Site Type	NRHP Eligibility
SRI-6046	historical period	artifact concentration	not eligible
SRI-6053	historical period	artifact concentration	not eligible
SRI-6059	historical period	artifact concentration	not eligible
SRI-6075	historical period	artifact concentration	not eligible
SRI-6081	historical period	artifact concentration	not eligible
SRI-6087	historical period	artifact concentration	not eligible
SRI-6096	historical period	artifact concentration	not eligible
SRI-6100	historical period	artifact concentration	not eligible
SRI-6104	historical period	artifact concentration	not eligible
SRI-6114	historical period	artifact concentration	not eligible
SRI-6115	historical period	artifact concentration	not eligible
SRI-6119	historical period	artifact concentration	not eligible
SRI-6471	prehistoric	rock features	not eligible
SRI-6491	prehistoric	lithic scatter	not eligible
SRI-7008	prehistoric	features with artifact concentration	not eligible
SRI-7009	prehistoric	rock features	possibly eligible
SRI-7010	prehistoric	features with artifact concentration	not eligible
SRI-7018	historical period	artifact concentration	not eligible
SRI-7019	prehistoric	lithic scatter	not eligible
SRI-7020	historical period	artifact concentration	not eligible
SRI-7024	historical period	artifact concentration	not eligible
SRI-7029	prehistoric	rock features	not eligible
SRI-7031	prehistoric	features with artifact concentration	not eligible
SRI-7040	prehistoric	rock features	not eligible
SRI-7060	historical period	artifact concentration	not eligible
SRI-7065	historical period	artifact concentration	not eligible
SRI-7066	prehistoric	features with artifact concentration	not eligible
SRI-7072	historical period	artifact concentration	not eligible
SRI-7074	historical period	artifact concentration	not eligible
SRI-7076	historical period	military activity	not eligible
SRI-7087	historical period	military activity	not eligible
SRI-8085	historical period	survey marker	not eligible
SRI-9016	historical period	water-well site	not eligible
SRI-9018	historical period	water-well site	not eligible
SRI-9020	historical period	road	not eligible

Key: NRHP = National Register of Historic Places.

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Addendum to

Class III Archaeological Survey of the Desert Quartzite Solar Project, Palo Verde Mesa, Riverside County, California

Michael K. Lerch

Addendum prepared for
Heather Thomson, Archaeologist
County of Riverside
Transportation and Land Management Agency—Planning Department
4080 Lemon St., 12th Floor
Riverside, CA 92501

Riverside County Archaeological Report 5020A

Technical Report 15-36A
Statistical Research, Inc.
Redlands, California

May 2017

CONTENTS

List of Figures v
List of Tables v
Abstract, Updated May 2017 vii

Introduction 1
Project Location 1
Project Description 4
Applicable Regulations 4
APE Definitions 5
  Direct APE 6
  Indirect APE 6
Records-Search Results 7
  Previously Recorded Cultural Resources: NRHP-Listed and -Eligible Sites within the Indirect APE 7
Evaluations and Recommendations 8
  NRHP- and CRHR-Eligibility Criteria 8
    NRHP-Eligibility Criteria 8
    CRHR-Eligibility Criteria 9
    Criteria for Unique Archaeological Resources 9
    Research Potential 10
    Integrity 10
    Criteria of Adverse Effect 10
  NRHP- and CRHR-Eligibility Recommendations 11
    Historical-Period Sites 11
      Artifact Concentrations 11
      Military-Activity Sites 12
      Water-Well Sites 12
      Survey Markers 13
      Roads/Trails 13
      Architectural Resources 14
    Prehistoric Sites 14
      Artifact Concentrations 14
      Rock-Feature Sites 14
      Rock Features with Artifact Scatters 15
      Trails 15
    Multicomponent Sites 15
  NRHP-/CRHR-Eligibility Summary 16
Management Recommendations 16
  Sites Recommended Eligible 16
  Possibly Eligible Sites 18
    Additional Testing of Rock-Feature Sites 18
    Mule Tank Discontiguous Rock Art District Viewshed 18
    Pilot Knob–Blythe and Blythe-Niland 161-kV Transmission Lines 18
  Buried-Site Sensitivity 19

Appendix B, Revised and Updated May 2017 21
Site Evaluations and National Register of Historic Places–/California Register of Historical Resources–Eligibility Recommendations 21

References Cited 37

LIST OF FIGURES

Figure 1. Vicinity map of the Desert Quartzite Solar Project 2
Figure 2. Project location map of the Desert Quartzite Solar Project 3

LIST OF TABLES

Table 1. Summary of National Register of Historic Places– and California Register of Historical Resources–Eligible Sites and Recommendations (Revised) 17

Project: Desert Quartzite Solar Project (U.S. Department of the Interior Bureau of Land Management [BLM] Project No. CACA 049397, Riverside County Conditional Use Permit 3721)

Applicant: Desert Quartzite, LLC, A Wholly Owned Subsidiary of First Solar Development, Inc.

Agency: BLM, Palm Springs–South Coast Field Office

Permits: BLM Permit for Archaeological Investigations CA-13-06, Fieldwork Authorization 66.66-15-02

Project location:

USGS 7.5-Minute Quadrangle	Township/Range (BM)	Sections
Ripley, California	7 South/21 East (SBBM)	11, 12, 13, 14, 23, 24
Roosevelt Mine, California	7 South/21 East (SBBM)	3, 4, 5, 6, 9, 10, 11, 14, 15, 22, 23

Key: BM = baseline and meridian; SBBM = San Bernardino Baseline and Meridian; USGS = U.S. Geological Survey.

Dates of Fieldwork: October 13–December 11, 2014; February 3, 2015

Acreage of Direct Area of Potential Effects (APE): 5,010

Total Acreage Surveyed: 5,010

Total Acreage Surveyed on BLM Land: 4,850; **Private Land:** 160

Acreage of Indirect APE: 18,060

Results—Direct APE: In total, 278 sites were recorded within the direct APE: 181 historical-period sites, 89 prehistoric sites, and 8 multicomponent sites. In addition, 620 isolated artifacts were recorded (Appendix B, revised).

Results—Indirect APE: Based on the results of the records search completed prior to the survey fieldwork and reported in the research design (Kremkau et al. 2014:3.5, Tables 3.2 and 3.3), 220 sites are located within the indirect APE, defined as a 1-mile radius around the direct APE and a travel corridor into the Mule Mountains: 89 historical-period sites, 95 prehistoric sites, and 36 multicomponent sites.

Sites Recommended Eligible for Listing in the National Register of Historic Places (NRHP) and California Register of Historical Resources (CRHR): Within the direct APE, 7 prehistoric sites and the prehistoric component of 1 multicomponent site are recommended eligible for listing in the NRHP and the CRHR on the basis of available information. An additional 9 prehistoric sites are possibly eligible for listing in the NRHP and the CRHR, pending additional research and formal evaluation.

Two sites recommended eligible for listing in the NRHP and the CRHR, P-33-000343 and P-33-001821, are within the direct APE and also extend into the indirect APE. Two additional sites, P-33-000733 and P-33-000504, are listed in the NRHP as the Mule Tank Discontiguous Rock Art District and are situated within the indirect APE. Finally, two historical-period resources, both transmission lines (P-

33-011110 and P-33-012532/CA-RIV-7127H) located within the indirect APE, have been determined eligible for listing in the NRHP.

Sites Recommended Not Eligible for Listing in the NRHP and the CRHR: The remaining 261 sites and all 620 isolates within the direct APE are recommended not eligible for listing in the NRHP.

Management Recommendations: Sites that are listed in or recommended eligible for listing in the NRHP and the CRHR should be avoided. Until the possibly eligible sites are formally evaluated, they should be assumed eligible for listing in the NRHP and the CRHR, for planning purposes. If avoidance of these areas is not feasible, archaeological data recovery or other approved mitigative treatment should occur within the portions of the sites that will be affected by development of the DQSP.

Introduction

Desert Quartzite, LLC, a wholly owned subsidiary of First Solar Development, Inc. (First Solar), is proposing to develop, construct, and operate a 300-megawatt[1] (MW) power generating solar photovoltaic (PV) facility in eastern Riverside County, California—the Desert Quartzite Solar Project (DQSP). At the request of First Solar, Statistical Research, Inc. (SRI), conducted a Class III archaeological survey of the project site to provide information to the U.S. Department of the Interior Bureau of Land Management (BLM) and the County of Riverside (County), to comply with federal and state environmental and historic-preservation laws and regulations.

The archaeological survey was reported in *Class III Archaeological Survey of the Desert Quartzite Solar Project, Palo Verde Mesa, Riverside County, California*, edited by Michael K. Lerch, Patrick B. Stanton, and Karen K. Swope (Lerch et al. 2016). The purpose of the study was to identify and evaluate archaeological resources within the project's area of potential effects (APE) regarding their eligibility for listing in the National Register of Historic Places (NRHP) and the California Register of Historical Resources (CRHR).

At the time the initial survey report was prepared, it was the understanding of the authors that only the resources located on the 160-acre privately owned inholding within the otherwise federal lands in the project area would require evaluation under the CRHR. Subsequently, the County determined that its environmental review must include the entirety of the proposed DQSP. Accordingly, this addendum provides evaluations of all archaeological resources within the direct APE of the DQSP, as identified in the original survey report (Lerch et al. 2016), for eligibility for listing in the CRHR in addition to the NRHP. It also includes a more-detailed review of potential effects of the DQSP on NRHP-eligible resources located within the indirect APE.

The background information, research design and methods, results, and soil descriptions previously presented in Chapters 2–3; all but the records-search results of the area subject to indirect effects presented in Chapter 4; and Appendix A of the original survey report (Lerch et al. 2016:9–120) remain unchanged and are not included in this addendum. Portions of the introductory Chapter 1, the results of the records search in the indirect APE in Chapter 4, the evaluations and recommendations in Chapter 5, and the details of site evaluations and NRHP eligibility presented in Appendix B of the original report have been updated to reflect the CRHR evaluations. Confidential Appendixes C, D, and E are unchanged.

Project Location

The proposed project area is located 0.8 km (1/2 mile) south of Interstate 10 and the community of Mesa Verde and about 13 km (8 miles) west of the city of Blythe in eastern Riverside County, California (Figure 1). The DQSP area is located in Sections 11–14, 23, and 24, Township 7 South, Range 21 East (San Bernardino Baseline and Meridian [SBBM]), on the Ripley, California, 7.5-minute U.S. Geological Survey (USGS) topographic quadrangle and in Sections 3–6, 9–11, 14, 15, 22, and 23, Township 7 South, Range 21 East (SBBM), on the Roosevelt Mine, California, 7.5-minute USGS topographic quadrangle (Figure 2).[2]

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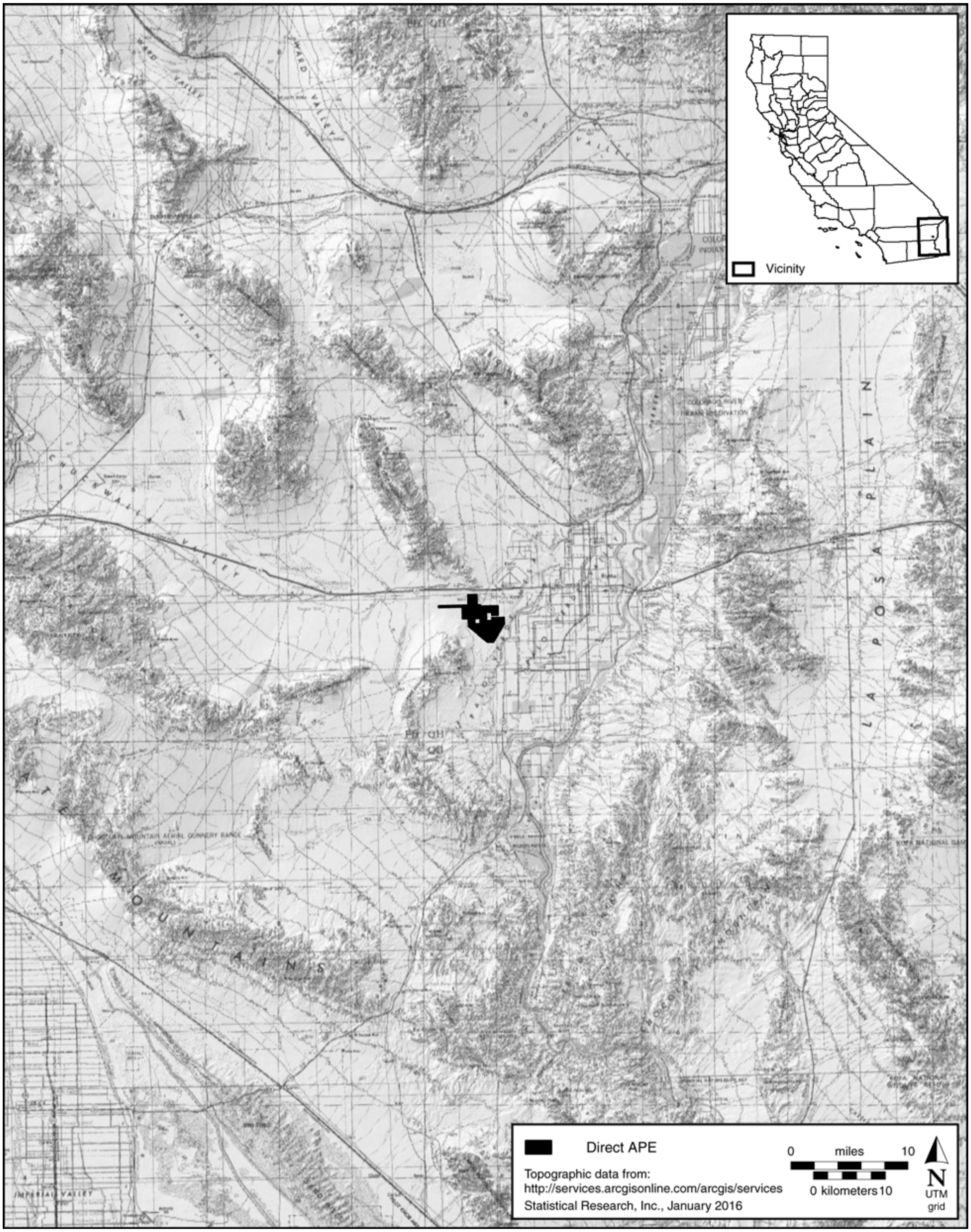
[1] The electrical generating capacity of the Desert Quartzite Solar Project was increased to 450 megawatts as a result of increases in photovoltaic module efficiencies from the 300-megawatt capacity shown in the project's SF299 right-of-way (ROW) grant application based on the Plan of Development filed on May 23, 2014 (Skinner 2016).

[2] Figures 1 and 2 depict the DQSP and its generator-tie-line (gen-tie-line)–corridor as they were configured during the archaeological survey reported by Lerch et al. (2016). Since that time, the west end of the gen-tie corridor has been enlarged where it enters the Colorado River Substation (CRSS).


Vicinity
WARD VALLEY
VIDAL VALLEY
CHUCKWALLA VALLEY
COLORADO RIVER INDIAN RESERVATION
LA POSA PLAIN
MOUNTAINS
IMPERIAL VALLEY
Direct APE
0 miles 10
0 kilometers 10
N
UTM grid

Topographic data from:
http://services.arcgisonline.com/arcgis/services
Statistical Research, Inc., January 2016

Figure 1. Vicinity map of the Desert Quartzite Solar Project.

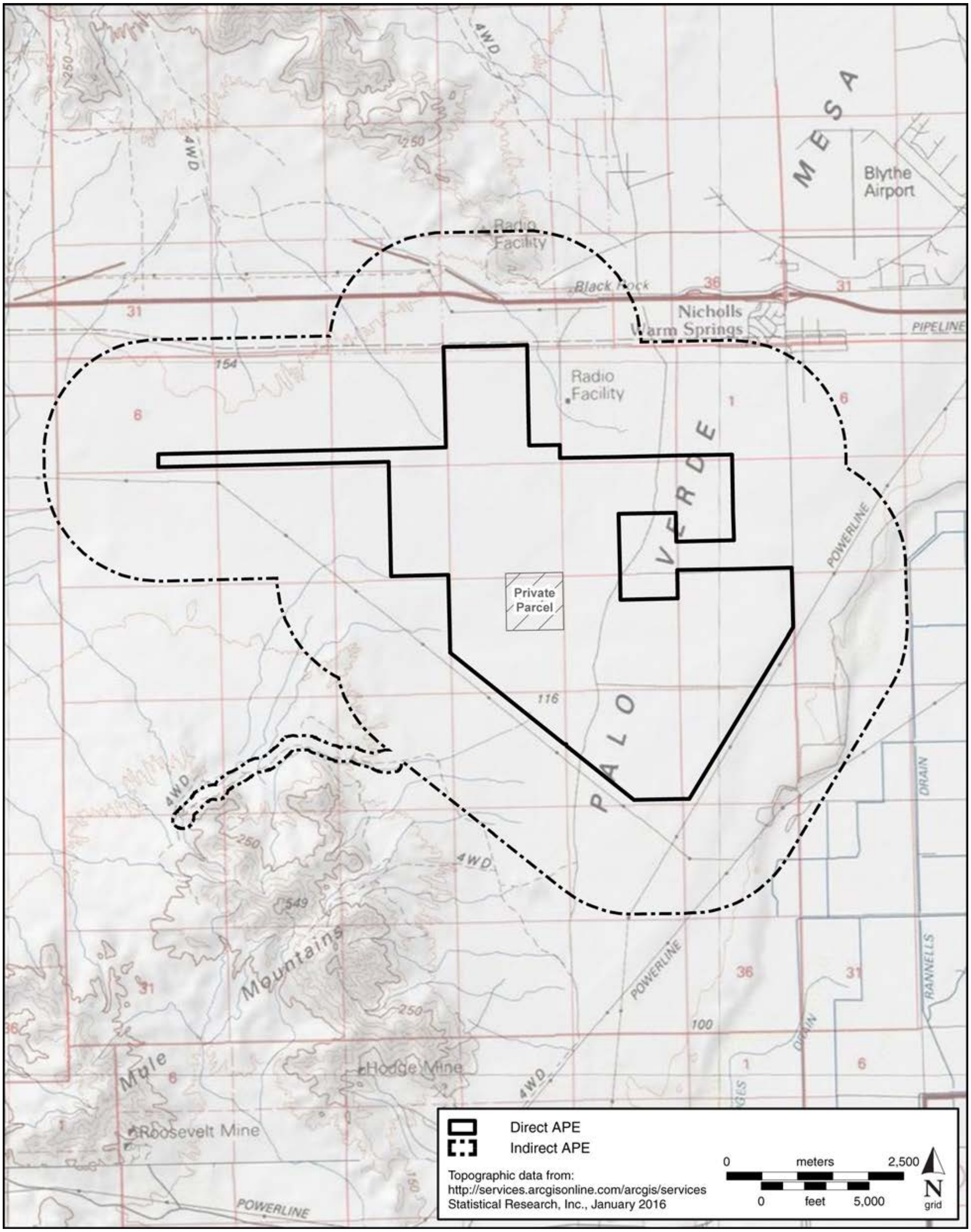

4WD
MESA
Blythe Airport
Radio Facility
Black Rock
36
31
Nicholls Warm Springs
PIPELINE
154
Radio Facility
8
1
6
PALO VERDE
POWERLINE
Private Parcel
116
4WD
250
549
Mule Mountains
Hodge Mine
Roosevelt Mine
POWERLINE
100
DRAIN
RANNELLS
Direct APE
Indirect APE
Topographic data from:
http://services.arcgisonline.com/arcgis/services
Statistical Research, Inc., January 2016
0 meters 2,500
0 feet 5,000
N grid

Figure 2. Project location map of the Desert Quartzite Solar Project.

The project site is situated on Palo Verde Mesa in the Colorado Desert, with the McCoy Mountains to the north, the Mule Mountains to the southwest, Chuckwalla Valley to the west, and Palo Verde Valley and the Colorado River to the east.

The DQSP area is bounded on the southwest and southeast by existing electrical transmission lines and access roads, including the Devers–Palo Verde Transmission Line Nos. 1 and 2. An existing 7.5-MW solar PV project, the NRG Blythe Solar Power Plant, is located on 200 acres adjacent to the northern boundary of the DQSP site. A portion of the Blythe Mesa Solar Project, a 485-MW, 3,660-acre PV project approved by the County in 2014 and by the BLM in 2015, is located on a keyhole-shaped parcel of land that is surrounded on three sides (the north, west, and south) by the DQSP site. The DQSP is located within the Riverside East Solar Energy Zone, identified as part of BLM's comprehensive Solar Energy Program (the Western Solar Plan) for utility-scale solar energy development on BLM-administered lands in six southwestern states, including California.

Project Description[3]

The DQSP includes a PV solar-facility site of approximately 3,560 acres on BLM land and 160 acres of private land, along with a corridor for gen-tie lines that extends for 3 miles and covers an area of 58 acres; this is all situated within a total project area of 5,010 acres. The total project area was initially defined on the basis of the right-of-way (ROW) grant application for a somewhat larger project footprint and associated buffer areas proposed in earlier versions of the DQSP *Plan of Development* (Desert Quartzite, LLC 2014).

The DQSP would consist of a single unit with a generating capacity of 300 MW. The proposed facilities on BLM-managed public land would include PV solar arrays, a gen-tie line, a 120-by-50 foot operations and maintenance building, an on-site substation, and ancillary facilities. The only facilities to be placed on the private land parcel would be solar arrays. The only linear facility extending out of the solar plant site would be the gen-tie line. The DQSP would use existing access roads.

The DQSP would involve the installation of thin-film solar modules made by First Solar, or other PV technology, mounted on either single-axis horizontal tracker structures, fixed-tilt mounting systems, or a combination of these two mounting systems. The mounting system for the PV modules would consist of steel posts driven into the ground to a depth of between 1.2 and 2.1 m (4 and 7 feet), and posts for single-axis tracking structures would need to be driven up to 3.7 m (12 feet) into the ground. The solar module assemblies would be organized into arrays. Each array would be approximately 800 feet long and 500 feet wide. The exact placement of the arrays within the DQSP area would be based on topography, hydrology, and geotechnical conditions and could also be modified to avoid cultural resources.

Applicable Regulations

Because most of the project area is on public land managed by the BLM, the project will require a BLM ROW grant (ROW No. CACA 049397). Issuance of a ROW grant for the project is considered an *undertaking* as defined by the National Historic Preservation Act of 1966, as amended (NHPA), and therefore, the BLM must comply with Section 106 of the NHPA (54 *U.S. Code* 300101), and its implementing regulations, 36 *Code of Federal Regulations* (CFR) 800, as well as BLM policies regarding cultural resources (BLM 2004). As required by the NHPA, as the federal agency that would approve the ROW grant, the BLM "shall take into account the effect of the undertaking on any historic property. The head of the Federal agency shall afford the Council a reasonable opportunity to comment with regard to the undertaking" (54 *U.S. Code* 306108). The BLM also must comply with the requirements of the National Environmental Policy Act (NEPA).

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[3] See Footnotes 1 and 2 for changes to the project description since the archaeological survey report (Lerch et al. 2016) was completed.

The portion of the project on private land will require a Conditional Use Permit (CUP) from the County (Riverside County CUP No. 3721), along with review under the California Environmental Quality Act (CEQA), with the County as the lead CEQA agency. The BLM and the County will prepare a joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) to meet the NEPA and CEQA requirements for the DQSP.

The CUP for the private-land portion of the DQSP is a "project" subject to the CEQA (Public Resources Code [PRC], Sections (§) 21000 et seq.) and the CEQA Guidelines (California Code of Regulations [CCR] Title 14, §15000 et seq.), as amended to date. The CEQA requires that the lead agency "shall determine whether the project may have a significant effect on archaeological resources" (PRC §21083.2), according to the CEQA Guidelines for "determining the significance of impacts to archeological and historical resources" (CCR Title 14, §15064.5). The lead agency for the project under the CEQA is the County.

For potential impacts to an archaeological or historical resource to be considered significant under the CEQA, the resource must be determined to be a "historical resource"—that is, one listed in or determined eligible for listing in the CRHR, included in a local register of historical resources, or determined by the lead agency to be a historical resource (PRC §21084.1). The term "historical resource" may apply to archaeological sites. For an archaeological site that does not meet the criteria for consideration as a "historical resource," however, a determination must be made as to whether it qualifies as a "unique archaeological resource" (PRC §21083.2[g]; CCR §15064.5[c][3]).

A cultural resource property that is listed in or determined eligible for listing in the NRHP is also listed automatically in the CRHR (PRC §5024.1[d]). Thus, for the purposes of this study, cultural resources are evaluated for significance with reference to their eligibility for listing in the NRHP, according to criteria published in 36 CFR 60.4. Cultural resources found to be not eligible for listing in the NRHP are also considered with respect to eligibility for listing only in the CRHR, because the CEQA criteria for integrity, age, and representation of local and California history set thresholds for significance that are different from those of the NHPA.

APE Definitions

Studies to identify and evaluate cultural resources must carefully establish the impact area, referred to in federal regulations as the APE for the undertaking and in the CEQA Guidelines as the affected "environment," which means "the physical conditions which will be affected by a proposed project including land . . . and objects of historical or aesthetic interest" (CCR §15360). We refer to the regulations implementing the NHPA for the following definition of APE:

> *Area of potential effects* means the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking [36 CFR 800.16(d)].

The APE considered for this study consists of the direct APE and the indirect APE, which are defined below. When the term "APE" is not defined as "direct" or "indirect," it refers to both together.

Direct APE

The direct APE was defined in the archaeological survey report (Lerch et al. 2016:5) as the entire 5,010-acre area containing the BLM ROW grant application area, the County CUP area, and the gen-tie corridor. The direct APE includes 4,850 acres of BLM land and 160 acres of private land.[4] It is the area where direct effects due to the implementation of the proposed development are possible (36 CFR 800.5[a][2][i]). Such direct effects to archaeological resources evaluated as NRHP eligible may include construction of perimeter fences and staging areas, grading for interior access roads, mowing and tilling to prepare the ground surface for installation of solar panels, trenching and excavation for electrical conduits and vaults, and construction of the gen-tie pylons and access road.

Within the direct APE, ground-disturbing activities would range in depths from 12–18 cm (5–7 inches) for the site surface preparation to 3.7 m (12 feet) for the solar-panel-support posts to 1.2 m (4 feet) for electrical-conduit trenches and to approximately 3 m (10 feet) for electrical vaults (Desert Quartzite, LLC 2014:35–38). These depths of disturbance, or the vertical APE, will be distributed across the project site at various locations within the direct APE. No mass grading is proposed for the DQSP.

Indirect APE

The indirect APE includes those areas outside of the direct APE that may contain historic properties that could be affected by the proposed project. Analysis of the effects of the undertaking in the indirect APE takes into consideration the introduction of visual, atmospheric, or audible elements that could diminish the integrity of significant historic features of resources listed in, or eligible for listing in, the NRHP (36 CFR 800.5[a][2][v]). Based on the results of the literature review and archaeological records search presented in the research design and work plan (Kremkau et al. 2014), the indirect APE was defined initially as a 1-mile area that contained approximately 13,000 acres extending around all sides of the direct APE. This definition was included by the BLM in its initial consultation letter to the SHPO dated August 21, 2014 (Wakefield 2014), and the SHPO concurred (Roland-Nawi 2014). However, during subsequent government-to-government consultation between BLM archaeologists and interested tribal representatives, concerns were expressed over potential effects of the DQSP on two sites containing rock art and ceremonial features that are listed in the NRHP (George Kline, personal communication 2015), and the indirect APE was expanded to 18,060 acres to include those resources, as currently shown in Figure 2.

Two NRHP-listed resources, P-33-000504 and P-33-000773,[5] listed in the NRHP as the Mule Tank Discontiguous Rock Art District, are located within the indirect APE, both located more than 1 mile from the DQSP boundary and the direct APE. Two other NRHP-eligible resources, the Pilot Knob–Blythe 161-kV transmission line (P-33-11110) and the Blythe–Niland 161-kV transmission line (P-33-012532/CA-RIV-

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[4] The changes in the project description cited in Footnote 1 have increased the direct APE slightly in the area where the gen-tie corridor enters the CRSS. Those areas had been previously surveyed (Enright and Mirro 2011), and the results will be included, along with the survey reported by Lerch et al. 2016) and in this addendum, in the DQSP EIS/EIR.

[5] Resources mentioned in this report are identified by several numbering systems. Generally, previously recorded sites are depicted on maps and listed in text and tables by their primary numbers, which consist of the letter "P" (for the Primary Record of the California Department of Parks and Recreation [DPR] recordation forms [DPR 523 series]), the two-digit code for the relevant county, and sequentially assigned six-digit numbers (e.g., P-33-000010 refers to the tenth primary number assigned in Riverside County). Archaeological sites may also be listed by a trinomial designation. The trinomial consists of the two-letter code "CA" (for California), the three-letter code for the relevant county, and a sequentially assigned number (e.g., CA-RIV-3 refers to the third trinomial assigned in Riverside County). In addition, a suffix that indicates the presence of "prehistoric" or "historical-period" materials at a recorded property may be included. The lack of a suffix on a trinomial indicates the presence of exclusively prehistoric materials, the suffix "H" indicates the presence of exclusively historical-period materials, and the suffix "/H" indicates the presence of prehistoric and historical-period materials. Some archaeologists also use the suffix "T" to denote trail sites. Isolated archaeological resources and architectural resources are listed by primary number only. Finally, newly recorded sites are listed by their field numbers, which are indicated in this report as "SRI-*nnnn*." Primary numbers and trinomials for the newly recorded sites and isolates have been added to the master table of sites shown in the revised Appendix B.

7127H), have also been identified within the indirect APE. Potential cumulative effects of the DQSP and other previous projects in the region on these resources will be considered by the BLM and the County in the project's EIS/EIR.

Records-Search Results

Updated results from the records-search information for the indirect APE are presented below.

Previously Recorded Cultural Resources: NRHP-Listed and -Eligible Sites within the Indirect APE

Of the sites located within the indirect APE, two are listed in the NRHP, two have been determined eligible, and several others have characteristics that suggest they could be considered NRHP eligible. The NRHP-listed sites include P-33-000773, the Mule Canyon site, located approximately 1 mile west of the direct APE and P-33-000504, the Mule Tank site farther to the west, which together are recognized as the Mule Tank Discontiguous Rock Art District, based on Criteria c and d. P-33-000504 is a petroglyph locus within the district, and P-33-000773 is a geoglyph/intaglio component.

Two transmission lines located within the indirect APE along the southeastern boundary of the DQSP have been determined eligible for listing in the NRHP. These lines are the Pilot Knob–Blythe 161-kV transmission line (P-33-11110) and the Blythe–Niland 161-kV transmission line (P-33-012532/CA-RIV-7127H) (see Lerch et al. 2016:Figure C.2). The former is a 64.4-mile-long line made of H-frame wooden poles built in 1951 that parallels the 2-mile-long boundary of the DQSP. The latter is a line of similar wooden-pole H-frame construction built in the 1940s and 1950s and is located in the same corridor.

Sites within the indirect APE that are not listed in the NRHP or determined eligible but could be considered eligible include two other intaglio sites, P-33-000661 and P-33-000662, located north of Interstate 10. These sites are alignments of waterworn cobbles. Several prehistoric trails are also located within the indirect APE. Among them is the Coco-Maricopa Trail (McCarthy 1982; 1993:70–84, 193–194), a system of trails that connected with other north–south- and east–west-trending trails. A portion of the trail has been recorded as P-33-000053, which passes through the indirect APE on the northern side of the project area and was determined eligible for listing in the NRHP as a result of cultural resources evaluation associated with the McCoy Solar Project. At least eight other trail segments (P-33-000343, P-33-000650, P-33-000673, P-33-000772, P-33-000775, P-33-003803, P-33-004568, and P-33-010822) have been recorded within the indirect APE (see Lerch et al. 2016:Table 6), although several may be segments of a smaller number of trails. Two of these trails extend into the direct APE.

P-33-001821, a large previously recorded site containing multiple rock features as well as lithic and ceramic artifact scatters is crossed by two trails and is located within the indirect APE, very close to the boundary of the direct APE. During a visit to the site by BLM archaeologists and tribal representatives for a previous project, a suspected cremation locus that had not been previously recorded was observed in the site vicinity. During a field visit for the DQSP by SRI and BLM archaeologists, the locus was relocated and formally recorded, and other portions of the site were found to extend into the DQSP direct APE.

Evaluations and Recommendations

NRHP- and CRHR-Eligibility Criteria

SRI has developed preliminary NRHP- and CRHR-eligibility recommendations for all 278 sites within the direct APE (see the revised Appendix B). Evaluation recommendations were made following the guidelines and eligibility criteria established in 36 CFR 60.4. The research questions and data requirements outlined in the research design (Kremkau et al. 2014) and presented in Chapter 3 of the report by Lerch et al. (2106) were used as the references for determining site eligibility. The 278 sites were classified as either eligible, not eligible, or possibly eligible, the last category denoting sites that require additional research before an eligibility recommendation can be provided. In the following section, we briefly discuss the NRHP and CRHR eligibility of the resources within the APE. None of the historical-period sites nor any of the 620 isolated finds met any of the eligibility criteria, or they lack integrity, and all are recommended not eligible for listing in the NRHP and the CRHR. In addition, neither the prehistoric sites nor the historical-period sites can be considered as elements of a district, because they do not represent "a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development" (Shrimpton 2002). The single isolated artifact that is located on the 160-acre privately owned parcel within the direct APE and is thus subject to compliance with the CEQA is also recommended not eligible for listing in the CRHR; no prehistoric or historical-period sites are located on the private parcel.

NRHP-Eligibility Criteria

Section 106 of the NHPA requires the BLM to take into account the effects of an undertaking on "historic properties," defined as cultural resources listed in or eligible for listing in the NRHP (36 CFR 800). Determination of NRHP eligibility for cultural resources prior to making a finding of effect is made according to the following criteria:

> The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association and
>
> (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (b) that are associated with the lives of persons significant in our past; or
>
> (c) that embody the distinctive characteristics of a type, period, method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> (d) that have yielded, or may be likely to yield, information important in prehistory or history [36 CFR 60.4].

If cultural resources do not possess integrity or do not meet the above criteria, they are not considered historic properties and are not further considered in the Section 106 process.

In addition to the above criteria, there is a general stipulation that a historic property must be 50 years old or older (for exceptions, see 36 CFR 60.4, Criteria Considerations). The importance of information in prehistory or history is measured by a resource's ability to answer research questions (McClelland 1997). In addition to research potential, both Native American and Euroamerican historic properties may have general-public and culture-specific values. Historic properties may also have broader public significance, such as serving to educate the public about important aspects of national, state, or local history.

CRHR-Eligibility Criteria

For purposes of the CEQA, a “historical resource” is any object, building, structure, site, area, place, record, or manuscript listed in or eligible for listing in the CRHR (PRC §21084.1). A resource is eligible for listing in the CRHR if it meets any of the following criteria:

(1) Is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage.

(2) Is associated with the lives of persons important in our past.

(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.

(4) Has yielded, or may be likely to yield, information important in prehistory or history.

The CCR (Title 14, §4852) further provides that cultural resources of local significance are CRHR eligible.

Historical resources defined by the CRHR criteria listed above (PRC §5024.1) are eligible for listing in the CRHR and include resources determined eligible for listing in the NRHP (CCR Title 14, §4851[a][1]). Thus, the County may apply the determinations of NRHP eligibility to its findings of historical significance under the CEQA. Cultural resources determined not eligible for listing in the NRHP may still qualify as historical resources under the CEQA, and thus, a separate determination regarding whether they are historical resources must be made by the County.

In addition to having significance, resources must have integrity for the period of significance. The period of significance is the date or span of time within which significant events transpired or significant individuals made their important contributions. Integrity is the authenticity of a historical resource’s physical identity, as evidenced by the survival of characteristics or historic fabric that existed during the resource’s period of significance. Simply put, resources must retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance (CCR Title 14, §4852).

Criteria for Unique Archaeological Resources

The CEQA also requires the lead agency to consider whether the project will have a significant effect on unique archaeological resources (even if they are not eligible for listing in the CRHR) and to avoid unique archaeological resources when feasible or mitigate any effects to less-than-significant levels (PRC §21083.2). As used in the CEQA,

> a unique archaeological resource means an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:
>
> (1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
>
> (2) Has a special and particular quality such as being the oldest of its type or the best available example of its type.
>
> (3) Is directly associated with a scientifically recognized important prehistoric or historic event or person.

Below, we discuss our evaluations, in terms of the above-listed NRHP- and CRHR-eligibility criteria, of the archaeological resources we identified within the APE during survey, with attention focused on two particular aspects of evaluation: research potential and integrity.

Research Potential

The research potential of any particular historic property is assessed with reference to a specific historic context or research design and themes. Historic contexts form the framework according to which much of the federal historic-preservation process is structured. A historic context is a body of information about a property, organized by three basic elements: theme, place, and time (McClelland 1997:1). Theoretically, all the historic contexts of a particular geographic area together constitute a comprehensive history of the area that could be broken down into a series of historically meaningful segments, each of which would constitute an individual historic context. Therefore, grouped together, the various historic contexts of an area form a comprehensive summary of all aspects of the area’s history.

Integrity

Another key determination regarding NRHP eligibility involves the concept of integrity, which refers to the physical condition of a historic property. If the physical condition of a site considered eligible for listing in the NRHP under Criterion d is such that important information about the past potentially can be derived from it, then it is said to possess good integrity. If various processes of disturbance—environmental or cultural, intentional or unintentional—have impacted the property such that the qualities that make the site significant have been lost or severely damaged, then the property is said to lack integrity. The critical aspect of evaluating integrity is assessment of the nature and extent of disturbance processes. Extensive impacts by recent human activity, such as vandalism or vehicular traffic, are relatively easy to recognize and assess, but other forms of disturbance are more subtle. For example, consider an artifact concentration. If environmental processes, such as erosion, have displaced artifacts and altered the geomorphological context, the condition of the scatter today might be considerably different from what it was when it was first created. Many of the artifacts may have been redeposited and those that remain may no longer be in primary context. If subsurface deposits are present, they may no longer be spatially associated with the surface artifacts.

Criteria of Adverse Effect

If a project alters the character-defining elements of an NRHP- or CRHR-eligible property, such as features relevant to its environment or its use, in a manner that affects the property’s eligibility for listing in the NRHP or the CRHR, such an alteration is considered an adverse effect. Adverse effects can include

- physical destruction, damage, or alteration of all or part of the property;
- isolation of the property from its setting or alteration of the character of its setting when that character contributes to the property’s qualification for listing in the NRHP;
- introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- neglect of a property resulting in its deterioration or destruction; or
- transfer, lease, or sale of a federally owned property without adequate conditions or restrictions regarding its preservation, maintenance, or use (36 CFR 800.5[a][2]).

If a historic property/historical resource within the APE were subject to any of the above, it would be considered an adverse effect to the property.

NRHP- and CRHR-Eligibility Recommendations

SRI's NRHP- and CRHR-eligibility recommendations are presented below. The discussions are organized by the site types presented in the revised Appendix B. These eligibility recommendations are preliminary and may change following additional research at some sites and consultation by the BLM with the tribes and the public. Ultimately, formal determinations of eligibility will be made by BLM and County, with concurrence by the SHPO.

Historical-Period Sites

Historical-period sites are classified as artifact concentrations, military-activity sites, water-well sites, roads/trails, and survey markers.

Artifact Concentrations

In total, 157 historical-period artifact concentrations were recorded within the direct APE. Generally, the artifact concentrations can be divided into three main time periods defined with reference to previous use of the area for the Desert Training Center/California-Arizona Maneuver Area (DTC/C-AMA): pre-DTC/C-AMA/Homesteading, DTC/C-AMA, and post-DTC/C-AMA.

The artifact concentrations dating to the DTC/C-AMA operations consist of small scatters of C- and K-ration cans and other historical-period refuse, such as beverage bottles or cans or nonstandard food cans, and are likely associated with training and maneuvers within the APE. The historic and archaeological contexts prepared for DTC/C-AMA sites identified refuse deposits as one of the property types associated with the resource. The guidance document indicated that DTC/C-AMA refuse deposits can range from "isolated artifact scatters to large trash dumps, used for long periods of time. Refuse deposits from the DTC/C-AMA period will be identifiable by the military-related artifacts present, as well as by their location" (Bischoff 2009:127). The small scatters identified within the project APE were likely associated with temporary campsites and bivouacs and were not "cleaned up by the departing soldiers," as many others were.

The DTC/C-AMA is "particularly relevant to several broad, important themes in American history," was "the largest training facility and the only one of its kind in American military history," and was "associated with several preeminent figures in the American Army" (Bischoff 2009:133–134). Nevertheless, the guidance went on to state that "whereas these resources have the potential to be considered significant under any or all of the four criteria, more often than not they will be considered primarily eligible under Criterion d for their ability to yield information important in history" (Bischoff 2009:134). Although the small sites retain aspects of integrity, it is not possible to relate them to specific military activities or units. They do not contain sufficient quantity or variety of materials to support statistically valid analyses, nor do they contain further data potential. The DTC/C-AMA sites were thoroughly documented during this investigation, including background and archival research, field recordation, collection of a photographic record, and detailed mapping. The artifact concentrations dating to the DTC/C-AMA period are recommended not eligible for listing in the NRHP or the CRHR under any criteria.

The artifact concentrations associated with the mid–late twentieth century represent small "wildcat" dumps, likely associated with residential areas north of the direct APE and with use of the project area for OHV or other recreational activity. The artifact concentrations are surficial deposits, lacking stratigraphic integrity and the quantity and variety of materials that would allow statistically valid analyses. These sites were thoroughly documented during this investigation, including background and archival research, field recordation, collection of a photographic record, and detailed mapping. The dumps cannot be associated with specific households or individuals and otherwise lack context. The mid–late-twentieth-century artifact concentrations are thus recommended not eligible for listing in the NRHP or the CRHR.

A dozen artifact concentrations date to the early twentieth century. These concentrations contain a variety of domestic refuse, as well as other artifact types. Most of these scatters are highly disturbed, but three are in good condition: SRI-1024, SRI-3014, and SRI-4045.[6] No homesteads or other historical-period residential areas were identified within the direct APE. SRI-1024, SRI-3014, and SRI-4045 cannot be associated with a particular activity, residence or individual. SRI-1024 and SRI-3014 contain burn areas or campfires, and a potential association with the 1917 U.S. General Land Office (GLO) survey crew was considered. The historic context and research design for work-camp properties in California (California Department of Transportation 2013:97, 112, 114, 123, 169) listed surveyors' camps as a potential work camp property type. It is not possible, however, to make a conclusive association of these sites with activities of the 1917 survey crew. The artifact concentrations are surficial deposits, lack stratigraphic integrity, and do not contain the quantity and variety of materials that would allow statistical analyses. These sites were thoroughly documented during this investigation, including background and archival research, field recordation, collection of a photographic record, and detailed mapping. The early-twentieth-century artifact concentrations are recommended not eligible for listing in the NRHP or the CRHR under any criteria.

Military-Activity Sites

The nine sites associated with military activity are all related to the use of the APE as part of the DTC/C-AMA. None of these sites appears to be related to the activities of Operation Desert Strike in 1964. The sites consist of small features, including tank emplacements, vehicle tracks, or lengths of communications wire. The historic and archaeological contexts prepared for DTC/C-AMA sites identified tank tracks as one of the property types associated with the resource. The guidance document indicated that tanks were a "primary aspect of the DTC/C-AMA, and countless operations and maneuvers were conducted throughout the facility" (Bischoff 2009:127). Tank tracks, therefore, have been reported throughout the DTC/C-AMA.

Despite the relevance of the DTC/C-AMA "to several broad, important themes in American history," its role as "the largest training facility and the only one of its kind in American military history" and its association with "several preeminent figures in the American Army" (Bischoff 2009:133–134), the guidance also stated that "whereas these resources have the potential to be considered significant under any or all of the four criteria, more often than not they will be considered primarily eligible under Criterion d for their ability to yield information important in history" (Bischoff 2009:134). Although the tank emplacements, vehicle tracks, and lengths of communications wire retain aspects of integrity, it is not possible to relate them to specific military activities or units. They do not contain sufficient identifiable association, nor do they contain further data potential. The nine military-activity sites are recommended not eligible for listing in the NRHP or the CRHR under any criteria.

Water-Well Sites

Three abandoned water well sites were recorded within the direct APE. One site (SRI-42) consists of a well casing surrounded by a disturbed area and artifact scatter. Archival research failed to disclose an association with a particular residence, agricultural use, or individual, although it was determined that the well dates to the early 1960s. The artifacts at the site date to the mid–late twentieth century. The artifact concentrations are surficial deposits, lack stratigraphic integrity, and do not contain the quantity and variety of materials that would allow statistical analyses. Two other sites (SRI-9016 and SRI-9018) each consist of a single well casing with no associated artifacts or other features. These two sites also date to the early 1960s. These wells may be associated with activities during the 1950s and 1960s related to possible development of the Palo Verde Mesa area for agricultural activities by the Palo Verde Irrigation District. The water-well sites were thoroughly documented during this investigation, including background and archival research, field recordation, collection of a photographic record, and detailed mapping. These three sites are recommended not eligible for listing in the NRHP or the CRHR under any criteria.

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[6] Primary numbers and trinomials for sites identified in the text only by their field numbers (SRI-*nnnn*) are contained in Appendix B.

Survey Markers

Two survey marker sites were identified within the direct APE. The first site, SRI-8085, consists of 22 survey markers and 10 linear disturbances associated with a 1917 survey by the GLO. They are small, bronze markers set on pipes or other foundations, set into the ground. The linear disturbances are approximately 2-foot-wide north–south or east–west ephemeral trails along section or quarter-section lines that were created during the survey for and placement of the markers. The number and array of markers and disturbances is related to the 1917 survey, which included setting markers at 85 locations (all section corners and centers). Although government surveys are associated with events that have contributed significantly to broad historical patterns, early-twentieth-century survey markers are common through the California desert and elsewhere, and their purpose and morphology are well documented; SRI-8085 does not meet NRHP Criterion a or c or CRHR Criterion 1 or 3. The names of all the surveyors for the 1917 survey (GLO 1917) were reviewed and researched, and none was found to be significant in our past (Lerch et al. 2016:Table 20). Based on the results of our archival research, SRI-8085 is not associated with the lives of persons significant in our past and does not appear eligible under Criterion b/2. Documentation of the site included background and archival research, field recordation, collection of a photographic record, and detailed mapping. The site was thoroughly documented during this investigation and has no further research potential under Criterion d/4. SRI-8085 is recommended not eligible for listing in the NRHP.

The other survey marker site, SRI-5063, consists of an undated USGS marker. Individual survey markers are ubiquitous features that can be found throughout California and the United States as a whole. Therefore, this site is not eligible under Criterion a/1, b/2, or c/3. Documentation of the site included background and archival research, field recordation, collection of a photographic record, and detailed mapping. The site was thoroughly documented during this investigation, and has no further research potential under Criterion d/4. Although this site is in good condition, SRI recommends it not eligible for listing in the NRHP or the CRHR.

Roads/Trails

Ten historical-period roads/trails were identified within the direct APE and are of sufficient age and integrity for consideration as historic properties. One of the sites, SRI-2333, is depicted on an early twentieth-century map. This southwest–northeast-trending road appears on the 1918 GLO plat map, drawn from survey data collected in 1917 (see Lerch et al. 2016:Figure 5). At that time, the road ended just south of the project APE, in the southwest quarter of Section 23 near a house and agricultural field outside the direct APE. From that point, the road followed its current alignment northeasterly through Sections 23 and 14 but branched northeasterly from the current alignment in the NE $^1/_4$ of Section 11. Its northern terminus at that time remains unknown. By 1952, the road continued northerly to a network of roads accessing mines in the Little Maria Mountains and had been extended southerly to connect with the Bradshaw Trail. In addition to SRI-2333, a two-track section road (P-33-014199) and two ambiguous trails (SRI-96 and SRI-129), were also discovered. Although these linear sites played roles in local and regional history as specific cultural resources related to settlement and industrial development, they did not make significant contributions to history in terms of culture, economics, politics, or technology. Another of these sites, P-33-017328, was previously recorded as a prehistoric trail segment. Further investigation revealed that this site is longer than originally recorded, is located precisely along a quarter-section line, and is likely associated with the 1917 GLO land survey and with the other features recorded as SRI-8085.

Three linear sites (SRI-121, SRI-122, and SRI-2051) appear to be associated with surveys that further subdivide the section and quarter-section subdivisions mapped by the 1917 GLO survey. The fact that these subdivisions are slightly oblique in relation to the official section divisions suggests these sites were made during another survey, possibly by a surveyor hired by a landowner, speculative owner, or claimant.

Finally, a map dated 1952 (drawn from aerial imagery dated 1948) shows a road in an east–west alignment along the north side of Section 13 that was recorded in this study as SRI-9020. Archival data from that decade shows three claimants for land in the northern part of Section 13: Don A. Allen, Elmer Cain, and Frank A. Gallender, Jr. Previously recorded road P-33-014173, which is also depicted on the 1952 map, runs east–west along the boundary between Sections 13, 14, 23, and 24. Adjacent land was claimed at that time by Ida May Cassell, Esther M. Cassell, Ralph W. Cassell, Victor A. Gudzunas, Prudence B. Anderson, Gerald A. Brinkman, John T. Scott, Minnie Van Reid, and H. L. Billson.

The roads and trails do not meet any of the NRHP- or CRHR-eligibility criteria. Despite background and archival research, origin and destination points for the linear features were not identified, nor do any of the names associated with adjacent land claims appear to be important in local or regional history. The sites were thoroughly documented during this investigation through field recordation, collection of a photographic record, and detailed mapping. However, the sites could not address any of the research questions in the research design (Kremkau et al. 2014), and further research at the sites will not yield additional information important to history. Therefore, SRI recommends the historical-period road/trail sites not eligible for listing in the NRHP.

Architectural Resources

There are no historical-period built environment resources identified within the direct APE that require evaluation regarding direct or indirect effects resulting from construction of the DQSP. However, two transmission lines, located within a utility corridor that forms the southeastern boundary of the project area, are within the indirect APE. These resources, the Pilot Knob–Blythe 161-kV transmission line (P-33-11110) and the Blythe-Niland 161-kV transmission line (P-33-012532/CA-RIV-7127H), have been determined NRHP eligible during previous projects, according to information obtained from the records search. Because the two transmission lines have been determined eligible for listing in the NRHP, they would also be considered historical resources eligible for listing in the CRHR.

Prehistoric Sites

The prehistoric sites are classified as artifact concentrations, rock-feature sites, rock features with artifact scatters, and trails.

Artifact Concentrations

Artifact concentrations are groups of artifacts scattered across the ground surface that lack features such as pits or thermal features. Two types are artifact concentrations, lithic scatters and ceramic scatters, were discovered. In total, 9 ceramic and 16 lithic scatters were identified within the direct APE. All were recorded in detail based on in-field analysis. The majority of these sites are sparse scatters (with fewer than 50 artifacts) that do not retain any integrity and lack diagnostic artifacts other than those already recorded (i.e., ceramic sherd types) (see Lerch et al. 2016:Tables 9 and 18). These artifact concentrations are recommended not eligible for listing in the NRHP or the CRHR.

Rock-Feature Sites

Thirty of the prehistoric sites in the project area are rock-feature sites. These sites consist of one or more rock features, usually with no associated artifacts. The majority of the rock features appear to be thermal features (earth ovens used for food preparation) and contain a mix of fire-altered and unaltered rock. The features vary greatly in size and integrity. Most intact features measure between 1 and 3 m in diameter and consist of between 20 and 50 pieces of rock. Most of the rock-feature sites are deflated, and the rock features retain no integrity. SRI recommends these sites not eligible for listing in the NRHP or the CRHR, because they lack integrity and cannot address any research questions.

Four sites (SRI-3039, SRI-3237, SRI-4085, and SRI-7009), however, retain some integrity and are possibly eligible for listing in the NRHP under Criterion d and CRHR under Criterion 4, pending formal evaluation. Such sites may contain important datable materials that can answer chronological questions, as Eerkens and Rosenthal (2002) have demonstrated in the northern Mojave Desert, and they may also be able to provide important information related to questions of settlement and subsistence. Although the use of earth ovens is conventionally correlated with the baking of agave or other succulent species (Castetter 1935), the scale of these particular features suggests that they may have served for the baking of small-scale plants such as geophytes (Thoms 2009). Ethnographic literature indicates that bulbs, corms, tubers, or rhizomes were traditionally gathered and subsequently processed in small earth ovens (Havard 1895). Scholze (2010) has noted that, in northern California alone, 85 percent of 73 ethnographic sources make reference to root crops, suggesting subsistence reliance. Moreover, Anderson (1993), among others, has noted that some California tribes gathered edible bulbs, corms and even replanted cormlets, bulblets, and sections of root for future use (Anderson 1993). In the anthropological literature, these plants have often been reported as “Indian potatoes” or “root-crops” (Anderson 1997:150). One geophyte plant species in particular, desert lily, was identified as common within the current survey area (see Lerch et al. 2016:Table 2) and is known to have been utilized ethnographically. Ethnographic information indicates the bulbs were eaten raw or baked in a pit oven pit by the Cahuilla (Bean and Saubel 1972:77) or eaten raw, baked, or boiled by the River Yumans (Castetter and Bell 1951:207). A geographical study of the Palo Verde Mesa noted that “during the spring months large fields of desert day lilies (*Hesperocallis undulata*) are to be found growing profusely in localized areas throughout the lower terrace” (Rumage 1956:40).

Overall, California is extremely rich in geophyte species, in comparison to the rest of the United States (Rundel 1996). Archaeobotanical investigations of earth-oven technology, as well as the study of prehistoric utilization of geophytes, are still in their infancy, and few sites have produced archaeological remains of geophytes. However, recent studies in central Texas have succeeded in developing pioneering methods for detecting archaeobotanical evidence of geophytes within earth ovens (Dering 2003). These newly introduced methods elevate the potential of these types of sites for future research, particularly for establishing links between hunter-gatherer lifestyles and settled agriculture. The gathering, replanting, and processing of wild-plant species, should this be demonstrable, may offer evidence as to why prehistoric peoples eventually adopted a sedentary lifestyle.

Rock Features with Artifact Scatters

These sites consist of one or more rock features with an associated artifact scatter. The diversity of artifacts and feature types among these sites imply that the site type was used for a variety of tasks and may indicate at least a temporary occupation. Of the 31 sites associated with this site type, 9 rock features with artifact scatters retain some level of integrity, and excavations at the sites may be able to address some of the research questions outlined in the original report (Lerch et al. 2016:Chapter 3). Four of these sites, SRI-83, SRI-2021, SRI-6034, and P-33-001821, have several intact rock features. A large scatter of calcined bone that may be a human cremation is associated with P-33-001821, and SRI-6034 is the only site within the direct APE that yielded pieces of ground stone. SRI recommends these four sites eligible for listing for the NRHP under Criterion d and the CRHR under Criterion 4, and in the case of P-33-001821, under Criteria a/1 and b/2, as well. Five other sites—SRI-17, SRI-1059, SRI-3019, SRI-4241, and SRI-6033—retain some integrity and are possibly eligible for listing in the NRHP and the CRHR, pending formal evaluation.

Trails

Three prehistoric trails were identified within the APE. The trails consist of narrow, linear features and were not associated with any artifact scatters. P-33-000343 and P-33-000772 were both previously recorded, and the current survey found them to be in generally the same condition as originally recorded. The third trail, SRI-3255, runs southwest–northeast though the direct APE. All three sites are recommended eligible for listing in the NRHP and the CRHR under Criterion d/4 and possibly under Criteria a/1 and b/2, depending on the results of tribal consultation by the BLM. Ethnographic studies based on literature review and interviews with tribal representatives have consistently noted that trails are important for both economic and spiritual reasons and were used well into the historical period (Bean and Vane 1978:6-54, 7-13–7-14; Cultural Systems Research, Inc. 1987:132–134).

Multicomponent Sites

All eight of the multicomponent sites within the direct APE are artifact concentrations. These sites contain a mix of prehistoric and historical-period artifacts. The prehistoric component of one of the larger multicomponent sites, P-33-019618, contains the largest number of flaked stone artifacts (primarily flakes and tested cobbles), has the potential to contain subsurface deposits, and may be able to address research questions. Therefore, SRI recommends P-33-019618 eligible for listing in the NRHP and the CRHR under Criterion d/4.

NRHP-/CRHR-Eligibility Summary

Four prehistoric rock features with artifact scatters (P-33-001821, SRI-83, SRI-2021, and SRI-6034), three trail sites (P-33-000343, P-33-000772, and SRI-3255), and the prehistoric component only of one multicomponent artifact concentration site (P-33-019618) are recommended eligible for listing in the NRHP and the CRHR under Criterion d/4 (Table 1). Because of their possible significance to tribes in the region, four of those sites (P-33-000343, P-33-000772, P-33-001821, and SRI-3255) may also be eligible under Criteria a/1 and b/2, pending further consultation with the tribes by BLM. Nine additional sites, including 4 prehistoric rock-feature sites (SRI-3039, SRI-3237, SRI-4085, and SRI-7009), and 5 prehistoric rock-feature sites with artifact scatters (SRI-17, SRI-1059, SRI-3019, SRI-4241, and SRI-6033), are possibly eligible for listing in the NRHP and the CRHR, but additional research is needed (see Table 1; Appendix B [Revised]). No sites recommended eligible for listing in the NRHP or the CRHR are located in the 160-acre private parcel located within the APE. Figure C.27 in the original report (Lerch et al. 2016) shows the location of the eligible and possibly eligible sites within the project area, as well as the relationship superimposed on the map of the proposed DQSP facility (solar arrays, fence lines, etc.).

Each of the sites recommended eligible or possibly eligible for listing in the NRHP is also recommended eligible or possibly eligible for listing in the CRHR. None of the sites evaluated is recommended as a unique archaeological site as defined by the CEQA (PRC §21083.2).

None of the sites within the direct APE appear to be eligible for listing in the NRHP as contributors to a district. Two previously recorded sites within the indirect APE, however, are listed in the NRHP as the Mule Tank Discontiguous Rock Art District.

Management Recommendations

Results from the archaeological survey have yielded a wealth of information that demonstrates the rich and diverse cultural landscape within the project area. This section provides management recommendations for mitigating adverse effects to cultural resources within the direct APE and within the viewshed of the project area, as well as addresses the results of the buried-site-sensitivity model presented in the original report (Lerch et al. 2016:Chapter 4) (see Table 1).

Sites Recommended Eligible

As previously mentioned, four prehistoric rock features with artifact scatters (P-33-001821, SRI-83, SRI-2021, and SRI-6034) and the prehistoric component of one multicomponent site (P-33-019618) are recommended eligible for listing in the NRHP/CRHR under Criterion d/4 and, in the case of P-33-001821, possibly under Criteria a/1 and b/2. To lessen adverse effects to these five cultural resources, the area where these sites are located should be avoided, along with a buffer area of at least 30 m. If avoidance of these areas is not practical, archaeological data recovery or other approved mitigative treatment should occur within the portions of the sites that will be affected by development of the DQSP to confirm the potential data yield of the sites, as well as recover any data that may address research questions pertaining to prehistoric themes, such as settlement and subsistence, presented in Chapter 3 of the original report (Lerch et al. 2016).

The three prehistoric trails (P-33-000343, P-33-000772, and SRI-3255) are related to prehistoric trade networks and, in the case of P-33-000343 and P-33-000772, which extend to the Mule Tank Discontiguous Rock Art District (P-33-000773) outside of the project area, the overall ceremonial landscape of the region. To mitigate cumulative impacts to these sites within the indirect APE, further investigation is recommended to trace the trail alignments on high-resolution aerial photographs and examine them carefully on the ground to document them more completely using GPS and digital photography. Decisions regarding their ultimate determinations of NRHP eligibility and treatment will be based on the results of tribal consultation by the BLM.

Table 1. Summary of National Register of Historic Places– and California Register of Historical Resources–Eligible Sites and Recommendations (Revised)

Primary Site No. (State Site Trinomial)	Field Site No.	Site Type	Age	NRHP-/CRHR-Eligibility Recommendation and Criteria	Testing and Treatment Recommendations
P-33-000343 (CA-RIV-343T)	9003	trail	prehistoric	recommended eligible; Criterion d/4, possibly Criteria a/1 or b/2	avoid; consult with tribes regarding Criteria a/1 and b/2
P-33-000772 (CA-RIV-772T)	110	trail	prehistoric	recommended eligible; Criterion d/4, possibly Criteria a/1 or b/2	avoid; consult with tribes regarding Criteria a/1 and b/2
P-33-001821 (CA-RIV-1821)	8020	rock feature with artifact scatter	prehistoric	recommended eligible; Criterion d/4, possibly Criteria a/1 or b/2	avoid; consult with tribes regarding Criteria a/1 and b/2
P-33-019618 (CA-RIV-009935)	127	multicomponent artifact concentration	prehistoric component only	recommended eligible; Criterion d/4	avoid
P-33-024719 (CA-RIV-012240)	17	rock feature with artifact scatter	prehistoric	possibly eligible; Criterion d/4	conduct formal testing to evaluate NRHP eligibility
P-33-024283 (CA-RIV-011937)	83	rock feature with artifact scatter	prehistoric	recommended eligible; Criterion d/4	avoid
P-33-023456 (CA-RIV-011990)	1059	rock feature with artifact scatter	prehistoric	possibly eligible; Criterion d/4	conduct formal testing to evaluate NRHP and CRHR eligibility
P-33-024361 (CA-RIV-011995)	2021	rock feature with artifact scatter	prehistoric	recommended eligible; Criterion d/4	avoid, if feasible, or conduct data recovery
P-33-024377 (CA-RIV-012011)	3019	rock feature with artifact scatter	prehistoric	possibly eligible; Criterion d/4	conduct formal testing to evaluate NRHP and CRHR eligibility
P-33-024385 (CA-RIV-012019)	3039	rock feature	prehistoric	possibly eligible; Criterion d/4	conduct formal testing to evaluate NRHP and CRHR eligibility
P-33-024393 (CA-RIV-012027)	3237	rock feature	prehistoric	possibly eligible; Criterion d/4	conduct formal testing to evaluate NRHP and CRHR eligibility
P-33-024394 (CA-RIV-012028)	3255	trail	prehistoric	recommended eligible; Criterion d/4, possibly Criteria a/1 or b/2	avoid; consult with tribes regarding Criteria a/1 and b/2
P-33-024459 (CA-RIV-012091)	4085	rock feature	prehistoric	possibly eligible; Criterion d/4	conduct formal testing to evaluate NRHP and CRHR eligibility
P-33-024476 (CA-RIV-012108)	4241	rock feature with artifact scatter	prehistoric	possibly eligible; Criterion d/4	conduct formal testing to evaluate NRHP and CRHR eligibility
P-33-024496 (CA-RIV-012128)	6033	rock feature with artifact scatter	prehistoric	possibly eligible; Criterion d	conduct formal testing to evaluate NRHP and CRHR eligibility
P-33-024497 (CA-RIV-012129)	6034	rock feature with artifact scatter	prehistoric	recommended eligible; Criterion d/4	avoid, if feasible, or conduct data recovery
P-33-024511 (CA-RIV-012143)	7009	rock feature	prehistoric	possibly eligible; Criterion d/4	conduct formal testing to evaluate NRHP and CRHR eligibility

Key: CRHR= California Register of Historical Resources; NRHP = National Register of Historic Places; SRI = Statistical Research, Inc.

Possibly Eligible Sites

Nine prehistoric sites were identified as being possibly eligible for listing in the NRHP/CRHR because of overall site integrity and their potential for providing information that may help address the research questions presented in Chapter 3 of the original report (Lerch et al. 2016). As with the recommended eligible sites, these sites should be avoided to lessen adverse effects to these resources during construction of the DQSP; if avoidance is not feasible, then appropriate mitigative treatments should be implemented. For the four prehistoric rock-feature sites (SRI-3039, SRI-3237, SRI-4085, and SRI-7009) and five prehistoric rock-feature sites with artifact scatters (SRI-17, SRI-1059, SRI-3019, SRI-4241, and SRI-6033), testing and/or data recovery of the sites to confirm eligibility and to capture any information that may help address research questions is warranted.

Additional Testing of Rock-Feature Sites

Fire-affected rock features are one of the more common features within the direct APE as well as within the landscape in the vicinity of the project (Jordan and Tennyson 2011; Keller 2010). Many of the rock features associated with the sites within the direct APE appear deflated or scattered. Those with observable good integrity are indicated above as recommended eligible or possibly eligible for listing in the NRHP. Usually for sites recommended not eligible, no additional testing or mitigative treatments are recommended. However, many of these features are located in areas associated with the Orita and Rositas soil series, where there is a high potential for buried resources (see Lerch et al. 2016:110–118). Additional testing is recommended at a sample of these sites that cannot feasibly be avoided to confirm their scattered and surficial nature, as well as provide comparative information for the intact sites where testing and data recovery will occur.

Mule Tank Discontiguous Rock Art District Viewshed

Although located within the indirect APE and more than 1 mile from the direct APE, the Mule Tank Discontiguous Rock Art District (P-33-000504 and P-33-000773) is located at a higher elevation and looks out over the project area. P-33-000504 is the petroglyph locus within the district, and P-33-000773 is the geoglyph/intaglio component. These sites are listed in the NRHP and were recommended eligible, based on Criteria c and d. Therefore, any visual adverse effect the DQSP may have on the viewshed of the district must be addressed and mitigated. Using geographic information system data and aerial photography of the area, the viewshed of the district will be identified. If the DQSP area is found to create a visual adverse effect, mitigation of the adverse effect in the form of an intensive and detailed site record update involving recordation of the geoglyphs and petroglyphs within the district should occur.

Pilot Knob–Blythe and Blythe-Niland 161-kV Transmission Lines

Two transmission lines located within the indirect APE have been determined NRHP-eligible during previous projects and are also considered historical resources eligible for listing in the CRHR. These resources, the Pilot Knob–Blythe 161-kV transmission line (P-33-11110) and the Blythe–Niland 161-kV transmission line (P-33-012532/CA-RIV-7127H), are industrial, linear resources of more than 60 miles in length that parallel the southeastern boundary of the DQSP for approximately 2 miles. These sites are not located in the direct APE and thus will not be subject to direct adverse effects from the DQSP. Their locations adjacent to the DQSP and within the indirect APE require consideration of whether construction and operation of the DQSP will result in the introduction of visual, audible, or atmospheric elements that are out of character with the properties or that will alter their settings. Because both the existing resources and the proposed project represent components of energy-related industrial uses, the DQSP does not appear to represent an adverse effect to these resources, and no recommendations to mitigate impacts are made.

Buried-Site Sensitivity

The buried-site-sensitivity model (Lerch et al. 2016:Chapter 4) identified the Orita and Rositas soil series as having high potential for buried archaeological resources at depths of up to 150 cm or more below the ground surface (see Lerch et al. 2016:Figure 16, Table 19). These two soils cover a southwest–northeast swath through the central portion of the direct APE as well in the northern portion of the direct APE and along the gen-tie corridor. Smaller pockets of the soils are also located in the southern, eastern, and north-eastern portion of the direct APE. Because of the sensitivity of these areas and the unknown nature of the subsurface deposits, test excavation and trenching is recommended to confirm the potential depths where buried resources may be present, especially along the gen-tie corridor and in the smaller pockets where fewer surface discoveries were made. Furthermore, although archaeological monitoring may be required for the entirety of the direct APE, earthmoving activities in areas associated with the Orita and Rositas soil series are particularly sensitive and should specifically be monitored.

Site Evaluations and National Register of Historic Places–/California Register of Historical Resources–Eligibility Recommendations

Primary Site No. (P-)	State Site Trinomial	Field Site No.	Age	Site Type	Condition/Integrity[a] (Comments)	NRHP-/ CRHR-Eligibility Status	NRHP-/ CRHR-Eligibility Criterion/Criteria
33-024804	CA-RIV-012294	SRI-2	historical period	artifact concentration	good/some	not eligible	
33-024678	CA-RIV-012209	SRI-3	historical period	artifact concentration	fair/some	not eligible	
33-024805	CA-RIV-012295	SRI-7	historical period	artifact concentration	fair/some	not eligible	
33-024810	CA-RIV-012300	SRI-9	historical period	artifact concentration	good/some	not eligible	
33-008133	CA-RIV-006043	SRI-16	prehistoric	lithic scatter	fair/some	not eligible	
33-024719	CA-RIV-012240	SRI-17	prehistoric	features with artifact concentration	good/all (some OHV tracks)	possibly eligible	Criterion d/4
33-024806	CA-RIV-012296	SRI-18	historical period	artifact concentration	good/some	not eligible	
33-024807	CA-RIV-012297	SRI-19	historical period	artifact concentration	fair/some	not eligible	
33-024808	CA-RIV-012298	SRI-21	historical period	artifact concentration	fair/some	not eligible	
33-024809	CA-RIV-012299	SRI-25	historical period	artifact concentration	fair/some	not eligible	
33-024270	CA-RIV-011924	SRI-26	historical period	artifact concentration	fair/some	not eligible	
33-024271	CA-RIV-011925	SRI-27	historical period	artifact concentration	fair/some	not eligible	
33-024272	CA-RIV-011926	SRI-29	prehistoric	rock features	good/all	not eligible	
33-024273	CA-RIV-011927	SRI-36	historical period	artifact concentration	good/some	not eligible	
33-024308	CA-RIV-011962	SRI-42	historical period	water well site	fair/some	not eligible	
33-024274	CA-RIV-011928	SRI-52	prehistoric	ceramic scatter	good/all	not eligible	
33-024275	CA-RIV-011929	SRI-58	prehistoric	rock features	good/all	not eligible	
33-024276	CA-RIV-011930	SRI-61	prehistoric	rock features	good/all	not eligible	
33-024277	CA-RIV-011931	SRI-63	historical period	artifact concentration	fair/some	not eligible	
33-024278	CA-RIV-011932	SRI-65	prehistoric	features with artifact concentration	good/all	not eligible	
33-024279	CA-RIV-011933	SRI-69	historical period	artifact concentration	fair/some	not eligible	
33-024280	CA-RIV-011934	SRI-71	multicomponent	artifact concentration	fair/some	not eligible	
33-024281	CA-RIV-011935	SRI-75	prehistoric	rock features	good/all	not eligible	
33-024282	CA-RIV-011936	SRI-81	historical period	artifact concentration	fair/some	not eligible	

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Primary Site No. (P-)	State Site Trinomial	Field Site No.	Age	Site Type	Condition/Integrity[a] (Comments)	NRHP-/ CRHR-Eligibility Status	NRHP-/ CRHR-Eligibility Criterion/Criteria
33-024283	CA-RIV-011937	SRI-83	prehistoric	features with artifact concentration	good/all (some OHV tracks)	recommended eligible	Criterion d/4
33-024284	CA-RIV-011938	SRI-96	historical period	road/trail	good/all	not eligible	
33-014147		SRI-101	historical period	military activity	fair/some	not eligible	
33-014199	CA-RIV-009098	SRI-107	historical period	road/trail	poor/none	not eligible	
33-000772	CA-RIV-000772T	SRI-110	prehistoric	trail	mostly good (partially obscured)	recommended eligible	Criterion d/4, possibly a/1 or b/2
33-024309	CA-RIV-011963	SRI-119	historical period	military activity	poor/none	not eligible	
33-024310	CA-RIV-011965	SRI-120	historical period	artifact concentration	good/some	not eligible	
33-024311	CA-RIV-011966	SRI-121	historical period	road/trail	fair/some	not eligible	
33-024312	CA-RIV-011967	SRI-122	historical period	road/trail	fair/some	not eligible	
33-024285	CA-RIV-011939	SRI-124	prehistoric	features with artifact concentration	fair/some	not eligible	
33-024286	CA-RIV-011940	SRI-125	historical period	artifact concentration	good/some	not eligible	
33-019618	CA-RIV-009935	SRI-127	multicomponent	artifact concentration/ lithic scatter	good/all (some OHV tracks and modern refuse)	recommended eligible	Criterion d/4
33-024287	CA-RIV-011941	SRI-129	historical period	road/trail	good/all	not eligible	
33-024288	CA-RIV-011942	SRI-132	historical period	artifact concentration	good/some	not eligible	
33-024289	CA-RIV-011943	SRI-133	prehistoric	features with artifact concentration	good/all	not eligible	
33-024290	CA-RIV-011944	SRI-134	prehistoric	features with artifact concentration	good/all	not eligible	
33-024291	CA-RIV-011945	SRI-137	historical period	artifact concentration	fair/some	not eligible	
33-024292	CA-RIV-011946	SRI-138	historical period	artifact concentration	fair/some	not eligible	
33-019739	CA-RIV-010053	SRI-139	prehistoric	lithic scatter	fair/some	not eligible	
33-018916	CA-RIV-010078	SRI-140	historical period	artifact concentration	poor/none	not eligible	
33-018853	CA-RIV-009649	SRI-146	historical period	artifact concentration	fair/some	not eligible	
33-024293	CA-RIV-011947	SRI-147	historical period	artifact concentration	good/some	not eligible	

Primary Site No. (P-)	State Site Trinomial	Field Site No.	Age	Site Type	Condition/Integrity[a] (Comments)	NRHP-/ CRHR-Eligibility Status	NRHP-/ CRHR-Eligibility Criterion/Criteria
33-024294	CA-RIV-011948	SRI-1001	historical period	artifact concentration	good/some	not eligible	
33-024295	CA-RIV-011949	SRI-1009	historical period	artifact concentration	good/some	not eligible	
33-021132	CA-RIV-010964	SRI-1010	historical period	artifact concentration	good/some	not eligible	
33-024296	CA-RIV-011950	SRI-1011	historical period	artifact concentration	fair/some	not eligible	
33-024297	CA-RIV-011951	SRI-1014	prehistoric	features with artifact concentration	good/all	not eligible	
33-024298	CA-RIV-011952	SRI-1021	historical period	artifact concentration	poor/none	not eligible	
33-024299	CA-RIV-011953	SRI-1024	historical period	artifact concentration	good/some	not eligible	
33-024300	CA-RIV-011954	SRI-1025	prehistoric	rock features	poor/none	not eligible	
33-024301	CA-RIV-011955	SRI-1035	historical period	artifact concentration	good/some	not eligible	
33-024302	CA-RIV-011956	SRI-1037	historical period	artifact concentration	good/some	not eligible	
33-024303	CA-RIV-011957	SRI-1043	prehistoric	rock features	good/all	not eligible	
33-024304	CA-RIV-011958	SRI-1049	historical period	artifact concentration	fair/some	not eligible	
33-024305	CA-RIV-011959	SRI-1053	prehistoric	features with artifact concentration	good/all	not eligible	
33-024306	CA-RIV-011960	SRI-1056	historical period	artifact concentration	good/some	not eligible	
33-024307	CA-RIV-011961	SRI-1058	prehistoric	features with artifact concentration	good/all	not eligible	
33-024356	CA-RIV-011990	SRI-1059	prehistoric	features with artifact concentration	fair/some (OHV and military activity, deflated features)	possibly eligible	Criterion d/4
33-024357	CA-RIV-011991	SRI-1061	prehistoric	ceramic scatter	good/all	not eligible	
33-017328		SRI-1068	historical period	road/trail	mostly good (partially obscured)	not eligible	
33-024358	CA-RIV-011992	SRI-1070	historical period	artifact concentration	good/some	not eligible	
33-014198		SRI-1073	historical period	artifact concentration	fair/some	not eligible	
33-024313	CA-RIV-011968	SRI-1076	historical period	artifact concentration	fair/some	not eligible	
33-024314	CA-RIV-011969	SRI-2001	historical period	artifact concentration	fair/some	not eligible	
33-024315	CA-RIV-011970	SRI-2007	historical period	artifact concentration	fair/some	not eligible	

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Primary Site No. (P-)	State Site Trinomial	Field Site No.	Age	Site Type	Condition/Integrity[a] (Comments)	NRHP-/ CRHR-Eligibility Status	NRHP-/ CRHR-Eligibility Criterion/Criteria
33-024316	CA-RIV-011971	SRI-2008	historical period	artifact concentration	fair/some	not eligible	
33-024317	CA-RIV-011972	SRI-2009	historical period	artifact concentration	fair/some	not eligible	
33-024359	CA-RIV-011993	SRI-2014	historical period	artifact concentration	fair/some	not eligible	
33-024360	CA-RIV-011994	SRI-2017	historical period	artifact concentration	good/some	not eligible	
33-024361	CA-RIV-011995	SRI-2021	prehistoric	features with artifact concentration	good/all (some OHV tracks)	recommended eligible	Criterion d/4
33-024362	CA-RIV-011996	SRI-2023	historical period	artifact concentration	good/some	not eligible	
33-024363	CA-RIV-011997	SRI-2029	historical period	artifact concentration	fair/some	not eligible	
33-024318	CA-RIV-011973	SRI-2030	historical period	artifact concentration	good/some	not eligible	
33-024319	CA-RIV-011974	SRI-2034	prehistoric	rock features	good/all	not eligible	
33-024364	CA-RIV-011998	SRI-2035	historical period	artifact concentration	fair/some	not eligible	
33-024365	CA-RIV-011999	SRI-2042	prehistoric	lithic scatter	good/all	not eligible	
33-024366	CA-RIV-012000	SRI-2051	historical period	road/trail	fair/some	not eligible	
33-024320	CA-RIV-011975	SRI-2066	historical period	artifact concentration	good/some	not eligible	
33-024367	CA-RIV-012001	SRI-2067	historical period	artifact concentration	good/some	not eligible	
33-024368	CA-RIV-012002	SRI-2068	multicomponent	artifact concentration/ ceramic scatter	fair/some	not eligible	
33-024321	CA-RIV-011976	SRI-2082	historical period	artifact concentration	good/some	not eligible	
33-024322	CA-RIV-011977	SRI-2088	historical period	artifact concentration	fair/some	not eligible	
33-024323	CA-RIV-011978	SRI-2094	historical period	artifact concentration	good/some	not eligible	
33-024324	CA-RIV-011979	SRI-2098	historical period	artifact concentration	good/some	not eligible	
33-024325	CA-RIV-011980	SRI-2100	historical period	artifact concentration	good/some	not eligible	
33-019740	CA-RIV-010054H	SRI-2113	historical period	artifact concentration	good/some	not eligible	
33-024369	CA-RIV-012003	SRI-2128	historical period	artifact concentration	good/some	not eligible	
33-024370	CA-RIV-012004	SRI-2135	historical period	military activity	good/all	not eligible	
33-024371	CA-RIV-012005	SRI-2136	prehistoric	ceramic scatter	good/all	not eligible	

Primary Site No. (P-)	State Site Trinomial	Field Site No.	Age	Site Type	Condition/Integrity[a] (Comments)	NRHP-/ CRHR-Eligibility Status	NRHP-/ CRHR-Eligibility Criterion/Criteria
33-024372	CA-RIV-012006	SRI-2329	prehistoric	features with artifact concentration	poor/none	not eligible	
33-024355	CA-RIV-011989	SRI-2333	historical period	road/trail	good/all	not eligible	
33-021264	CA-RIV-011057	SRI-2322	historical period	military activity	fair/some	not eligible	
33-024373	CA-RIV-012007	SRI-2582	historical period	artifact concentration	good/some	not eligible	
33-018675	CA-RIV-010077	SRI-2668	historical period	artifact concentration	fair/some	not eligible	
33-024326	CA-RIV-011981	SRI-3007	historical period	artifact concentration	fair/some	not eligible	
33-024327	CA-RIV-011982	SRI-3010	historical period	artifact concentration	fair/some	not eligible	
33-024374	CA-RIV-012008	SRI-3014	historical period	artifact concentration	good/some	not eligible	
33-024375	CA-RIV-012009	SRI-3015	multicomponent	artifact concentration	poor/none	not eligible	
33-024376	CA-RIV-012010	SRI-3017	prehistoric	rock features	good/all	not eligible	
33-024377	CA-RIV-012011	SRI-3019	prehistoric	features with artifact concentration	good/all (OHV activity, deflated features)	possibly eligible	Criterion d/4
33-024378	CA-RIV-012012	SRI-3020	historical period	artifact concentration	fair/some	not eligible	
33-024379	CA-RIV-012013	SRI-3022	prehistoric	rock features	good/all	not eligible	
33-024380	CA-RIV-012014	SRI-3027	historical period	artifact concentration	good/some	not eligible	
33-024381	CA-RIV-012015	SRI-3029	historical period	artifact concentration	good/some	not eligible	
33-024382	CA-RIV-012016	SRI-3031	historical period	artifact concentration	good/some	not eligible	
33-024383	CA-RIV-012017	SRI-3037	historical period	artifact concentration	good/some	not eligible	
33-024384	CA-RIV-012018	SRI-3038	historical period	artifact concentration	good/some	not eligible	
33-024385	CA-RIV-012019	SRI-3039	prehistoric	rock features	good/all (no disturbances)	possibly eligible	Criterion d/4
33-024386	CA-RIV-012020	SRI-3040	prehistoric	features with artifact concentration	good/all	not eligible	
33-024387	CA-RIV-012021	SRI-3041	prehistoric	features with artifact concentration	good/all	not eligible	
33-024388	CA-RIV-012022	SRI-3042	prehistoric	features with artifact concentration	good/all	not eligible	

continued on next page

Primary Site No. (P-)	State Site Trinomial	Field Site No.	Age	Site Type	Condition/Integrity[a] (Comments)	NRHP-/ CRHR-Eligibility Status	NRHP-/ CRHR-Eligibility Criterion/Criteria
33-024389	CA-RIV-012023	SRI-3045	prehistoric	rock features	good/all	not eligible	
33-024390	CA-RIV-012024	SRI-3047	prehistoric	rock features	good/all	not eligible	
33-024423	CA-RIV-012055	SRI-3054	historical period	military activity	good/all	not eligible	
33-024424	CA-RIV-012056	SRI-3057	prehistoric	lithic scatter	good/all	not eligible	
33-024425	CA-RIV-012057	SRI-3059	prehistoric	ceramic scatter	good/all	not eligible	
33-024426	CA-RIV-012058	SRI-3078	historical period	artifact concentration	fair/some	not eligible	
33-024349	CA-RIV-011983	SRI-3101	prehistoric	features with artifact concentration	good/all	not eligible	
33-024350	CA-RIV-011984	SRI-3103	historical period	artifact concentration	fair/some	not eligible	
33-024351	CA-RIV-011985	SRI-3108	historical period	artifact concentration	good/some	not eligible	
33-024352	CA-RIV-011986	SRI-3115	historical period	artifact concentration	good/some	not eligible	
33-024353	CA-RIV-011987	SRI-3116	historical period	artifact concentration	fair/some	not eligible	
33-024354	CA-RIV-011988	SRI-3117	historical period	artifact concentration	fair/some	not eligible	
33-024427	CA-RIV-012059	SRI-3119	historical period	artifact concentration	fair/some	not eligible	
33-024428	CA-RIV-012060	SRI-3123	historical period	artifact concentration	fair/some	not eligible	
33-024429	CA-RIV-012061	SRI-3124	historical period	artifact concentration	fair/some	not eligible	
33-024430	CA-RIV-012062	SRI-3127	historical period	artifact concentration	fair/some	not eligible	
33-024431	CA-RIV-012063	SRI-3135	prehistoric	lithic scatter	fair/some	not eligible	
33-024432	CA-RIV-012064	SRI-3147	prehistoric	lithic scatter	fair/some	not eligible	
33-002795	CA-RIV-002795	SRI-3149	prehistoric	lithic scatter	good/all	not eligible	
33-024433	CA-RIV-012065	SRI-3155	historical period	artifact concentration	fair/some	not eligible	
33-024434	CA-RIV-012066	SRI-3156	historical period	artifact concentration	good/some	not eligible	
33-024435	CA-RIV-012067	SRI-3158	historical period	artifact concentration	good/some	not eligible	
33-024391	CA-RIV-012025	SRI-3175	prehistoric	rock features	good/all	not eligible	
33-024436	CA-RIV-012068	SRI-3186	prehistoric	ceramic scatter	poor/none	not eligible	
33-024437	CA-RIV-012069	SRI-3205	prehistoric	rock features	poor/none	not eligible	
33-024392	CA-RIV-012026	SRI-3211	prehistoric	rock features	good/all	not eligible	

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33-024438	CA-RIV-012070	SRI-3224	prehistoric	rock features	good/all	not eligible	
33-024439	CA-RIV-012071	SRI-3228	prehistoric	ceramic scatter	good/all	not eligible	
33-024393	CA-RIV-012027	SRI-3237	prehistoric	artifact concentration	good/all (no disturbances)	possibly eligible	Criterion d/4
33-024394	CA-RIV-012028	SRI-3255	prehistoric	trail	mostly good (partially obscured)	recommended eligible	Criterion d/4, possibly a/1 or b/2
33-024395	CA-RIV-012029	SRI-3256	historical period	artifact concentration	good/some	not eligible	
33-024396	CA-RIV-012030	SRI-3260	multicomponent	artifact concentration/ ceramic scatter	good/all	not eligible	
33-013660		SRI-3273	prehistoric	features with artifact concentration	good/all	not eligible	
33-024440	CA-RIV-012072	SRI-3306	prehistoric	lithic scatter	good/all	not eligible	
33-024441	CA-RIV-012073	SRI-3331	prehistoric	rock features	good/all	not eligible	
33-014151		SRI-3408	prehistoric	ceramic scatter	good/all	not eligible	
33-024442	CA-RIV-012074	SRI-3487	prehistoric	rock features	fair/some	not eligible	
33-024397	CA-RIV-012031	SRI-4004	historical period	artifact concentration	good/some	not eligible	
33-024398	CA-RIV-012032	SRI-4005	historical period	artifact concentration	fair/some	not eligible	
33-024443	CA-RIV-012075	SRI-4014	prehistoric	rock features	good/all	not eligible	
33-024444	CA-RIV-012076	SRI-4016	prehistoric	features with artifact concentration	good/all	not eligible	
33-024445	CA-RIV-012077	SRI-4017	multicomponent	artifact concentration/ rock features	good/all	not eligible	
33-024446	CA-RIV-012078	SRI-4019	historical period	artifact concentration	fair/some	not eligible	
33-024447	CA-RIV-012079	SRI-4024	prehistoric	lithic scatter	good/all	not eligible	
33-024448	CA-RIV-012080	SRI-4028	historical period	artifact concentration	good/some	not eligible	
33-024449	CA-RIV-012081	SRI-4034	historical period	artifact concentration	good/some	not eligible	
33-024450	CA-RIV-012082	SRI-4041	historical period	artifact concentration	good/some	not eligible	
33-024399	CA-RIV-012033	SRI-4045	historical period	artifact concentration	good/some	not eligible	

continued on next page

Primary Site No. (P-)	State Site Trinomial	Field Site No.	Age	Site Type	Condition/Integrity[a] (Comments)	NRHP-/ CRHR-Eligibility Status	NRHP-/ CRHR-Eligibility Criterion/Criteria
33-024451	CA-RIV-012083	SRI-4054	prehistoric	rock features	good/all	not eligible	
33-024452	CA-RIV-012084	SRI-4056	prehistoric	features with artifact concentration	fair/some	not eligible	
33-024453	CA-RIV-012085	SRI-4060	multicomponent	artifact concentration/ lithic scatter	good/all	not eligible	
33-024454	CA-RIV-012086	SRI-4063	prehistoric	rock features	good/all	not eligible	
33-024455	CA-RIV-012087	SRI-4078	prehistoric	ceramic scatter	fair/some	not eligible	
33-024456	CA-RIV-012088	SRI-4079	prehistoric	rock features	fair/some	not eligible	
33-024457	CA-RIV-012089	SRI-4080	historical period	artifact concentration	fair/some	not eligible	
33-024458	CA-RIV-012090	SRI-4084	prehistoric	features with artifact concentration	fair/some	not eligible	
33-024459	CA-RIV-012091	SRI-4085	prehistoric	rock features	fair/some (OHV activity, deflated features)	possibly eligible	Criterion d/4
33-024460	CA-RIV-012092	SRI-4098	historical period	artifact concentration	fair/some	not eligible	
33-024400	CA-RIV-012034	SRI-4116	historical period	artifact concentration	good/some	not eligible	
33-024401	CA-RIV-012035	SRI-4127	historical period	artifact concentration	fair/some	not eligible	
33-024402	CA-RIV-012036	SRI-4145	historical period	artifact concentration	fair/some	not eligible	
33-024403	CA-RIV-012037	SRI-4151	historical period	artifact concentration	fair/some	not eligible	
33-024404	CA-RIV-012038	SRI-4160	historical period	artifact concentration	fair/some	not eligible	
33-024405	CA-RIV-012039	SRI-4162	historical period	military activity	poor/none	not eligible	
33-024406	CA-RIV-012040	SRI-4167	historical period	artifact concentration	fair/some	not eligible	
33-019735	CA-RIV-010049	SRI-4172	prehistoric	lithic scatter	good/all	not eligible	
33-019734	CA-RIV-010048/H	SRI-4173	historical period	artifact concentration/ lithic scatter	fair/some	not eligible	
33-024461	CA-RIV-012093	SRI-4175	historical period	artifact concentration	fair/some	not eligible	
33-024462	CA-RIV-012094	SRI-4178	historical period	artifact concentration	fair/some	not eligible	
33-024463	CA-RIV-012095	SRI-4180	historical period	military activity	good/all	not eligible	
33-024464	CA-RIV-012096	SRI-4182	historical period	artifact concentration	good/some	not eligible	

Primary Site No. (P-)	State Site Trinomial	Field Site No.	Age	Site Type	Condition/Integrity[a] (Comments)	NRHP-/ CRHR-Eligibility Status	NRHP-/ CRHR-Eligibility Criterion/Criteria
33-024465	CA-RIV-012097	SRI-4185	historical period	artifact concentration	fair/some	not eligible	
33-024466	CA-RIV-012098	SRI-4186	historical period	artifact concentration	fair/some	not eligible	
33-024467	CA-RIV-012099	SRI-4191	historical period	artifact concentration	good/some	not eligible	
33-024468	CA-RIV-012100	SRI-4196	historical period	artifact concentration	poor/none	not eligible	
33-019741	CA-RIV-010055H	SRI-4203	historical period	artifact concentration	good/all	not eligible	
33-019733	CA-RIV-010047	SRI-4207	prehistoric	lithic scatter	poor/none	not eligible	
33-024469	CA-RIV-012101	SRI-4208	historical period	artifact concentration	good/some	not eligible	
33-019742	CA-RIV-010056H	SRI-4209	historical period	artifact concentration	fair/some	not eligible	
33-019736	CA-RIV-010050H	SRI-4211	historical period	artifact concentration	fair/some	not eligible	
33-024470	CA-RIV-012102	SRI-4217	historical period	artifact concentration	fair/some	not eligible	
33-024471	CA-RIV-012103	SRI-4222	historical period	artifact concentration	fair/some	not eligible	
33-024472	CA-RIV-012104	SRI-4229	historical period	artifact concentration	fair/some	not eligible	
33-024473	CA-RIV-012105	SRI-4231	historical period	artifact concentration	fair/some	not eligible	
33-024474	CA-RIV-012106	SRI-4235	historical period	artifact concentration	fair/some	not eligible	
33-024475	CA-RIV-012107	SRI-4236	historical period	artifact concentration	good/some	not eligible	
33-024476	CA-RIV-012108	SRI-4241	prehistoric	features with artifact concentration	good/all (no disturbances)	possibly eligible	Criterion d/4
33-024477	CA-RIV-012109	SRI-4242	historical period	artifact concentration	fair/some	not eligible	
33-024478	CA-RIV-012110	SRI-4248	historical period	artifact concentration	poor/none	not eligible	
33-024479	CA-RIV-012111	SRI-4250	historical period	artifact concentration	good/some	not eligible	
33-024407	CA-RIV-012041	SRI-5000	historical period	artifact concentration	fair/some	not eligible	
33-024408	CA-RIV-012042	SRI-5003	historical period	artifact concentration	good/some	not eligible	
33-024409	CA-RIV-012043	SRI-5006	historical period	artifact concentration	fair/some	not eligible	
33-024410	CA-RIV-012044	SRI-5008	historical period	artifact concentration	fair/some	not eligible	
33-024480	CA-RIV-012112	SRI-5029	historical period	artifact concentration	good/some	not eligible	
33-024481	CA-RIV-012113	SRI-5034	prehistoric	rock features	good/all	not eligible	

continued on next page

Primary Site No. (P-)	State Site Trinomial	Field Site No.	Age	Site Type	Condition/Integrity[a] (Comments)	NRHP-/ CRHR-Eligibility Status	NRHP-/ CRHR-Eligibility Criterion/Criteria
33-024482	CA-RIV-012114	SRI-5035	historical period	artifact concentration	fair/some	not eligible	
33-024483	CA-RIV-012115	SRI-5054	prehistoric	rock features	good/all	not eligible	
33-024411	CA-RIV-012045	SRI-5063	historical period	survey marker	good/all	not eligible	
33-024412	CA-RIV-012046	SRI-5067	prehistoric	features with artifact concentration	good/all	not eligible	
33-024413	CA-RIV-012047	SRI-5070	historical period	artifact concentration	good/some	not eligible	
33-024414	CA-RIV-012048	SRI-5073	historical period	artifact concentration	good/some	not eligible	
33-024415	CA-RIV-012049	SRI-5076	historical period	artifact concentration	good/some	not eligible	
33-024484	CA-RIV-012116	SRI-5083	historical period	artifact concentration	fair/some	not eligible	
33-024485	CA-RIV-012117	SRI-5087	historical period	artifact concentration	good/some	not eligible	
33-024486	CA-RIV-012118	SRI-5099	historical period	artifact concentration	good/some	not eligible	
33-024487	CA-RIV-012119	SRI-5106	multicomponent	artifact concentration	fair/some	not eligible	
33-018852	CA-RIV-009648	SRI-5108	historical period	artifact concentration	fair/some	not eligible	
33-019021	CA-RIV-009810	SRI-5109	prehistoric	lithic scatter	good/all	not eligible	
33-019743	CA-RIV-010057H	SRI-5122	historical period	artifact concentration	good/some	not eligible	
33-024488	CA-RIV-012120	SRI-5132	historical period	artifact concentration	fair/some	not eligible	
33-024489	CA-RIV-012121	SRI-5135	historical period	artifact concentration	fair/some	not eligible	
33-024416	CA-RIV-012050	SRI-6003	historical period	artifact concentration	good/some	not eligible	
33-024417	CA-RIV-012051	SRI-6005	historical period	artifact concentration	fair/some	not eligible	
33-024490	CA-RIV-012122	SRI-6011	historical period	artifact concentration	good/some	not eligible	
33-024491	CA-RIV-012123	SRI-6017	historical period	artifact concentration	good/some	not eligible	
33-024492	CA-RIV-012124	SRI-6018	historical period	artifact concentration	fair/some	not eligible	
33-024493	CA-RIV-012125	SRI-6021	historical period	artifact concentration	good/some	not eligible	
33-024494	CA-RIV-012126	SRI-6022	historical period	artifact concentration	good/some	not eligible	
33-024495	CA-RIV-012127	SRI-6023	prehistoric	features with artifact concentration	good/all	not eligible	
33-008134	CA-RIV-006044	SRI-6025	prehistoric	ceramic scatter	good/all	not eligible	

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33-024496	CA-RIV-012128	SRI-6033	multicomponent	features with artifact concentration	good/all (no disturbances)	possibly eligible	Criterion d/4
33-024497	CA-RIV-012129	SRI-6034	prehistoric	features with artifact concentration	good/all (no disturbances)	recommended eligible	Criterion d/4
33-024498	CA-RIV-012130	SRI-6046	historical period	artifact concentration	fair/some	not eligible	
33-024418	CA-RIV-012052	SRI-6053	historical period	artifact concentration	good/some	not eligible	
33-024499	CA-RIV-012131	SRI-6059	historical period	artifact concentration	good/some	not eligible	
33-024419	CA-RIV-012053	SRI-6075	historical period	artifact concentration	good/some	not eligible	
33-024500	CA-RIV-012132	SRI-6081	historical period	artifact concentration	fair/some	not eligible	
33-024501	CA-RIV-012133	SRI-6087	historical period	artifact concentration	good/some	not eligible	
33-024502	CA-RIV-012134	SRI-6096	historical period	artifact concentration	fair/some	not eligible	
33-024503	CA-RIV-012135	SRI-6100	multicomponent	artifact concentration	fair/some	not eligible	
33-024504	CA-RIV-012136	SRI-6104	historical period	artifact concentration	fair/some	not eligible	
33-024505	CA-RIV-012137	SRI-6114	historical period	artifact concentration	good/some	not eligible	
33-024506	CA-RIV-012138	SRI-6115	historical period	artifact concentration	fair/some	not eligible	
33-024507	CA-RIV-012139	SRI-6119	historical period	artifact concentration	poor/none	not eligible	
33-024508	CA-RIV-012140	SRI-6471	prehistoric	rock features	good/all	not eligible	
33-024509	CA-RIV-012141	SRI-6491	multicomponent	lithic scatter	fair/some	not eligible	
33-017317	CA-RIV-009007	SRI-6519	prehistoric	lithic scatter	fair/some	not eligible	
33-002796	CA-RIV-002796	SRI-6523	prehistoric	lithic scatter	good/all	not eligible	
33-024510	CA-RIV-012142	SRI-7008	prehistoric	features with artifact concentration	good/all	not eligible	
33-024511	CA-RIV-012143	SRI-7009	prehistoric	rock features	good/all (no disturbances)	possibly eligible	Criterion d/4
33-024512	CA-RIV-012144	SRI-7010	prehistoric	features with artifact concentration	good/all	not eligible	
33-024513	CA-RIV-012145	SRI-7018	historical period	artifact concentration	fair/some	not eligible	
33-024514	CA-RIV-012146	SRI-7019	prehistoric	lithic scatter	good/all	not eligible	

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Primary Site No. (P-)	State Site Trinomial	Field Site No.	Age	Site Type	Condition/Integrity[a] (Comments)	NRHP-/ CRHR-Eligibility Status	NRHP-/ CRHR-Eligibility Criterion/Criteria
33-024515	CA-RIV-012147	SRI-7020	historical period	artifact concentration	good/some	not eligible	
33-024420	CA-RIV-012054	SRI-7024	historical period	artifact concentration	good/some	not eligible	
33-024516	CA-RIV-012148	SRI-7029	prehistoric	rock features	fair/some	not eligible	
33-024517	CA-RIV-012149	SRI-7031	prehistoric	features with artifact concentration	fair/some	not eligible	
33-024518	CA-RIV-012150	SRI-7040	multicomponent	rock features	good/all	not eligible	
33-024519	CA-RIV-012151	SRI-7060	historical period	artifact concentration	poor/none	not eligible	
33-024520	CA-RIV-012152	SRI-7065	historical period	artifact concentration	good/some	not eligible	
33-024521	CA-RIV-012153	SRI-7066	prehistoric	features with artifact concentration	good/all	not eligible	
33-024522	CA-RIV-012154	SRI-7072	historical period	artifact concentration	fair/some	not eligible	
33-024523	CA-RIV-012155	SRI-7074	historical period	artifact concentration	fair/some	not eligible	
33-024524	CA-RIV-012156	SRI-7076	historical period	military activity	fair/some	not eligible	
33-024525	CA-RIV-012157	SRI-7087	historical period	military activity	fair/some	not eligible	
33-001821	CA-RIV-001821	SRI-8020	prehistoric	features with artifact concentration	good/all (OHV activity, deflated features)	recommended eligible	Criterion d/4, possibly a/1 or b/2
33-024526	CA-RIV-012158	SRI-8085	historical period	survey marker	fair/some	not eligible	
33-000343	CA-RIV-000343T	SRI-9003	prehistoric	trail	mostly good (partially obscured)	recommended eligible	Criterion d/4, possibly a/1 or b/2
33-014173	CA-RIV-009097	SRI-9013	historical period	road	fair/some	not eligible	
33-024818	CA-RIV-012307	SRI-9016	historical period	water well site	good/all	not eligible	
33-024813	CA-RIV-012303	SRI-9018	historical period	water well site	good/all	not eligible	
33-024817	CA-RIV-012306	SRI-9020	historical period	road	good/all	not eligible	
33-024421		various	historical period	isolates (Ripley 7.5-minute quadrangle)	poor/none	not eligible	
33-024527		various	historical period	isolate (Roosevelt Mine 7.5-minute quadrangle)	poor/none	not eligible	
33-024422		various	prehistoric	isolates (Ripley 7.5-minute quadrangle)	poor/none	not eligible	

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33-024528		various	prehistoric	isolates (Roosevelt Mine 7.5-minute quadrangle)	poor/none	not eligible	
33-019390		IO-7088	prehistoric	isolate	poor/none	not eligible	

[a] Condition = good, fair, or poor; integrity = all, some, or none of the integrity aspects of location, design, setting, materials, workmanship, feeling and association.

Key: CRHR = California Register of Historical Resources; NRHP = National Register of Historic Places; OHV = off-highway vehicle.

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APPENDIX Q

PHASE I ENVIRONMENTAL SITE ASSESSMENT REPORT

PHASE I ENVIRONMENTAL SITE ASSESSMENT

FOR THE
FIRST SOLAR DESERT QUARTZITE SOLAR PROJECT SITE

RIVERSIDE COUNTY, CALIFORNIA

Prepared for:

First Solar
135 Main Street, 6th Floor
San Francisco, California 94105

First Solar Purchase Order Number 4800024052

Prepared by:

URS
130 Robin Hill Road, Suite 100
Santa Barbara, California 93117
(805) 692-0600 ⬍ Fax: (805) 964-0259

URS Project Number 28907585

January 28, 2015

TABLE OF CONTENTS

Section **Page**

EXECUTIVE SUMMARY ES-1
1.0 INTRODUCTION 1-1

1.1 ASTM STANDARD AND ALL APPROPRIATE INQUIRIES 1-1

1.1.1 All Appropriate Inquiries 1-1
1.1.2 ASTM Standard 1-1

1.2 PURPOSE 1-2
1.3 SCOPE OF SERVICES 1-2
1.4 USER RELIANCE 1-4
1.5 LIMITATIONS AND EXCEPTIONS 1-4
1.6 DATA GAPS 1-5

2.0 SITE DESCRIPTION 2-1

2.1 LOCATION 2-1
2.2 FEATURES/USE 2-1
2.3 SITE VICINITY AND ADJACENT PROPERTIES 2-1

3.0 PHYSICAL SETTING 3-1

3.1 TOPOGRAPHY 3-1
3.2 SURFACE WATER 3-1
3.3 AREA GEOLOGY AND SOILS 3-1
3.4 HYDROGEOLOGY 3-1

4.0 HISTORICAL USE 4-1

4.1 HISTORICAL TOPOGRAPHIC MAPS 4-1
4.2 HISTORICAL AERIAL PHOTOGRAPHS 4-1
4.3 SANBORN FIRE INSURANCE MAPS 4-2
4.4 PREVIOUS ENVIRONMENTAL INVESTIGATIONS 4-2
4.5 SPECIALIZED USER KNOWLEDGE 4-2
4.6 TITLE RECORDS/ENVIRONMENTAL LIENS OR ACTIVITY AND USE LIMITATIONS 4-3
4.7 VALUATION REDUCTION FOR ENVIRONMENTAL ISSUES 4-3

4.8 SUMMARY OF HISTORICAL DATA 4-3

4.9 HISTORICAL DATA GAPS 4-3

5.0 SITE RECONNAISSANCE 5-1

5.1 INTERVIEWS 5-1
5.2 SITE CONDITIONS 5-1
5.3 HAZARDOUS SUBSTANCES 5-2
5.4 DRUMS AND OTHER CHEMICAL CONTAINERS 5-2
5.5 STORAGE TANKS 5-2

5.5.1 Aboveground Storage Tanks 5-2
5.5.2 Underground Storage Tanks 5-2

5.6 POLYCHLORINATED BIPHENYLS 5-2
5.7 WASTE DISPOSAL 5-2
5.8 DUMPING 5-3
5.9 PITS, PONDS, LAGOONS, SEPTIC SYSTEMS, CISTERNS, SUMPS, DRAINS, AND CLARIFIERS 5-3
5.10 PESTICIDE USE 5-3
5.11 STAINING AND DISCOLORED SOIL/SURFACES 5-3
5.12 STRESSED VEGETATION 5-3
5.13 UNUSUAL ODORS 5-3
5.14 ON-SITE WELLS 5-3
5.15 OTHER CONCERNS 5-4
5.16 NON-SCOPE CONSIDERATIONS 5-4

5.16.1 Asbestos 5-4
5.16.2 Lead-based Paint 5-4
5.16.3 Radon 5-4

6.0 AGENCY RECORDS REVIEW 6-1

6.1 DATABASE LIST SEARCH 6-1

6.1.1 Property 6-1
6.1.2 Site Vicinity 6-1
6.1.3 Orphan Sites 6-1
6.1.4 Vapor Migration 6-1

6.2 AGENCY CONTACTS 6-2

7.0 CONCLUSIONS 7-1

8.0 PREPARER SIGNATURES AND QUALIFICATIONS 8-1
9.0 REFERENCES 9-1

Tables

Table 1 Data Gaps 1-6

Figures

Figure 1 Topographic Map of Project Area
Figure 2 Aerial Map of Project Area

Appendices

Appendix A Site Photographs
Appendix B EDR Historical Topographic Map Report
Appendix C EDR USGS Aerial Photography Priority Package
Appendix D EDR DataMap Area Study
Appendix E NETR Environmental Lien Search Report
Appendix F AAI User/Site History Questionnaires

EXECUTIVE SUMMARY

This report presents the results of a Phase I Environmental Site Assessment (Phase I ESA) conducted by URS Corporation (URS) of the First Solar Desert Quartzite Solar Project Site (Solar Facility Site and the 600-foot-wide study corridor for the Gen-Tie Line), an approximately 4,843-acre property located in eastern Riverside County, California (property). The purpose of the Phase I ESA was to gather information concerning the property and surrounding areas in order to identify conditions indicative of releases or threatened releases of hazardous substances, pollutants, contaminants, petroleum or petroleum products, and controlled substances in order to identify and evaluate Recognized Environmental Conditions (REC) affecting the property. This Phase I ESA was accomplished by, and limited to, a site reconnaissance, a site vicinity perimeter survey, and review of agency databases and other reasonably ascertainable records regarding past and current land use for indications of the manufacture, generation, use, storage and/or disposal of hazardous substances at the property.

The Scope of Services performed was in accordance with the Technical Services Agreement dated November 24, 2009 between First Solar and URS, URS' proposal dated November 24, 2014, and First Solar Purchase Order Number 4800024052 dated December 3, 2014. The format and content of this Phase I ESA are in general accordance with ASTM International (ASTM) Standard Practice for *Environmental Site Assessments: Phase I Site Assessment Process E 1527-13* (ASTM 2013) approved on November 1, 2013, and the U.S. Environmental Protection Agency All Appropriate Inquiries *Standards and Practices for All Appropriate Inquiries – Final Rule: [40 CFR Part 312]*, approved November 1, 2006 and amended on December 30, 2013.

At the time of the site reconnaissance, the First Solar Desert Quartzite Solar Project Site (Solar Facility Site and the 600-foot-wide study corridor for the Gen-Tie Line [extends to the west of the main Project Site]) was observed to be approximately 4,843 acres of primarily undeveloped public lands administered by the U.S. Department of the Interior, Bureau of Land Management (BLM) and includes Assessor's Parcel Numbers (APN) 879-080-025, 879-080-020, 879-080-021, 879-090-031, 879-080-024, 879-090-033, 879-090-034, 879-090-035, 879-110-006, 879-110-007, 879-110-008, 879-110-009, 879-110-010, 879-110-012, 879-110-011, and one privately owned 160-acre parcel (APN 879-110-001). The property is located south of Interstate 10 and approximately 2.75 miles southwest of the western edge of the City of Blythe in an unincorporated area of eastern Riverside County in Sections 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15, 22, 23, and 24, Township 7 South, Range 21 East, within the San Bernardino Base and Meridian (U.S. Geological Survey [USGS] Ripley and Roosevelt Mine 7.5-minute quadrangles).

The BLM portion of the property has historically remained undeveloped desert land. The 160-acre private parcel was reportedly historically used for agricultural purposes/ undeveloped land.

The property was not identified on the databases searched by Environmental Data Resources, Inc. (EDR). No facilities in the site vicinity were identified on the databases searched by EDR (see Section 6.1, Database List Search for additional information).

URS has performed a Phase I ESA in conformance with the scope and limitations of ASTM Practice E1527 for the First Solar Desert Quartzite Solar Project Site, located in eastern Riverside County, California. Any exceptions to or deletions from this practice are described in Sections 1.3 and 1.5. The following RECs were identified on the property:

- Two suspected water supply wells located within the BLM parcels (APNs 879-090-035 and 879-110-010) were observed to be open and unsecured. The two suspected water wells did not have locked tops and were open and exposed to the elements. It is possible that unauthorized dumping may have occurred at these suspected wells and/or the open pipes could provide a conduit for contamination of groundwater and/or sediments.

This Executive Summary is not intended to be a “stand-alone” document, but a summary of findings as described in the Phase I ESA report. Its use is intended to be in conjunction with the findings and limitations described therein.

SECTION 1.0
INTRODUCTION

Presented in this report are the results of the Phase I Environmental Site Assessment (Phase I ESA) conducted by URS Corporation (URS) of the First Solar Desert Quartzite Solar Project Site, an approximately 4,843-acre property located in an unincorporated area of eastern Riverside County, California (property). This assessment was accomplished by, and limited to, a reconnaissance of the site, a perimeter survey of the site vicinity, and review of agency databases and other reasonably ascertainable information regarding past and current land use for indications of the manufacture, generation, use, storage, and/or disposal of hazardous substances at the property.

1.1 ASTM STANDARD AND ALL APPROPRIATE INQUIRIES

The format and content of this Phase I ESA are in general accordance with the ASTM International (ASTM) Standard Practice for *Environmental Site Assessments: Phase I Site Assessment Process E1527-13* (ASTM 2013) approved on November 1, 2013, and the U.S. Environmental Protection Agency (USEPA) All Appropriate Inquiries (AAI) *Standards and Practices for All Appropriate Inquiries – Final Rule: [40 CFR Part 312],* approved November 1, 2006 and amended on December 30, 2013.

1.1.1 All Appropriate Inquiries

The USEPA Rule on AAI was developed to establish federal regulatory requirements for conducting all appropriate inquiries into the previous ownership, uses, and environmental condition of the property for the purposes of qualifying for landowner liability protections to property owners under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as innocent landowners, bona fide prospective purchasers, and/or contiguous property owners. The Final Rule was published in the Federal Register on November 1, 2005, went into effect on November 1, 2006, and was amended on December 30, 2013. The 2013 amendment provides that the ASTM Standard E1527-13 is consistent with the AAI statutory requirements and may be used to comply with the provisions of the AAI Final Rule.

1.1.2 ASTM Standard

The ASTM Standard was approved by ASTM International on November 1, 2013 and was approved by the USEPA on December 30, 2013.

The goal of the ASTM Standard is to identify Recognized Environmental Conditions (REC). The ASTM Standard E1527-13 defines a REC as the presence or likely presence of any hazardous substance or petroleum products in, on, or at a property: 1) due to release to the environment; 2) under conditions indicative of a release to the environment; or 3) under conditions that pose a material threat of a future release to the environment. Conditions determined to be *de minimis* are not RECs.

A Controlled REC (CREC) is identified as a REC that has been addressed to the satisfaction of a regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (e.g., property use restrictions, activity and use limitations [AUL], institutional controls, or engineering controls).

A Historical REC (HREC) is identified as a REC that has been addressed to the satisfaction of a regulatory authority to meet unrestricted land use standards, without the need for controls such as property use restrictions, institutional controls, or engineering controls.

A *de minimis* condition is defined as a condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies.

1.2 PURPOSE

The purpose of the Phase I ESA is to gather information concerning the property and surrounding areas in order to identify conditions indicative of releases or threatened releases of hazardous substances, pollutants and contaminants, petroleum or petroleum products, and controlled substances.

1.3 SCOPE OF SERVICES

The Scope of Services performed was in accordance with the Technical Services Agreement dated November 24, 2009 between First Solar and URS, URS' proposal dated November 24, 2014, and First Solar Purchase Order Number 4800024052 dated December 3, 2014. The format and content of this Phase I ESA are in general accordance with the ASTM Standard E1527-13 and the USEPA AAI.

The Phase I ESA was accomplished by a site reconnaissance included a driving and walking tour of the property and a perimeter survey of surrounding and accessible adjacent properties and review of pertinent documentation available through URS' standard resources regarding past and current land use for indications of the manufacture, generation, use, storage and/or disposal of hazardous substances. To meet the objective of this Phase I ESA, URS completed the following tasks:

- Performed a reconnaissance survey of the property to make visual observations of existing site conditions and activities, and a perimeter survey of the area within 0.25 mile of the property (as practical) to observe types of general land use. Photographs of the property are provided in Appendix A.

- Reviewed and interpreted archival topographic maps of the property and the area within 0.5 mile of the property for information regarding historical land use potentially involving the manufacture, generation, use, storage and/or disposal of hazardous substances. Environmental Data Resources (EDR) historical topographic maps are included in Appendix B.
- Reviewed and interpreted available historical aerial photographs of the property and vicinity for evidence of previous site activities and development that would suggest the potential presence of hazardous substances at the property. The EDR U.S. Geological Survey (USGS) Aerial Photography Priority Package is included in Appendix C.
- Reviewed pertinent, available documents and maps regarding local physiographic and hydrogeologic conditions in the property vicinity.
- Reviewed the federal, state, and local database list search provided by EDR of known or potential hazardous waste sites or landfills, sites currently under investigation for environmental violations, and subsurface contamination in the surrounding area within specified radii of the property. The agency lists and area search results are provided in Appendix D.
- Reviewed and interpreted available documents regarding wells on the property and in the site vicinity, for evidence that would suggest the potential presence of hazardous substances at the property.
- Conducted inquiries in person, by telephone, or in writing to the appropriate regulatory agencies for information regarding environmental permits, violations or incidents, and/or the status of enforcement actions at the property.
- Conducted an environmental lien search of the 160-acre private parcel to determine potential environmental liens or other activity and use limitations associated with the property. The Nationwide Environmental Title Research (NETR) Environmental Lien Search Report is provided in Appendix E.
- Provided First Solar a copy of the AAI User Questionnaire to complete to obtain specialized knowledge of site conditions. The AAI User Questionnaire completed by Ms. Lien Dinh, Real Estate Manager with First Solar is included in Appendix F.
- Conducted an interview with Ms. Ms. Nicole Chao, daughter of current owners of the 160-acre private parcel (APN 879-110-001), to obtain specialized knowledge of site conditions. Ms. Chao provided answers to a Site History Questionnaire. The completed Site History Questionnaire is included in Appendix F.
- Contacted Mr. Cedric C. Perry, Project Manager with the BLM to obtain specialized knowledge of site conditions. Mr. Perry was not available for interview within the timeframe of the project.
- Reviewed previous environmental investigations pertaining to the property.

- Prepared this report describing the research performed and presenting URS' findings and professional opinions regarding the potential for adverse environmental impacts to the property.

1.4 USER RELIANCE

This report was prepared for use by First Solar, and shall not be relied upon by or transferred to any other party, or used for any other purpose, without the express written authorization of URS. This Phase I ESA is valid for 180 days.

1.5 LIMITATIONS AND EXCEPTIONS

The Phase I ESA report was prepared in accordance with URS' scope of work dated November 24, 2014 described in Section 1.3. This report and the associated work were provided in accordance with the principles and practices generally employed by the local environmental consulting profession. This is in lieu of all warranties, expressed or implied.

Discussions of the ASTM Standard or AAI data gaps, if any, including sources reviewed, the significance of each data gap, and an opinion if the data gap inhibits the environmental professional's ability to reach an opinion about contamination at the property, are incorporated into the appropriate sections of the report and summarized in Section 1.6.

It should be recognized that this Phase I ESA was not intended to be a definitive investigation of potential contamination at the property and the recommendations provided are not necessarily inclusive of all the possible conditions. This Phase I ESA is not a regulatory compliance audit or an evaluation of the efficiency of the use of any hazardous materials at the property. Soil and/or groundwater sampling was not undertaken as part of this investigation. The Phase I ESA did not include non-scope considerations listed in Section 13.1.5 of E1527-13 including asbestos-containing building materials, biological agents, cultural and historical resources, ecological resources, endangered species, health and safety, indoor air quality unrelated to releases of hazardous substances or petroleum products into the environment, industrial hygiene, lead-based paint, lead in drinking water, mold, radon, regulatory compliance, and wetlands. Non-scope considerations may represent a business environmental risk to the property. A business environmental risk is defined by ASTM as "a risk which can have a material environmental or environmentally-driven impact on the business associated with the current or planned use of a parcel of commercial real estate, not necessarily limited to those environmental issues required to be investigated in this practice." Given that the Scope of Services for this investigation was limited, it is possible that unobserved contamination might exist.

The conclusions presented are professional opinions based solely upon indicated data described in this report, visual site and vicinity observations, and the interpretation of the available historical information and documents reviewed, as described in this report. Unless

URS has actual knowledge to the contrary, information obtained from interviews or provided to URS by the client was assumed to be correct and complete. URS does not assume any liability for information that was misrepresented to URS by others or for items not visible, accessible or present on the property during the time of the site reconnaissance. The conclusions are intended exclusively for the purpose outlined herein and the site location and project indicated. The executed Scope of Services may not be appropriate to satisfy the needs of other users, and any use or reuse of this document or the findings, conclusions, or recommendations presented herein is at the sole risk of said user.

Opinions and recommendations presented herein apply to the site conditions existing at the time of this assessment and cannot necessarily apply to site changes of which URS is not aware and has not had the opportunity to evaluate. Changes in the conditions of this property may occur with time due to natural processes or the works of man on the property or adjacent properties. Changes in applicable standards may also occur as a result of legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated, wholly or in part, by changes beyond URS' control. Opinions and judgments expressed herein are based on URS' understanding and interpretation of current regulatory standards, and should not be construed as legal opinions.

1.5 DATA GAPS

During the assessment, URS identified data gaps which may have the potential to impact the conclusions of this Phase I ESA. A description of the data gap, as well as URS' opinion as to whether it may alter the conclusions of this Phase I ESA is provided in Table 1.

The data gaps identified in Table 1 are not expected to alter the conclusions of this Phase I ESA.

TABLE 1
DATA GAPS

Condition	Data Gap (Yes/No)	Description/Opinion
Data failure – uses of the property to first developed use (included agricultural use) or 1940, whichever is earlier	Yes	Available historical sources indicate that the property has remained undeveloped land with the 160-acre private parcel used for agricultural purposes as well as undeveloped land. The dates of the agricultural use could not be confirmed. However, it is URS' opinion that the historical data gap does not inhibit URS' evaluation of historical information or the potential of RECs at the property, and therefore it does not alter the conclusions of this report.
Data failure – historical uses of the property due to lack of information available (i.e., in 5-year intervals)	Yes	A historical data gap (intervals greater than 5 years of historical sources) was identified during the review of historical documentation for the property. However, it is URS' opinion that the historical data gap does not inhibit URS' evaluation of historical information or the potential of RECs at the property, and therefore it does not alter the conclusions of this report.
Data gap – interviews	Yes	The BLM contact for the BLM portions of the property was not available for interview within the timeframe of the project. Past owners of the property were not available for interview. In addition, occupants or owners of adjacent properties were not available to interview. It is URS' opinion that this data gap does not inhibit URS' evaluation for the potential of RECs at the property, and therefore it does not alter the conclusions of this report.
Data gap – user-provided information	No	No user-provided information data gap was identified.
Data gap – environmental liens	No	No environmental liens data gap was identified.
Limiting conditions – vegetation/ forest	No	No limiting conditions were encountered due to overgrown vegetation or forested areas.
Limiting condition – weather (snow, rain)	No	No limiting conditions were encountered due to the weather.
Limiting condition – storage/ active facility	No	No limiting conditions were encountered due to storage of goods or activities conducted on-site.
Limiting condition – access limitations (inaccessible rooms)	No	No limiting conditions were encountered due to access limitations at the time of the site visit.
Other	No	None.

SECTION 2.0
SITE DESCRIPTION

2.1 LOCATION

The property is located south of Interstate 10 and approximately 2.75 miles southwest of the western edge of the City of Blythe, in Sections 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15, 22, 23, and 24, Township 7 South, Range 21 East, within the San Bernardino Base and Meridian (USGS Ripley and Roosevelt Mine 7.5-minute quadrangles).

A topographic map and an aerial map of the Project Area are included as Figures 1 and 2, respectively.

2.2 FEATURES/USE

The First Solar Desert Quartzite Solar Project Site (Solar Facility Site and the 600-foot-wide study corridor for the Gen-Tie Line [extends to the west of the main Project Site]) was observed to be approximately 4,843 acres of primarily undeveloped public lands administered by the U.S. Department of the Interior, Bureau of Land Management (BLM) and includes APNs 879-080-025, 879-080-020, 879-080-021, 879-090-031, 879-080-024, 879-090-033, 879-090-034, 879-090-035, 879-110-006, 879-110-007, 879-110-008, 879-110-009, 879-110-010, 879-110-012, 879-110-011, and one privately owned 160-acre parcel (APN 879-110-001).

Construction activity was observed during the site reconnaissance within the project Gen-Tie Corridor along the western and northwestern portions of the property. Activity consisted of road construction and staging and assembly of electrical tower pieces.

2.3 SITE VICINITY AND ADJACENT PROPERTIES

The property is located within an area that is primarily undeveloped, developed for agriculture, and developed with rural residences in eastern Riverside County. In general, prominent adjoining land uses are as follows:

- North: McCoy Mountains, McCoy Wash, BLM Limited Multiple-Use Class (MUC) land with interspersed privately owned land and an existing operating solar plant, the community of Mesa Verde, and Interstate 10
- South: Palo Verde Mesa, Mule Mountains, BLM Limited MUC land with interspersed privately owned land
- East: Palo Verde Valley, agricultural land, some fallow land

- West: Southern California Edison’s Colorado River Substation, Mule Mountains, BLM Moderate and Limited MUC land with interspersed privately owned land

URS did not observe activities that would indicate the potential for surface or subsurface impacts to the property from adjoining properties.

SECTION 3.0
PHYSICAL SETTING

URS reviewed pertinent maps and readily available literature for information on the physiography and hydrogeology of the property. A summary of this information is presented in the following subsections.

3.1 TOPOGRAPHY

The property is located in Sections 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 15, 22, 23, and 24, Township 7 South, Range 21 East, within the San Bernardino Base and Meridian (USGS Ripley and Roosevelt Mine 7.5-minute quadrangles). Elevation of the property ranges from approximately 380 to 460 feet above mean sea level. Figure 1 presents the site topography at a scale of 1:24,000 using recent USGS data.

3.2 SURFACE WATER

A dry drainage was observed along the northern boundary of the property.

3.3 AREA GEOLOGY AND SOILS

The property is located in the northwestern Colorado Desert, which is part of the greater Colorado Desert Geomorphic Province. The Colorado Desert Province is characterized by isolated mountain ranges separated by broad alluvium-filled basins of Cenozoic sedimentary and volcanic materials overlying older rocks. The flood plain of the Colorado River forms the east margin of the area. The structural geology of the area is dominated by deformations associated with historic tectonic activity and recent and historical alluvial deposits associated with the Colorado River and the local mountain erosion patterns. The Colorado Desert province includes the Salton Sea, the Imperial Valley in the south, and the Coachella Valley in the north.

The property is located in the alluvial-filled basin of the Palo Verde Mesa. The basin is bound by the McCoy Mountains to the west, the Little Maria Mountains to the northwest, and the Big Maria mountains to the northeast.

The property is underlain by recent alluvium comprised of sand, silt, and gravel. Surface water in Palo Verde Mesa drains to the southeast and towards the Colorado River.

3.4 HYDROGEOLOGY

Groundwater in the area of the property is contained within the Palo Verde Mesa Groundwater Basin. Groundwater levels on the property are estimated to be 100-250 feet below ground surface.

SECTION 4.0
HISTORICAL USE

URS reviewed readily available historical data pertaining to the property. These references were reviewed for evidence of activities that would suggest the potential presence of hazardous substances at the property and to evaluate the potential for the property to be impacted by off-property sources of contamination. The objective of consulting historical sources is to develop a history of the previous uses of the property and surrounding area, in order to help identify the likelihood that past uses have resulted in RECs, CRECs, or HRECs in connection with the property. The following subsections present a summary of the review results.

4.1 HISTORICAL TOPOGRAPHIC MAPS

URS reviewed the following USGS 7.5-minute Quadrangle maps of California provided in the EDR Historical Topographic Map Report: Blythe (1947), Ripley (1952, 1970, and 1975), McCoy Spring (1952), Palo Verde Mountains (1953 and 2002), Roosevelt Mine (1983), Hopkins Well (1983), and Wiley Well (1983). These maps provide topographic map coverage of the property and site vicinity (see Appendix B). The following is a summary of the review:

- The maps depict the property, adjacent properties and site vicinity as undeveloped land. No structures are observed on the property. Various unimproved unnamed roads are observed on the property. Transmission lines are observed along the eastern and western boundaries of the property. Various canals, drains, and levees are observed in the site vicinity. Various roads are observed in the site vicinity. A Radio Facility, Nicholls Warm Springs, and the Blythe Airport are observed to the north and northeast of the property. Ridley, Neighbors and Blythe are observed to the east of the property. The Riverside County/La Paz County Line was observed southeast of the property. The 1983 and 2002 maps depict the site vicinity west of the property and north of the Mule Mountains which were observed southwest of the property.

4.2 HISTORICAL AERIAL PHOTOGRAPHS

The general type of activity and land use can often be discerned from the type and layout of structures visible in an aerial photograph; however, specific elements of a property operation cannot normally be determined from the photographs. Considering these conditions, URS reviewed historical aerial photographs dated 1947, 1956, 1968, 1981, 1990, and 2002 that were provided by EDR (see Appendix C). The following is a summary of the review:

1947 The property is depicted as undeveloped desert land. The adjacent properties are depicted as undeveloped desert land. Interstate 10 is observed to the north of the property. The Blythe Airport is observed in the site vicinity northeast of the property. Agricultural use is observed to the east of the property.

1956 No significant changes are observed to the property or adjacent properties. A small area of residential development is observed to the northeast of the property to the south of the Blythe Airport.

1968 No significant changes are observed to the property or adjacent properties. Increased residential development is observed to the northeast of the property. Agricultural development is observed surrounding the Blythe Airport.

1981 No significant changes are observed to the property, adjacent properties, or site vicinity.

1990 The 160-acre private parcel is observed to be used for agricultural purposes. No other changes are observed to the property. Solar panels are observed along the northeastern boundary of the property. Transmission lines are observed along the southwestern and southern boundaries of the property. Agricultural use is observed to the south of the property. Unimproved roads are observed in the site vicinity.

2002 No significant changes are observed to the property, adjacent properties, or site vicinity.

4.3 SANBORN FIRE INSURANCE MAPS

URS contracted with EDR to obtain Sanborn Fire Insurance Maps for the property. Based on EDR’s search, Sanborn Fire Insurance Maps were not available for the property.

4.4 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

URS was not provided previous environmental investigations for the property.

4.5 SPECIALIZED USER KNOWLEDGE

As required by AAI, in order to qualify for one of the Landowner Liability Protections, additional inquiries are to be conducted by the User of the Phase I ESA. These inquiries include:

- Identification of environmental cleanup liens against the property
- Specialized knowledge or experience regarding the property
- Relationship of the purchase price to the fair market value if the property was not contaminated
- Commonly known or reasonably ascertainable information regarding the property
- Degree of obviousness of the presence or likely presence of contamination at the property

URS provided the *AAI User Questionnaire* to Ms. Lien Dinh, Real Estate Manager with First Solar, in order to obtain specialized knowledge of site conditions. The *AAI User Questionnaire* completed on January 12, 2015 is included in Appendix F. Ms. Dinh stated that, to her knowledge, there are no known environmental liens associated with the property. Ms. Dinh indicated that the property has historically been undeveloped land.

Ms. Dinh indicated that the Phase I ESA was requested in connection with the purchase of the private parcel and the development of a solar power plant on the overall property.

4.6 TITLE RECORDS/ENVIRONMENTAL LIENS OR ACTIVITY AND USE LIMITATIONS

The majority of the property consists of BLM land. There are reportedly no environmental liens associated with the BLM property.

URS requested NETR to perform an Environmental Lien Search for the privately-owned parcel on the property. Results of the lien search indicate that there are no reported environmental liens or activity and use limitations associated with the parcel.

APN 879-110-001 is reportedly vested in Yuan-Jiun Nicole Chao, a single woman.

A copy of the NETR Environmental Lien Search Report is included in Appendix E.

4.7 VALUATION REDUCTION FOR ENVIRONMENTAL ISSUES

URS was not provided information to indicate that the value of the property decreased due to environmental issues.

4.8 SUMMARY OF HISTORICAL DATA

The BLM portion of the property has historically remained undeveloped desert land. The 160-acre private parcel was reportedly historically used for agricultural purposes/ undeveloped land.

Based on URS' review of historical data, adjacent properties have generally been undeveloped or used for agricultural purposes.

4.9 HISTORICAL DATA GAPS

Historical data gaps were identified during URS' review of reasonably ascertainable historical sources for the property, as discussed in Section 1.6. The data gaps identified in Table 1 are not expected to alter the conclusions of this Phase I ESA.

SECTION 5.0
SITE RECONNAISSANCE

On December 9, 2014, Mr. Anthony Schuetze of URS conducted an unescorted reconnaissance of the property. The reconnaissance consisted of the observation and documentation of existing site conditions and the nature of the neighboring property development within approximately 0.5 mile of the property. Photographs taken during the site reconnaissance are provided in Appendix A.

The property was accessed from Blythe Way, 16th Avenue, 18th Avenue, 20th Avenue, Ford Drive, Haig Drive, and interior roads.

5.1 INTERVIEWS

As discussed in Section 4.5, Specialized User Knowledge, URS provided Lien Dinh, Real Estate Manager with First Solar a copy of the *AAI User Questionnaire.* The completed *AAI User Questionnaire* is included in Appendix F. Ms. Dinh indicated that the property has historically been undeveloped land with the 160-acre private parcel, used for agricultural purposes.

Mr. Anthony Schuetze of URS conducted an interview with Ms. Nicole Chao, (daughter of current owners of the 160-acre private parcel), on January 6, 2015, to obtain information regarding the current and historic condition of the property. According to Ms. Chao, the Chao family has owned the property for approximately 15 years. The property was historically used for agricultural use. Ms. Chao was not aware of any environmental concerns on the property and was not aware of the suspected water well on the property.

Mr. Anthony Schuetze of URS contacted Mr. Cedric C. Perry, Project Manager for the BLM and site representative for the property on December 18, 2014, to obtain information regarding the current and historic condition of the property. Mr. Perry was not available for interview within the timeframe of the project.

5.2 SITE CONDITIONS

At the time of the site reconnaissance, the property consisting of BLM parcels were observed to be undeveloped desert land and contained some sparse debris. The private parcel (APN 879-110-001) contained some debris and suspect former irrigation infrastructure.

Construction activity was observed during site reconnaissance within the project Gen-Tie Corridor along the western and northwestern portions of the property. Activity consisted of road construction and staging and assembly of electrical tower pieces.

5.3 HAZARDOUS SUBSTANCES

Hazardous substances consisting of partially filled oil and lubricant containers and other trash and debris were observed within the private parcel (APN 879-110-001) on the property during the site reconnaissance.

5.4 DRUMS AND OTHER CHEMICAL CONTAINERS

Approximately two dozen small plastic (one quart to one gallon) partially filled oil and lubricant containers were observed within the northeast corner of the private parcel (APN 879-110-001) on the property during the site reconnaissance.

5.5 STORAGE TANKS

5.5.1 Aboveground Storage Tanks

Aboveground storage tanks (AST) were not observed on the property during the site reconnaissance.

5.5.2 Underground Storage Tanks

Evidence of underground storage tanks (UST) was not observed on the property. No known historical USTs were reported to exist on the property.

5.6 POLYCHLORINATED BIPHENYLS

Electrical transformers, hydraulic equipment, capacitors, and similar equipment may contain polychlorinated biphenyls (PCB) as operating or dielectric insulating fluids within the units. The Federal Toxic Substances Control Act generally prohibited the domestic manufacture of PCBs after 1976; therefore, there is a potential for the dielectric fluid in electrical and hydraulic equipment manufactured prior to that date to contain PCBs.

Electric transmission lines were observed on the property on the northern, southwestern, and southern boundaries. Transformers were not observed during the site reconnaissance within the property but were observed along electric transmission lines adjacent to the property.

Other equipment that may contain PCBs, such as capacitors, was not observed on the property during the site reconnaissance.

5.7 WASTE DISPOSAL

Waste disposal activities were not observed on the property during the site reconnaissance.

5.8 DUMPING

Several locations of suspected dumping (metal cans, debris, tires, wood, and glass) were observed during the site reconnaissance throughout the BLM parcels.

Several locations of debris including apparent household materials such as appliances, beds, tires, wood, and irrigation piping were observed within the private parcel (APN 879-110-001).

5.9 PITS, PONDS, LAGOONS, SEPTIC SYSTEMS, CISTERNS, SUMPS, DRAINS, AND CLARIFIERS

Evidence of pits, ponds, lagoons, cisterns, septic systems, cisterns, sumps, drains or clarifiers was not observed on the property during the site reconnaissance.

5.10 PESTICIDE USE

Based on the historical agricultural use of the private parcel on the property, chemical retention in surface and subsurface soils could be of concern within this area. Most agricultural chemicals degrade rapidly in the presence of ultraviolet light from the sun and most newer-formulated chemicals have lower retention time especially at the lower application concentrations directed by regulatory agencies. Based on the historical agricultural use of the property, there is the potential for residual pesticide concentrations in the surface and subsurface soils.

5.11 STAINING AND DISCOLORED SOIL/SURFACES

Staining and discolored soil/surfaces were not observed on the property during the site reconnaissance.

5.12 STRESSED VEGETATION

Stressed vegetation was not observed on the property during the site reconnaissance.

5.13 UNUSUAL ODORS

Unusual odors were not detected on the property during the site reconnaissance.

5.14 ON-SITE WELLS

Three suspected water supply wells or agriculture irrigation wells were observed on the property during the site reconnaissance. Two of the suspected water wells were located within the BLM parcels (APNs 879-090-035 and 879-110-010). These suspected water wells were observed to be open and unsecured, and exposed to the elements. URS contacted Mr.

Noel Ludwig, BLM hydrologist to obtain additional information regarding the wells. Mr. Ludwig was not aware of the existence of water wells on the property.

One suspected water well was observed in the northeast corner of the private parcel (APN 879-110-001). This suspected water well appeared to be covered by a steel cap. Evidence of irrigation piping was observed adjacent to suspect water well and within the abandoned field nearby.

Monitoring or oil and gas wells were not observed on the property during the site reconnaissance.

URS reviewed the California Division of Oil, Gas, and Geothermal Resources (DOGGR) database to evaluate oil and gas exploration in the vicinity of the property. No oil and gas wells were identified on the property.

5.15 OTHER CONCERNS

Construction activity was observed within the project Gen-Tie Corridor along the western and northwestern portions of the property during the site reconnaissance. Activity consisted of road construction and staging and assembly of electrical tower pieces. This consisted of heavy grading equipment and steel electrical tower pieces.

5.16 NON-SCOPE CONSIDERATIONS

5.16.1 Asbestos

An asbestos-containing material (ACM) survey was not included in the Scope of Services performed for this Phase I ESA. The use of asbestos was primarily discontinued after the late 1970s. Structures with the potential to contain asbestos were not observed on the property during the site reconnaissance.

5.16.2 Lead-based Paint

A lead-based paint (LBP) survey was not included in the Scope of Services performed for this Phase I ESA. Concern for LBP is primarily related to older structures. Structures with the potential to contain LBP were not observed on the property during the site reconnaissance.

5.16.3 Radon

A radon survey was not included in the Scope of Services performed for this Phase I ESA. A USEPA survey by state and county of indoor radon concentrations indicated the radon zone level for Riverside County is 2 Zone 2 areas are predicted to have an indoor radon screening potential of between 2.0 and 4.0 picocuries per liter (pCi/l) of air. The USEPA action level for radon is 4.0 pCi/l. Further assessment for radon appears unwarranted based on regional background levels.

SECTION 6.0
AGENCY RECORDS REVIEW

URS reviewed readily available records regarding past and current property use, contacted applicable agencies regarding potential environmental concerns at the property, and reviewed the agency database list search for potential environmental concerns at surrounding properties. The information obtained during the records review is provided in the following sections.

6.1 DATABASE LIST SEARCH

URS contracted with EDR to conduct a search for facilities listed by regulatory agencies as potentially having environmental concerns. The complete list of databases reviewed is provided in the EDR DataMap Area Study included as Appendix D, and is summarized in Sections 6.1.1 and 6.1.2. It should be noted that this information is reported as received by URS from EDR, which in turn reports information as provided in various government databases. It is not possible for either URS or EDR to verify the accuracy or completeness of information contained in these databases. However, the use of and reliance on this information is a generally accepted practice in the conduct of environmental due diligence.

6.1.1 Property

The property was not identified on any of the databases searched by EDR. A summary of agency databases searched can be found in the EDR DataMap Area Study provided as Appendix D.

6.1.2 Site Vicinity

Facilities in the site vicinity were not identified on any of the databases searched by EDR.

6.1.3 Orphan Sites

URS reviewed EDR’s Orphan Summary, which is a listing of sites that have not been geo-coded (coded and plotted on EDR maps) based on lack of sufficient data regarding their exact location within the general area. The property was not identified as an Unmapped Site. No additional Unmapped Sites identified on the Orphan Summary appear to be located within the ASTM-designated radii of the property and, therefore, URS has no evidence that any orphan sites have had an impact on the property.

6.1.4 Vapor Migration

ASTM E1527-13 indicates that a REC at a property can be caused by the release of vapors from contaminated soil or groundwater on or near the property. In order to evaluate the potential for vapor migration, URS conducted a Vapor Encroachment Screening (VES) in general accordance with the procedures included in ASTM E2600-10, Standard Guide for Vapor Encroachment Screening on Property Involved in Real Estate Transactions. The purpose of the VES is to determine if a potential Vapor Encroachment Condition (VEC) exists, likely exists, cannot be ruled out, or can be ruled out because a VEC does not or is not likely to exist. The VES is not an exhaustive screening and is intended to reduce, but not eliminate, uncertainty regarding whether or not a VEC exists in connection with a property. URS reviewed the EDR database information described above, as well as the physical setting information and historical information to identify potential VECs.

As defined by ASTM E2600-10, off-site properties with known or suspected soil or groundwater contamination located within an approximate minimum search distance of ⅓-mile for hazardous substances (volatile and semi-volatile nonpetroleum hydrocarbons, e.g. perchloroethylene associated with dry cleaners) or $^{1}/_{10}$-mile for petroleum hydrocarbons (e.g. gasoline fuel associated with gas stations), were evaluated to determine if a potential VEC exists for the property.

Facilities in the site vicinity within $^{1}/_{10}$-mile (528 feet) of the property, with known or suspected releases of petroleum products were not identified in the DataMap Area Study. Facilities in the site vicinity within ⅓-mile (1,760 feet) of the property, with known or suspected releases of non-petroleum volatile contaminants were not identified in the EDR DataMap Area Study. Based on available information, potential VECs were not identified.

6.2 AGENCY CONTACTS

During the performance of an environmental assessment, state and local regulatory agencies having jurisdiction over the property are contacted to assess the following information: the status of relevant environmental permits; whether there has been any violations, or other similar correspondence from such agencies; whether corrective action or remediation is planned, currently taking place, or was completed at the property; whether there were any reported violations or complaints that the property is not in compliance with environmental laws, regulations, or standards, and whether the property is under investigation for such non-compliance; whether the property is listed on any of the regulatory databases; and whether there is any other pertinent documentation on file with such regulatory agencies regarding the property or surrounding sites of concern. The following agencies were contacted:

- The California Department of Toxic Substances Control (DTSC) was contacted. The DTSC does not maintain files for the property. No cases were cited in the EnviroStor database at or near the property.
- The Colorado River Regional Water Quality Control Board (RWQCB) was contacted. The RWQCB does not maintain files for the property. No cases were cited in the GeoTracker database at or near the property.

- The Mojave Desert Air Quality Management District (MDAQMD) was contacted. The MDAQMD does not maintain files for the property.
- The County of Riverside, Department of Environmental Health (DEH) was contacted. The DEH has not yet responded to our request for information. URS will follow-up with the DEH. If information is provided that changes the conclusions of this report, an addendum report will be issued.

SECTION 7.0
CONCLUSIONS

URS has performed a Phase I ESA in conformance with the scope and limitations of ASTM Practice E1527 for the First Solar Desert Quartzite Project Site located in eastern Riverside County, California. Any exceptions to or deletions from this practice are described in Sections 1.3 and 1.5. The following RECs were identified on the property:

- Two suspected water supply wells located within the BLM parcels (APNs 879-090-035 and 879-110-010) were observed to be open and unsecured. The two suspected water wells did not have locked tops and were open and exposed to the elements. It is possible that unauthorized dumping may have occurred at these suspected wells and/or the open pipes could provide a conduit for contamination of groundwater and/or sediments.

RECOMMENDATIONS

Based on the open and unsecured suspected water wells observed on the property, a Limited Phase II ESA is warranted to assess potential impacts to groundwater, if present, associated with the identified suspected water supply wells.

Debris was observed on the property. This debris should be removed from the property and disposed of in accordance with appropriate regulations, prior to any land use changes. Should hazardous materials or impacts to soil from drums or containers be identified on the property during removal of debris, additional investigation would be required.

Three suspect water wells were observed on the property. If these wells are not planned for future use, they should be properly abandoned (with consideration of pending limited Phase II groundwater sampling results, as applicable) in accordance with Riverside County regulations.

SECTION 8.0
PREPARER SIGNATURES AND QUALIFICATIONS

This section includes qualification statements of the environmental professionals responsible for conducting the Phase I ESA and preparing this report.

Ms. Tricia Winterbauer of the URS Santa Barbara, California office directed the site reconnaissance by qualified URS personnel, conducted the data review for the project, and wrote the Phase I ESA report. Ms. Winterbauer has 18 years of experience in environmental site investigations, characterizations, and Phase I ESAs.

The work conducted and the report written by Ms. Winterbauer was reviewed by Mr. David Bernal, PG. Mr. Bernal has over 25 years of experience in environmental site investigation, characterizations, and Phase I ESAs.

We declare that, to the best of our professional knowledge and belief, we meets the definition of Environmental Professional as defined in §312.10 of 40 CFR 312.

We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312 and have performed the Phase I ESA in general conformance with the standards and practices set forth in ASTM E1527-13 subject to the limitations and data gaps as described in this reported and the authorized scope of work.

Tricia Winterbauer

Tricia Winterbauer
Senior Environmental Specialist

David M. Bernal

David Bernal, PG #5554
Principal Geologist

SECTION 9.0
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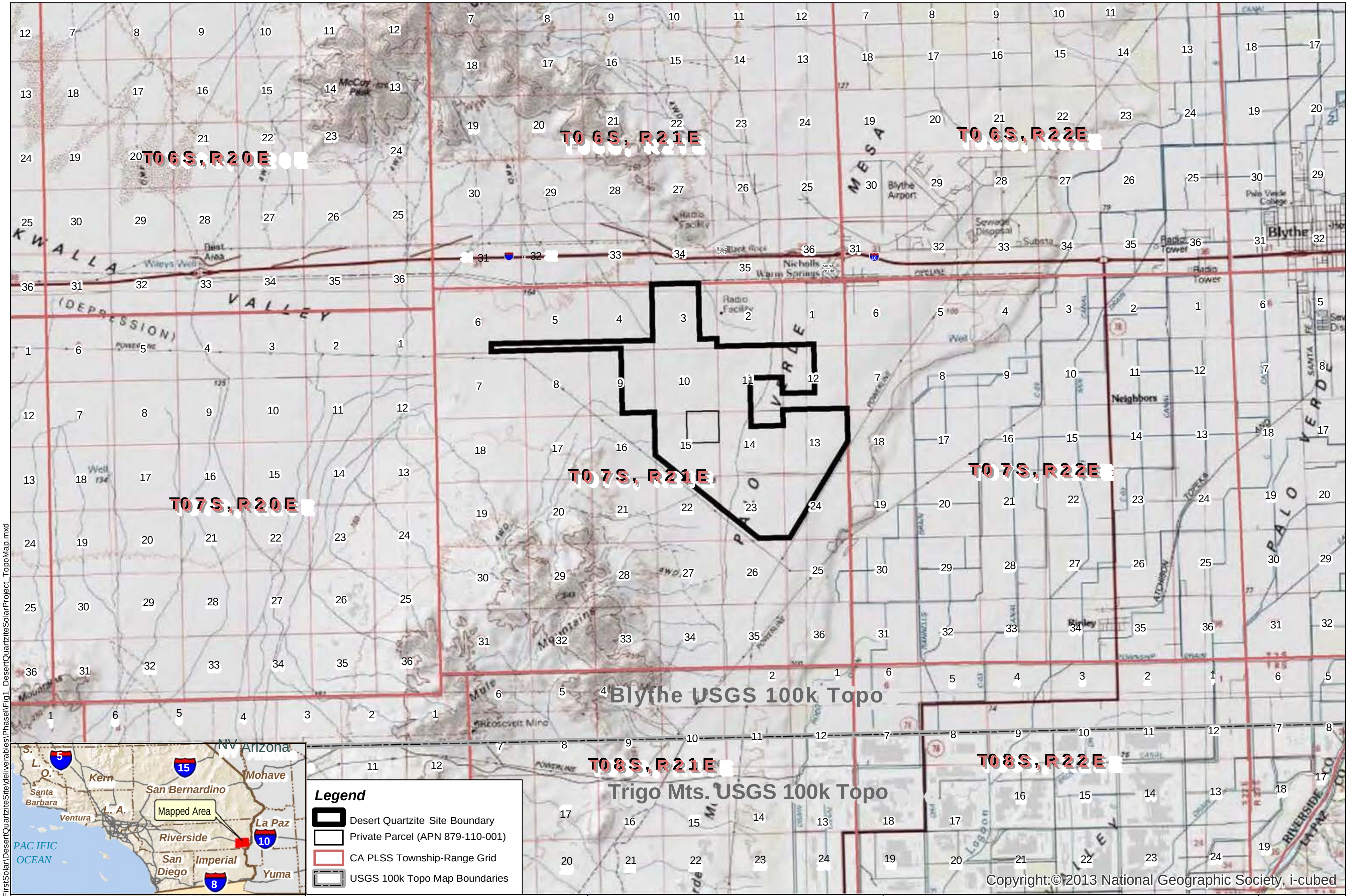
FIGURES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Trigo Mts. USGS 100k Topo
McCoy Peak
Wileys Well
Rest Area
Nicholls Warm Springs
Radio Facility
Blythe Airport
Sewage Disposal
Substa
Radio Tower
Palo Verde College
Blythe
Neighbors
Ripley
Roosevelt Mine
Mule Mountains
CHUCKWALLA VALLEY (DEPRESSION)
MESA
PALO VERDE
Legend
Desert Quartzite Site Boundary
Private Parcel (APN 879-110-001)
CA PLSS Township-Range Grid
USGS 100k Topo Map Boundaries
Mapped Area
NV
Arizona
S. L. O.
Kern
San Bernardino
Mohave
Santa Barbara
Ventura
L.A.
La Paz
Riverside
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First Solar - Phase I ESA
Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

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Source: [1] Bing Maps Aerial Imagery Web Mapping Service - (c) 2010 Microsoft Corporation and its datas upplier (Image Date: 3/13/2011), [2] California Geospatial Information Library PLS, [3] ESRI StreetMap USA (2007).

Figure 1. Topographic Map of Project Area

2015

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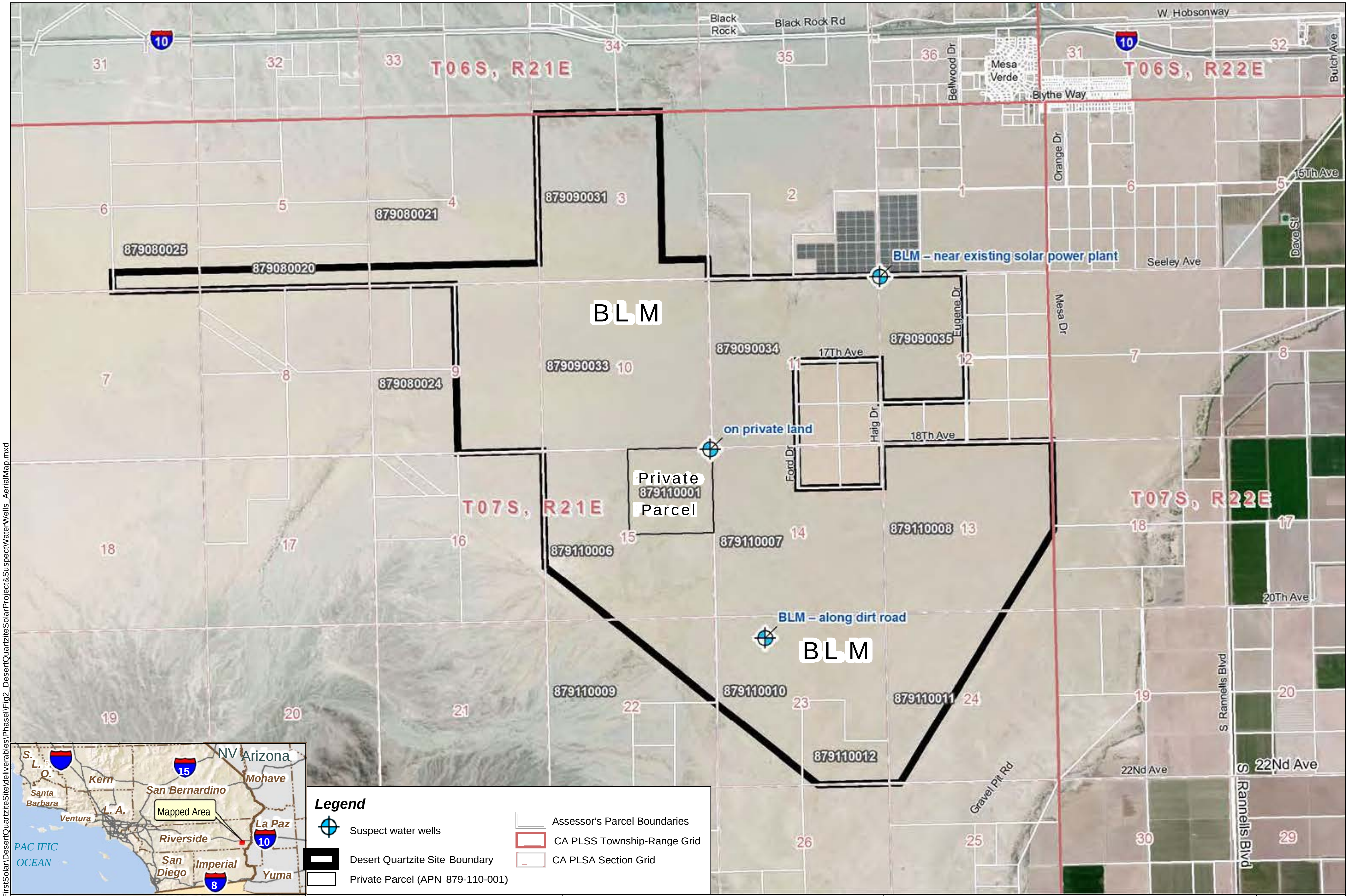

Black Rock
Black Rock Rd
W. Hobsonway
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T06S, R21E
T06S, R22E
Mesa Verde
Blythe Way
Bellwood Dr
Orange Dr
Butch Ave
15Th Ave
Dave St
Seeley Ave
Mesa Dr
Eugene Dr
17Th Ave
18Th Ave
Haig Dr
Ford Dr
20Th Ave
22Nd Ave
S 22Nd Ave
S Rannells Blvd
Gravel Pit Rd
BLM – near existing solar power plant
on private land
BLM – along dirt road
BLM
Private 879110001 Parcel
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Santa Barbara
Ventura
L.A.
San Bernardino
Mapped Area
Riverside
San Diego
Imperial
Mohave
La Paz
Yuma
NV
Arizona
PACIFIC OCEAN
15
10
8
Legend
Suspect water wells
Desert Quartzite Site Boundary
Private Parcel (APN 879-110-001)
Assessor's Parcel Boundaries
CA PLSS Township-Range Grid
CA PLSA Section Grid

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First Solar - Phase I ESA
Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

0 0.25 0.5 0.75 1 Miles

0 1,000 2,000 3,000 4,000 5,000 Feet

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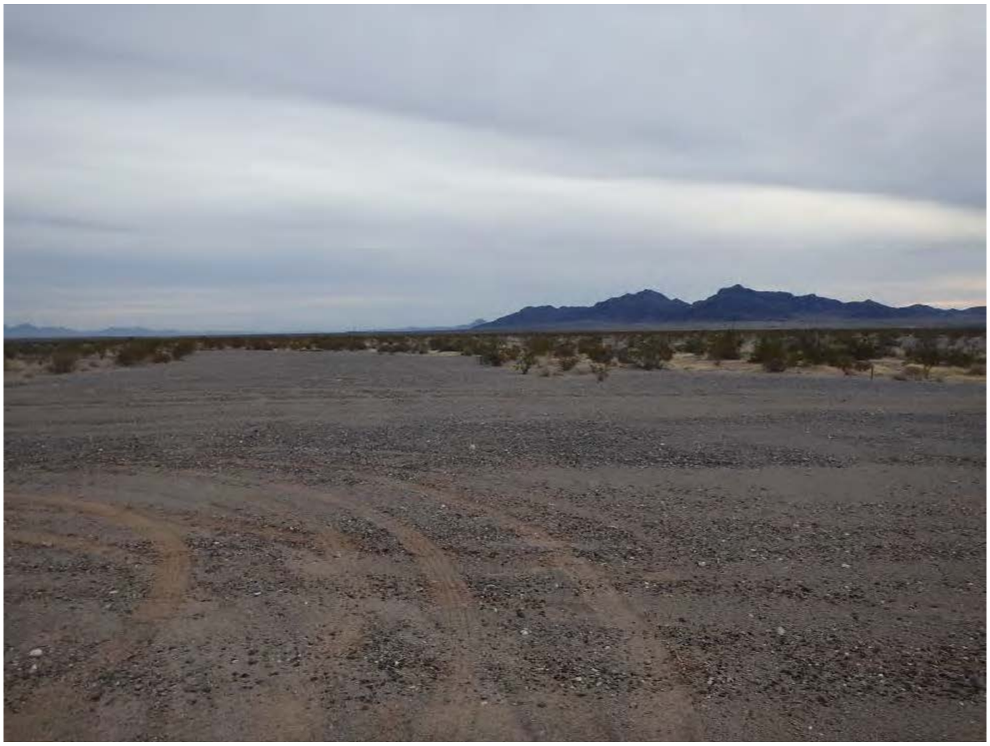
Source: [1] Bing Maps Aerial Imagery Web Mapping Service - (c) 2010 Microsoft Corporation and its datas upplier (Image Date: 3/13/2011), [2] Riverside County Assessor, Geographic Information Services Riverside County Innovation Center, October 2014.

Figure 2. Aerial Map of Project Area

2015

APPENDIX A
SITE PHOTOGRAPHS

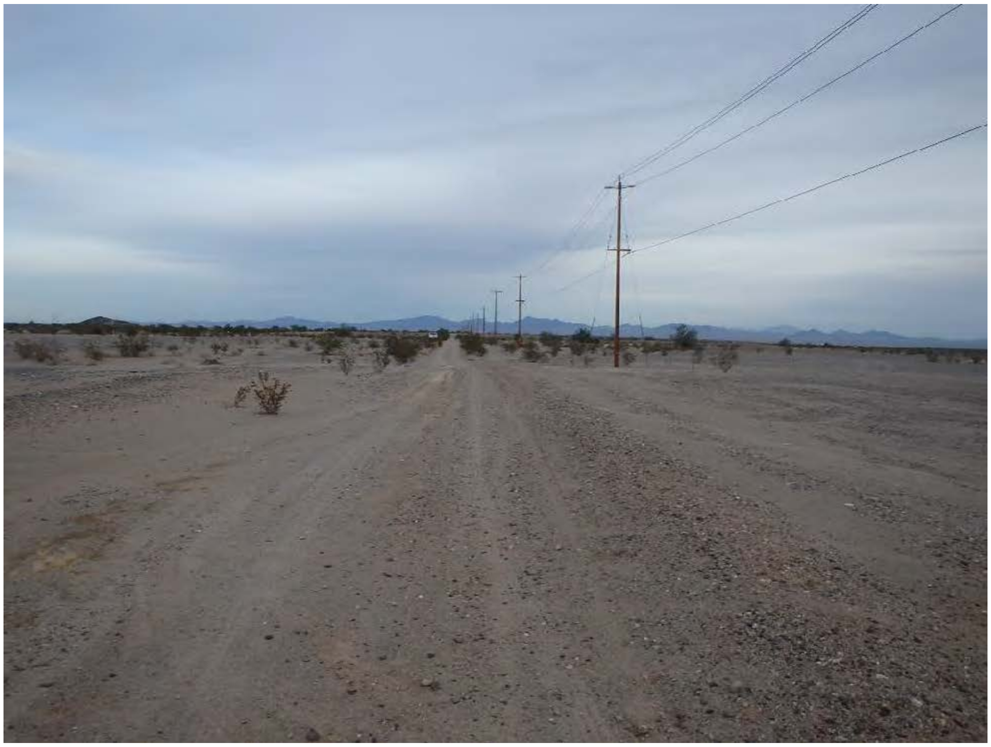


Photograph 1

Comments:

APN: 879-090-031

Facing south from the northwest portion of the property.



Photograph 2

Comments:

APN: 879-090-031

Facing east along the northern property boundary.

Photograph 3

Comments:

APN: 879-090-031

Facing south at interior of the property from the northern property boundary.

Photograph 4

Comments:

APN: 879-090-035

Facing south from the northeast corner of the property along 16th Avenue.

	Photograph 5 Comments: APN: 879-110-008 Facing west along 18th Avenue from the eastern boundary of the property.
	Photograph 6 Comments: APN: 879-110-008 Facing southwest towards the interior of the property from the eastern boundary of the property.

Photograph 7

Comments:

APN: 879-110-011

Facing west towards the interior of property from the eastern boundary of the property.

Photograph 8

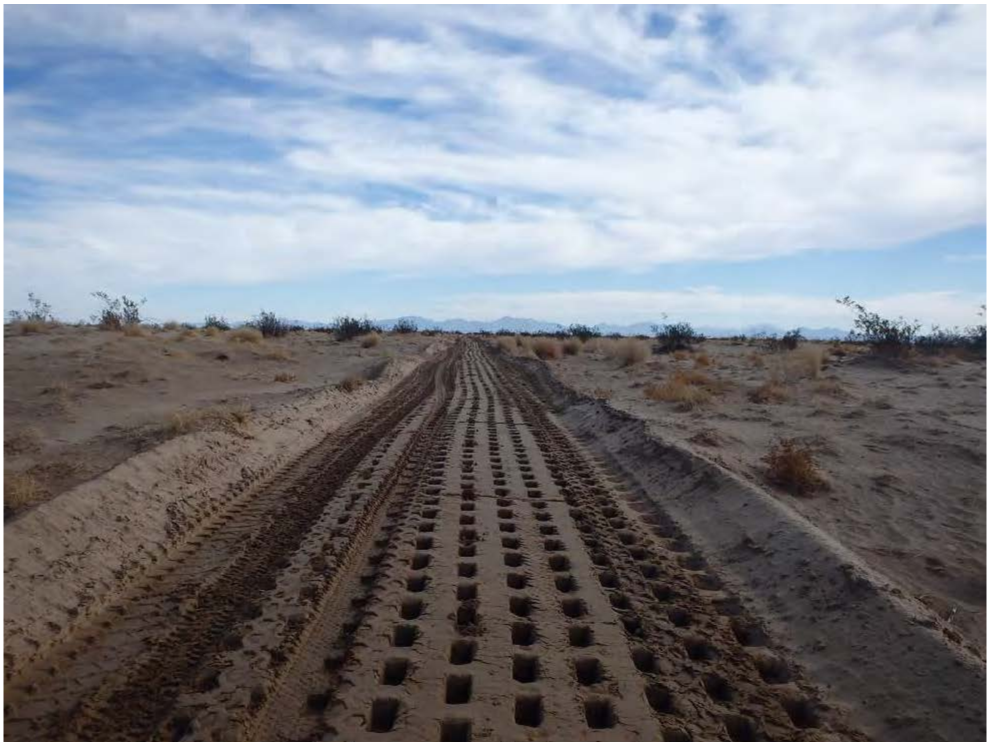
Comments:

APN: 879-110-011

Facing north towards the interior of the property from the southern boundary of the property.

	Photograph 9 Comments: APN: 879-110-010 Facing northwest along western boundary of the property from the southwestern portion of the property.
	Photograph 10 Comments: APN: 879-110-010 Facing north along Ford Drive at interior of the property from the southern boundary of the property.

	Photograph 11 Comments: APN: 879-110-006 Facing north along the western boundary from the southwestern portion of the property.
	Photograph 12 Comments: APN: 879-110-006 Facing northeast towards the interior of the property from the southwestern portion of the property.

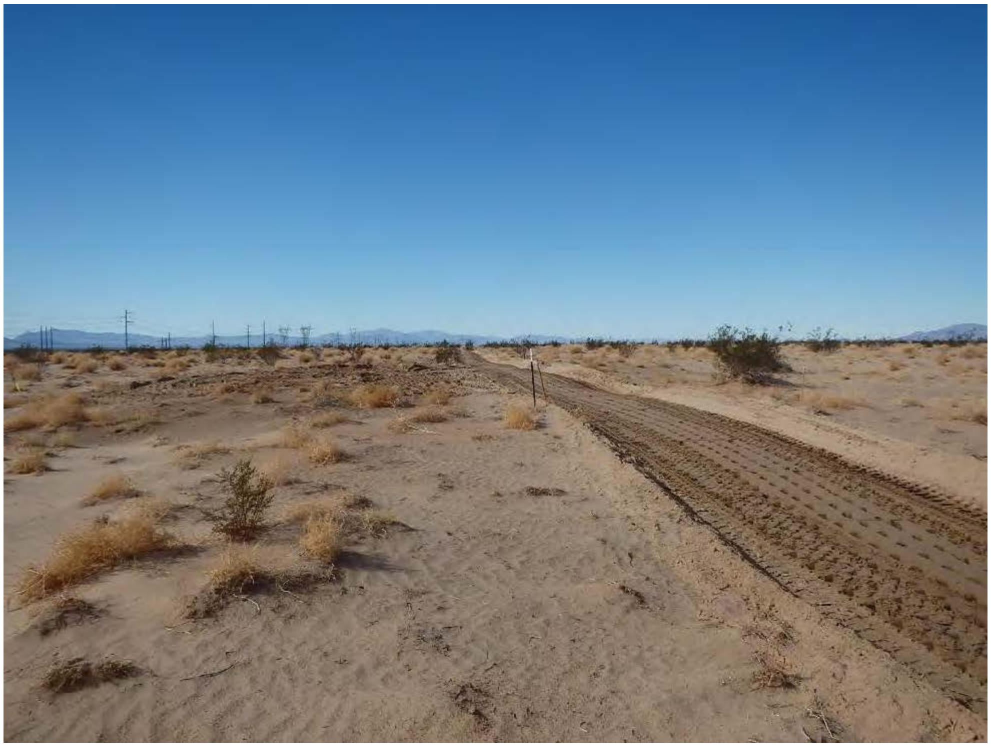


Photograph 13

Comments:

APN: 879-080-020

Facing east along Gen-Tie Corridor and at the property from the center of the Gen-Tie Corridor. Current construction activity visible.

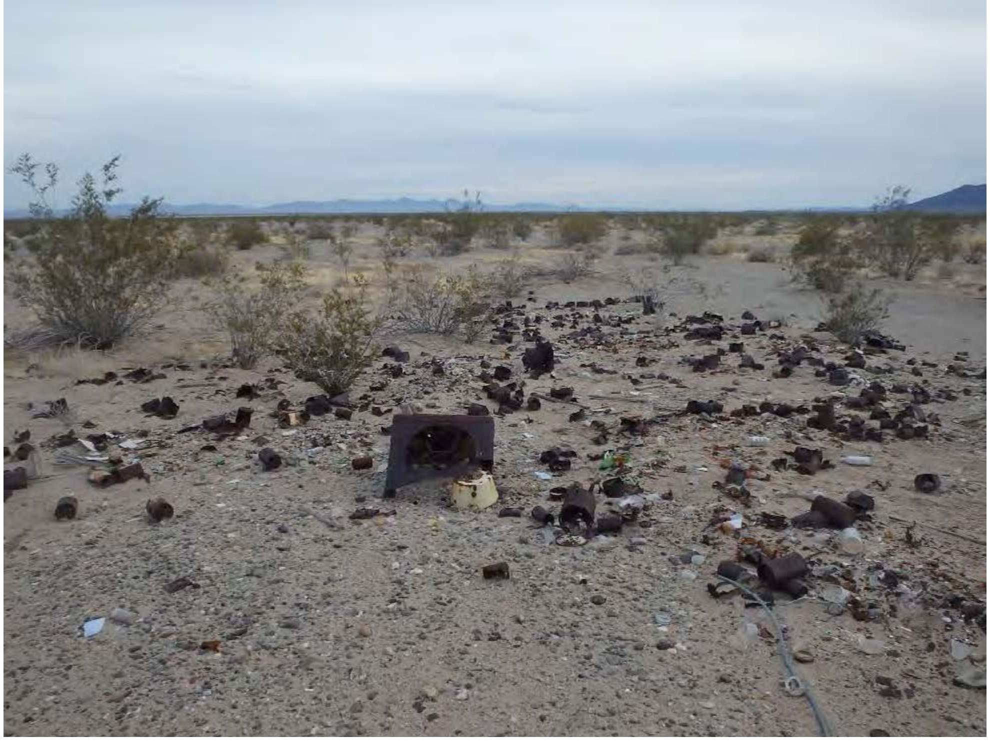


Photograph 14

Comments:

APN: 879-080-020

Facing west along Gen-Tie Corridor and towards the property from the middle of the Gen-Tie Corridor. Current construction activity visible.

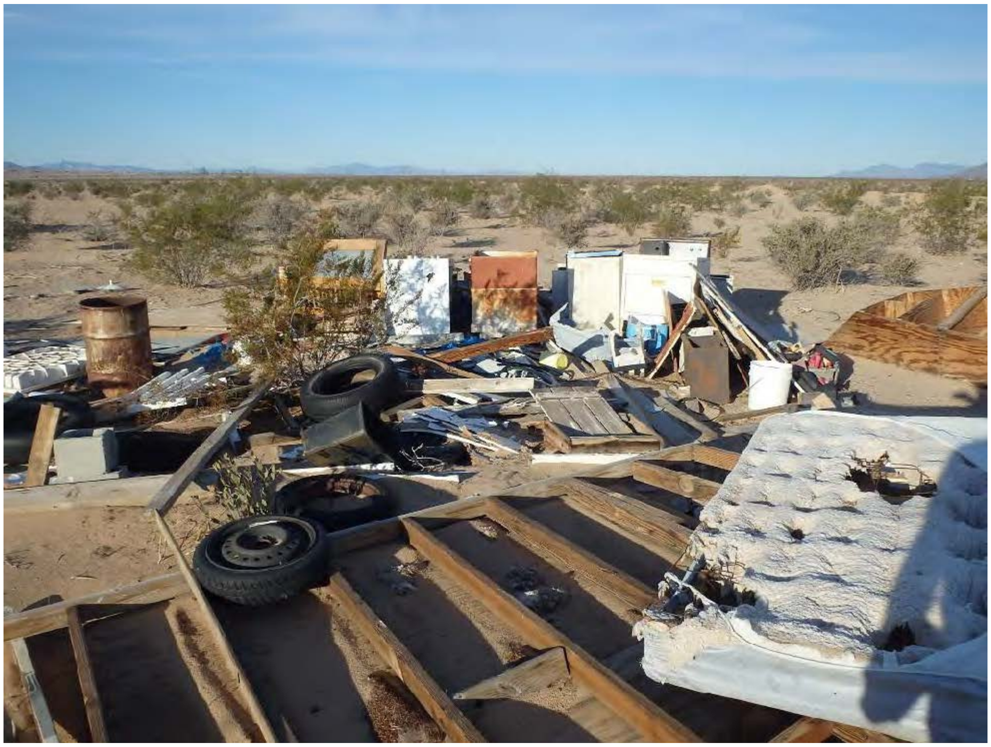


Photograph 15

Comments:

APN: 879-090-031

Debris located near the northwest corner of the property.

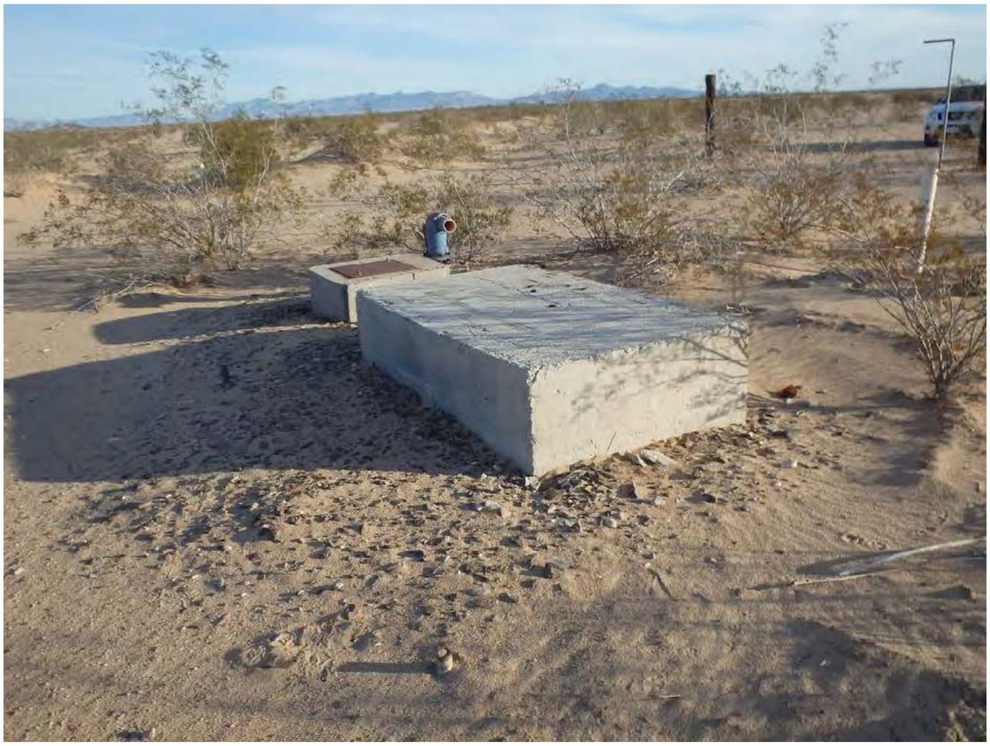


Photograph 16

Comments:

APN: 879-110-001

Debris located in the northeast corner of the private parcel within the western portion of the property.

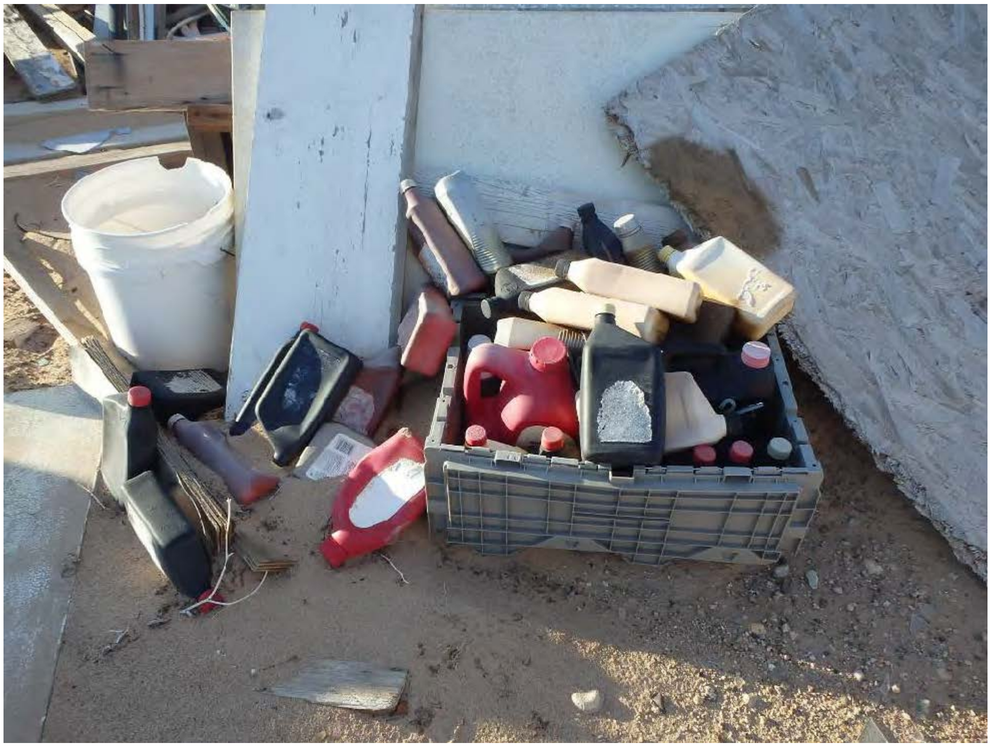


Photograph 17

Comments:

APN: 879-110-001

Suspect water well (covered by steel plate) and concrete pad located in the northeast corner of the private parcel within the western portion of the property.

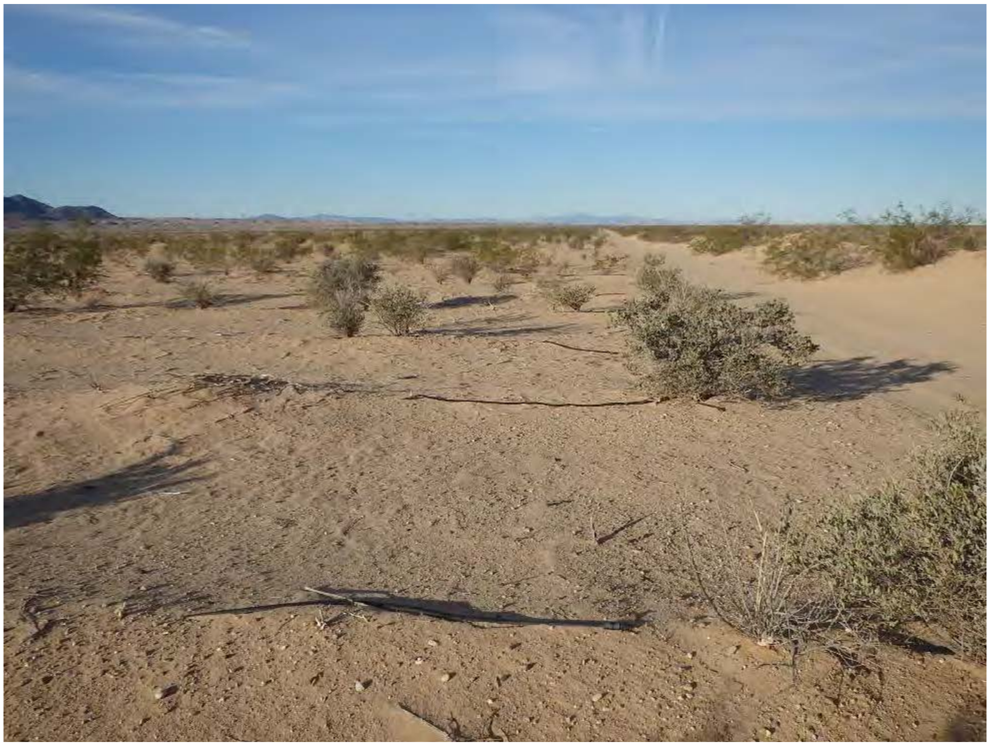


Photograph 18

Comments:

APN: 879-110-001

Empty and partially filled oil and lubricant containers located in the northeast corner of the private parcel within the western portion of the property.



Photograph 19

Comments:

APN: 879-110-001

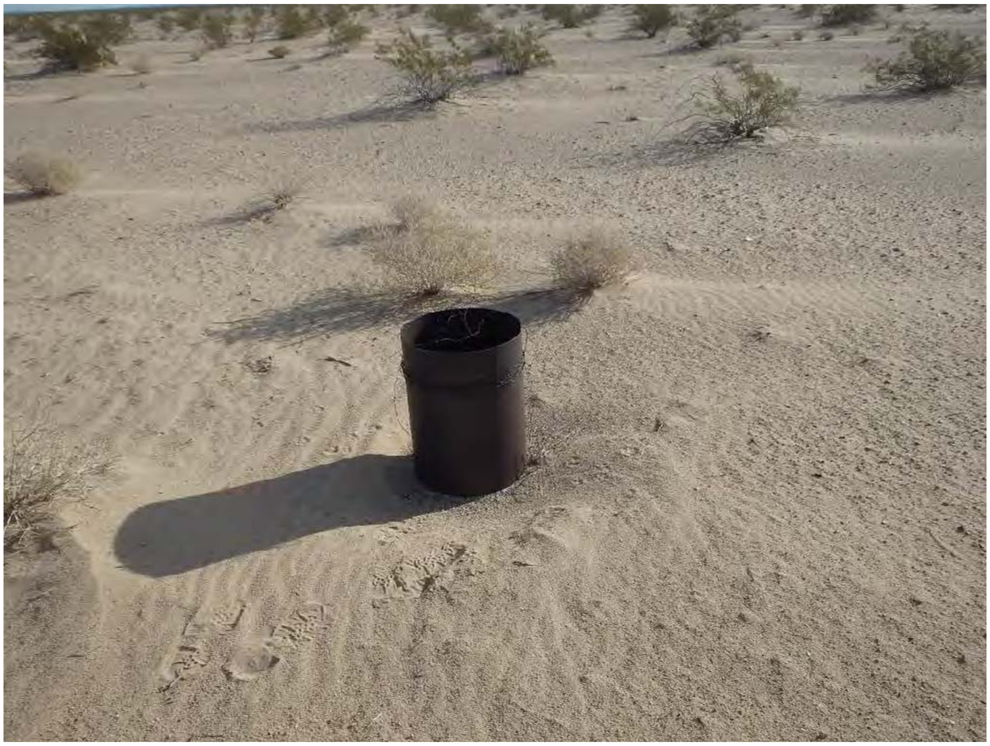
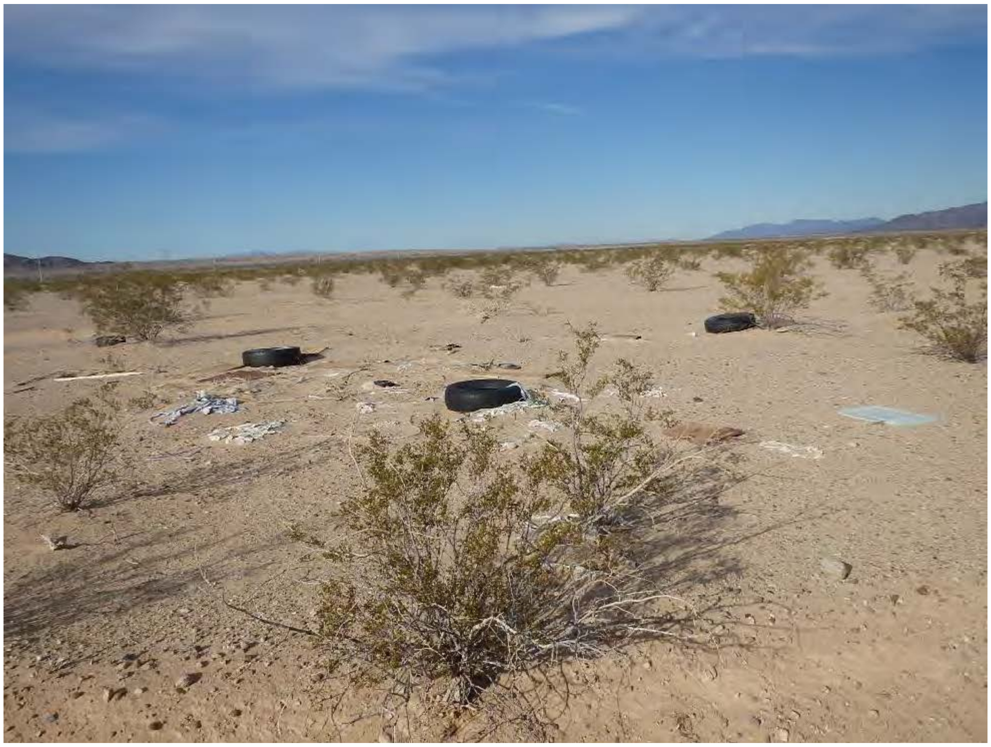
Former irrigation lines located in the private parcel within the western portion of the property.

Photograph 20

Comments:

APN: 879-110-001

Facing north at the western portion of the property from the northwest corner of the private parcel within the western portion of the property.

	Photograph 21 Comments: APN: 879-110-010 Suspect water well located near the south-central portion of the property.
	Photograph 22 Comments: APN: 879-110-010 Scattered tires and debris located near the south-central portion of the property.

Photograph 23

Comments:

APN: 879-110-010

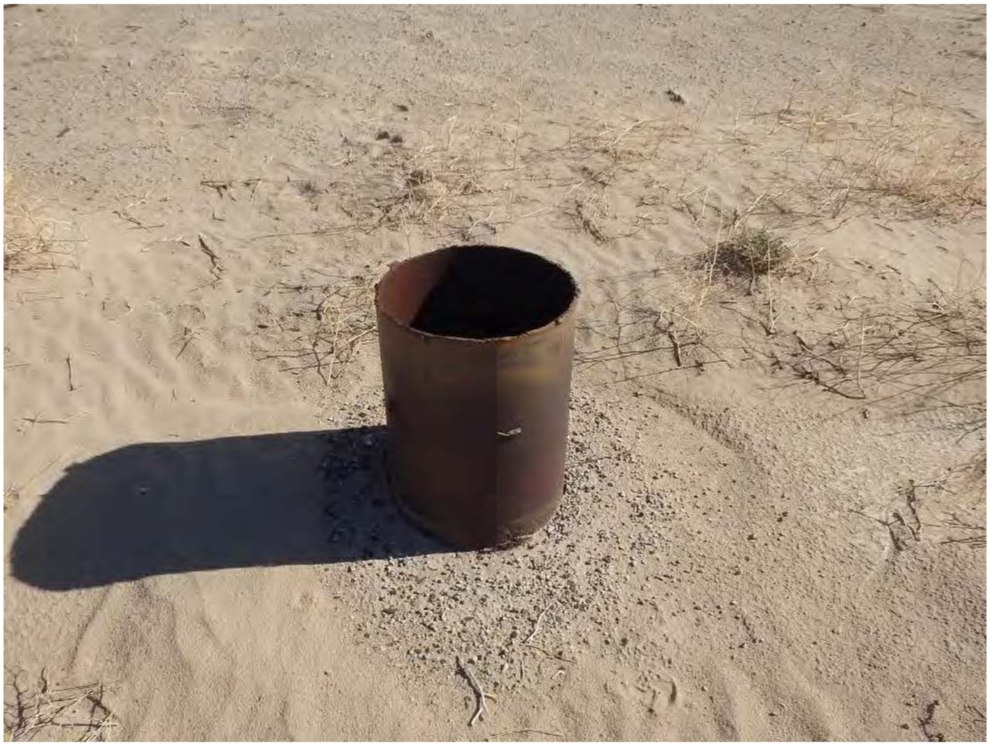
Facing south along Ford Drive from the southern portion of the property.

Photograph 24

Comments:

APN: 879-110-011

Facing north towards the interior of the property from the southeastern portion of the property.



Photograph 25

Comments:

APN: 879-090-035

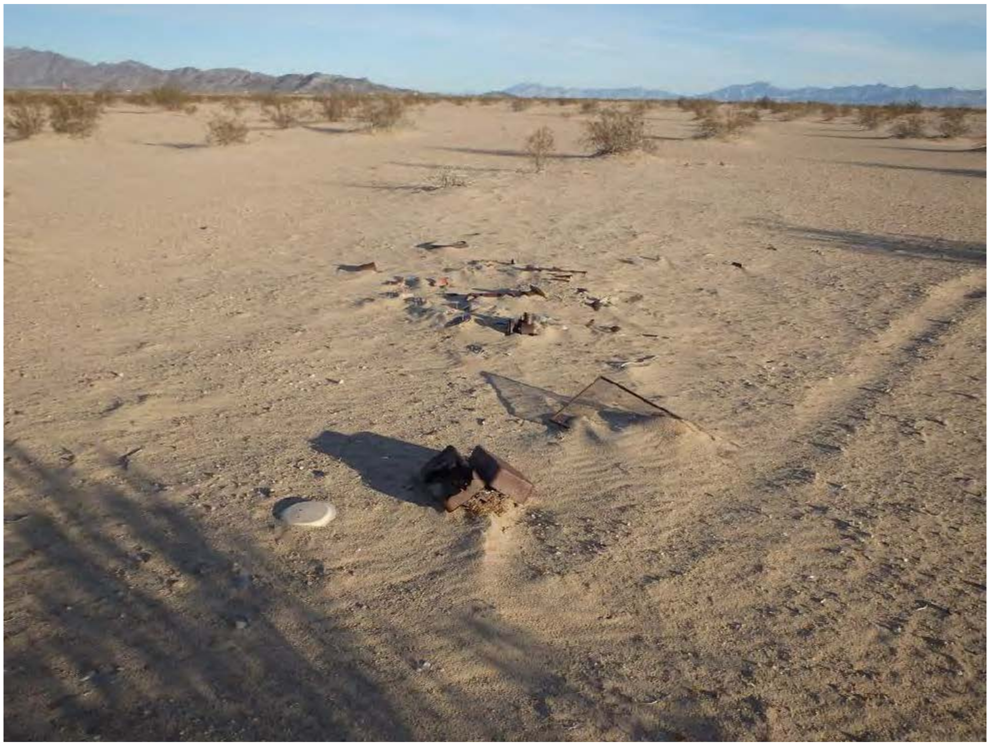
Suspect water well located near the intersection of Haig Drive and 16th Avenue near the northern boundary of the property.

Photograph 26

Comments:

APN: 879-090-033

Facing east from the central portion of the property.

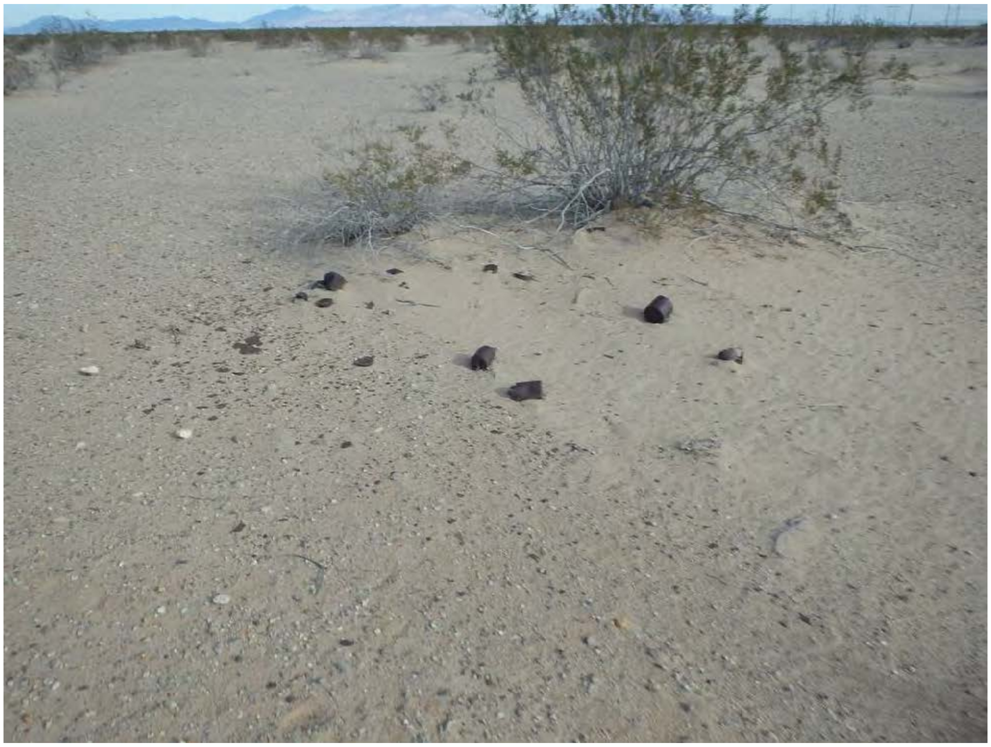


Photograph 27

Comments:

APN: 879-090-034

Debris located in the central portion of the property.



Photograph 28

Comments:

APN: 879-110-008

Debris located near the eastern boundary of the property.

Photograph 29

Comments:

APN: 879-090-033

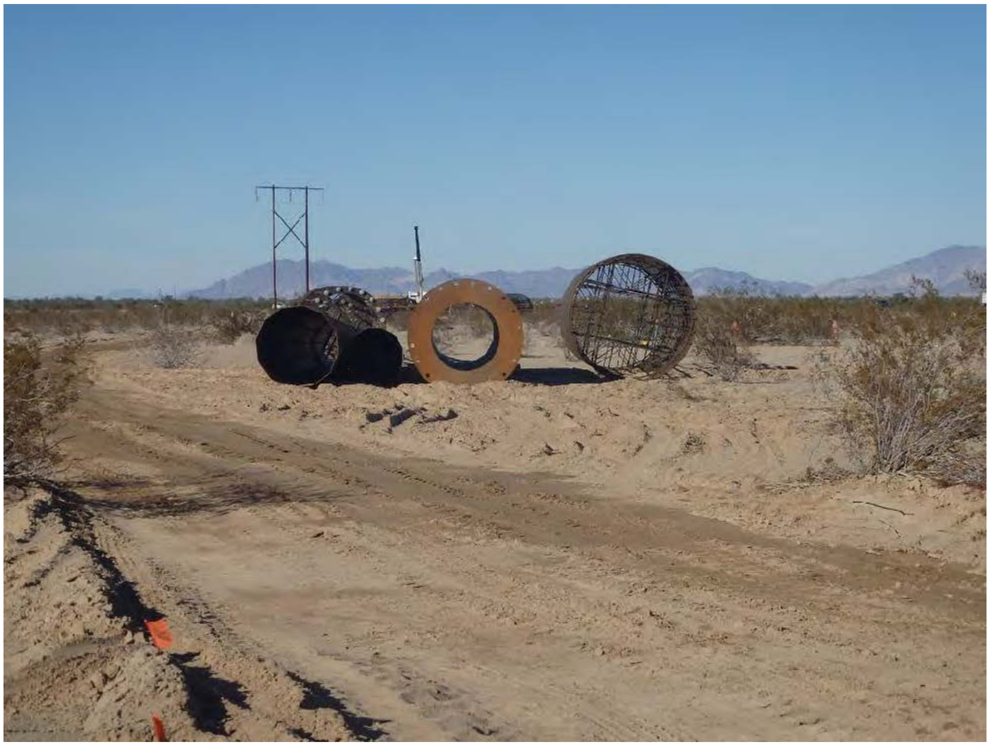
Facing west along Gen-Tie Corridor and at the property from the east end of the Gen-Tie Corridor. Current construction activity and material staging visible.

Photograph 30

Comments:

APN: 879-090-033

Facing north along Gen-Tie Corridor and at the property from the east end of the Gen-Tie Corridor. Current construction activity and material staging visible.

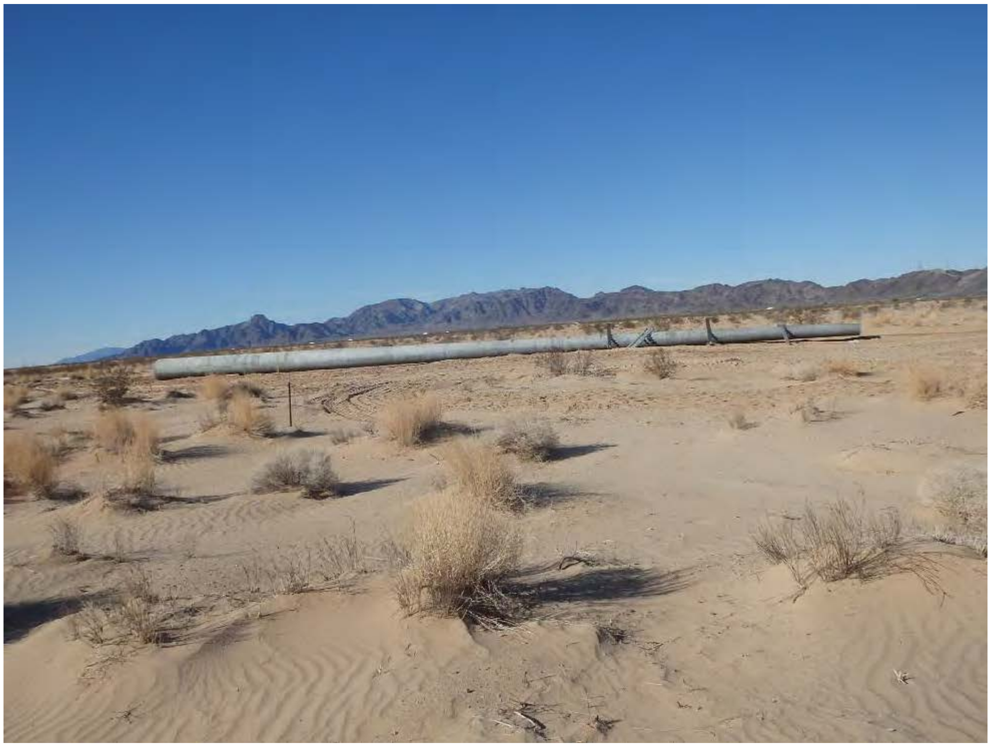


Photograph 31

Comments:

APN: 879-090-033

Facing north along Gen-Tie Corridor and at the property from the east end of the Gen-Tie Corridor. Current construction activity and material staging visible.



Photograph 32

Comments:

APN: 879-090-033

Facing north along Gen-Tie Corridor and at the property from the east end of the Gen-Tie Corridor. Current construction activity and material staging visible.

APPENDIX B
EDR HISTORICAL TOPOGRAPHIC MAP REPORT

First Solar Desert Quartzite Solar Project Site
First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225

Inquiry Number: 4154996.5
January 23, 2015

EDR Historical Topographic Map Report

6 Armstrong Road, 4th Floor
Shelton, Connecticut 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Historical Topographic Map Report

Environmental Data Resources, Inc.s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property resulting from past activities. EDRs Historical Topographic Map Report includes a search of a collection of public and private color historical topographic maps, dating back to the early 1900s.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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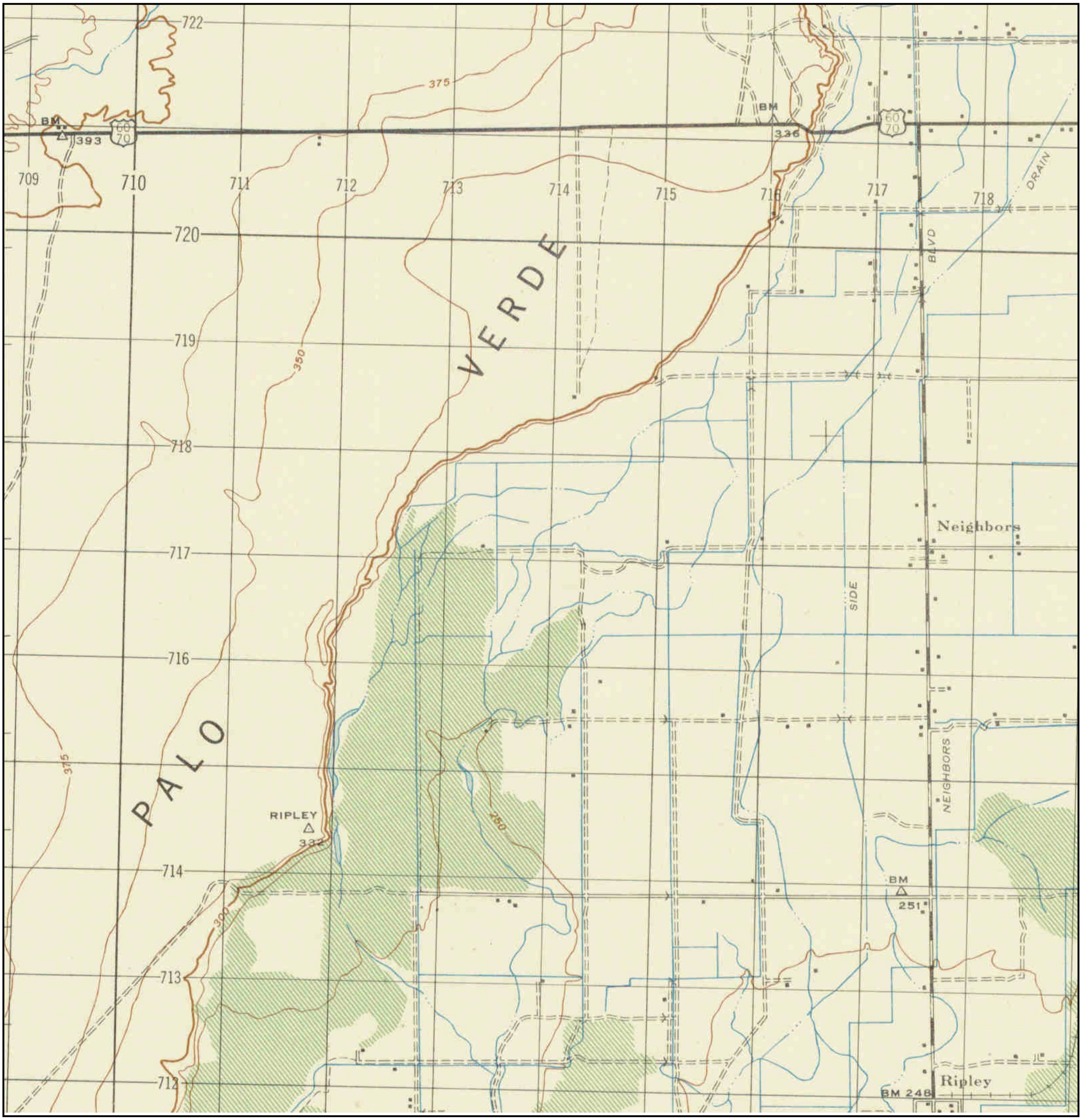
Historical Topographic Map



722
375
BM
393
60
70
BM
336
709
710
711
712
713
714
715
716
717
718
DRAIN
720
VERDE
BLVD
719
350
718
Neighbors
717
SIDE
716
PALO
NEIGHBORS
375
RIPLEY
332
250
714
BM
251
300
713
712
Ripley
BM 248

N

TARGET QUAD
NAME: BLYTHE
MAP YEAR: 1947

SERIES: 15
SCALE: 1:50000

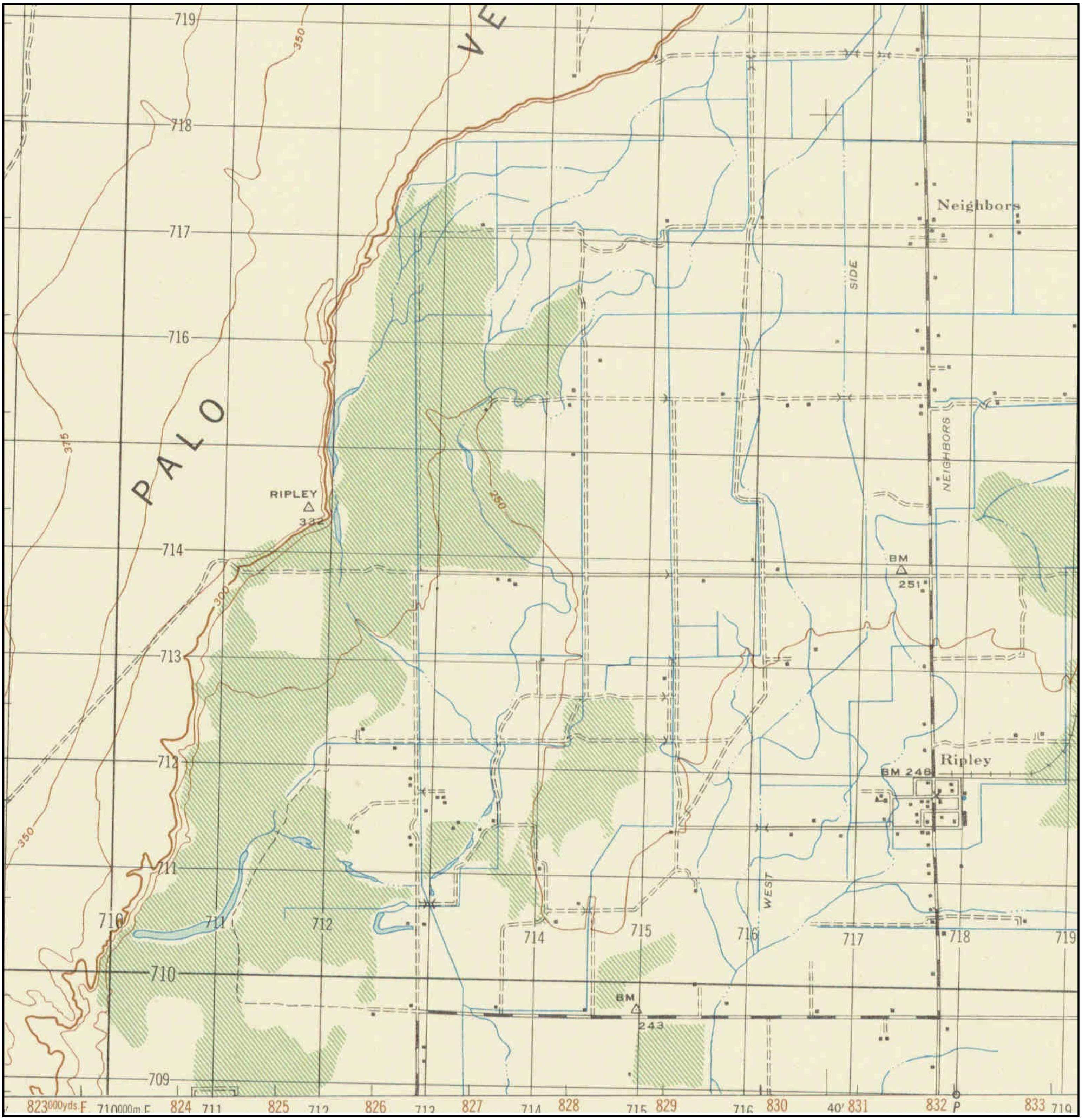
SITE NAME: First Solar Desert Quartzite Solar Project Site

ADDRESS: First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225

LAT/LONG: 33.576 / -114.7639

CLIENT: URS Corporation
CONTACT: Tricia Winterbauer
INQUIRY#: 4154996.5
RESEARCH DATE: 01/23/2015

Historical Topographic Map


VE
PALO
RIPLEY
332
Neighbors
SIDE
NEIGHBORS
BM
251
Ripley
BM 248
WEST
BM
243
350
375
300
250
719
718
717
716
714
713
712
711
710
709
711
712
714
715
716
717
718
719
823000yds. E
710000m. E
824
825
826
827
828
829
830
40′ 831
832
833

N

TARGET QUAD
NAME: BLYTHE
MAP YEAR: 1947

SERIES: 15
SCALE: 1:50000

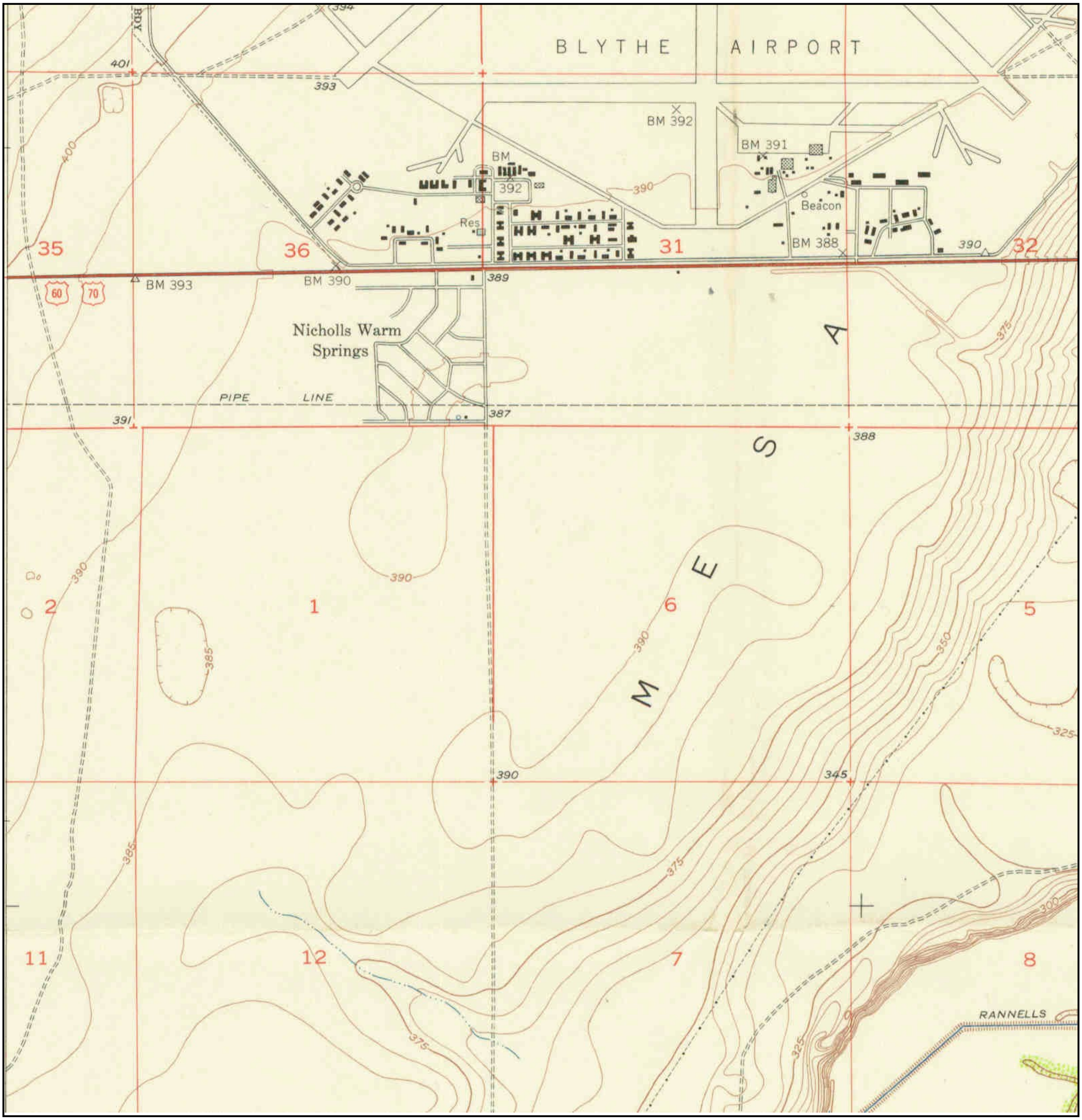
SITE NAME: First Solar Desert Quartzite Solar Project Site

ADDRESS: First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225

LAT/LONG: 33.576 / -114.7639

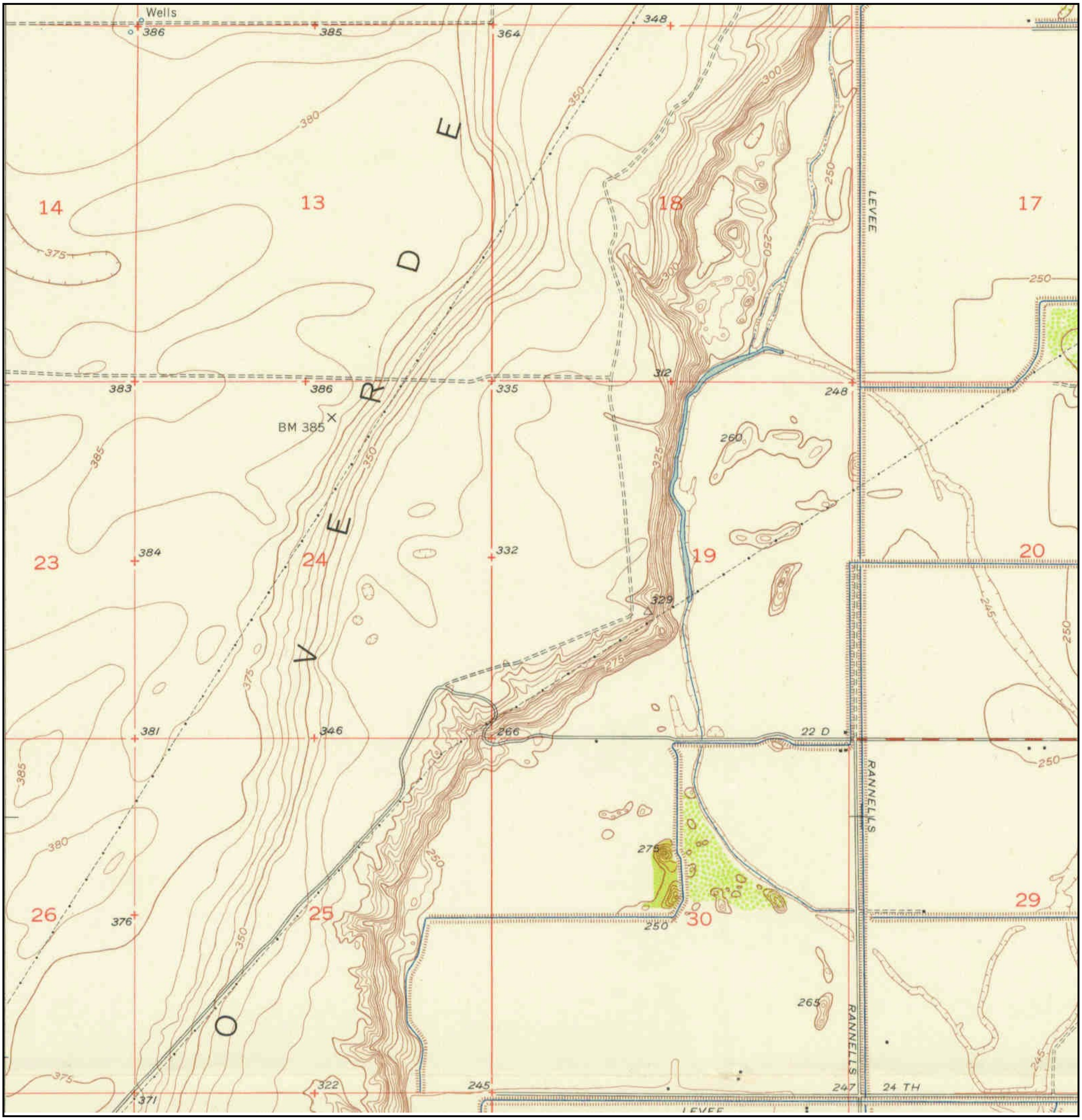
CLIENT: URS Corporation
CONTACT: Tricia Winterbauer
INQUIRY#: 4154996.5
RESEARCH DATE: 01/23/2015

Historical Topographic Map


BLYTHE AIRPORT
BM 392
BM 391
BM
392
390
Res
Beacon
BM 388
35
36
31
32
BM 393
BM 390
389
60
70
Nicholls Warm Springs
PIPE LINE
391
387
388
401
393
394
BDY
400
M E S A
390
2
1
6
5
385
375
350
325
345
11
12
7
8
300
RANNELLS

N ↑	TARGET QUAD NAME: RIPLEY MAP YEAR: 1952 SERIES: 7.5 SCALE: 1:24000	SITE NAME: First Solar Desert Quartzite Solar Project Site ADDRESS: First Solar Desert Quartzite Solar Project Site Blythe, CA 92225 LAT/LONG: 33.576 / -114.7639	CLIENT: URS Corporation CONTACT: Tricia Winterbauer INQUIRY#: 4154996.5 RESEARCH DATE: 01/23/2015

Historical Topographic Map


Wells
386
385
364
348
300
350
380
E
14
13
18
17
375
LEVEE
250
D
383
386
335
312
248
R
BM 385
260
385
325
350
E
384
332
23
24
19
20
245
329
V
275
375
381
346
266
22 D
250
RANNELLS
380
275
250
26
376
25
250
30
29
350
265
O
RANNELLS
375
245
322
245
371
247
24 TH
LEVEE

N

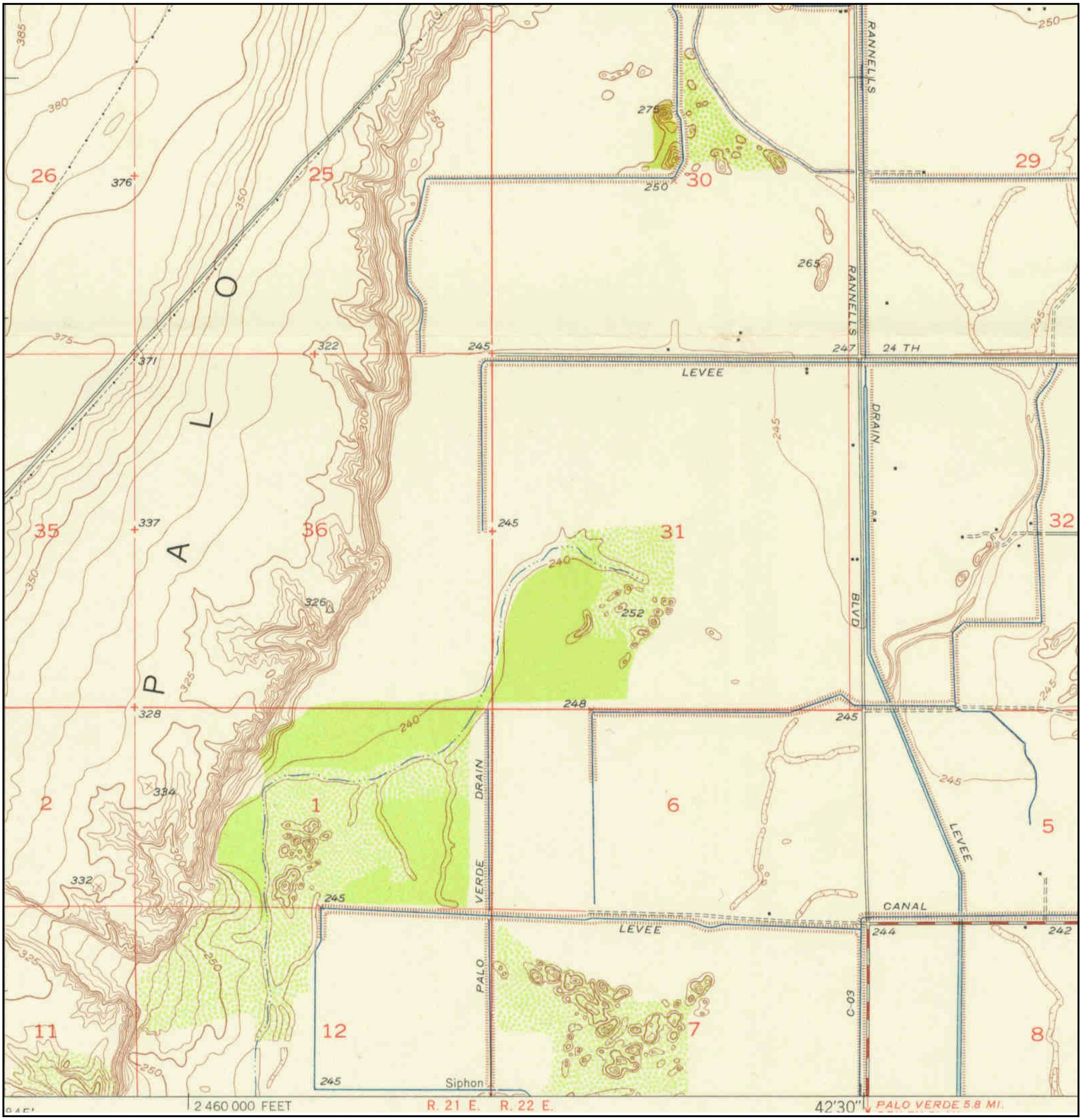
TARGET QUAD
NAME: RIPLEY
MAP YEAR: 1952

SERIES: 7.5
SCALE: 1:24000

SITE NAME: First Solar Desert Quartzite Solar Project Site
ADDRESS: First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225
LAT/LONG: 33.576 / -114.7639

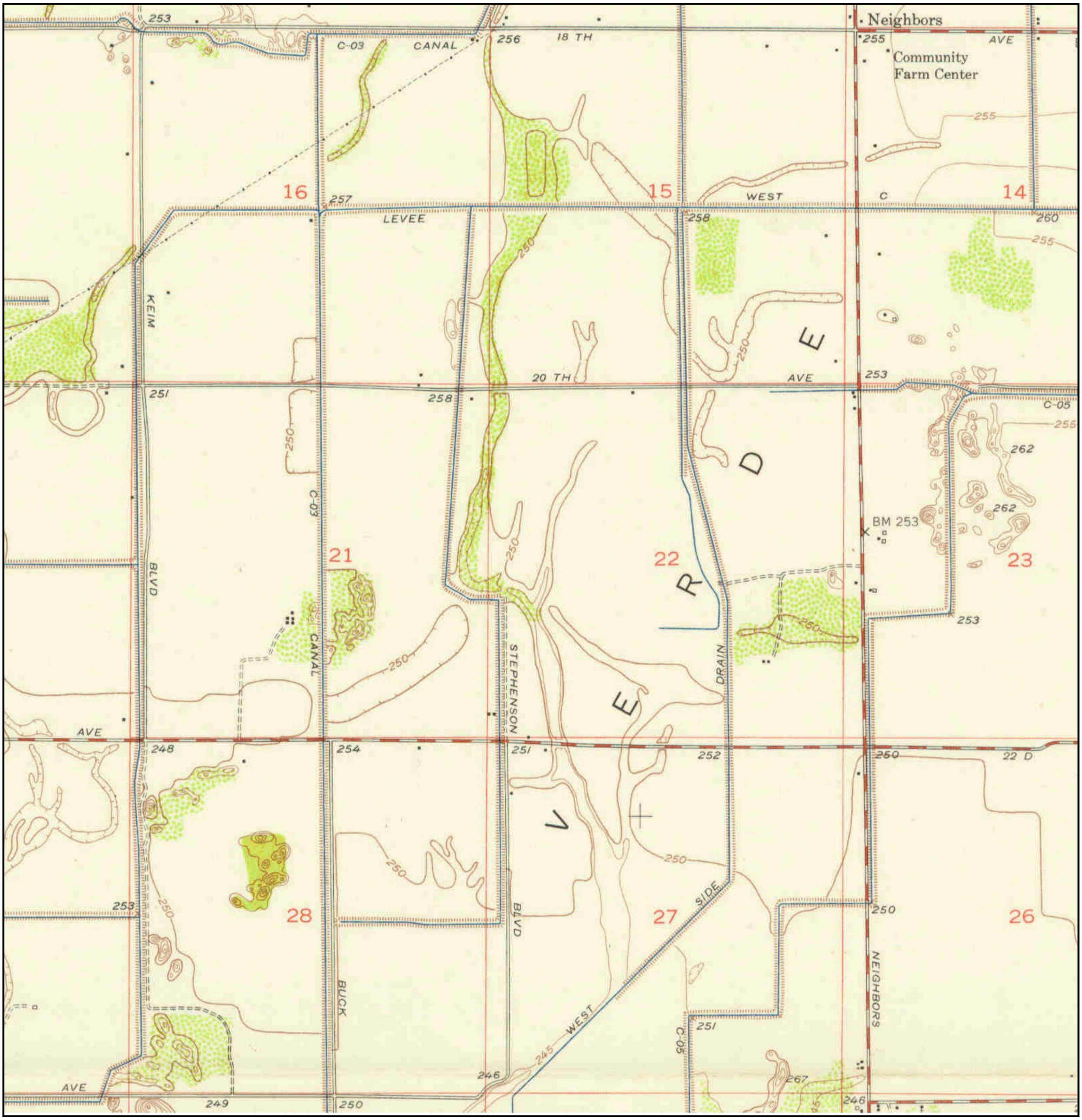
CLIENT: URS Corporation
CONTACT: Tricia Winterbauer
INQUIRY#: 4154996.5
RESEARCH DATE: 01/23/2015

Historical Topographic Map


26
25
30
29
35
36
31
32
2
1
6
5
11
12
7
8
P A L O
LEVEE
DRAIN
RANNELLS
RANNELLS BLVD
24 TH
PALO VERDE DRAIN
CANAL
LEVEE
C-03
Siphon
376
371
337
328
334
332
322
326
275
250
265
245
247
248
252
240
244
242
2 460 000 FEET
R. 21 E.
R. 22 E.
42'30"
PALO VERDE 5.8 MI.

N	TARGET QUAD NAME: RIPLEY MAP YEAR: 1952 SERIES: 7.5 SCALE: 1:24000	SITE NAME: First Solar Desert Quartzite Solar Project Site ADDRESS: First Solar Desert Quartzite Solar Project Site Blythe, CA 92225 LAT/LONG: 33.576 / -114.7639	CLIENT: URS Corporation CONTACT: Tricia Winterbauer INQUIRY#: 4154996.5 RESEARCH DATE: 01/23/2015

Historical Topographic Map


Neighbors
Community Farm Center
18 TH
C-03 CANAL
16
15
14
LEVEE
WEST
C
AVE
KEIM
20 TH
AVE
C-05
BM 253
21
22
23
C-03
CANAL
BLVD
STEPHENSON
DRAIN
V
E
R
D
E
AVE
22 D
28
27
26
BLVD
SIDE
WEST
BUCK
C-05
NEIGHBORS
AVE
253
256
255
257
258
260
250
251
262
248
254
252
246
245
249
267

N

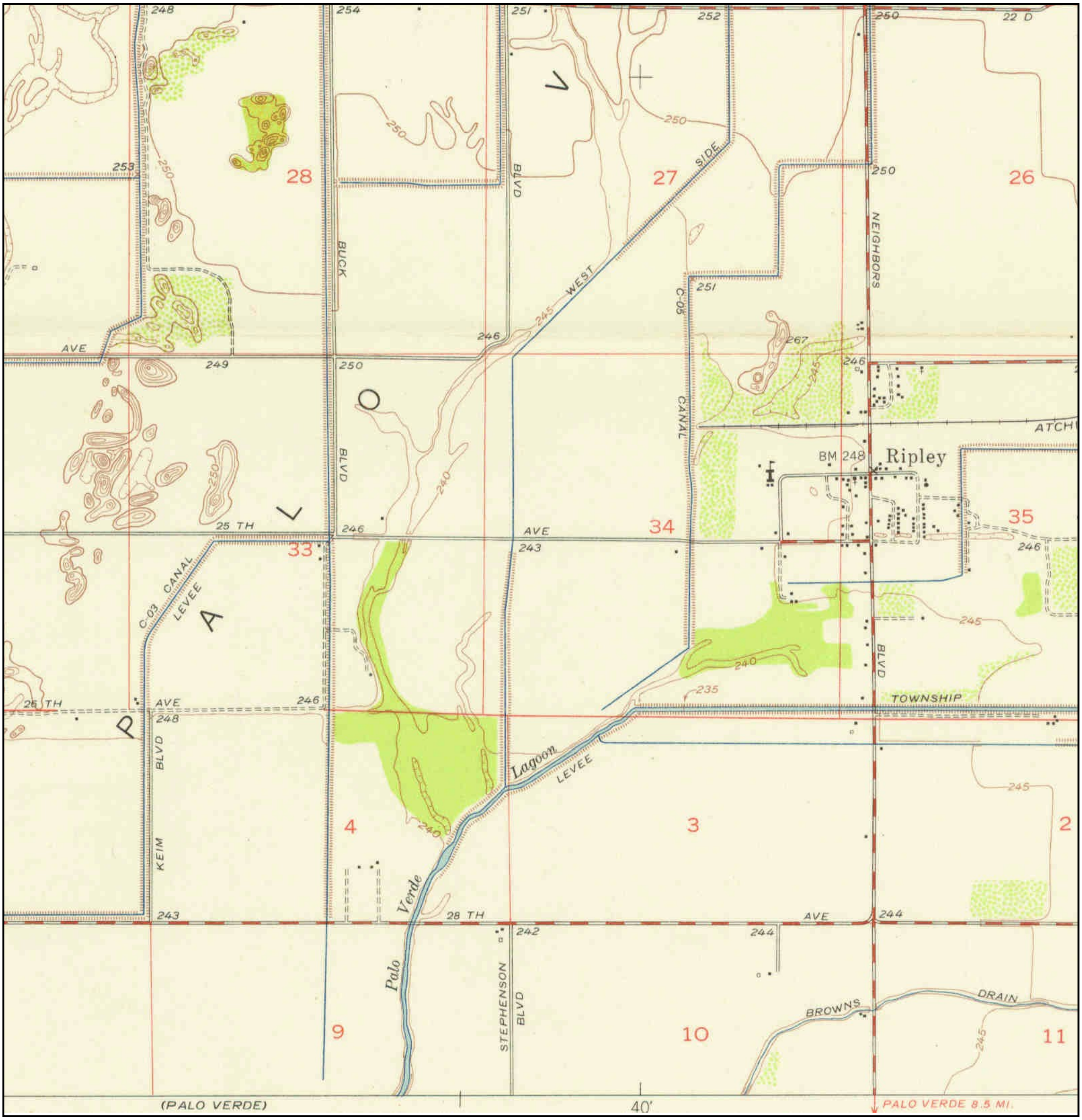
TARGET QUAD
NAME: RIPLEY
MAP YEAR: 1952

SERIES: 7.5
SCALE: 1:24000

SITE NAME: First Solar Desert Quartzite Solar Project Site
ADDRESS: First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225
LAT/LONG: 33.576 / -114.7639

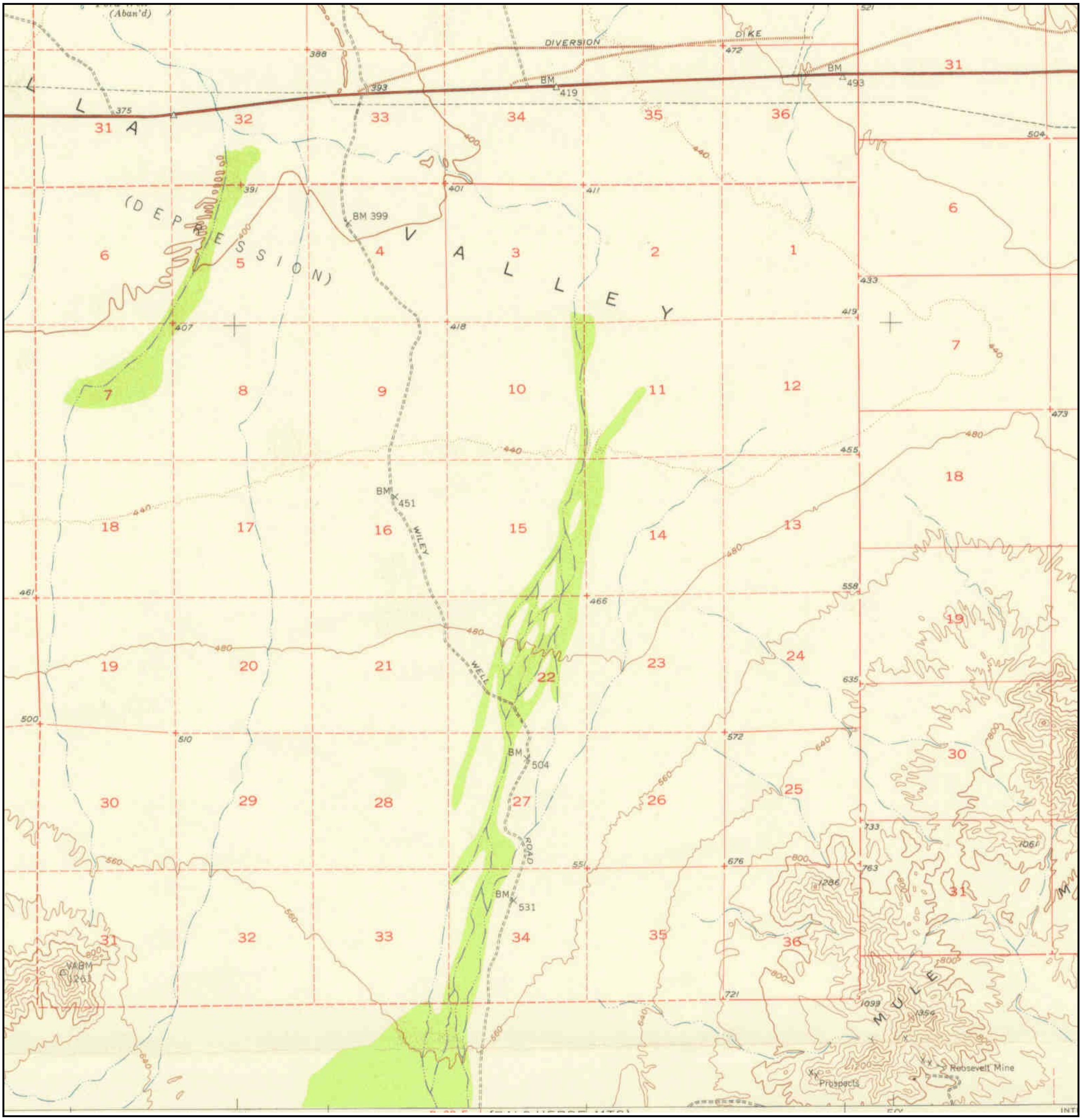
CLIENT: URS Corporation
CONTACT: Tricia Winterbauer
INQUIRY#: 4154996.5
RESEARCH DATE: 01/23/2015

Historical Topographic Map


Ripley
BM 248
NEIGHBORS
BLVD
TOWNSHIP
WEST SIDE
C-05 CANAL
C-03 CANAL LEVEE
BUCK BLVD
KEIM BLVD
STEPHENSON BLVD
25 TH AVE
26 TH AVE
28 TH AVE
Palo Verde Lagoon
LEVEE
BROWNS DRAIN
ATCH
P A L O V
28
27
26
33
34
35
4
3
2
9
10
11
(PALO VERDE)
40'
PALO VERDE 8.5 MI.
22 D

N ↑	TARGET QUAD NAME: RIPLEY MAP YEAR: 1952 SERIES: 7.5 SCALE: 1:24000	SITE NAME: First Solar Desert Quartzite Solar Project Site ADDRESS: First Solar Desert Quartzite Solar Project Site Blythe, CA 92225 LAT/LONG: 33.576 / -114.7639	CLIENT: URS Corporation CONTACT: Tricia Winterbauer INQUIRY#: 4154996.5 RESEARCH DATE: 01/23/2015

Historical Topographic Map


(Aban'd)
DIVERSION
DIKE
BM 419
BM 493
BM 399
(DEPRESSION)
VALLEY
BM 451
WILEY WELL ROAD
BM 504
BM 531
YABM 1261
MULE
Roosevelt Mine
Prospects
31
32
33
34
35
36
31
6
5
4
3
2
1
6
7
8
9
10
11
12
7
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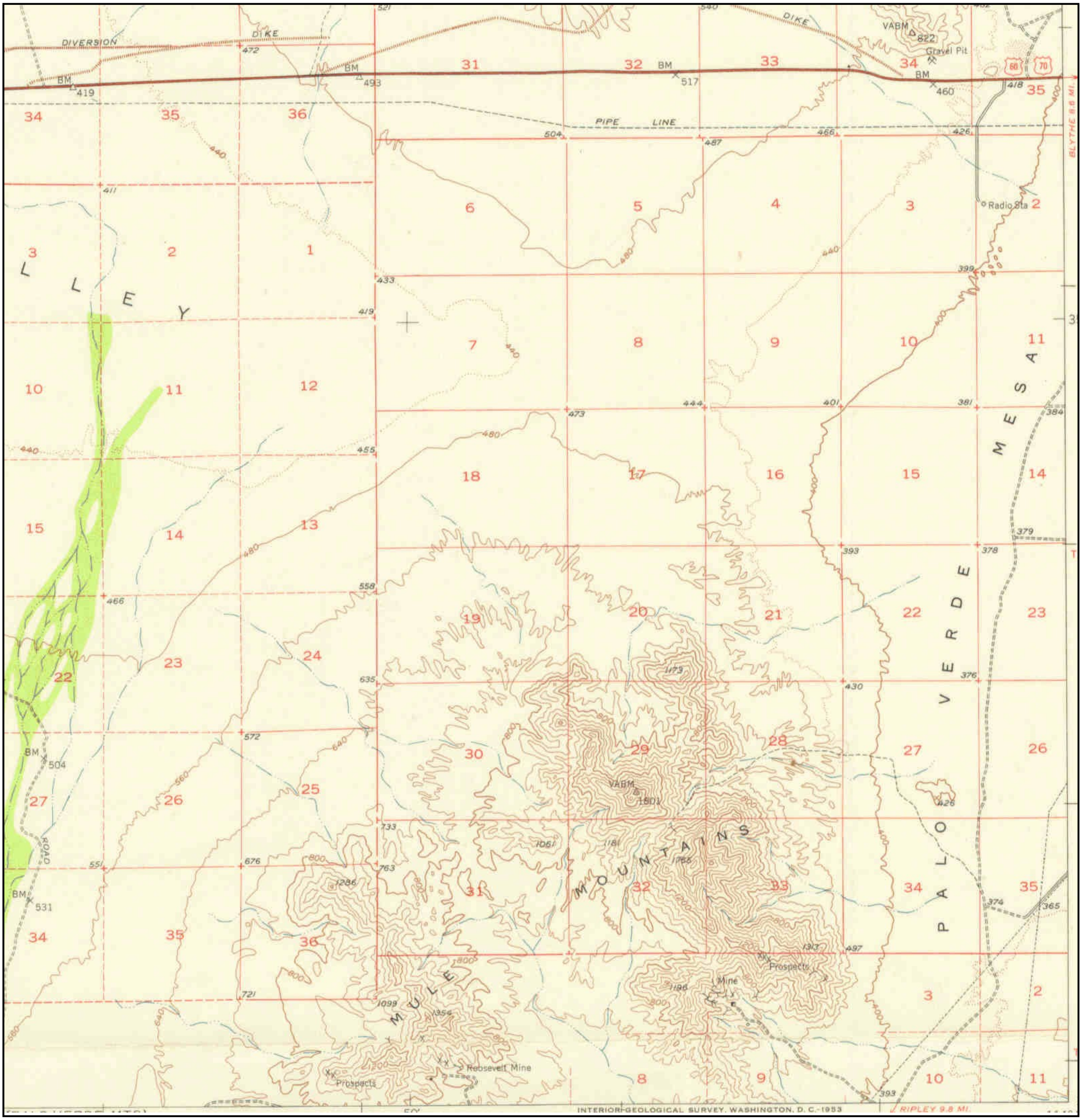
375
388
393
391
401
411
407
418
433
419
440
455
461
466
472
473
480
500
504
510
521
551
558
560
572
635
640
676
721
733
763
800
1061
1099
1286
1354

N	TARGET QUAD NAME: MCCOY SPRING MAP YEAR: 1952 SERIES: 15 SCALE: 1:62500	SITE NAME: First Solar Desert Quartzite Solar Project Site ADDRESS: First Solar Desert Quartzite Solar Project Site Blythe, CA 92225 LAT/LONG: 33.576 / -114.7639	CLIENT: URS Corporation CONTACT: Tricia Winterbauer INQUIRY#: 4154996.5 RESEARCH DATE: 01/23/2015

Historical Topographic Map



DIVERSION
DIKE
PIPE LINE
VABM 822
Gravel Pit
BM 419
BM 493
BM 517
BM 460
60
70
BLYTHE 9.6 MI.
Radio Sta
L L E Y
PALO VERDE MESA
MULE MOUNTAINS
VABM 1801
Prospects
Mine
Rebsevelt Mine
ROAD
BM 504
BM 531
RIPLEY 9.8 MI.
INTERIOR-GEOLOGICAL SURVEY, WASHINGTON, D. C.-1953

N

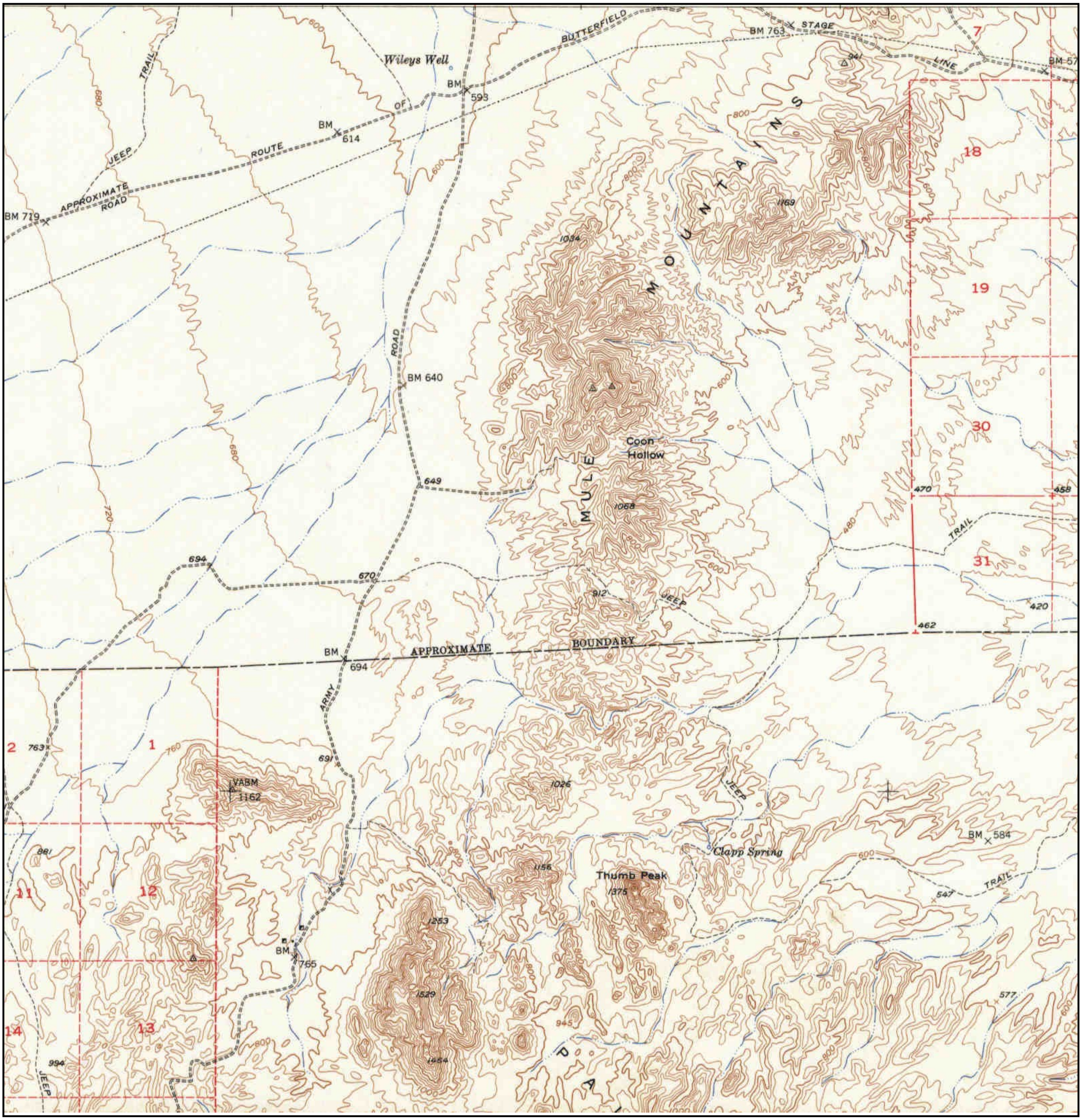
TARGET QUAD
NAME: MCCOY SPRING
MAP YEAR: 1952

SERIES: 15
SCALE: 1:62500

SITE NAME: First Solar Desert Quartzite Solar Project Site
ADDRESS: First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225
LAT/LONG: 33.576 / -114.7639

CLIENT: URS Corporation
CONTACT: Tricia Winterbauer
INQUIRY#: 4154996.5
RESEARCH DATE: 01/23/2015

Historical Topographic Map


Wileys Well
BUTTERFIELD
STAGE
LINE
BM 763
BM 593
BM 614
OF
JEEP
ROUTE
APPROXIMATE
ROAD
BM 719
TRAIL
941
1169
1034
MULE
MOUNTAINS
Coon Hollow
1068
BM 640
ROAD
649
694
670
912
JEEP
APPROXIMATE
BOUNDARY
BM 694
ARMY
691
462
470
458
420
TRAIL
1026
JEEP
VABM 1162
763
881
Clapp Spring
BM 584
Thumb Peak
1375
1156
547
TRAIL
BM 765
1253
1529
1464
945
577
994
JEEP
PA
7
18
19
30
31
1
2
11
12
13
14

N

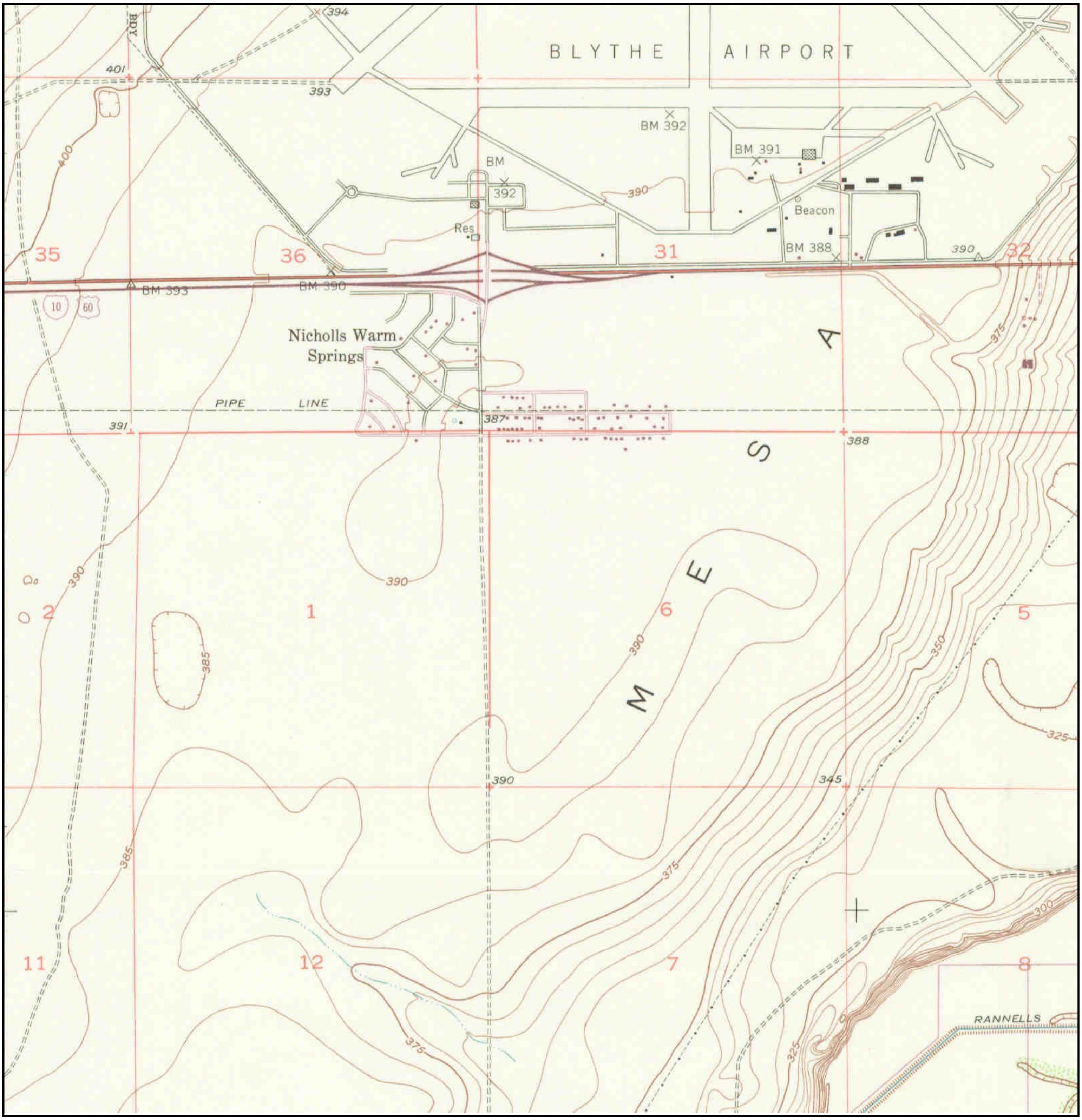
TARGET QUAD
NAME: PALO VERDE MOUNTAINS
MAP YEAR: 1953

SERIES: 15
SCALE: 1:62500

SITE NAME: First Solar Desert Quartzite Solar Project Site
ADDRESS: First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225
LAT/LONG: 33.576 / -114.7639

CLIENT: URS Corporation
CONTACT: Tricia Winterbauer
INQUIRY#: 4154996.5
RESEARCH DATE: 01/23/2015

Historical Topographic Map


394
BDY
BLYTHE
AIRPORT
401
393
BM 392
400
BM 391
BM
392
390
Res
Beacon
35
36
BM 388
31
390
32
BM 393
BM 390
10
60
Nicholls Warm
Springs
375
PIPE
LINE
391
387
388
A
S
390
E
390
2
1
6
5
385
390
350
M
325
390
345
385
375
300
11
12
7
8
375
RANNELLS
325

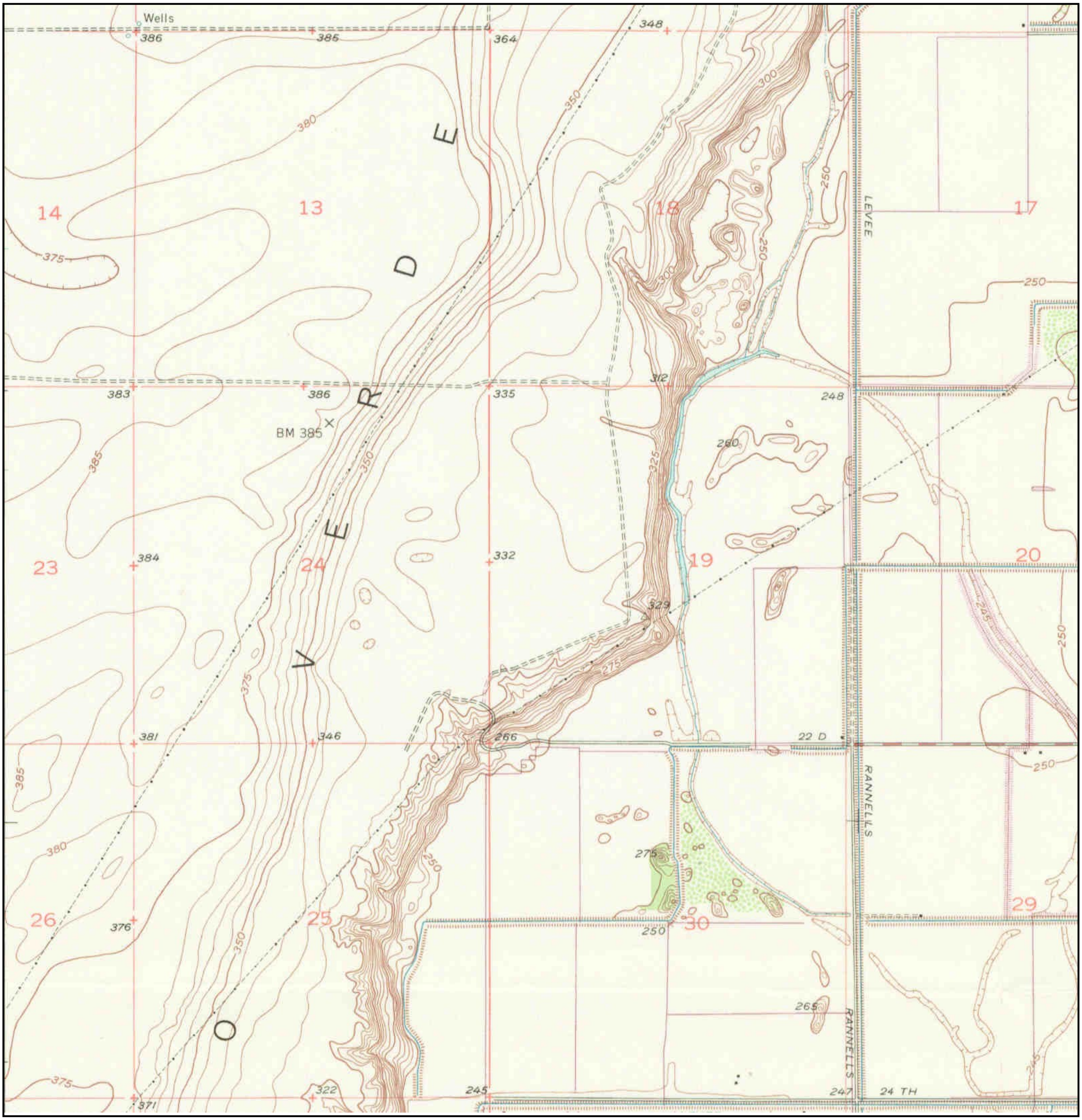
N

TARGET QUAD
NAME: RIPLEY
MAP YEAR: 1970
PHOTOREVISED FROM :1952
SERIES: 7.5
SCALE: 1:24000

SITE NAME: First Solar Desert Quartzite Solar Project Site
ADDRESS: First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225
LAT/LONG: 33.576 / -114.7639

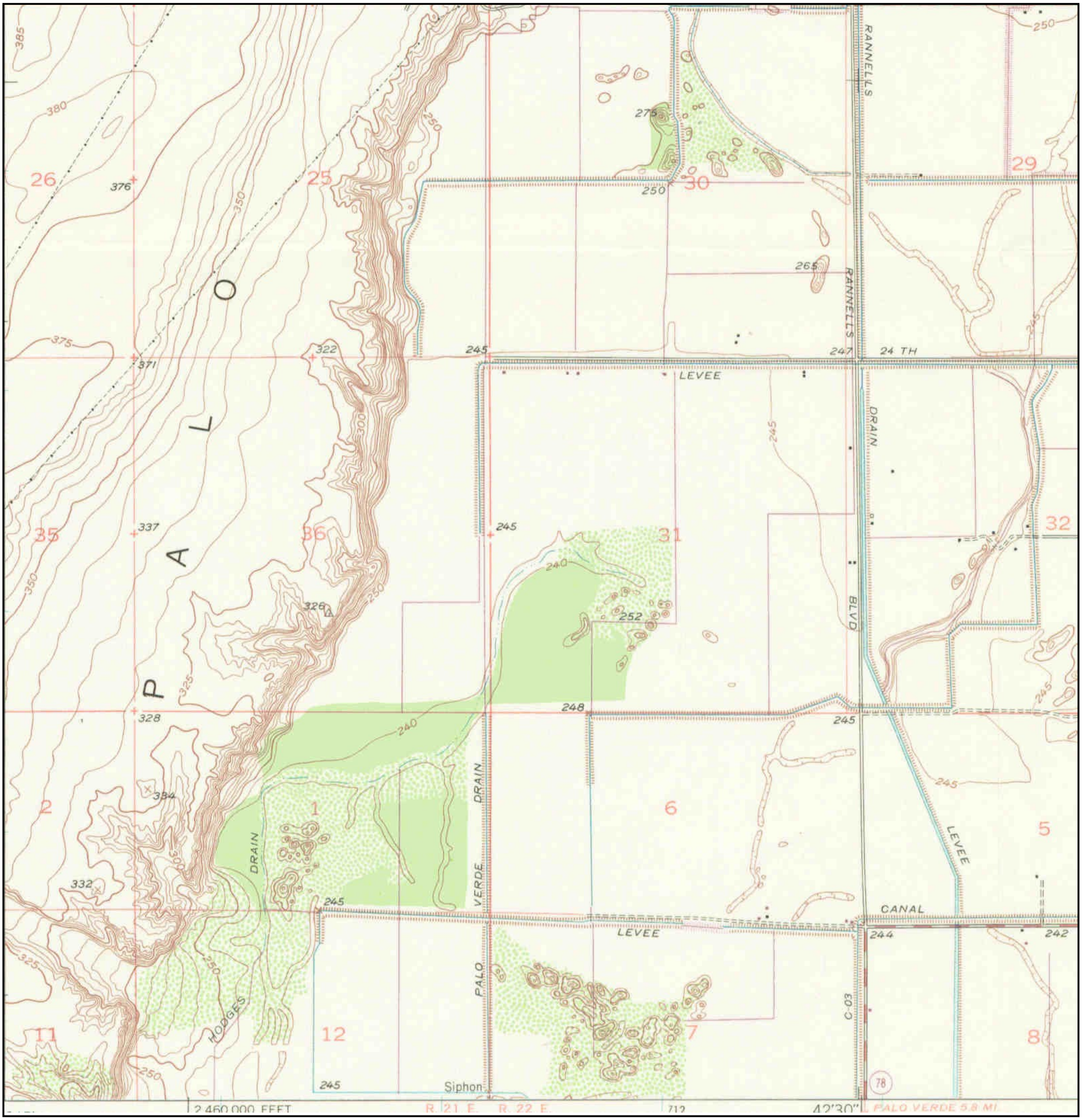
CLIENT: URS Corporation
CONTACT: Tricia Winterbauer
INQUIRY#: 4154996.5
RESEARCH DATE: 01/23/2015

Historical Topographic Map


Wells
386
385
364
348
300
350
380
E
14
13
18
17
375
D
250
R
383
386
335
312
248
BM 385
260
385
350
325
LEVEE
23
384
24
332
19
20
E
329
V
275
245
381
346
266
22 D
385
RANNELLS
380
250
275
26
376
25
30
29
350
O
265
RANNELLS
375
322
245
247
24 TH
371

TARGET QUAD NAME: RIPLEY MAP YEAR: 1970 PHOTOREVISED FROM :1952 SERIES: 7.5 SCALE: 1:24000	SITE NAME: First Solar Desert Quartzite Solar Project Site ADDRESS: First Solar Desert Quartzite Solar Project Site Blythe, CA 92225 LAT/LONG: 33.576 / -114.7639	CLIENT: URS Corporation CONTACT: Tricia Winterbauer INQUIRY#: 4154996.5 RESEARCH DATE: 01/23/2015

Historical Topographic Map


385
380
26
376
25
350
250
O
375
371
L
35
337
36
A
326
252
31
240
350
P
325
328
248
334
2
1
DRAIN
VERDE
DRAIN
6
5
332
245
LEVEE
325
HODGES
PALO
11
12
7
8
250
245
Siphon
2 460 000 FEET
R. 21 E.
R. 22 E.
712
42'30"
PALO VERDE 5.8 MI.
78
C-03
244
242
CANAL
LEVEE
245
RANNELLS
RANNELLS
BLVD
DRAIN
24 TH
247
LEVEE
32
29
30
275
250
265
322
245
245

N

TARGET QUAD
NAME: RIPLEY
MAP YEAR: 1970
PHOTOREVISED FROM :1952
SERIES: 7.5
SCALE: 1:24000

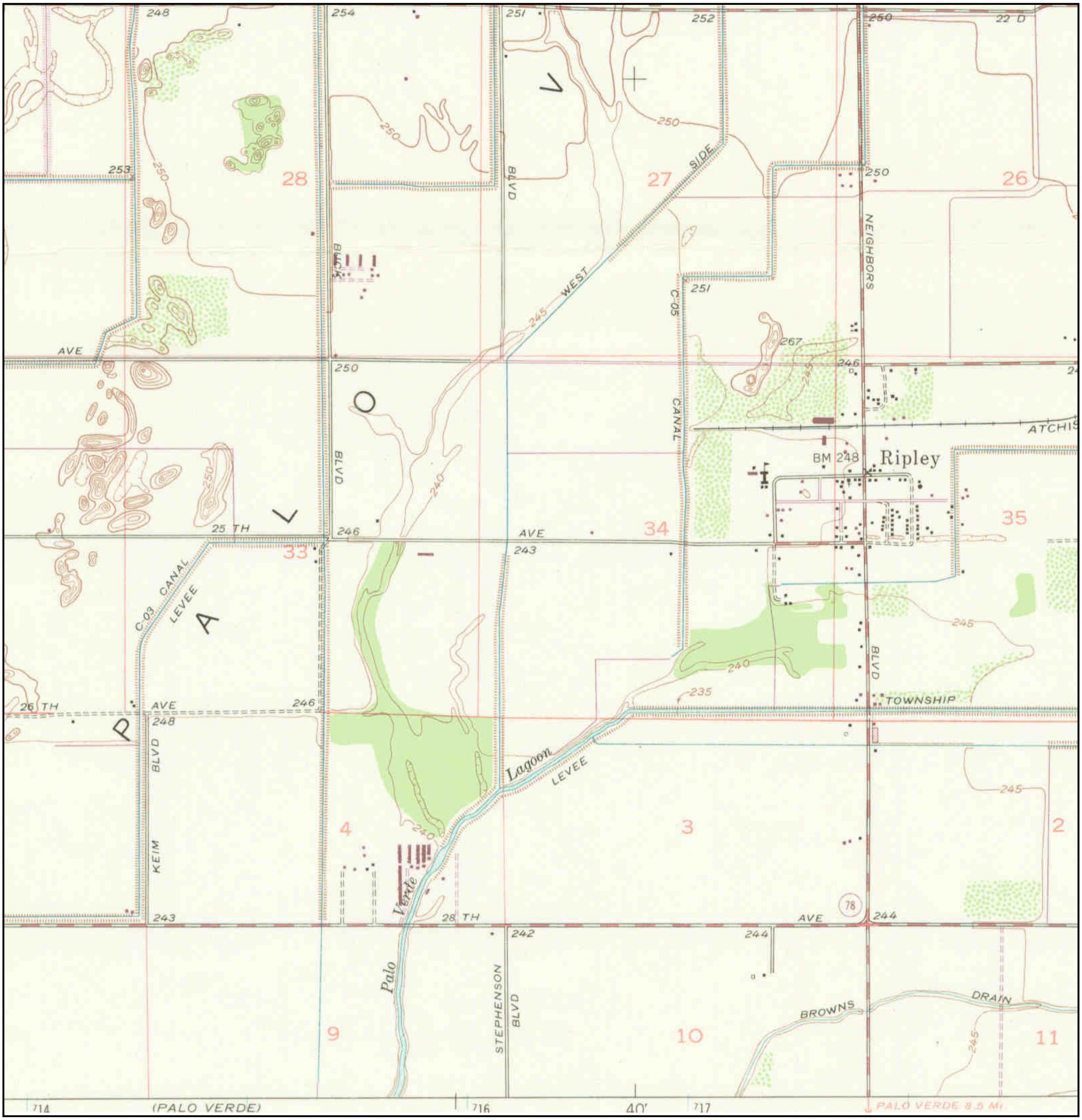
SITE NAME: First Solar Desert Quartzite Solar Project Site

ADDRESS: First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225

LAT/LONG: 33.576 / -114.7639

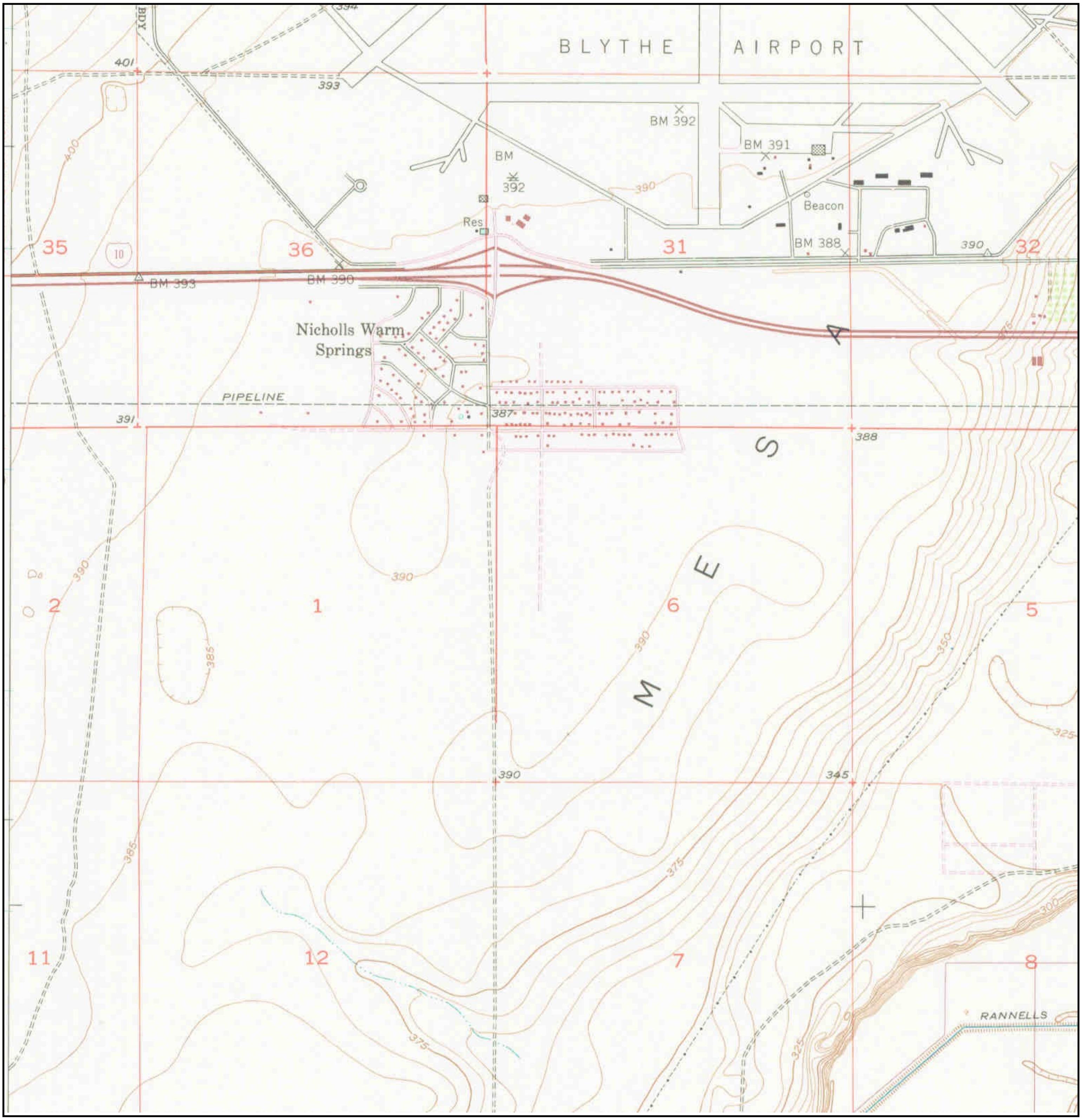
CLIENT: URS Corporation
CONTACT: Tricia Winterbauer
INQUIRY#: 4154996.5
RESEARCH DATE: 01/23/2015

Historical Topographic Map


Ripley
28
27
26
33
34
35
4
3
2
9
10
11
WEST SIDE
C-05 CANAL
C-03 CANAL LEVEE
NEIGHBORS BLVD
STEPHENSON BLVD
KEIM BLVD
25 TH AVE
26 TH AVE
28 TH AVE
TOWNSHIP
ATCHIS
Lagoon LEVEE
Palo Verde
BROWNS DRAIN
BM 248
P A L O V
(PALO VERDE)
PALO VERDE 8.5 MI.
40'
714
716
717
78

TARGET QUAD		SITE NAME:	First Solar Desert Quartzite Solar Project Site	CLIENT: URS Corporation
NAME:	RIPLEY			CONTACT: Tricia Winterbauer
MAP YEAR: 1970		ADDRESS:	First Solar Desert Quartzite Solar Project Site	INQUIRY#: 4154996.5
PHOTOREVISED FROM :1952				RESEARCH DATE: 01/23/2015
SERIES:	7.5		Blythe, CA 92225	
SCALE:	1:24000	LAT/LONG:	33.576 / -114.7639	

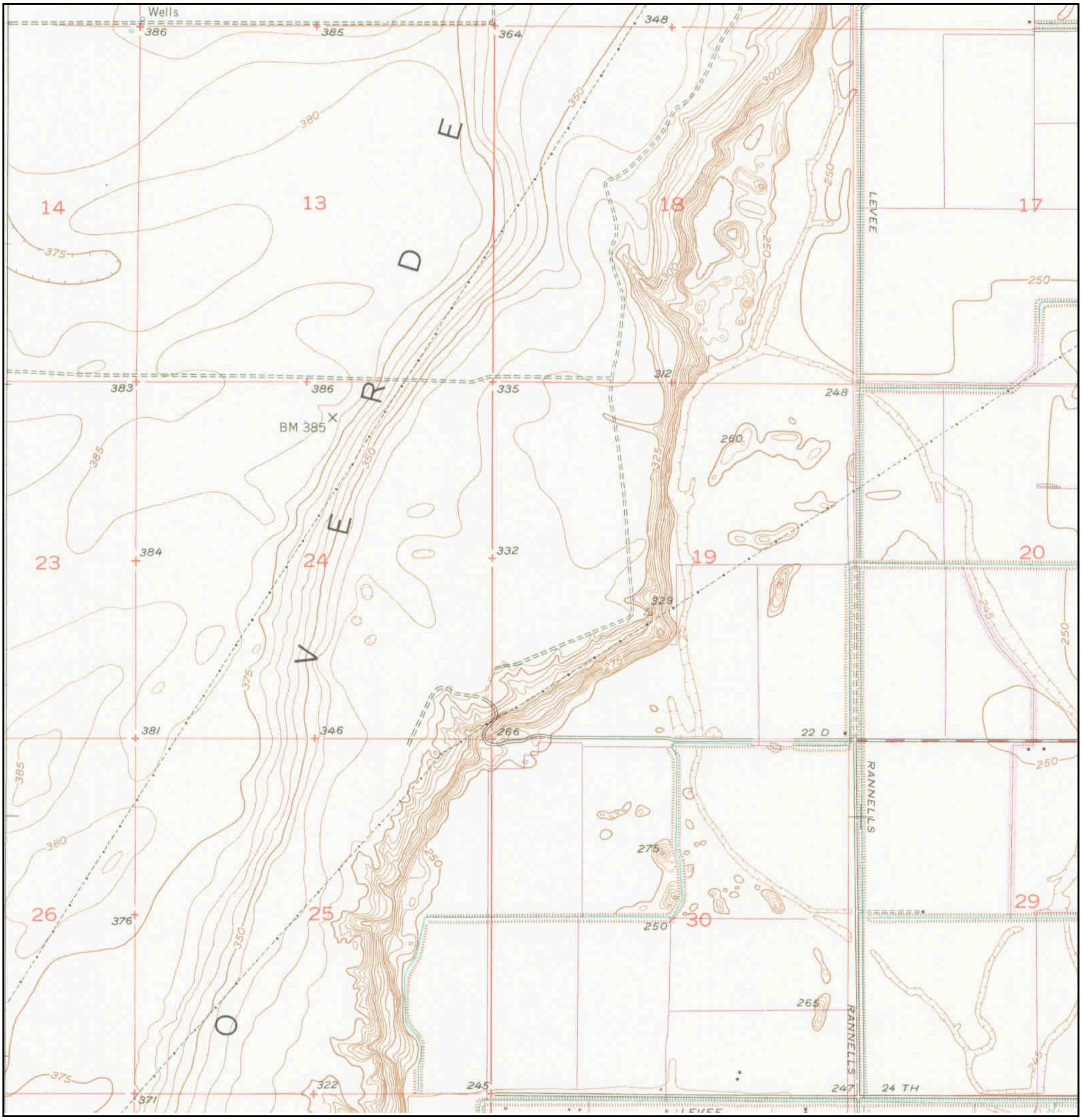
Historical Topographic Map


BLYTHE AIRPORT
BDY
401
393
394
BM 392
BM 391
BM
392
390
Res
Beacon
BM 388
35
36
31
32
10
BM 393
BM 390
Nicholls Warm Springs
PIPELINE
391
387
388
A
S
390
E
M
2
1
6
5
385
350
325
390
345
375
300
11
12
7
8
RANNELLS

TARGET QUAD		SITE NAME:	First Solar Desert Quartzite Solar Project Site	CLIENT:	URS Corporation
NAME:	RIPLEY	ADDRESS:	First Solar Desert Quartzite Solar Project Site Blythe, CA 92225	CONTACT:	Tricia Winterbauer
MAP YEAR: 1975				INQUIRY#:	4154996.5
PHOTOREVISED FROM :1952				RESEARCH DATE: 01/23/2015	
SERIES:	7.5	LAT/LONG:	33.576 / -114.7639		
SCALE:	1:24000				

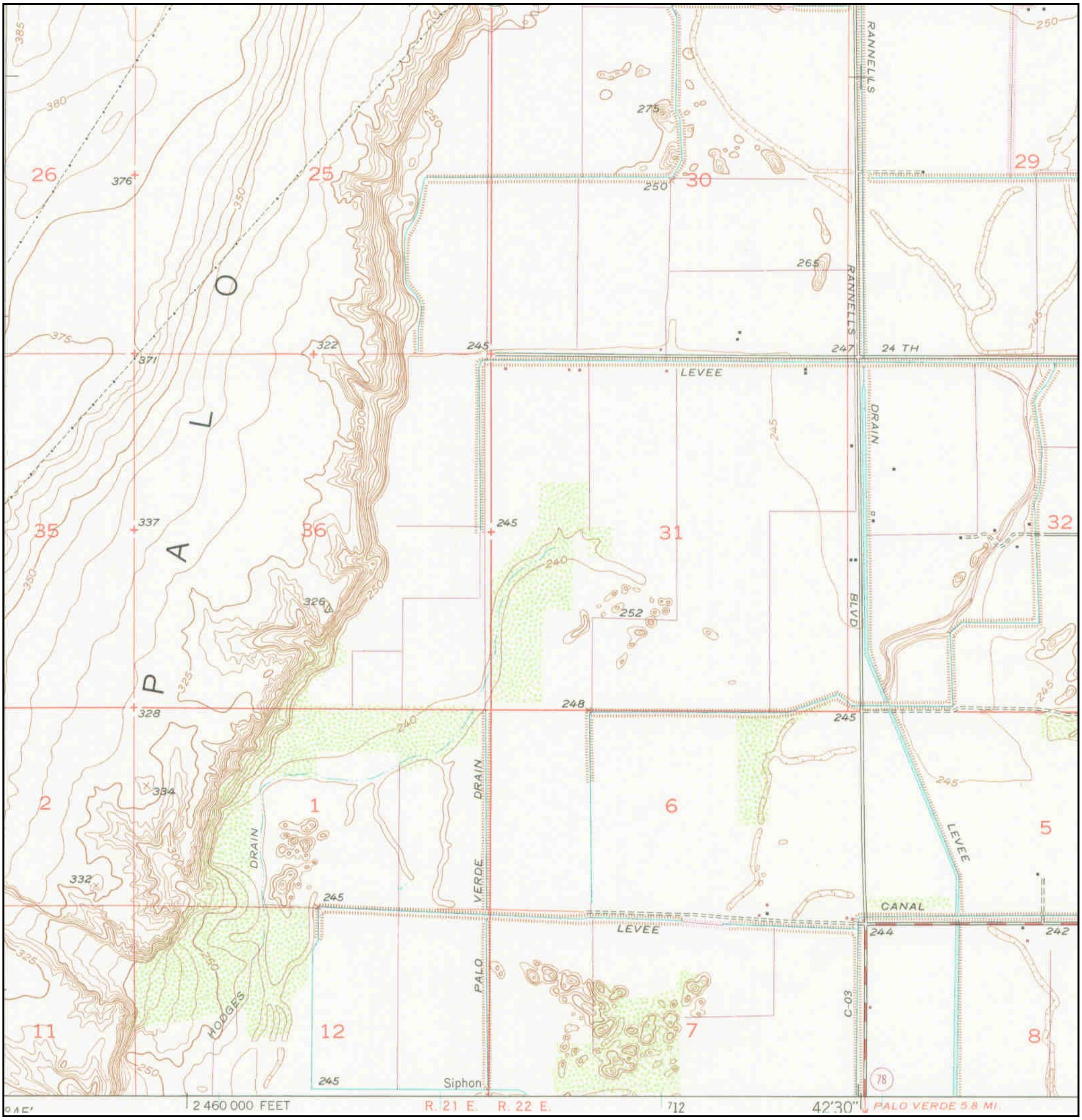
N

Historical Topographic Map


Wells
386
385
364
348
380
350
300
E
D
R
E
V
O
14
13
18
17
375
250
LEVEE
383
386
335
312
248
BM 385
260
325
23
384
24
332
19
20
329
275
245
381
346
266
22 D
385
RANNELLS
380
275
26
376
25
30
250
29
265
375
322
245
247
24 TH
371
LEVEE

N	TARGET QUAD	SITE NAME:	First Solar Desert Quartzite Solar Project Site	CLIENT:	URS Corporation
	NAME: RIPLEY			CONTACT:	Tricia Winterbauer
	MAP YEAR: 1975	ADDRESS:	First Solar Desert Quartzite Solar Project Site	INQUIRY#:	4154996.5
	PHOTOREVISED FROM :1952			RESEARCH DATE: 01/23/2015	
	SERIES: 7.5		Blythe, CA 92225		
	SCALE: 1:24000	LAT/LONG:	33.576 / -114.7639		

Historical Topographic Map


26
25
30
29
35
36
31
32
2
1
6
5
11
12
7
8
P A L O
RANNELLS
RANNELLS
24 TH
LEVEE
DRAIN
BLVD
CANAL
LEVEE
LEVEE
DRAIN
DRAIN
PALO VERDE
HODGES
C-03
Siphon
78
385
380
376
375
371
350
322
337
326
325
328
334
332
300
250
275
265
245
247
248
240
252
244
242
2 460 000 FEET
R. 21 E.
R. 22 E.
712
42'30"
PALO VERDE 5.8 MI.

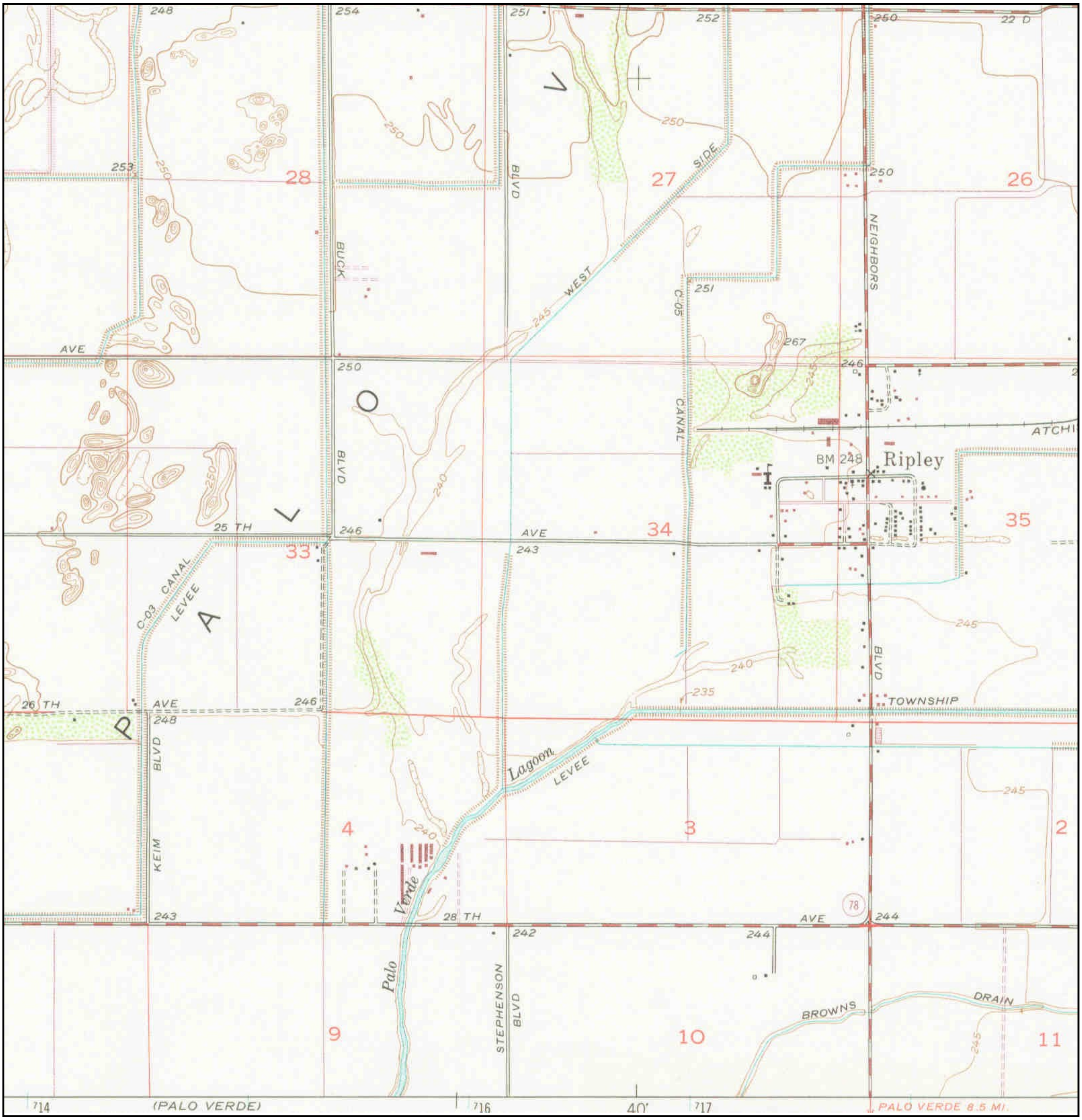
N

TARGET QUAD
NAME: RIPLEY
MAP YEAR: 1975
PHOTOREVISED FROM :1952
SERIES: 7.5
SCALE: 1:24000

SITE NAME: First Solar Desert Quartzite Solar Project Site
ADDRESS: First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225
LAT/LONG: 33.576 / -114.7639

CLIENT: URS Corporation
CONTACT: Tricia Winterbauer
INQUIRY#: 4154996.5
RESEARCH DATE: 01/23/2015

Historical Topographic Map


248
254
251
252
250
22 D
253
28
27
26
SIDE
WEST
BUCK
BLVD
NEIGHBORS
C-05
CANAL
251
267
246
AVE
250
O
V
ATCHI
BM 248
Ripley
35
34
33
25 TH
246
AVE
243
C-03 CANAL
LEVEE
A
P
26 TH
AVE
246
248
KEIM
BLVD
240
245
235
TOWNSHIP
Lagoon
LEVEE
4
3
2
243
28 TH
AVE
244
78
Palo
Verde
242
244
STEPHENSON
BLVD
BROWNS
DRAIN
9
10
11
714
(PALO VERDE)
716
40'
717
PALO VERDE 8.5 MI.

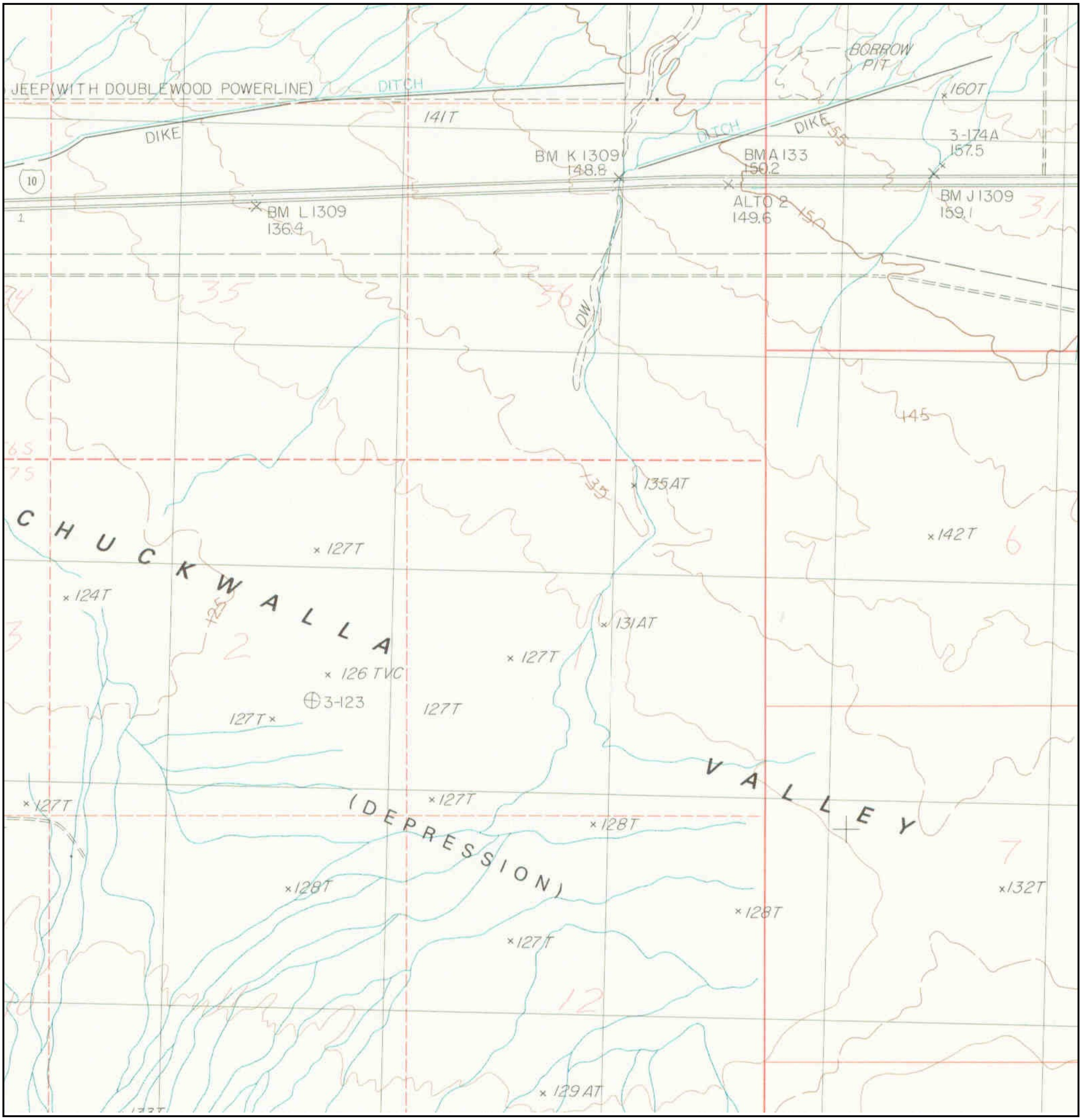
N

TARGET QUAD
NAME: RIPLEY
MAP YEAR: 1975
PHOTOREVISED FROM :1952
SERIES: 7.5
SCALE: 1:24000

SITE NAME: First Solar Desert Quartzite Solar Project Site
ADDRESS: First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225
LAT/LONG: 33.576 / -114.7639

CLIENT: URS Corporation
CONTACT: Tricia Winterbauer
INQUIRY#: 4154996.5
RESEARCH DATE: 01/23/2015

Historical Topographic Map

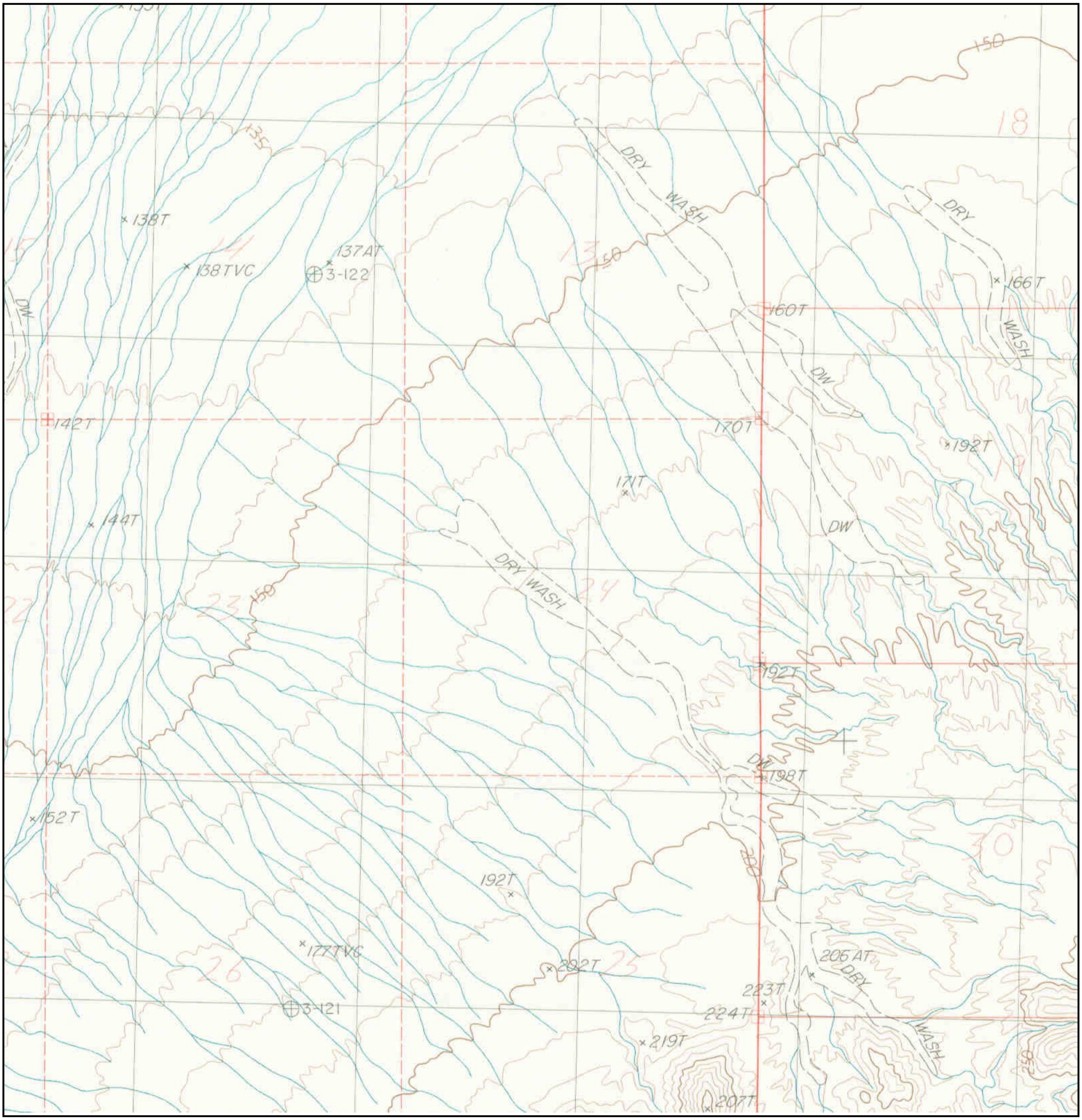

JEEP (WITH DOUBLEWOOD POWERLINE)
DITCH
DIKE
141T
BM K 1309
148.8
BM A 133
150.2
DITCH
DIKE
BORROW PIT
160T
3-174A
157.5
10
BM L 1309
136.4
ALTO 2
149.6
BM J 1309
159.1
155
150
31
35
36
DW
145
135AT
135
CHUCKWALLA
127T
142T
6
124T
125
2
3
131AT
127T
126 TVC
3-123
127T
127T
VALLEY
127T
127T
(DEPRESSION)
128T
7
128T
132T
128T
127T
12
129AT

TARGET QUAD
NAME: ROOSEVELT MINE
MAP YEAR: 1983
PROVISIONAL
SERIES: 7.5
SCALE: 1:24000

SITE NAME: First Solar Desert Quartzite Solar Project Site
ADDRESS: First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225
LAT/LONG: 33.576 / -114.7639

CLIENT: URS Corporation
CONTACT: Tricia Winterbauer
INQUIRY#: 4154996.5
RESEARCH DATE: 01/23/2015

Historical Topographic Map


150
18
135
DRY WASH
138T
137AT
3-122
138TVC
13
DRY
166T
WASH
DW
160T
DW
142T
170T
192T
171T
144T
DW
DRY WASH
24
23
150
192T
DW
198T
152T
200
192T
177TVC
202T
26
25
206 AT
DRY
223T
3-121
224T
WASH
219T
207T

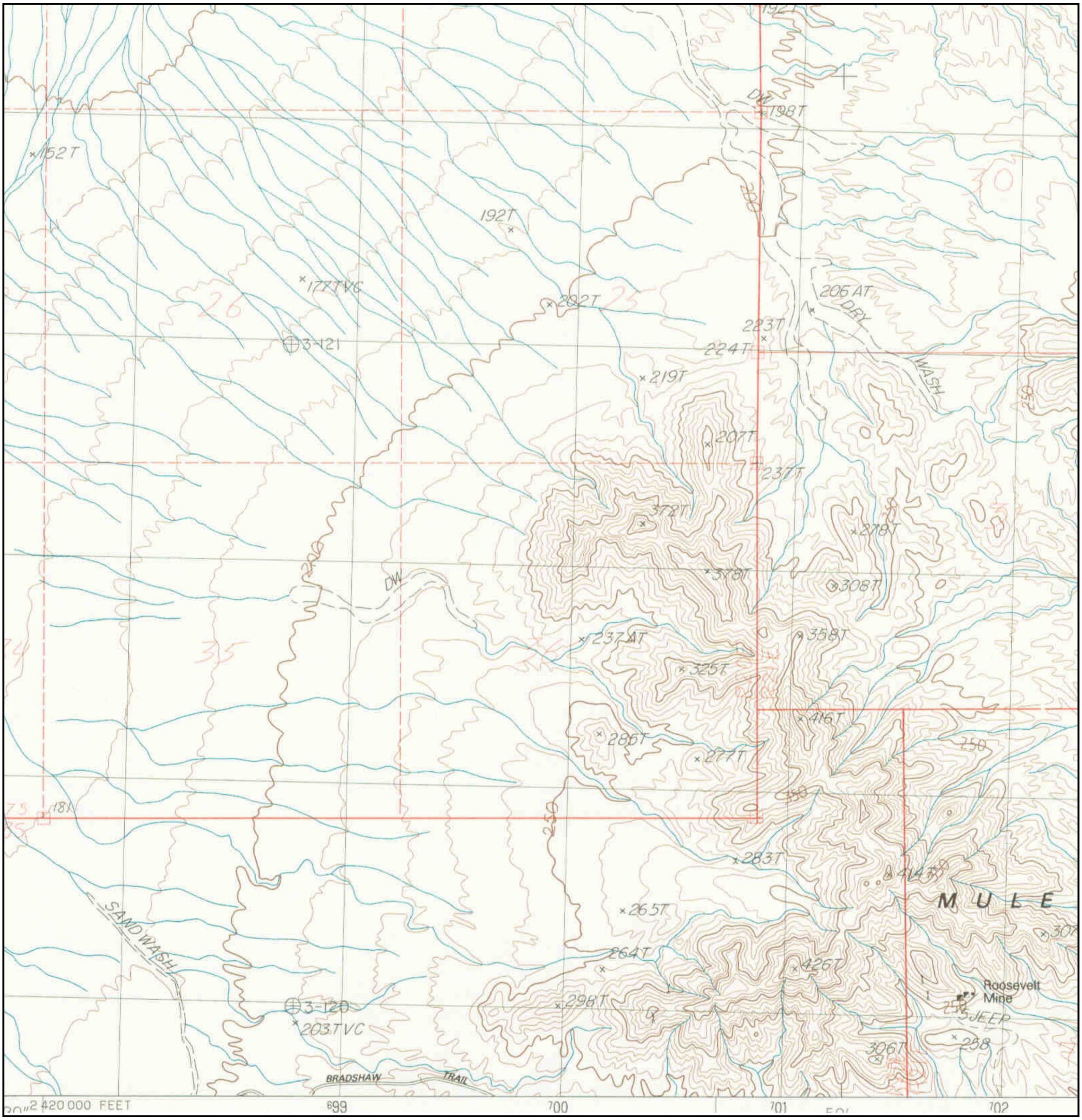
N

TARGET QUAD
NAME: ROOSEVELT MINE
MAP YEAR: 1983
PROVISIONAL
SERIES: 7.5
SCALE: 1:24000

SITE NAME: First Solar Desert Quartzite Solar Project Site
ADDRESS: First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225
LAT/LONG: 33.576 / -114.7639

CLIENT: URS Corporation
CONTACT: Tricia Winterbauer
INQUIRY#: 4154996.5
RESEARCH DATE: 01/23/2015

Historical Topographic Map


152T
192T
177TVC
3-121
202T
198T
206 AT
DRY
WASH
223T
224T
219T
207T
237T
372T
378T
278T
308T
DW
237AT
358T
325T
416T
285T
277T
250
283T
414T
MULE
265T
264T
426T
SAND WASH
3-120
203TVC
298T
Roosevelt Mine
JEEP
258
306T
BRADSHAW
TRAIL
2 420 000 FEET
699
700
701
702

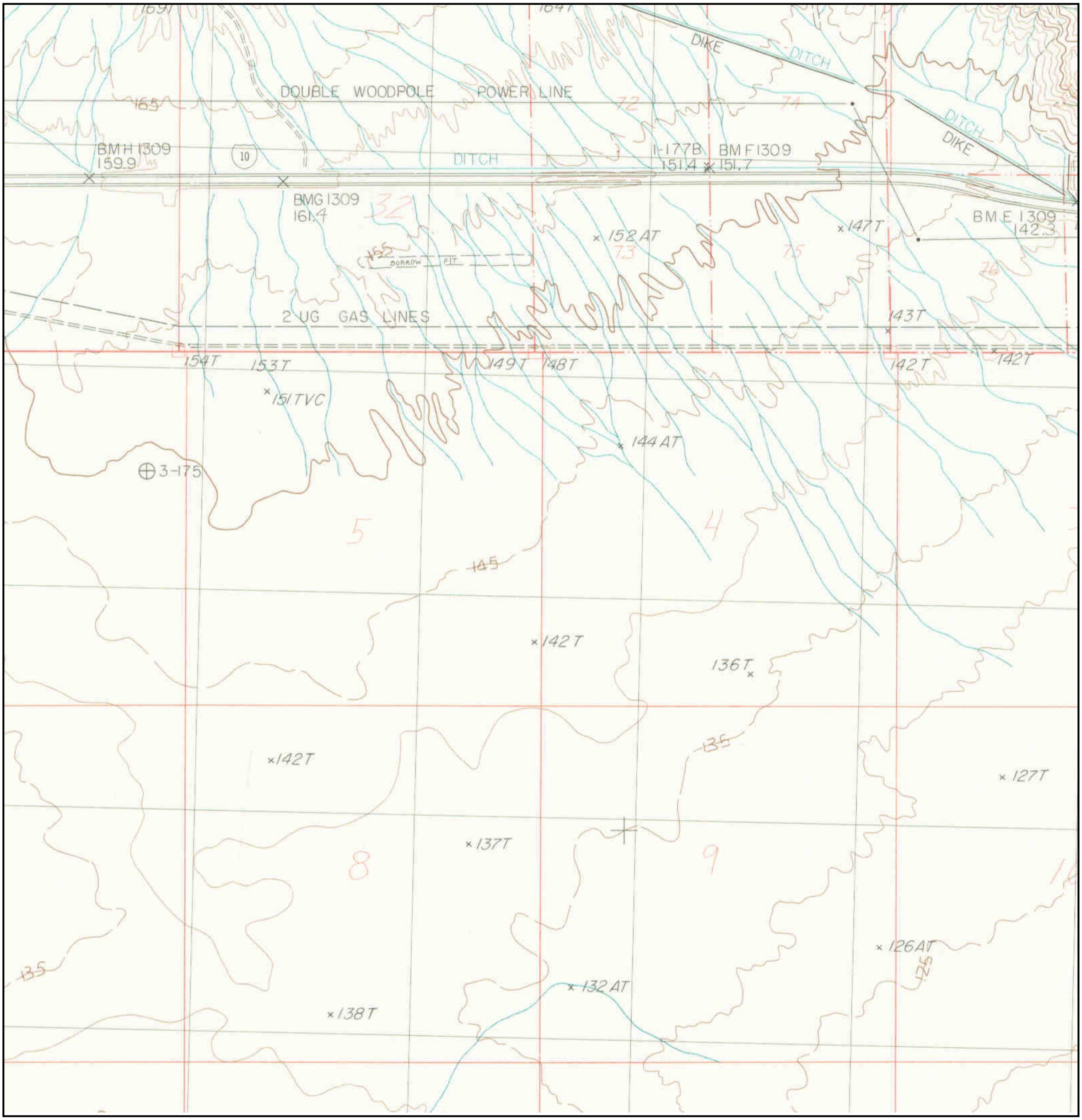
N

TARGET QUAD
NAME: ROOSEVELT MINE
MAP YEAR: 1983
PROVISIONAL
SERIES: 7.5
SCALE: 1:24000

SITE NAME: First Solar Desert Quartzite Solar Project Site
ADDRESS: First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225
LAT/LONG: 33.576 / -114.7639

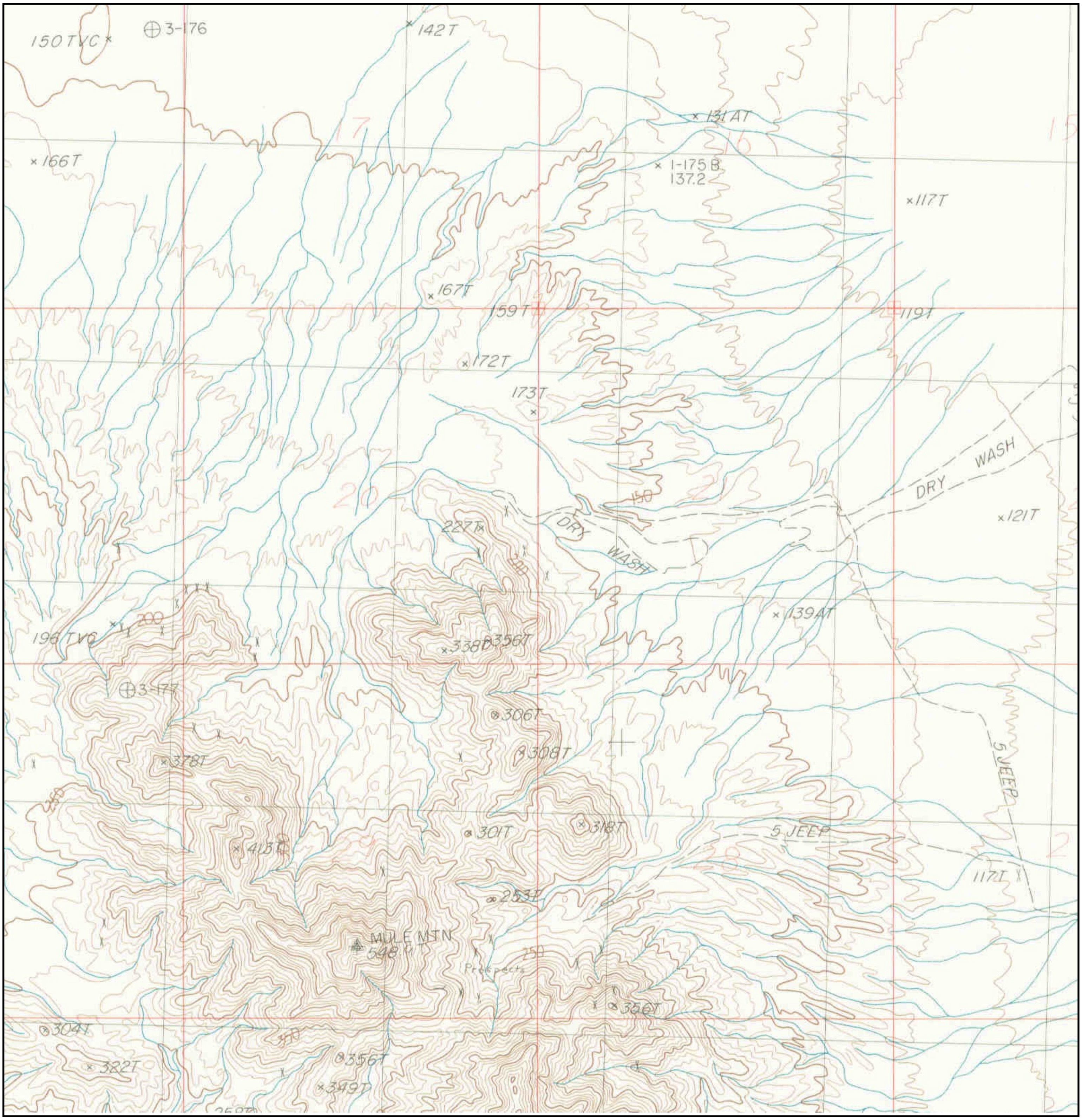
CLIENT: URS Corporation
CONTACT: Tricia Winterbauer
INQUIRY#: 4154996.5
RESEARCH DATE: 01/23/2015

Historical Topographic Map


DOUBLE WOODPOLE POWER LINE
DIKE
DITCH
BM H 1309 159.9
BM G 1309 161.4
I-177B 151.4
BM F 1309 151.7
BM E 1309 142.3
2 UG GAS LINES
BORROW PIT
152 AT
147 T
143 T
154 T
153 T
149 T
148 T
142 T
151 TVC
3-175
144 AT
145
142 T
136 T
135
127 T
137 T
126 AT
125
132 AT
138 T
5
4
8
9
32
165

TARGET QUAD NAME: ROOSEVELT MINE MAP YEAR: 1983 PROVISIONAL SERIES: 7.5 SCALE: 1:24000	SITE NAME: First Solar Desert Quartzite Solar Project Site ADDRESS: First Solar Desert Quartzite Solar Project Site Blythe, CA 92225 LAT/LONG: 33.576 / -114.7639	CLIENT: URS Corporation CONTACT: Tricia Winterbauer INQUIRY#: 4154996.5 RESEARCH DATE: 01/23/2015

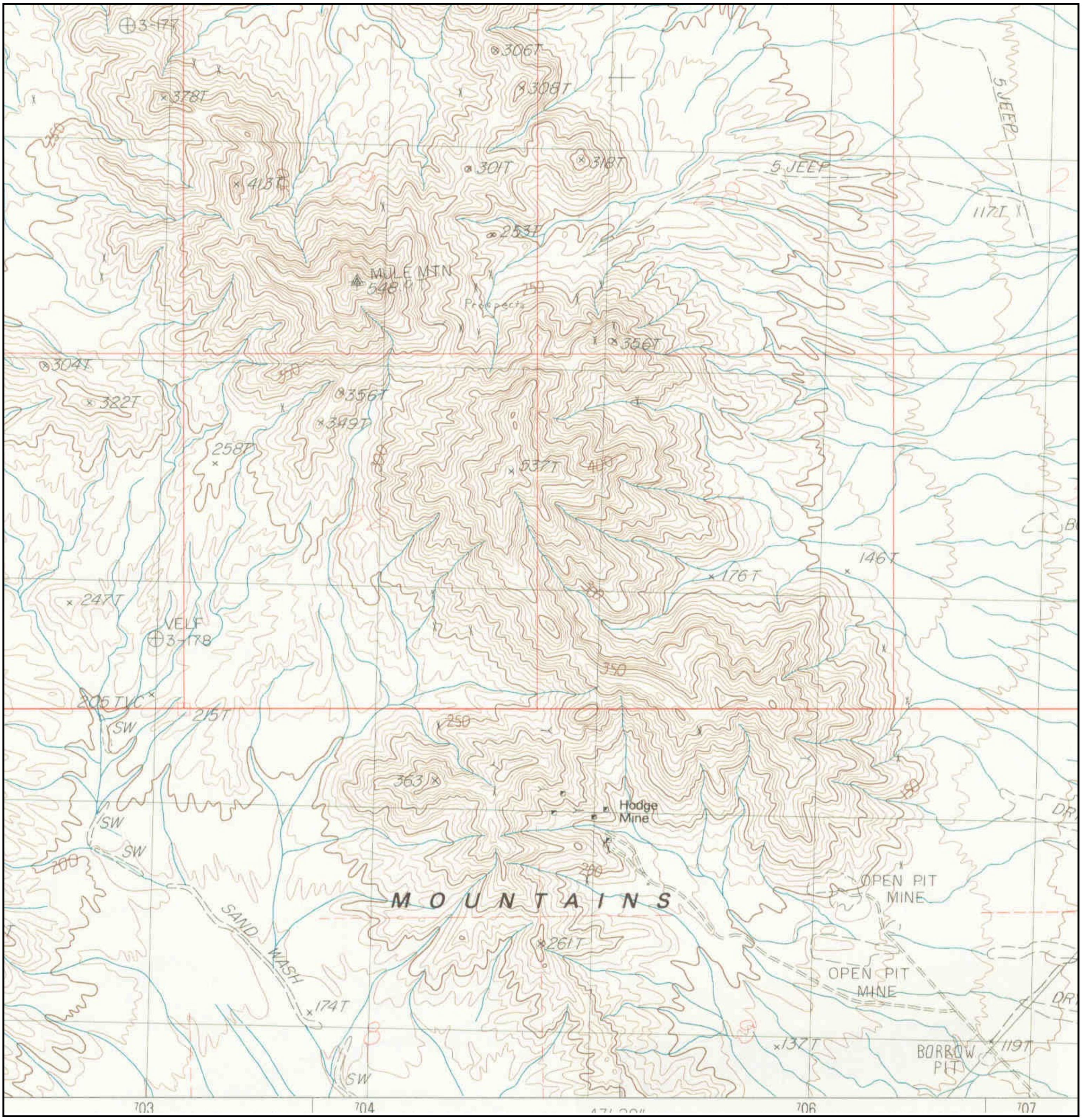
Historical Topographic Map


150 TVC
3-176
142 T
131 AT
166 T
1-175 B
137.2
117 T
167 T
159 T
119 T
172 T
173 T
DRY WASH
DRY WASH
121 T
227 T
139 AT
196 TVC
200
338
356 T
3-177
306 T
308 T
378 T
5 JEEP
5 JEEP
301 T
318 T
413 T
117 T
253 T
MULE MTN
548
Prospects
250
326 T
304 T
322 T
356 T
349 T

N

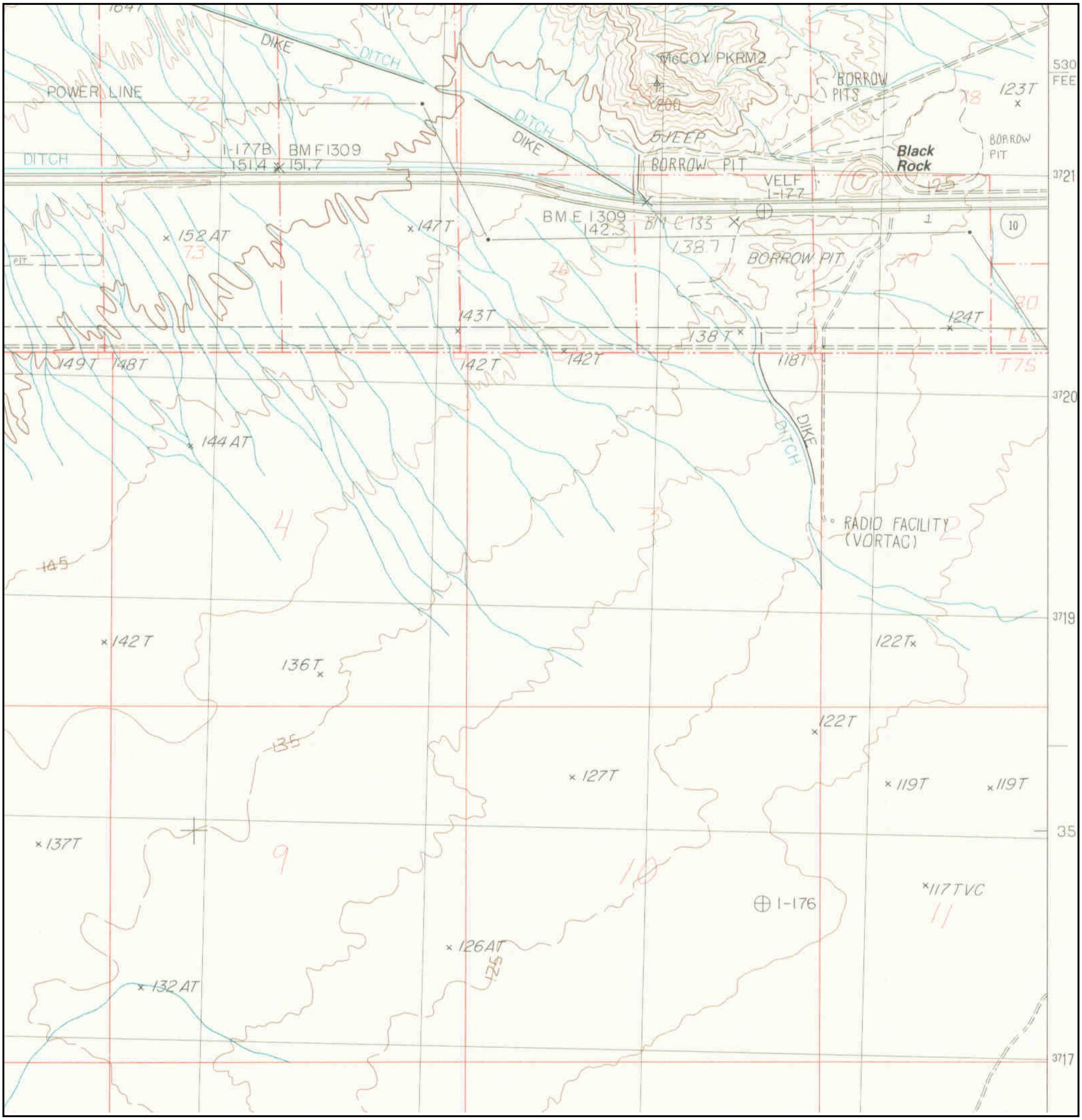
TARGET QUAD NAME: ROOSEVELT MINE MAP YEAR: 1983 PROVISIONAL SERIES: 7.5 SCALE: 1:24000	SITE NAME: First Solar Desert Quartzite Solar Project Site ADDRESS: First Solar Desert Quartzite Solar Project Site Blythe, CA 92225 LAT/LONG: 33.576 / -114.7639	CLIENT: URS Corporation CONTACT: Tricia Winterbauer INQUIRY#: 4154996.5 RESEARCH DATE: 01/23/2015

Historical Topographic Map


3-177
306T
308T
378T
5 JEEP
5 JEEP
301T
318T
415T
117T
253T
MULE MTN
548
Prospects
356T
304T
322T
356T
349T
258T
537T
400
146T
176T
247T
VELF
3-178
205TVC
215T
SW
250
363
Hodge Mine
SW
SW
200
OPEN PIT MINE
M O U N T A I N S
SAND WASH
261T
OPEN PIT MINE
174T
137T
BORROW PIT
119T
SW
703
704
706
707

N TARGET QUAD NAME: ROOSEVELT MINE MAP YEAR: 1983 PROVISIONAL SERIES: 7.5 SCALE: 1:24000	SITE NAME: First Solar Desert Quartzite Solar Project Site ADDRESS: First Solar Desert Quartzite Solar Project Site Blythe, CA 92225 LAT/LONG: 33.576 / -114.7639	CLIENT: URS Corporation CONTACT: Tricia Winterbauer INQUIRY#: 4154996.5 RESEARCH DATE: 01/23/2015

Historical Topographic Map


DIKE
DITCH
POWER LINE
McCOY PK RM2
BORROW PITS
123T
530 FEET
Black Rock
BORROW PIT
DITCH
I-177B
151.4
BM F 1309
151.7
DIKE
JEEP
BORROW PIT
VELF I-177
BM E 1309 142.3
BM C 133
138.7
152 AT
147T
BORROW PIT
10
143T
124T
138T
149T
148T
142T
142T
118T
T7S
3721
3720
DITCH
DIKE
144 AT
RADIO FACILITY (VORTAC)
145
4
3
2
3719
142T
136T
122T
135
122T
127T
119T
119T
137T
9
10
35
117TVC
11
I-176
126AT
125
132 AT
3717

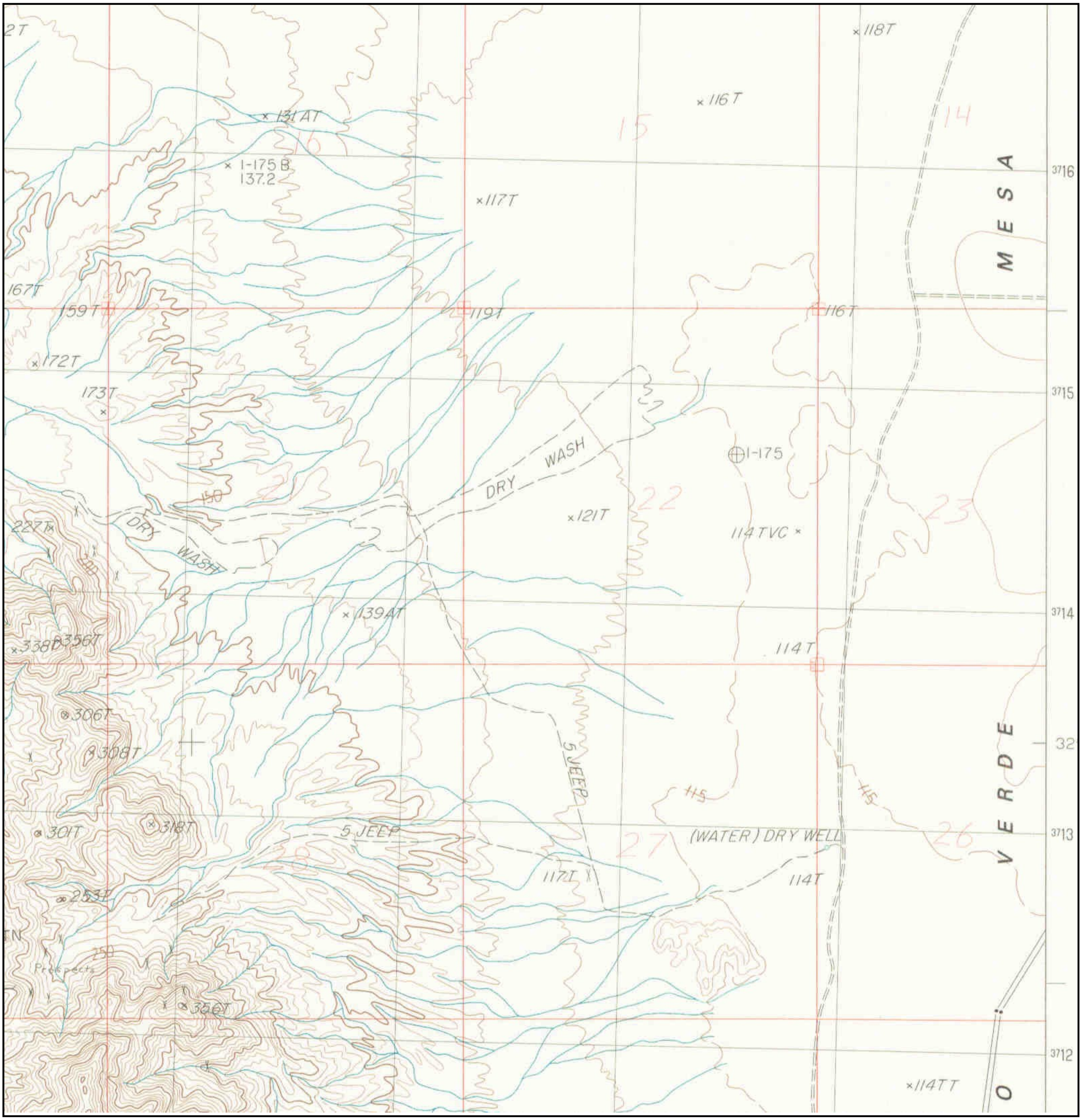
N

TARGET QUAD
NAME: ROOSEVELT MINE
MAP YEAR: 1983
PROVISIONAL
SERIES: 7.5
SCALE: 1:24000

SITE NAME: First Solar Desert Quartzite Solar Project Site
ADDRESS: First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225
LAT/LONG: 33.576 / -114.7639

CLIENT: URS Corporation
CONTACT: Tricia Winterbauer
INQUIRY#: 4154996.5
RESEARCH DATE: 01/23/2015

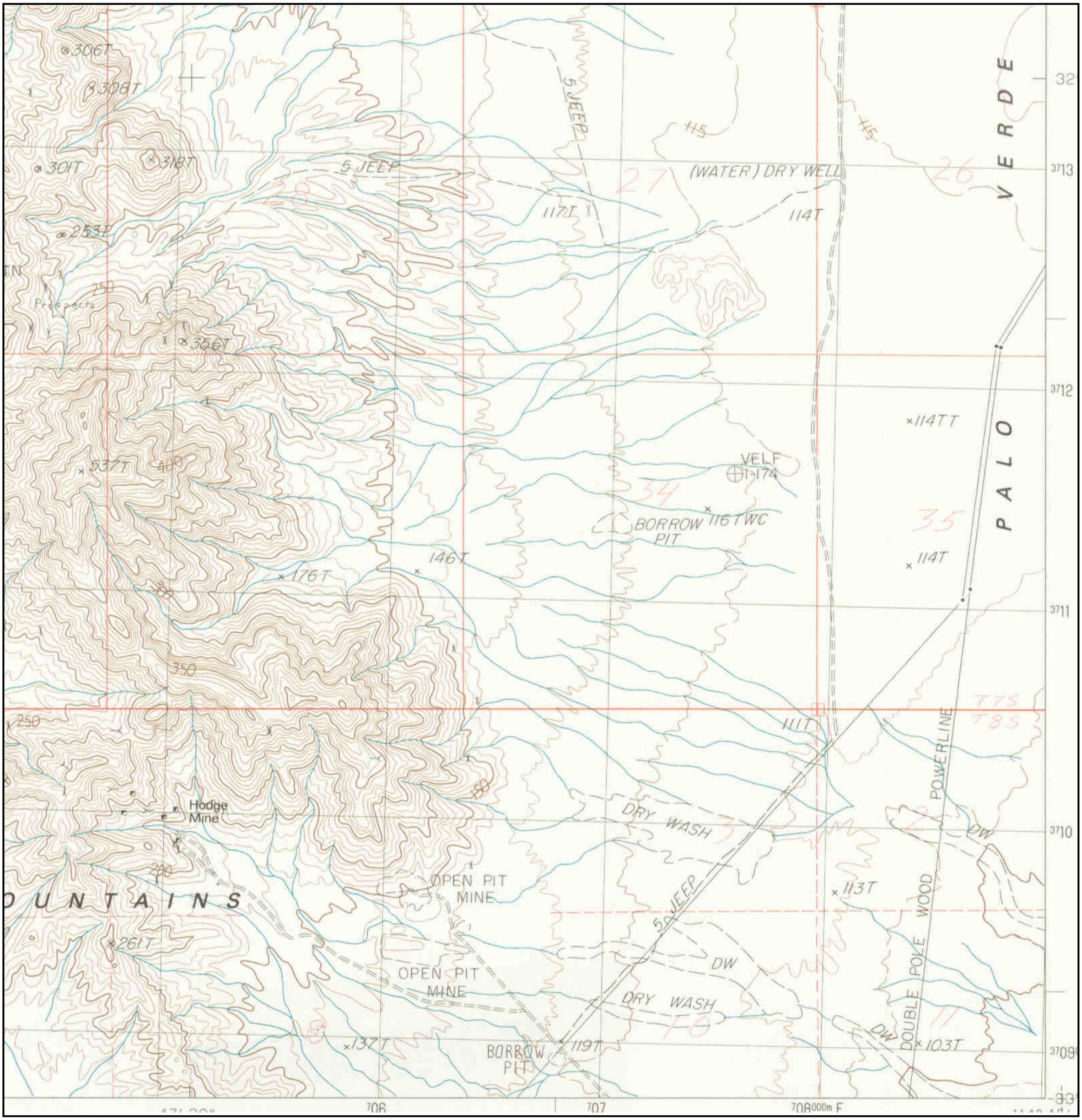
Historical Topographic Map



2T
×118T
×116T
×131AT
16
15
14
× I-175 B
137.2
×117T
MESA
3716
167T
159T
119T
116T
×172T
173T
3715
DRY WASH
I-175
150
DRY WASH
22
×121T
23
227T
114TVC ×
200
×139AT
3714
×338
356T
114T
306T
308T
5 JEEP
32
115
115
301T
318T
5 JEEP
(WATER) DRY WELL
3713
27
26
VERDE
117T
114T
253T
TN
Prospects
250
356T
3712
×114TT
O

N	TARGET QUAD NAME: ROOSEVELT MINE MAP YEAR: 1983 PROVISIONAL SERIES: 7.5 SCALE: 1:24000	SITE NAME: First Solar Desert Quartzite Solar Project Site ADDRESS: First Solar Desert Quartzite Solar Project Site Blythe, CA 92225 LAT/LONG: 33.576 / -114.7639	CLIENT: URS Corporation CONTACT: Tricia Winterbauer INQUIRY#: 4154996.5 RESEARCH DATE: 01/23/2015

Historical Topographic Map


306T
308T
301T
318T
253T
5 JEEP
5 JEEP
(WATER) DRY WELL
117T
114T
115
27
26
VERDE
PALO
Prospects
356T
114TT
VELF
174
34
116TWC
BORROW PIT
35
114T
146T
176T
537T
T7S
T8S
111T
Hodge Mine
DRY WASH
POWERLINE
DW
OPEN PIT MINE
OPEN PIT MINE
113T
5 JEEP
DW
DOUBLE POLE WOOD
DRY WASH
MOUNTAINS
261T
DW
103T
137T
BORROW PIT
119T
706
707
708000m E
3713
3712
3711
3710
3709

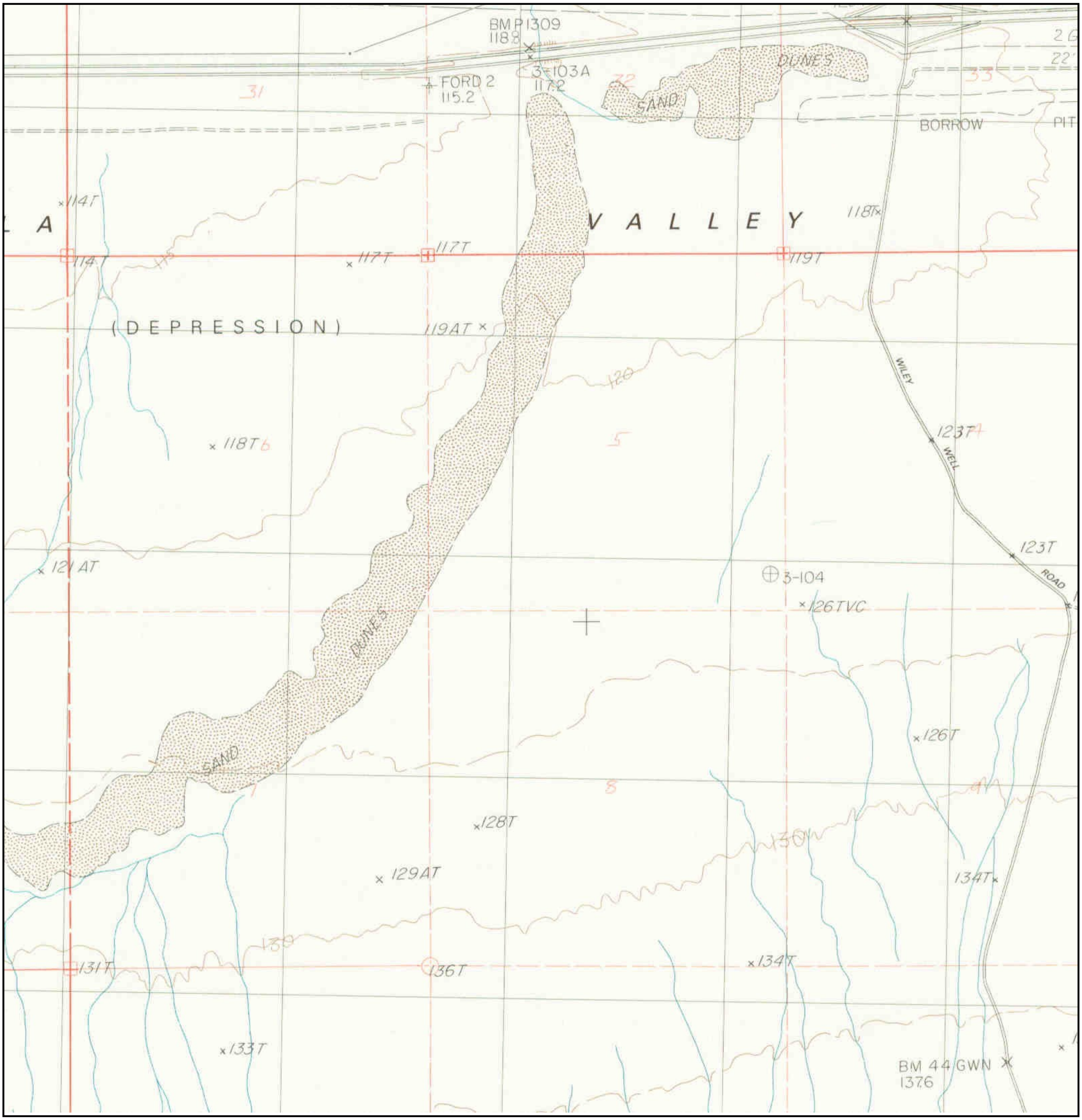
N

TARGET QUAD
NAME: ROOSEVELT MINE
MAP YEAR: 1983
PROVISIONAL
SERIES: 7.5
SCALE: 1:24000

SITE NAME: First Solar Desert Quartzite Solar Project Site
ADDRESS: First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225
LAT/LONG: 33.576 / -114.7639

CLIENT: URS Corporation
CONTACT: Tricia Winterbauer
INQUIRY#: 4154996.5
RESEARCH DATE: 01/23/2015

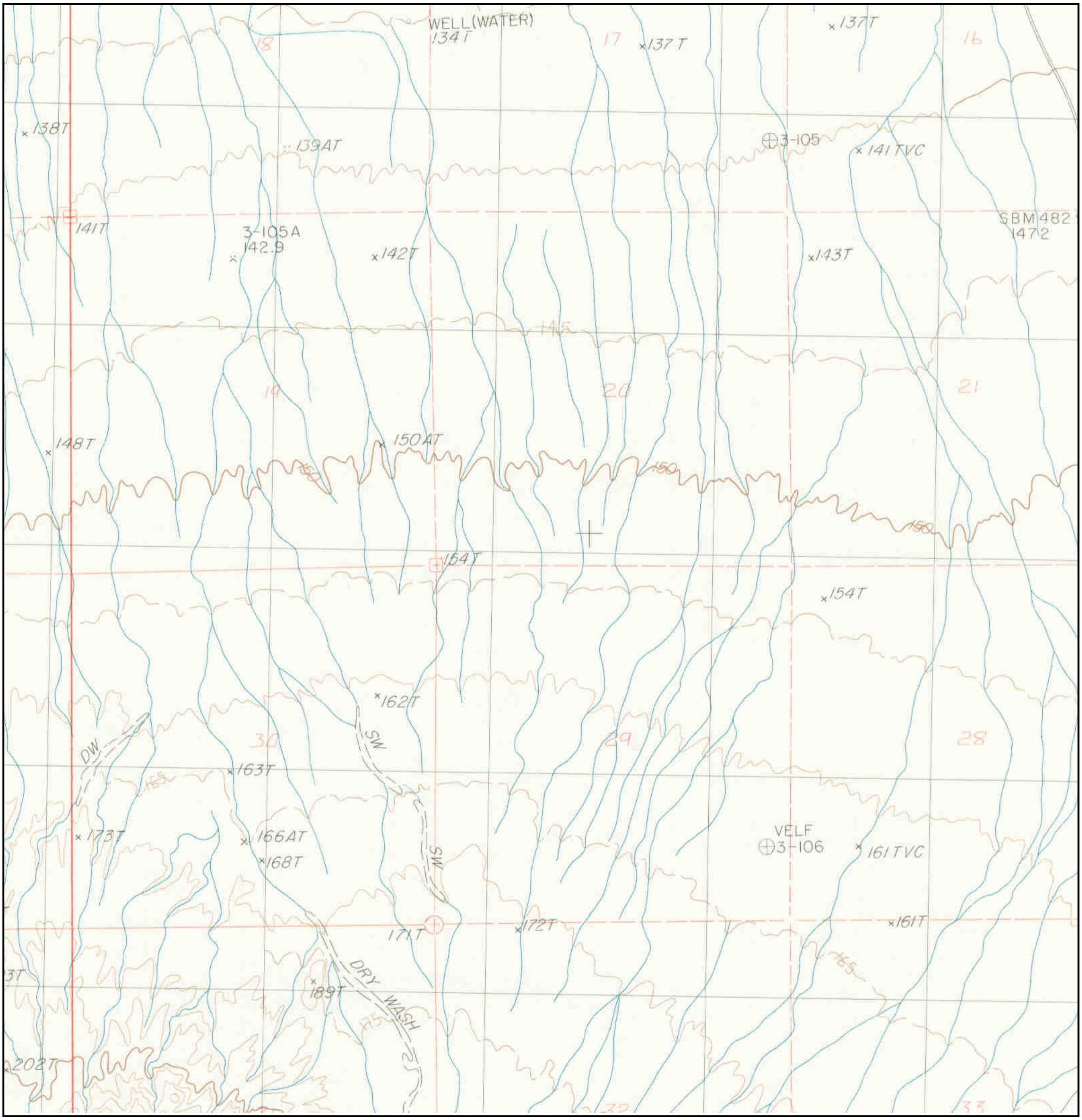
Historical Topographic Map



BM P 1309
1188
FORD 2
115.2
3-103A
117.2
SAND
DUNES
BORROW
PIT
31
32
33
A
V A L L E Y
(DEPRESSION)
114T
117T
117T
119T
118T
119AT
120
5
118T
121 AT
3-104
126TVC
SAND
DUNES
WILEY
WELL
ROAD
123T
123T
126T
8
128T
129AT
130
134T
139
131T
136T
134T
133T
BM 44 GWN
1376

N	TARGET QUAD	SITE NAME: First Solar Desert Quartzite Solar Project Site	CLIENT: URS Corporation
	NAME: HOPKINS WELL	ADDRESS: First Solar Desert Quartzite Solar Project Site Blythe, CA 92225	CONTACT: Tricia Winterbauer
	MAP YEAR: 1983		INQUIRY#: 4154996.5
	PROVISIONAL		RESEARCH DATE: 01/23/2015
	SERIES: 7.5		
	SCALE: 1:24000	LAT/LONG: 33.576 / -114.7639	

Historical Topographic Map


WELL (WATER)
134T
18
17
137T
137T
16
138T
139AT
3-105
141TVC
141T
3-105A
142.9
142T
143T
SBM 482
1472
145
19
20
21
148T
150AT
150
150
150
154T
154T
162T
DW
SW
30
29
28
165
163T
173T
166AT
168T
SW
VELF
3-106
161TVC
171T
172T
161T
165
DRY WASH
189T
175
202T
32
33

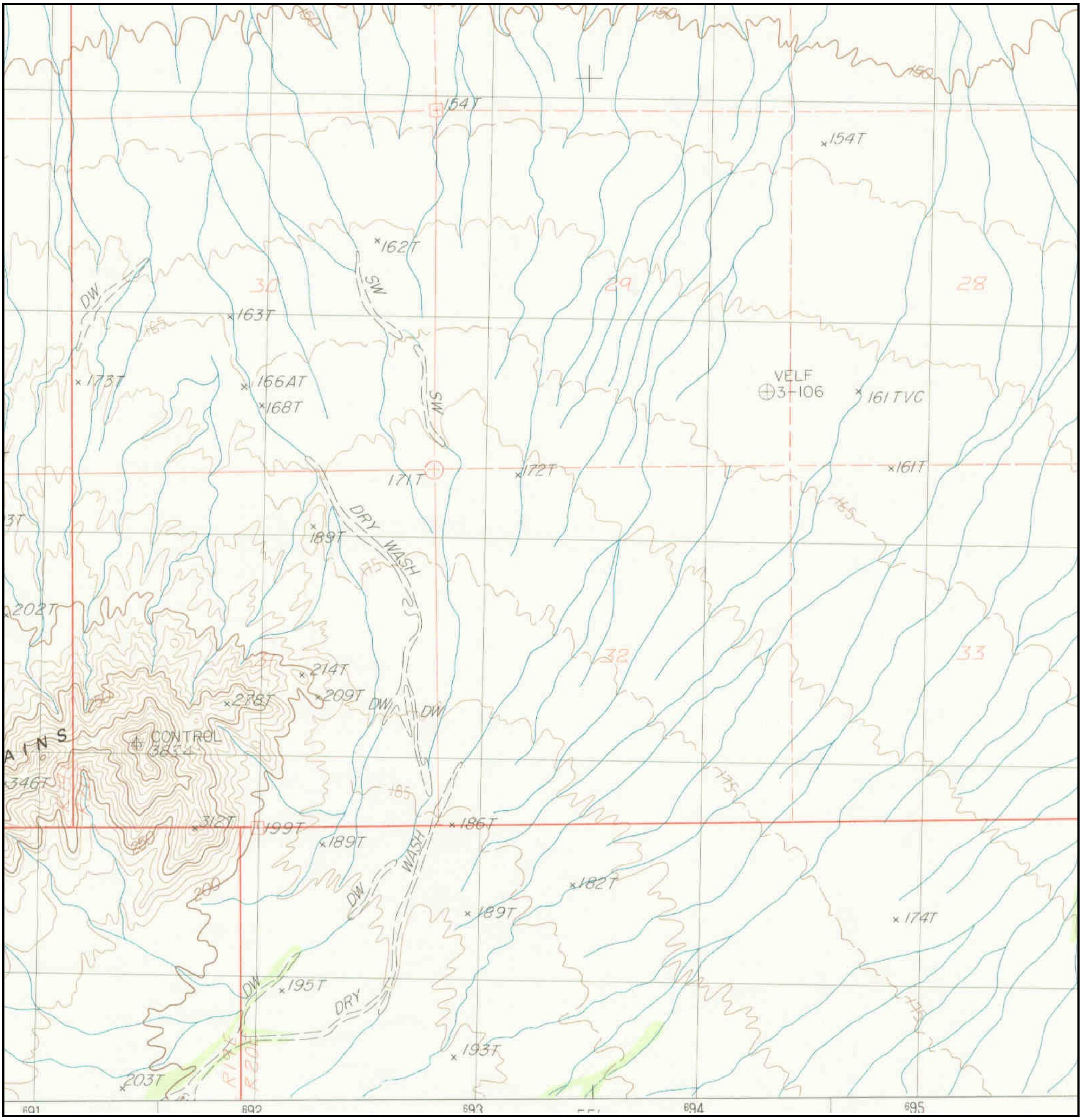
N

TARGET QUAD
NAME: HOPKINS WELL
MAP YEAR: 1983
PROVISIONAL
SERIES: 7.5
SCALE: 1:24000

SITE NAME: First Solar Desert Quartzite Solar Project Site
ADDRESS: First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225
LAT/LONG: 33.576 / -114.7639

CLIENT: URS Corporation
CONTACT: Tricia Winterbauer
INQUIRY#: 4154996.5
RESEARCH DATE: 01/23/2015

Historical Topographic Map


150
154T
154T
162T
SW
30
29
28
163T
173T
166AT
168T
VELF
3-106
161TVC
171T
172T
161T
165
DRY WASH
189T
3T
202T
214T
209T
278T
DW
DW
AINS
CONTROL
3834
346T
175
185
312T
199T
189T
186T
250
WASH
200
DW
182T
189T
174T
32
33
DW
195T
DRY
193T
203T
691
692
693
694
695

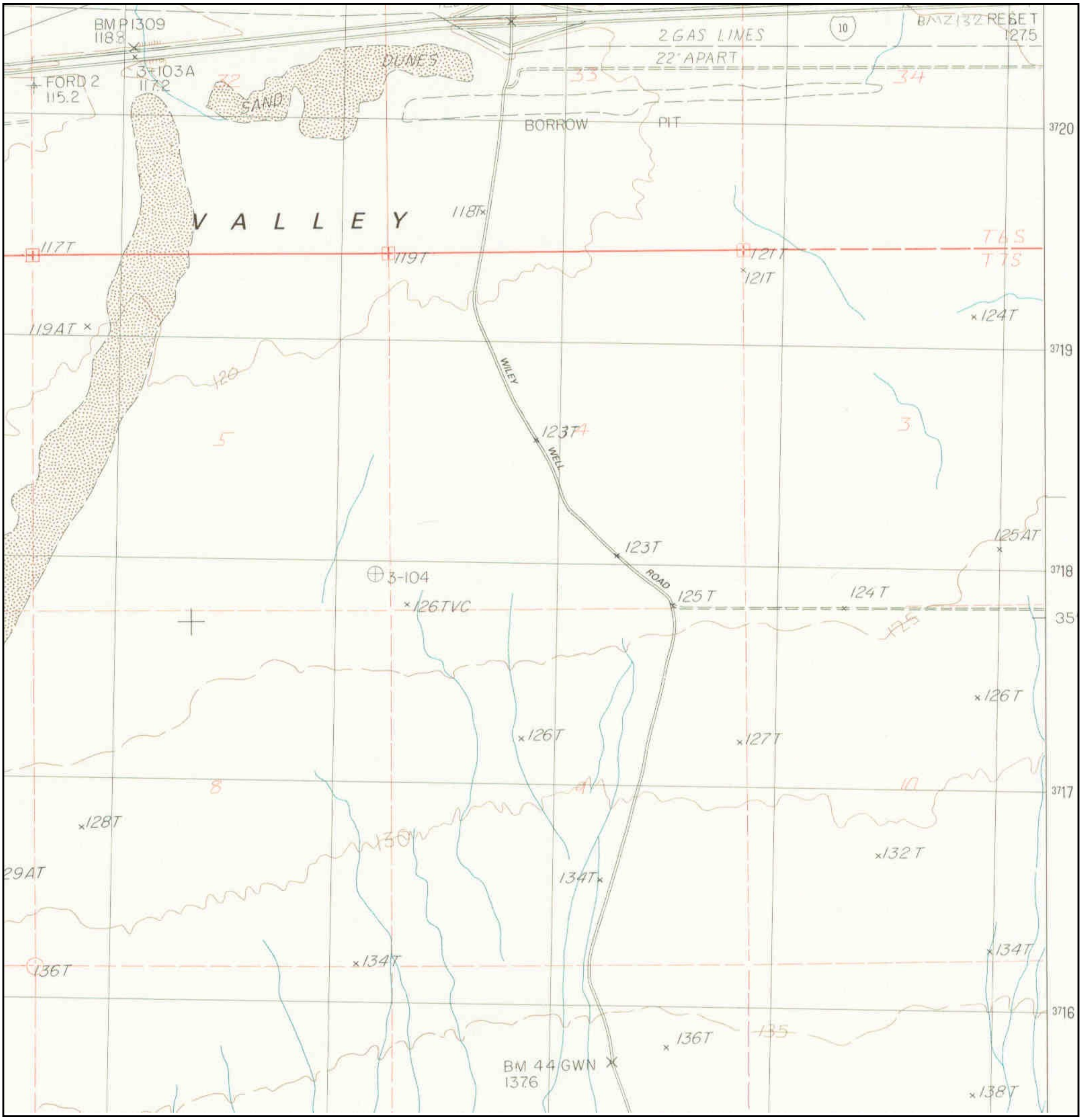
N

TARGET QUAD
NAME: HOPKINS WELL
MAP YEAR: 1983
PROVISIONAL
SERIES: 7.5
SCALE: 1:24000

SITE NAME: First Solar Desert Quartzite Solar Project Site
ADDRESS: First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225
LAT/LONG: 33.576 / -114.7639

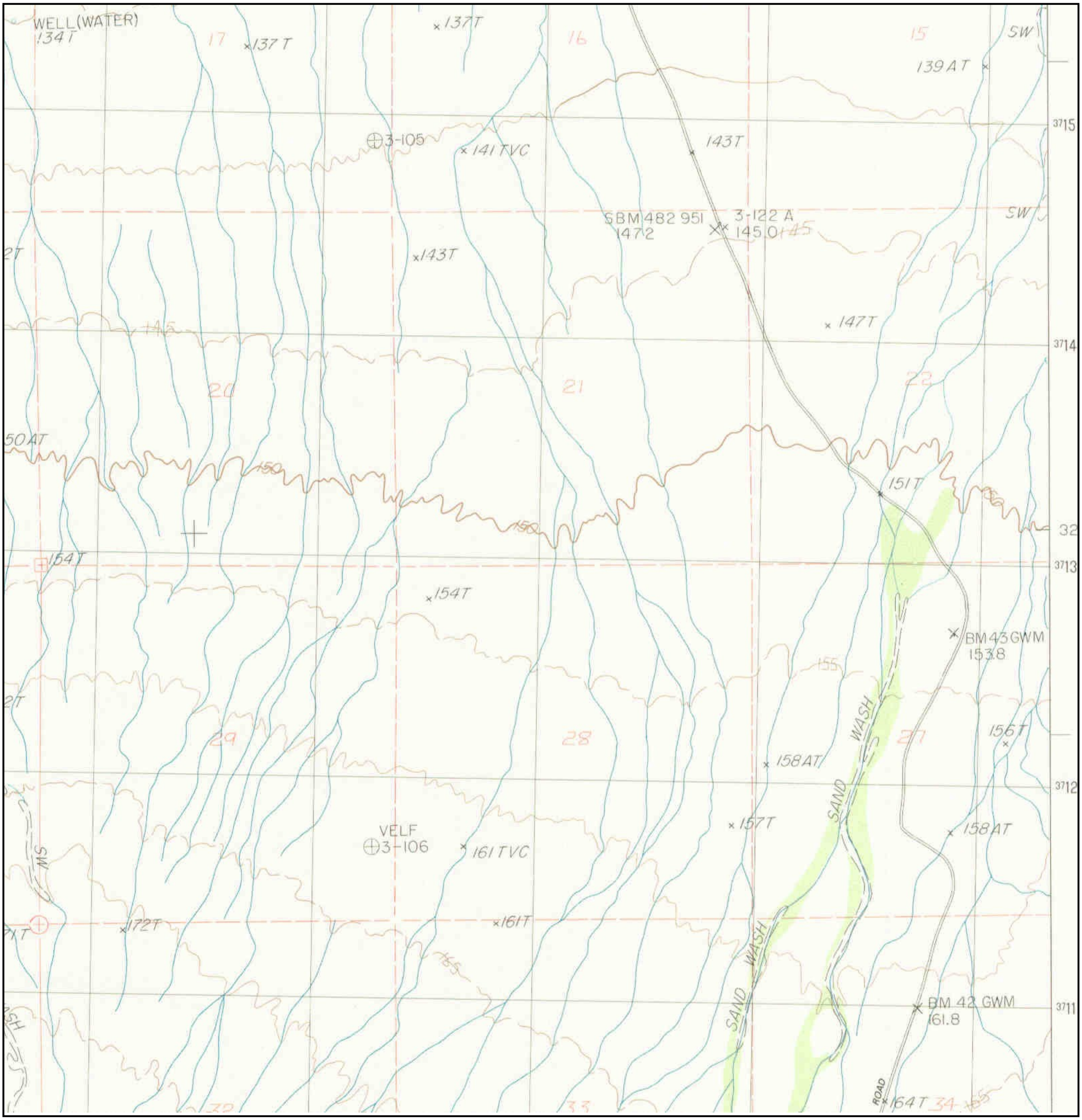
CLIENT: URS Corporation
CONTACT: Tricia Winterbauer
INQUIRY#: 4154996.5
RESEARCH DATE: 01/23/2015

Historical Topographic Map


BM P 1309
1188
3-103A
1172
FORD 2
115.2
SAND
DUNES
32
33
34
2 GAS LINES
22' APART
10
BM Z 132 RESET
127.5
BORROW PIT
3720
VALLEY
118T
117T
119T
121T
121T
T6S
T7S
124T
119AT
120
3719
WILEY
WELL
ROAD
123T
4
5
3
123T
125AT
3718
3-104
126TVC
125T
124T
125
35
126T
126T
127T
8
9
10
3717
128T
130
132T
134T
29AT
136T
134T
134T
3716
136T
135
BM 44 GWN
137.6
138T

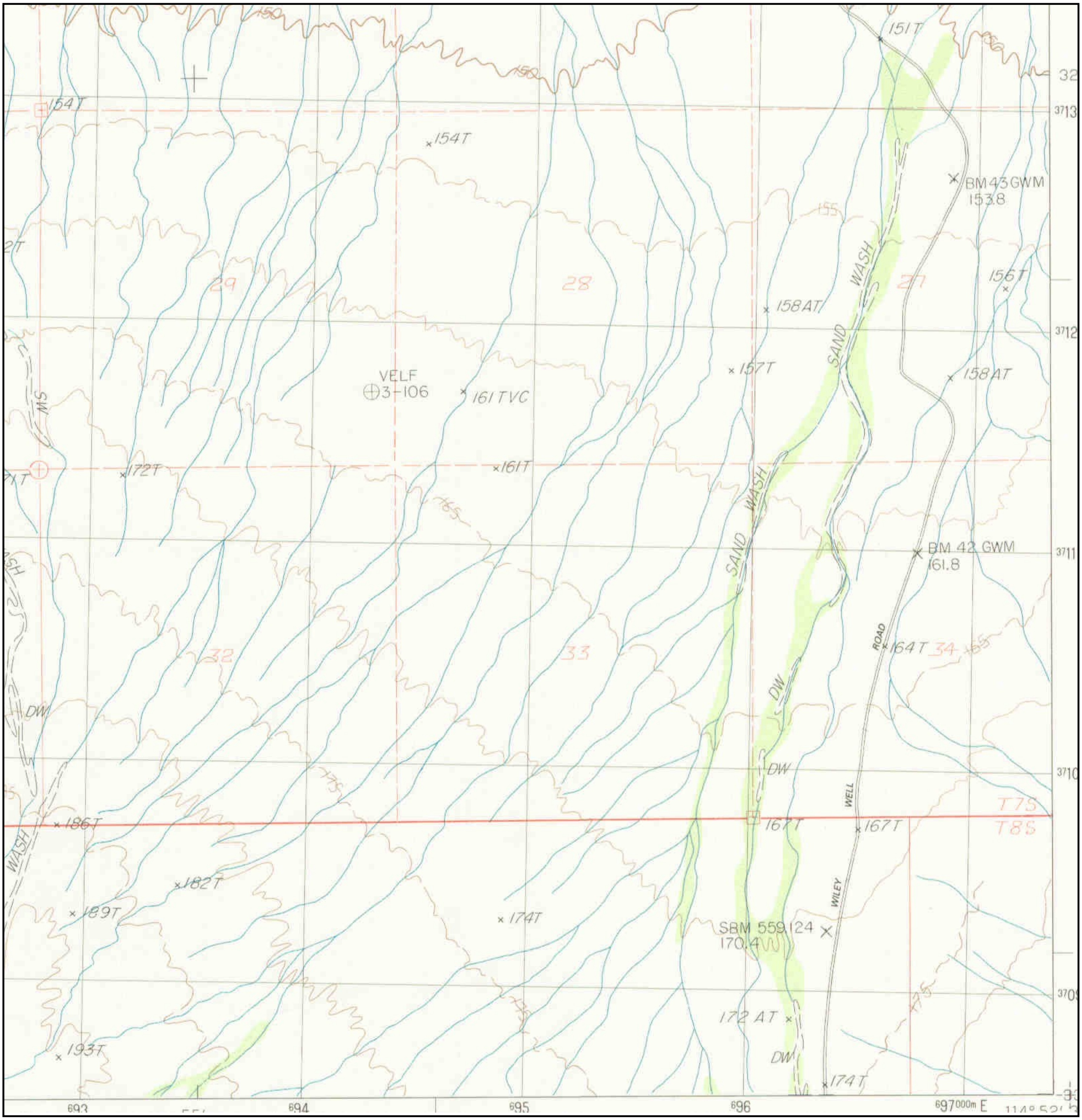
N TARGET QUAD NAME: HOPKINS WELL MAP YEAR: 1983 PROVISIONAL SERIES: 7.5 SCALE: 1:24000	SITE NAME: First Solar Desert Quartzite Solar Project Site ADDRESS: First Solar Desert Quartzite Solar Project Site Blythe, CA 92225 LAT/LONG: 33.576 / -114.7639	CLIENT: URS Corporation CONTACT: Tricia Winterbauer INQUIRY#: 4154996.5 RESEARCH DATE: 01/23/2015

Historical Topographic Map


WELL (WATER)
134 T
137 T
137 T
139 A T
SW
3-105
141 TVC
143 T
SBM 482 951
147.2
3-122 A
145.0
145
SW
143 T
147 T
146
20
21
22
150 AT
150
150
151 T
154 T
154 T
BM 43 GWM
153.8
155
SAND WASH
29
28
27
156 T
158 AT
157 T
158 AT
VELF
3-106
161 TVC
172 T
161 T
165
BM 42 GWM
161.8
ROAD
164 T
17
16
15
3715
3714
3713
3712
3711
32

N	TARGET QUAD NAME: HOPKINS WELL MAP YEAR: 1983 PROVISIONAL SERIES: 7.5 SCALE: 1:24000	SITE NAME: First Solar Desert Quartzite Solar Project Site ADDRESS: First Solar Desert Quartzite Solar Project Site Blythe, CA 92225 LAT/LONG: 33.576 / -114.7639	CLIENT: URS Corporation CONTACT: Tricia Winterbauer INQUIRY#: 4154996.5 RESEARCH DATE: 01/23/2015

Historical Topographic Map


150
151T
32
3713
154T
154T
BM 43 GWM
153.8
155
2T
29
28
27
156T
158AT
3712
SAND
WASH
157T
158AT
VELF
3-106
161TVC
MS
172T
71T
161T
165
BM 42 GWM
161.8
3711
SAND
WASH
32
33
34
164T
ROAD
DW
DW
3710
175
186T
167T
WELL
167T
T7S
T8S
WASH
182T
189T
174T
WILEY
SBM 559124
170.4
172 AT
175
3709
193T
DW
174T
693
694
695
696
697000m E

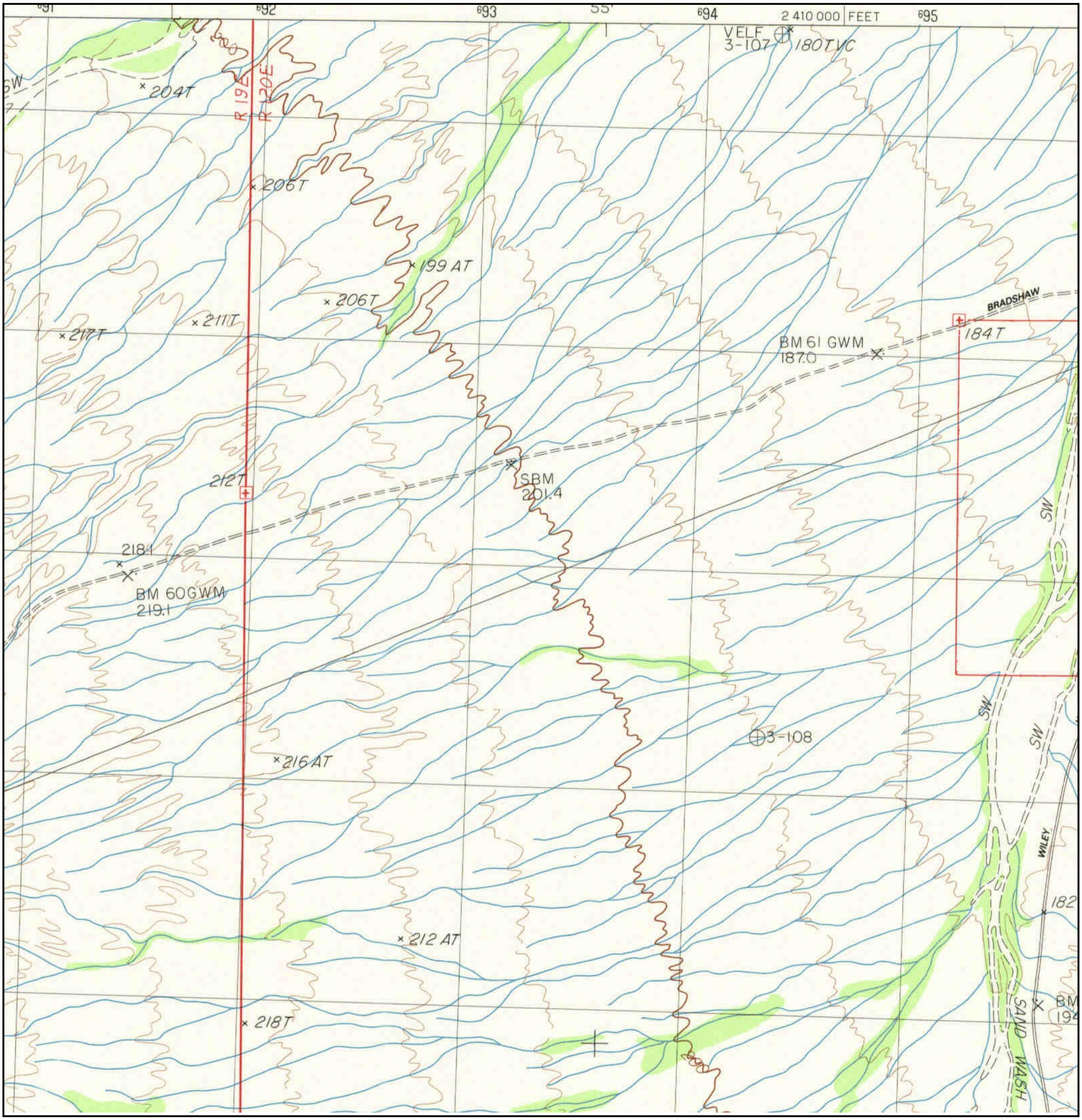
N

TARGET QUAD
NAME: HOPKINS WELL
MAP YEAR: 1983
PROVISIONAL
SERIES: 7.5
SCALE: 1:24000

SITE NAME: First Solar Desert Quartzite Solar Project Site
ADDRESS: First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225
LAT/LONG: 33.576 / -114.7639

CLIENT: URS Corporation
CONTACT: Tricia Winterbauer
INQUIRY#: 4154996.5
RESEARCH DATE: 01/23/2015

Historical Topographic Map


691
692
693
694
2 410 000 FEET
695
VELF 3-107
180TVC
204T
R 19E
R 20E
206T
199 AT
206T
211T
217T
BRADSHAW
184T
BM 61 GWM 187.0
SBM 201.4
212T
218
BM 60GWM 219.1
SW
3-108
216AT
WILEY
182
212 AT
218T
BM
SAND WASH

N

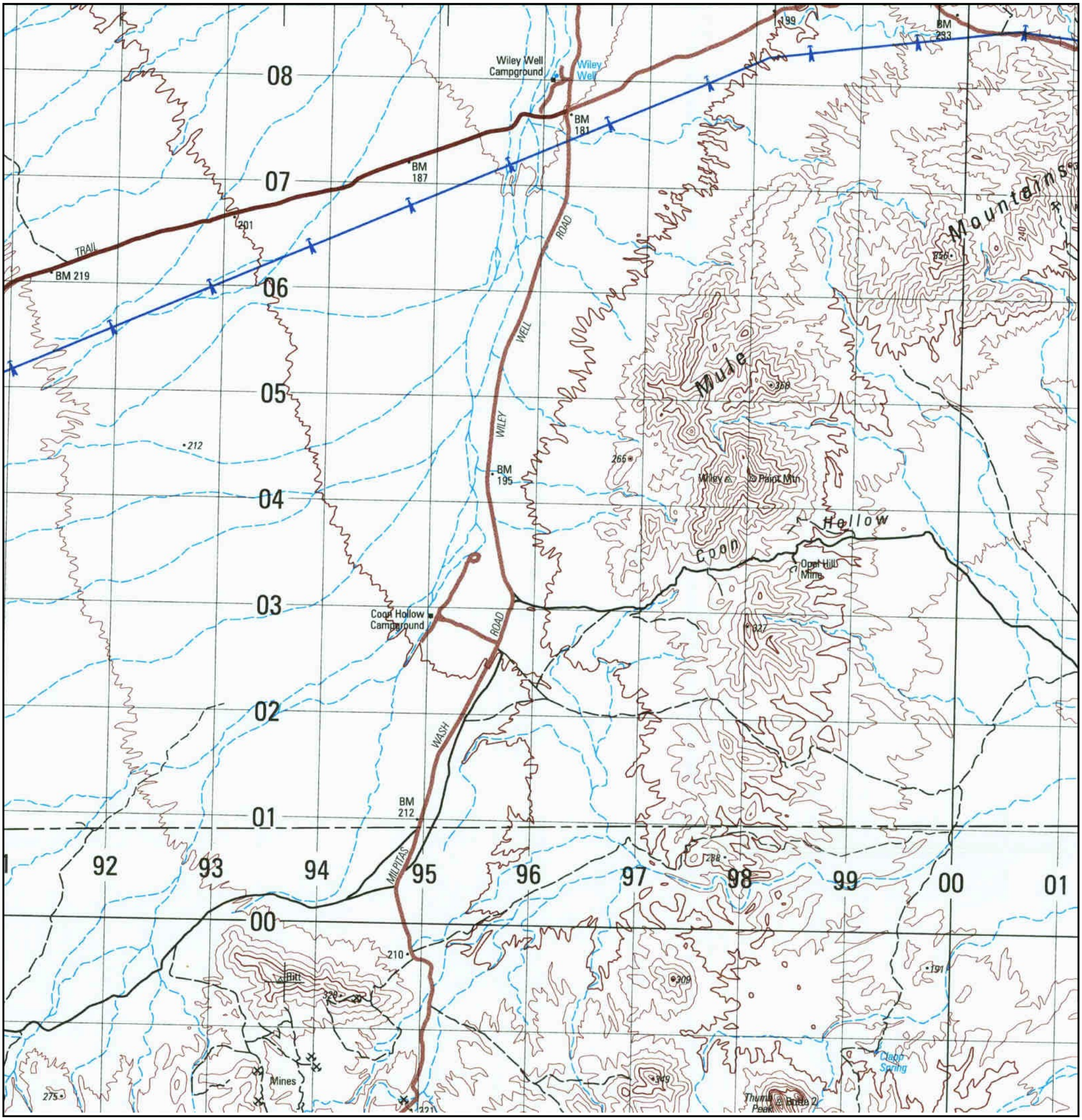
TARGET QUAD
NAME: WILEY WELL
MAP YEAR: 1983

SERIES: 7.5
SCALE: 1:24000

SITE NAME: First Solar Desert Quartzite Solar Project Site
ADDRESS: First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225
LAT/LONG: 33.576 / -114.7639

CLIENT: URS Corporation
CONTACT: Tricia Winterbauer
INQUIRY#: 4154996.5
RESEARCH DATE: 01/23/2015

Historical Topographic Map


08
07
06
05
04
03
02
01
00
92
93
94
95
96
97
98
99
00
01
Wiley Well Campground
Wiley Well
BM 181
BM 187
201
TRAIL
BM 219
BM 233
99
ROAD
WELL
WILEY
BM 195
212
265
Mule
Mountains
256
240
Wiley
Paint Mtn
Hollow
Coon
Opal Hill Mine
327
Coon Hollow Campground
ROAD
WASH
BM 212
MILPITAS
210
Hitt
Mines
275
221
309
191
Clapp Spring
Thumb Peak
Butte 2

N	TARGET QUAD NAME: PALO VERDE MOUNTAINS MAP YEAR: 2002 SERIES: 15 SCALE: 1:50000	SITE NAME: First Solar Desert Quartzite Solar Project Site ADDRESS: First Solar Desert Quartzite Solar Project Site Blythe, CA 92225 LAT/LONG: 33.576 / -114.7639	CLIENT: URS Corporation CONTACT: Tricia Winterbauer INQUIRY#: 4154996.5 RESEARCH DATE: 01/23/2015

APPENDIX C
EDR USGS AERIAL PHOTOGRAPHY PRIORITY PACKAGE

First Solar Desert Quartzite Solar Project Site
First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225

Inquiry Number: 4158239.1
December 11, 2014

e

EDR® Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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USGS Aerial Photography

Order # 4158239.1

Desert Center, CA Riverside County

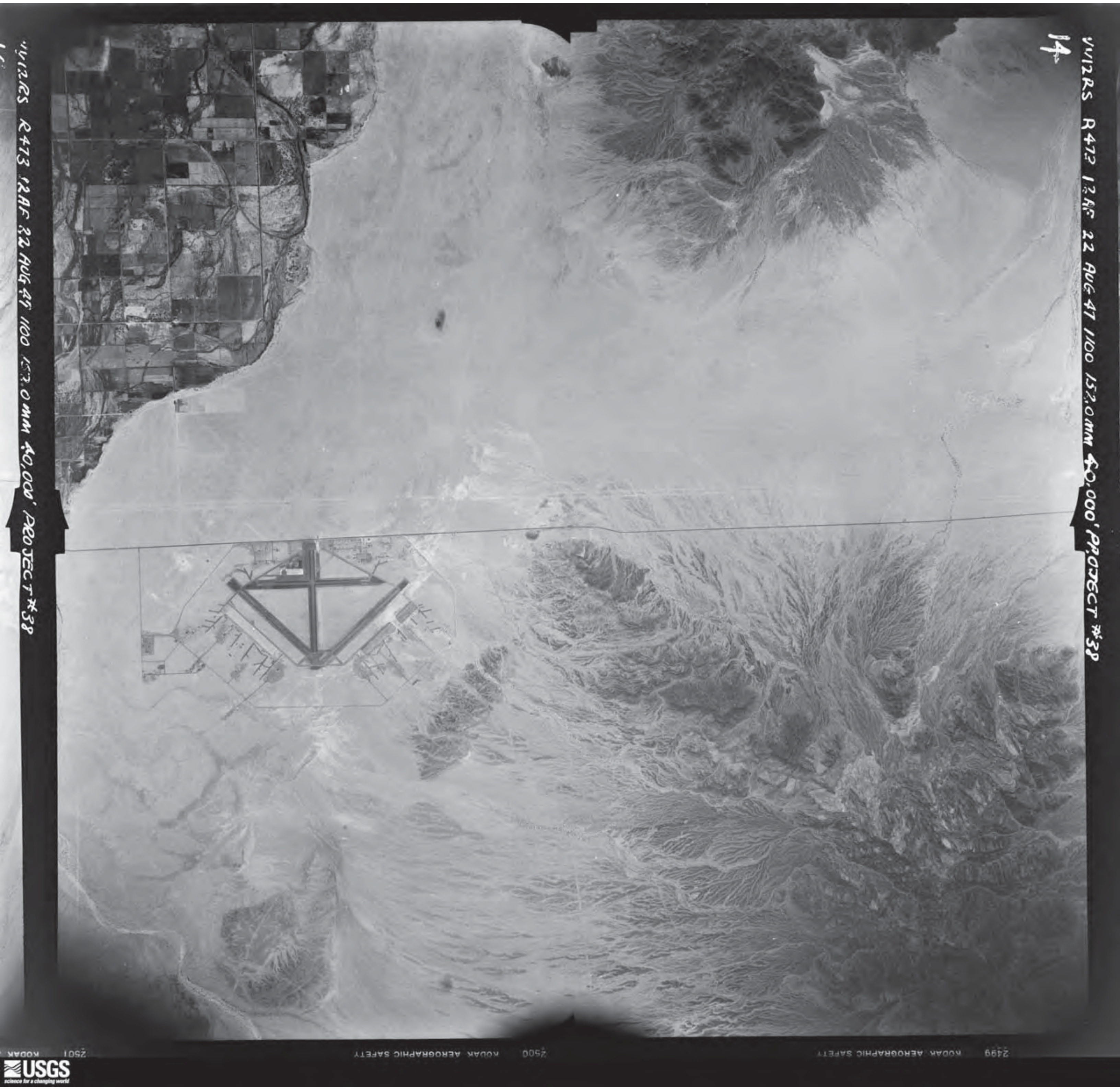
Photo ID	Date	Scale
NP0NAPP012487120	2002	1”= 3333’
NP0NAPP001799206	1990	1”= 3333’
NB1NHAP800368043	1981	1”= 6666’
ARB0059V0060152	1968	1”= 10416’
ARMC80000V30100	1956	1”= 10833’
ARB000384730014	1947	1”= 7144’

Tips:

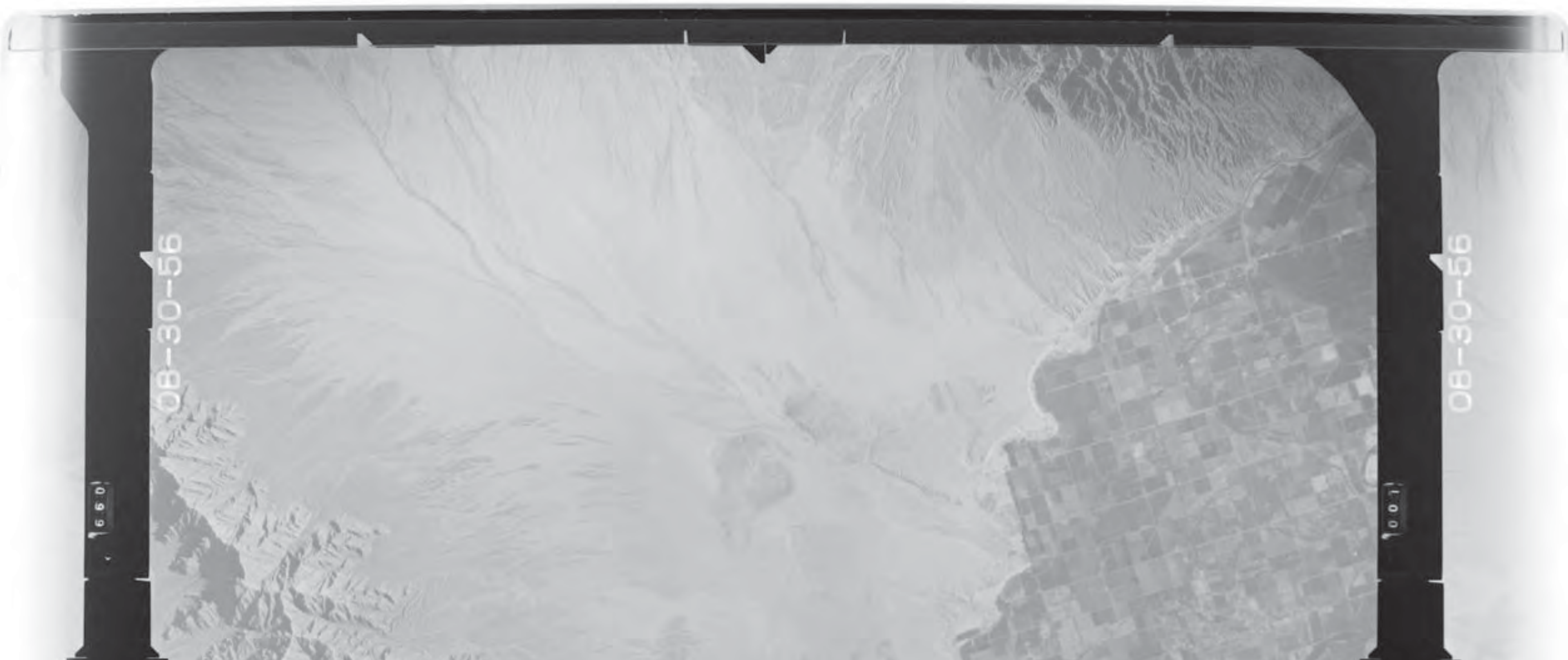
The following information is intended to assist you in the use of the USGS Aerials. Because the performance and use of different systems can vary greatly, questions on the use of each computer, and program used should be referred to the manufacturer of the computer and program.

Opening and working with large .tiff files:

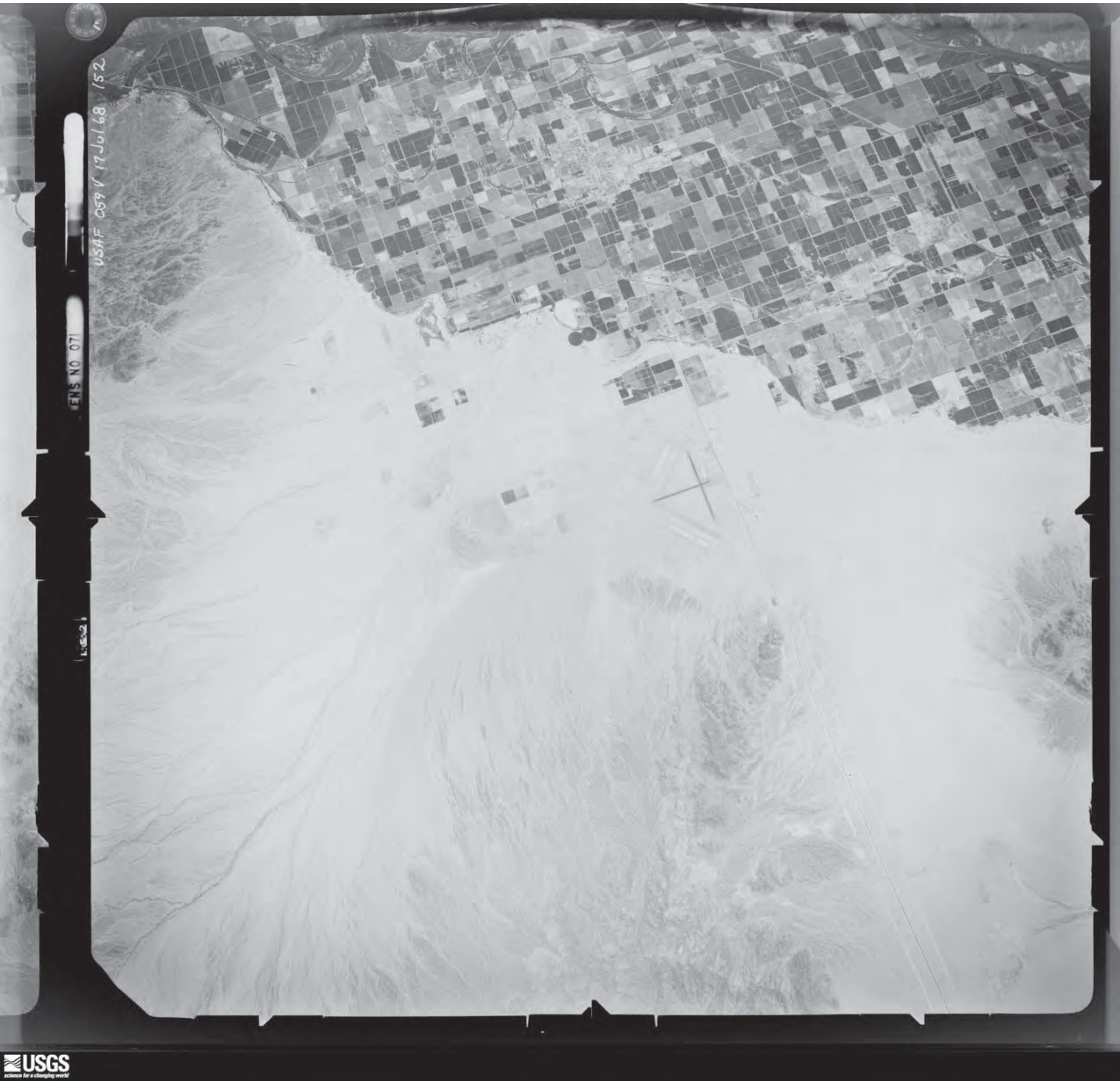
- **Click on file to open once only (please be patient).**
- **Close other programs to make memory available.**
- **Only open one photo at a time, close photo before attempting to open another.**
- USGS Aerials are provided in .tiff format on a DVD and may require a special program to open or edit.
- **You must have a DVD-ROM drive** on your computer to open the images.
- If you have Windows XP/98se, the **Microsoft Paint Program** will allow you to view and edit the images. Other programs are available from Adobe and on the Internet.
- The files provided on the USGS DVD are **very large** (up to 400 megabytes) and can take up to **15 minutes, or longer, to open** on your computer depending on your hardware and software.
- For faster opening, copy the files into your local hard drive prior to opening the files.
- USGS Aerials **do not have a north indicator**; please verify natural land marks such as lakes and rivers for proper alignment.
- Be sure your computer meets the minimum system requirements.
- Minimum System Requirements:
    - Microsoft Windows 98/2000/XP Mac OS 9+ LINUX
    - Pentium-300mhz + or equivalent
    - 64 MB RAM
    - HDD free space: 300 Mb for each photo 100 Mb of system disk space for a swap-file
    - DVD-ROM Drive
    - .tiff editing/viewing program

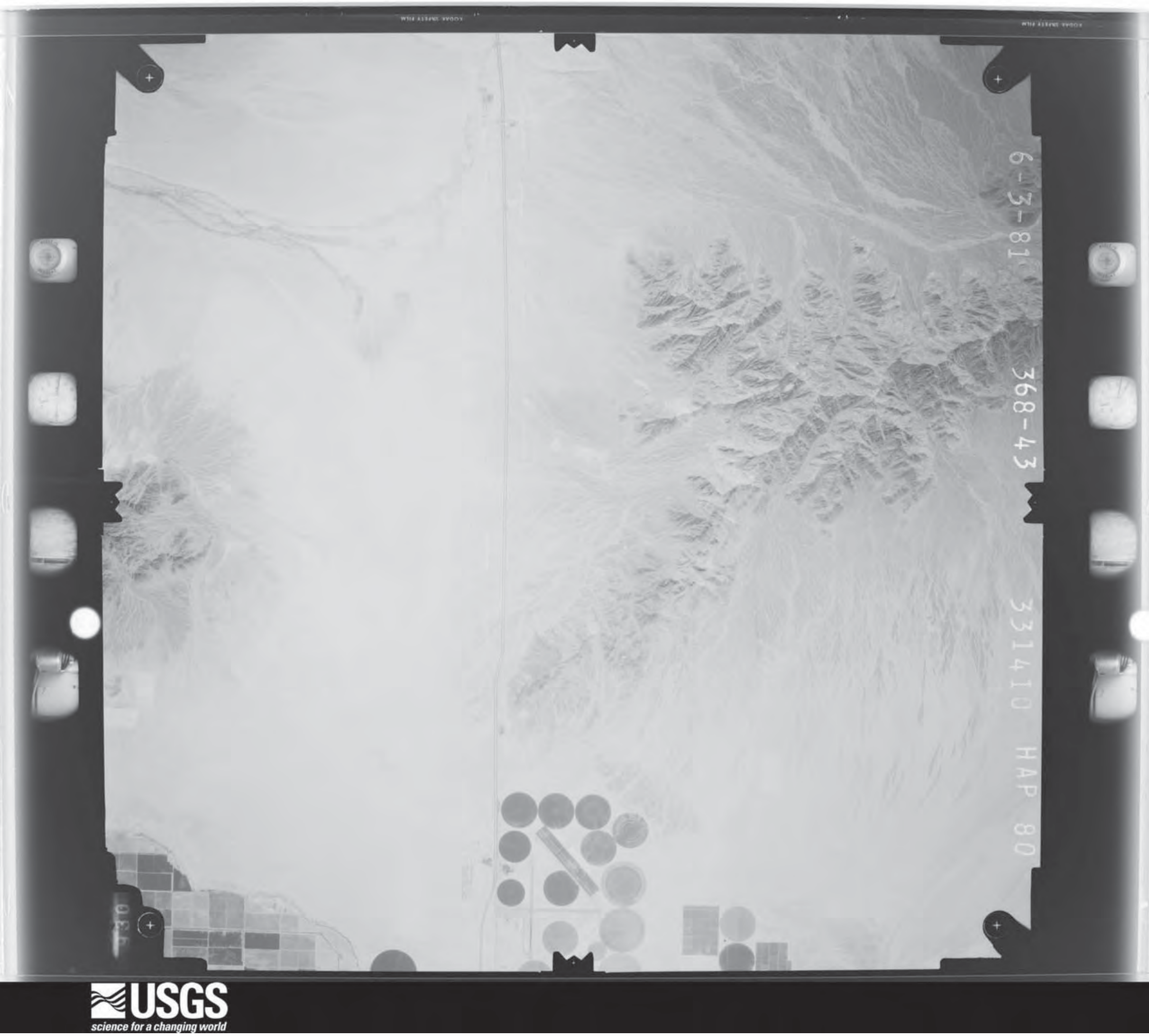

VV12RS R473 12AF 22 AUG 47 1100 152.0MM 40,000' PROJECT #38
14
VV12RS R472 12AF 22 AUG 47 1100 152.0MM 40,000' PROJECT #38
2501 KODAK
2500 KODAK AEROGRAPHIC SAFETY
2499 KODAK AEROGRAPHIC SAFETY

USGS
science for a changing world

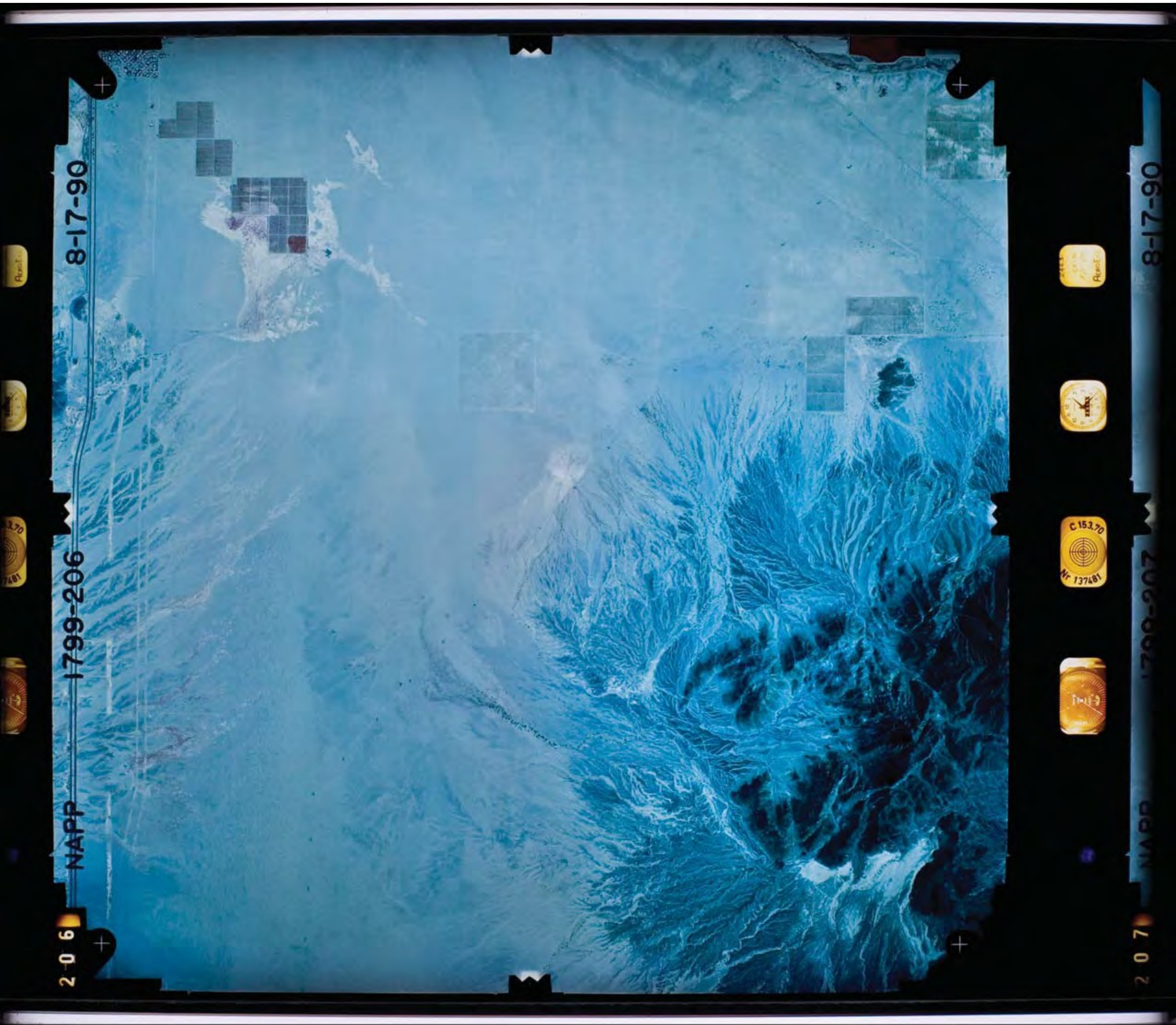

08-30-56
100
LENS NO 149
MC8000 V3
08-30-56
101
LENS NO 149
MC8000 V3

USGS
science for a changing world

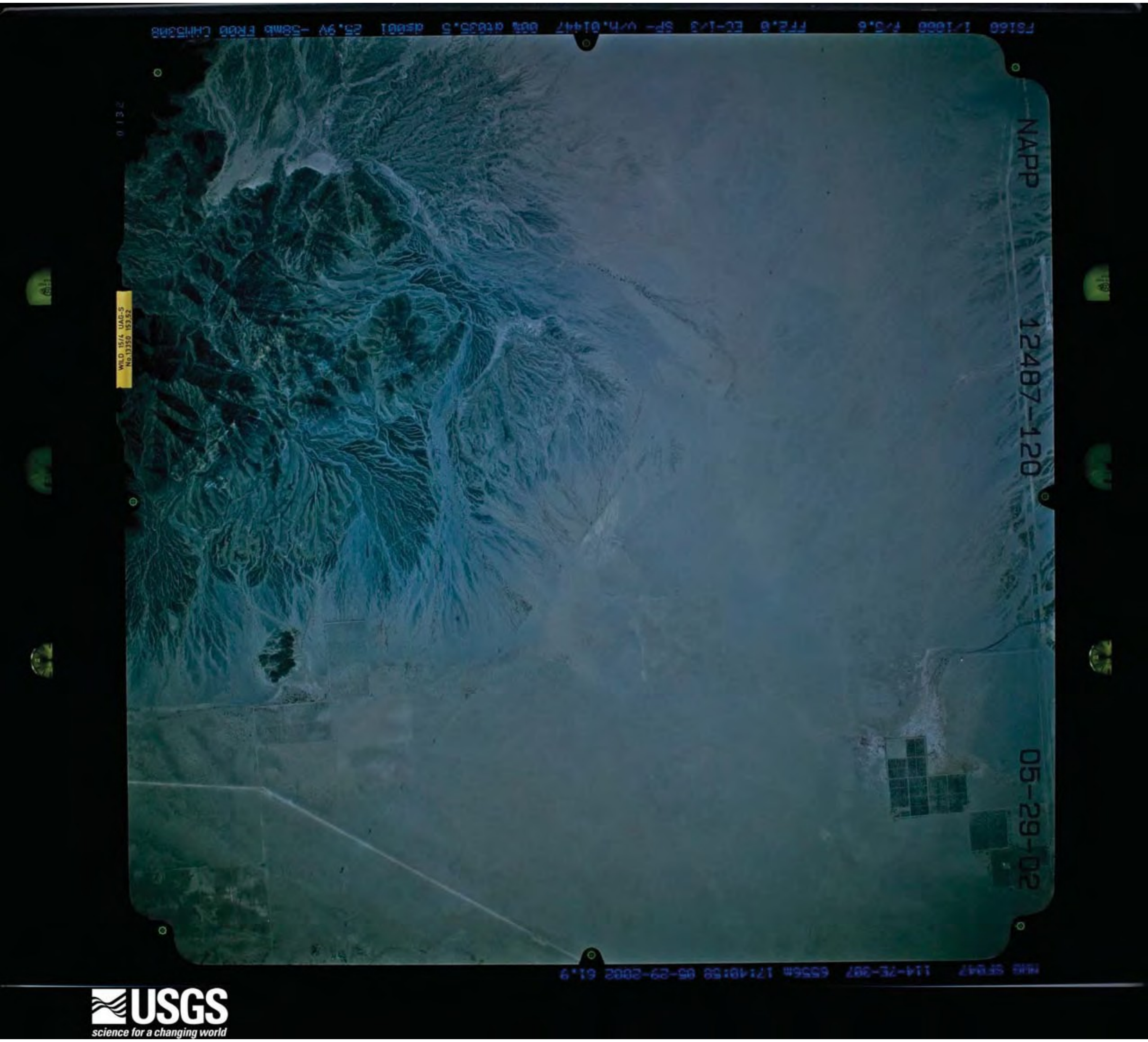

USAF 059V 17Jul68 152
ENS NO 071


6-3-81
368-43
331410 HAP 80

USGS
science for a changing world


8-17-90
NAPP 1799-206
2 0 6
8-17-90
NAPP 1799-207
2 0 7
C 153,70
Nr 137481

USGS
science for a changing world


NAPP
12487-120
05-29-02
WILD 15/4 UAG-S
No 13350 153.52

APPENDIX D
EDR DATAMAP AREA STUDY

First Solar Desert Quartzite Solar Project Site
Blythe, CA 92225

Inquiry Number: 4154996.7s
January 23, 2015

EDR DataMap™ Area Study

EDR® Environmental Data Resources Inc

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

TARGET PROPERTY INFORMATION

ADDRESS

BLYTHE, CA 92225
BLYTHE, CA 92225

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records within the requested search area for the following databases:

FEDERAL RECORDS

NPL	National Priority List
Proposed NPL	Proposed National Priority List Sites
Delisted NPL	National Priority List Deletions
NPL LIENS	Federal Superfund Liens
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP	CERCLIS No Further Remedial Action Planned
LIENS 2	CERCLA Lien Information
CORRACTS	Corrective Action Report
RCRA-TSDF	RCRA - Treatment, Storage and Disposal
RCRA-LQG	RCRA - Large Quantity Generators
RCRA-SQG	RCRA - Small Quantity Generators
RCRA-CESQG	RCRA - Conditionally Exempt Small Quantity Generator
RCRA NonGen / NLR	RCRA - Non Generators / No Longer Regulated
US ENG CONTROLS	Engineering Controls Sites List
US INST CONTROL	Sites with Institutional Controls
ERNS	Emergency Response Notification System
HMIRS	Hazardous Materials Information Reporting System
DOT OPS	Incident and Accident Data
US CDL	Clandestine Drug Labs
US BROWNFIELDS	A Listing of Brownfields Sites
DOD	Department of Defense Sites
FUDS	Formerly Used Defense Sites
LUCIS	Land Use Control Information System
CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
UMTRA	Uranium Mill Tailings Sites
ODI	Open Dump Inventory
DEBRIS REGION 9	Torres Martinez Reservation Illegal Dump Site Locations
US MINES	Mines Master Index File
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS	Section 7 Tracking Systems

ICIS	Integrated Compliance Information System
PADS	PCB Activity Database System
MLTS	Material Licensing Tracking System
RADINFO	Radiation Information Database
FINDS	Facility Index System/Facility Registry System
RAATS	RCRA Administrative Action Tracking System
RMP	Risk Management Plans
US AIRS	Aerometric Information Retrieval System Facility Subsystem
LEAD SMELTERS	Lead Smelter Sites
FEMA UST	Underground Storage Tank Listing
COAL ASH DOE	Steam-Electric Plant Operation Data
2020 COR ACTION	2020 Corrective Action Program List
PRP	Potentially Responsible Parties
EPA WATCH LIST	EPA WATCH LIST
US FIN ASSUR	Financial Assurance Information
FEDERAL FACILITY	Federal Facility Site Information listing
SCRD DRYCLEANERS	State Coalition for Remediation of Drycleaners Listing
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER	PCB Transformer Registration Database
US HIST CDL	National Clandestine Laboratory Register

STATE AND LOCAL RECORDS

HIST Cal-Sites	Historical Calsites Database
CA BOND EXP. PLAN	Bond Expenditure Plan
SCH	School Property Evaluation Program
Toxic Pits	Toxic Pits Cleanup Act Sites SWF/LF
	Solid Waste Information System
WDS	Waste Discharge System
NPDES	NPDES Permits Listing
UIC	UIC Listing
Cortese	"Cortese" Hazardous Waste & Substances Sites List
HIST CORTESE	Hazardous Waste & Substance Site List
SWRCY	Recycler Database
LUST	Geotracker’s Leaking Underground Fuel Tank Report
CA FID UST	Facility Inventory Database
SLIC	Statewide SLIC Cases
UST	Active UST Facilities
HIST UST	Hazardous Substance Storage Container Database
LIENS	Environmental Liens Listing
CUPA Listings	CUPA Resources List
SWEEPS UST	SWEEPS UST Listing
CHMIRS	California Hazardous Material Incident Report System
LDS	Land Disposal Sites Listing
MCS	Military Cleanup Sites Listing
AST	Aboveground Petroleum Storage Tank Facilities
Notify 65	Proposition 65 Records
DEED	Deed Restriction Listing
VCP	Voluntary Cleanup Program Properties
DRYCLEANERS	Cleaner Facilities
WIP	Well Investigation Program Case List
ENF	Enforcement Action Listing
CDL	Clandestine Drug Labs
RESPONSE	State Response Sites
HAZNET	Facility and Manifest Data

EXECUTIVE SUMMARY

EMI	Emissions Inventory Data
HAULERS	Registered Waste Tire Haulers Listing
ENVIROSTOR	EnviroStor Database
HWP	EnviroStor Permitted Facilities Listing
HWT	Registered Hazardous Waste Transporter Database
PROC	Certified Processors Database
WMUDS/SWAT	Waste Management Unit Database
MWMP	Medical Waste Management Program Listing

TRIBAL RECORDS

INDIAN RESERV	Indian Reservations
INDIAN ODI	Report on the Status of Open Dumps on Indian Lands
INDIAN LUST	Leaking Underground Storage Tanks on Indian Land
INDIAN UST	Underground Storage Tanks on Indian Land
INDIAN VCP	Voluntary Cleanup Priority Listing

EDR PROPRIETARY RECORDS

EDR MGP	EDR Proprietary Manufactured Gas Plants
EDR US Hist Auto Stat	EDR Exclusive Historic Gas Stations
EDR US Hist Cleaners	EDR Exclusive Historic Dry Cleaners
RGA LF	Recovered Government Archive Solid Waste Facilities List
RGA LUST	Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were not identified.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

Please refer to the end of the findings report for unmapped orphan sites due to poor or inadequate address information.

MAP FINDINGS SUMMARY

FEDERAL RECORDS

Database	Total Plotted
NPL	0
Proposed NPL	0
Delisted NPL	0
NPL LIENS	0
CERCLIS	0
CERC-NFRAP	0
LIENS 2	0
CORRACTS	0
RCRA-TSDF	0
RCRA-LQG	0
RCRA-SQG	0
RCRA-CESQG	0
RCRA NonGen / NLR	0
US ENG CONTROLS	0
US INST CONTROL	0
ERNS	0
HMIRS	0
DOT OPS	0
US CDL	0
US BROWNFIELDS	0
DOD	0
FUDS	0
LUCIS	0
CONSENT	0
ROD	0
UMTRA	0
ODI	0
DEBRIS REGION 9	0
US MINES	0
TRIS	0
TSCA	0
FTTS	0
HIST FTTS	0
SSTS	0
ICIS	0
PADS	0
MLTS	0
RADINFO	0
FINDS	0
RAATS	0
RMP	0
US AIRS	0
LEAD SMELTERS	0
FEMA UST	0
COAL ASH DOE	0
2020 COR ACTION	0
PRP	0
EPA WATCH LIST	0

MAP FINDINGS SUMMARY

Database	Total Plotted
US FIN ASSUR	0
FEDERAL FACILITY	0
SCRD DRYCLEANERS	0
COAL ASH EPA	0
PCB TRANSFORMER	0
US HIST CDL	0
STATE AND LOCAL RECORDS	
HIST Cal-Sites	0
CA BOND EXP. PLAN	0
SCH	0
Toxic Pits	0
SWF/LF	0
WDS	0
NPDES	0
UIC	0
Cortese	0
HIST CORTESE	0
SWRCY	0
LUST	0
CA FID UST	0
SLIC	0
UST	0
HIST UST	0
LIENS	0
CUPA Listings	0
SWEEPS UST	0
CHMIRS	0
LDS	0
MCS	0
AST	0
Notify 65	0
DEED	0
VCP	0
DRYCLEANERS	0
WIP	0
ENF	0
CDL	0
RESPONSE	0
HAZNET	0
EMI	0
HAULERS	0
ENVIROSTOR	0
HWP	0
HWT	0
PROC	0
WMUDS/SWAT	0
MWMP	0
TRIBAL RECORDS	
INDIAN RESERV	0

MAP FINDINGS SUMMARY

Database	Total Plotted
INDIAN ODI	0
INDIAN LUST	0
INDIAN UST	0
INDIAN VCP	0

EDR PROPRIETARY RECORDS

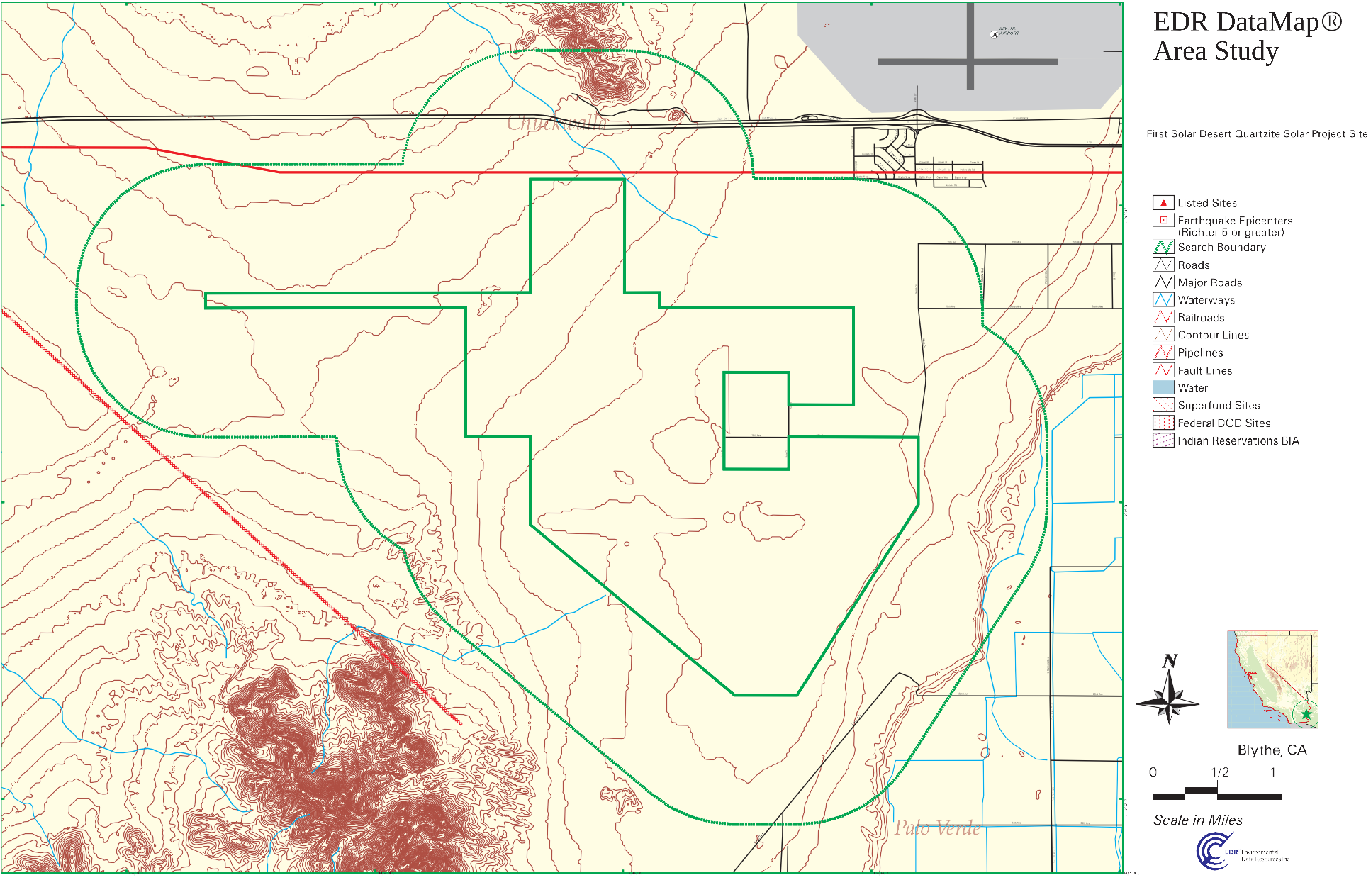
Database	Total Plotted
EDR MGP	0
EDR US Hist Auto Stat	0
EDR US Hist Cleaners	0
RGA LF	0
RGA LUST	0

NOTES:

Sites may be listed in more than one database

EDR DataMap®
Area Study

First Solar Desert Quartzite Solar Project Site



Chuckwalla
Palo Verde
BLYTHE AIRPORT
114 50 00
114 48 00
114 46 00
114 44 00
114 42 00
33 32 00
Listed Sites
Earthquake Epicenters (Richter 5 or greater)
Search Boundary
Roads
Major Roads
Waterways
Railroads
Contour Lines
Pipelines
Fault Lines
Water
Superfund Sites
Federal DOD Sites
Indian Reservations BIA
N
Blythe, CA
0
1/2
1
Scale in Miles
EDR Environmental Data Resources Inc

MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Site	Database(s)	EDR ID Number EPA ID Number
	NO SITES FOUND		

Count: 56 records

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
BLYTHE	1016717870	RIO MESA SOLAR FACILITY 1	1	92225	FINDS
BLYTHE	S117227914	GENESIS SOLAR ENERGY PROJECT - FORD DRY LAKE	HIGHWAY 10	92225	LDS
BLYTHE	1016264459	WESTERN FARM SVC DESERT DIV	15TH & 15400 S LOVEKIN	92225	FINDS
BLYTHE	U001573653	MOBIL OIL	9021 HWY 60	92225	HIST UST
BLYTHE	S109821522	BLYTHE AIRPORT DUMPSITE	ADJACENT TO EAST SIDE OF RUNWAY		SWF/LF
BLYTHE	S111214312	BLYTHE SOLAR POWER PROJECT	BLACK ROCK ROAD	92225	NPDES
BLYTHE	1009394143	WATER WHEEL RESORT	CHR 20 - 20900, HWY 95	92225	INDIAN LUST, INDIAN UST
BLYTHE	1016689254	BLYTHE SOLAR POWER PROJECT	1000 DRACKER DRIVE	92225	FINDS
BLYTHE	1009393171	TWIN PALMS RESORT	HCR 20, BOX 160018 1/2 MILE N. CA HWY 95	92225	INDIAN UST
BLYTHE	S101590287	S & R OIL COMPANY-BULK PLANT	9265 E HIGHWAY 60	92225	CA FID UST, SWEEPS UST
BLYTHE	U001573655	PALO VERDE EQUIPMENT CO	11390 WEST HIGHWAY 60	92225	HIST UST
BLYTHE	U001573662	S&R OIL COMPANY-BULK PLANT	9265 E. HIGHWAY 60	92225	HIST UST
BLYTHE	S114696998	SUN DESERT	15550 WEST HOBSON WAY		RGA LUST
BLYTHE	S114620591	FIRST INTERSTATE BANK-BLYTHE	149 E. HOBSON WAY		RGA LUST
BLYTHE	S114696997	SUN DESERT	15550 W. HOBSON WAY		RGA LUST
BLYTHE	S114620594	FIRST INTERSTATE BANK	149 EAST HOBSON WAY		RGA LUST
BLYTHE	S114620593	FIRST INTERSTATE BANK	149 E. HOBSON WAY		RGA LUST
BLYTHE	1009393126	AHA QUIN RESORT	HRC 20, HWY 95P.O. BOX 2400	92225	INDIAN UST
BLYTHE	S117348456	VENABLE SOLAR 1	881 S INTAKE BLVD	92225	NPDES
BLYTHE	U001573648	LOST LAKE RESORT	LOST LAKE (31 MI. N. OF BLYTHE	92225	HIST UST
BLYTHE	S114610495	DESERT SECURITY FARMS	LUGO/BERYLWOOD		RGA LUST
BLYTHE	U001573617	BLYTHE UNION 76 AUTO/TRUCK STO	MESA DRIVE	92225	HIST UST
BLYTHE	U001573611	BLYTHE MUNICIPAL GOLF COURSE	NORTH MESA	92225	HIST UST
BLYTHE	1006837166	UNION FEED YARDS DISPOSAL SITE	2 1/2 MI S OF BLYTHE ON SOUTH	92225	FINDS
BLYTHE	S114733789	UNION FEED YARDS DISPOSAL SITE	2 1/2 MI S OF BLYTHE ON SOUTH LOVEKIN		RGA LF
BLYTHE	1014672306	BLYTHE SOLAR POWER PROJECT	8 MILES W OF BLYTHE	92225	FINDS
BLYTHE	1014387846	BLYTHE SOLAR POWER PROJECT	8 MILES W OF BLYTHE	92225	RCRA-SQG
BLYTHE	1005441389	SHEPWELLS CORPORATION	7 MI N OF BLYTHE	92225	RCRA-SQG, FINDS, HAZNET
BLYTHE	1016718173	MCCOY SOLAR ENERGY PROJECT	NA	92225	FINDS
BLYTHE	1014672299	BLYTHE SOLAR POWER PROJ	2 MI NORTH INTERSTATE 10	92225	FINDS
BLYTHE	1014387839	BLYTHE SOLAR POWER PROJ	2 MI NORTH INTERSTATE 10	92225	RCRA-SQG, HAZNET
BLYTHE	S114610492	DESERT SECURITY FARMS	3116 PLANT ROAD		RGA LUST
BLYTHE	S117310440	GENESIS SOLAR, LLC	11995 WILEY’S WELL RD	92225	HAZNET
BLYTHE	1015877804	GENESIS SOLAR ENERGY PROJECT	11995 WILEY’S ROAD	92225	FINDS
DESERT CENTER	S113801556	PAR ELECTRICAL CONTRACTORS - DESERT CENTE 1 MATERIAL YARD	APN 808061001	92239	HAZNET
DESERT CENTER	S117041466	INDIGO SOLAR FARM	42220 BELSBY AVE	92239	NPDES
DESERT CENTER	1014672120	PALEN SOLAR POWER PROJECT	CORN SPRINGS ROAD	92239	FINDS
DESERT CENTER	1016687894	DESERT CENTER	DESERT CENTER AIRPORT	92239	FINDS
DESERT CENTER	S113748013	DESERT CENTER	DESERT CENTER AIRPORT	92239	EMI
DESERT CENTER	1016696540	PALEN SOLAR GENERATING STATION	10 MI EAST OF DESERT CENTER	92239	FINDS
DESERT CENTER	1016264762	SOUTHERN CALIFORNIA GAS COMPANY DESERT CENTER STATION	SOUTH FRONTAGE ROAD	92239	FINDS

Count: 56 records

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
DESERT CENTER	S113801346	DESERT SUNLIGHT 250 LLC AND DESERT SUNLIGHT 300 LLC	44810 KAISER RD	92239	HAZNET
DESERT CENTER	1016718151	DESERT SUNLIGHT 250, LLC	KAISER ROAD	92239	FINDS
DESERT CENTER	1016718436	DESERT SUNLIGHT 300, LLC	KAISER RD	92239	FINDS
DESERT CENTER	1015877811	NRG SOLAR DESERT CENTER	EAST OF RICE ROAD	92239	FINDS
DESERT CENTER	1003879899	KAISER EAGLE MOUNTAIN	N OF HWY 10 8M OFF KAISER RD.	92239	CERC-NFRAP
DESERT CENTER	1004444186	DESERT CENTER SCHOOL	RAGSDALE RD & HWY 60	92239	FINDS
DESERT CENTER	S106932871	TEXACO DESERT CENTER	29560 RAGSDALE RD	92239	SWEEPS UST
DESERT CENTER	U001573853	DESERT CENTER TEXACO	29560RAGSDALE RD.	92239	HIST UST
DESERT CENTER	1014674633	DESERT CENTER	UNKNOWN	92239	FINDS
DONTKNOW	1000167580	SO CALIF GAS CO/DESERT CENTER STATION	1 MILE EAST OF DESERT CENTER	92239	RCRA-SQG
PALO VERDE	S116381373	CALLAN TRANSPORTATION HIGHWAY 78	HIGHWAY 78 & 35TH AVENUE	92225	SLIC
RICE	1014672122	RICE SOLAR ENERGY	23555 SR-62	92239	FINDS
RIPLEY	1000886229	TOHSHIN TRADING INC	34100 HWY 78 PMP	92225	RCRA-SQG, FINDS, HAZNET
RIVERSIDE COUNTY	M300003149	ROBERT R. FORD TRUCKING, INC.	PACIFIC CLAY / FORD PIT		US MINES
RIVERSIDE COUNTY	M300003130	WHITEWATER ROCK & SUPPLY CO.	SAND & GRAVEL OPERATION		

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

FEDERAL RECORDS

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 09/29/2014
Date Data Arrived at EDR: 10/08/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 40

Source: EPA
Telephone: N/A
Last EDR Contact: 01/08/2015
Next Scheduled EDR Contact: 04/20/2015
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 10
Telephone 206-553-8665

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 09/29/2014
Date Data Arrived at EDR: 10/08/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 40

Source: EPA
Telephone: N/A
Last EDR Contact: 01/08/2015
Next Scheduled EDR Contact: 04/20/2015
Data Release Frequency: Quarterly

DELISTED NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 09/29/2014
Date Data Arrived at EDR: 10/08/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 40

Source: EPA
Telephone: N/A
Last EDR Contact: 01/08/2015
Next Scheduled EDR Contact: 04/20/2015
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 94

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 01/09/2015
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Quarterly

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 94

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 01/09/2015
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Quarterly

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/18/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Varies

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 06/10/2014
Date Data Arrived at EDR: 07/02/2014
Date Made Active in Reports: 09/18/2014
Number of Days to Update: 78

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 12/29/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Quarterly

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 06/10/2014	Source: Environmental Protection Agency
Date Data Arrived at EDR: 07/02/2014	Telephone: (415) 495-8895
Date Made Active in Reports: 09/18/2014	Last EDR Contact: 12/29/2014
Number of Days to Update: 78	Next Scheduled EDR Contact: 04/13/2015
	Data Release Frequency: Quarterly

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 06/10/2014	Source: Environmental Protection Agency
Date Data Arrived at EDR: 07/02/2014	Telephone: (415) 495-8895
Date Made Active in Reports: 09/18/2014	Last EDR Contact: 12/29/2014
Number of Days to Update: 78	Next Scheduled EDR Contact: 04/13/2015
	Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 06/10/2014	Source: Environmental Protection Agency
Date Data Arrived at EDR: 07/02/2014	Telephone: (415) 495-8895
Date Made Active in Reports: 09/18/2014	Last EDR Contact: 12/29/2014
Number of Days to Update: 78	Next Scheduled EDR Contact: 04/13/2015
	Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 06/10/2014	Source: Environmental Protection Agency
Date Data Arrived at EDR: 07/02/2014	Telephone: (415) 495-8895
Date Made Active in Reports: 09/18/2014	Last EDR Contact: 12/29/2014
Number of Days to Update: 78	Next Scheduled EDR Contact: 04/13/2015
	Data Release Frequency: Varies

RCRA NonGen / NLR: RCRA - Non Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 06/10/2014	Source: Environmental Protection Agency
Date Data Arrived at EDR: 07/02/2014	Telephone: (415) 495-8895
Date Made Active in Reports: 09/18/2014	Last EDR Contact: 12/29/2014
Number of Days to Update: 78	Next Scheduled EDR Contact: 04/13/2015
	Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 09/18/2014
Date Data Arrived at EDR: 09/19/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 12/03/2014
Next Scheduled EDR Contact: 03/16/2015
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 09/18/2014
Date Data Arrived at EDR: 09/19/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 12/03/2014
Next Scheduled EDR Contact: 03/16/2015
Data Release Frequency: Varies

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 09/29/2014
Date Data Arrived at EDR: 09/30/2014
Date Made Active in Reports: 11/06/2014
Number of Days to Update: 37

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 12/29/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Annually

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 09/30/2014
Date Data Arrived at EDR: 10/01/2014
Date Made Active in Reports: 11/06/2014
Number of Days to Update: 36

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 12/30/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Annually

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 11/04/2014
Next Scheduled EDR Contact: 02/16/2015
Data Release Frequency: Varies

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 07/25/2014
Date Data Arrived at EDR: 09/09/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 41

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 11/25/2014
Next Scheduled EDR Contact: 03/16/2015
Data Release Frequency: Quarterly

US BROWNFIELDS: A Listing of Brownfields Sites

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 09/22/2014
Date Data Arrived at EDR: 09/23/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 12/22/2014
Next Scheduled EDR Contact: 04/06/2015
Data Release Frequency: Semi-Annually

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 01/15/2015
Next Scheduled EDR Contact: 04/27/2015
Data Release Frequency: Semi-Annually

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 06/06/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 09/18/2014
Number of Days to Update: 8

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 12/12/2014
Next Scheduled EDR Contact: 03/23/2015
Data Release Frequency: Varies

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 08/29/2014
Date Data Arrived at EDR: 10/09/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 11

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 11/17/2014
Next Scheduled EDR Contact: 03/02/2015
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 01/24/2014
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 31

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 12/24/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Varies

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 11/25/2013	Source: EPA
Date Data Arrived at EDR: 12/12/2013	Telephone: 703-416-0223
Date Made Active in Reports: 02/24/2014	Last EDR Contact: 12/12/2014
Number of Days to Update: 74	Next Scheduled EDR Contact: 03/23/2015
	Data Release Frequency: Annually

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010	Source: Department of Energy
Date Data Arrived at EDR: 10/07/2011	Telephone: 505-845-0011
Date Made Active in Reports: 03/01/2012	Last EDR Contact: 11/26/2014
Number of Days to Update: 146	Next Scheduled EDR Contact: 03/09/2015
	Data Release Frequency: Varies

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985	Source: Environmental Protection Agency
Date Data Arrived at EDR: 08/09/2004	Telephone: 800-424-9346
Date Made Active in Reports: 09/17/2004	Last EDR Contact: 06/09/2004
Number of Days to Update: 39	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009	Source: EPA, Region 9
Date Data Arrived at EDR: 05/07/2009	Telephone: 415-947-4219
Date Made Active in Reports: 09/21/2009	Last EDR Contact: 10/24/2014
Number of Days to Update: 137	Next Scheduled EDR Contact: 02/09/2015
	Data Release Frequency: No Update Planned

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 08/05/2014	Source: Department of Labor, Mine Safety and Health Administration
Date Data Arrived at EDR: 09/04/2014	Telephone: 303-231-5959
Date Made Active in Reports: 11/17/2014	Last EDR Contact: 12/30/2014
Number of Days to Update: 74	Next Scheduled EDR Contact: 03/16/2015
	Data Release Frequency: Semi-Annually

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2011	Source: EPA
Date Data Arrived at EDR: 07/31/2013	Telephone: 202-566-0250
Date Made Active in Reports: 09/13/2013	Last EDR Contact: 11/26/2014
Number of Days to Update: 44	Next Scheduled EDR Contact: 03/09/2015
	Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2006	Source: EPA
Date Data Arrived at EDR: 09/29/2010	Telephone: 202-260-5521
Date Made Active in Reports: 12/02/2010	Last EDR Contact: 12/22/2014
Number of Days to Update: 64	Next Scheduled EDR Contact: 04/06/2015
	Data Release Frequency: Every 4 Years

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009	Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Date Data Arrived at EDR: 04/16/2009	Telephone: 202-566-1667
Date Made Active in Reports: 05/11/2009	Last EDR Contact: 11/19/2014
Number of Days to Update: 25	Next Scheduled EDR Contact: 03/09/2015
	Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009	Source: EPA
Date Data Arrived at EDR: 04/16/2009	Telephone: 202-566-1667
Date Made Active in Reports: 05/11/2009	Last EDR Contact: 11/19/2014
Number of Days to Update: 25	Next Scheduled EDR Contact: 03/09/2015
	Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/01/2007	Telephone: 202-564-2501
Date Made Active in Reports: 04/10/2007	Last EDR Contact: 12/17/2007
Number of Days to Update: 40	Next Scheduled EDR Contact: 03/17/2008
	Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006	Source: Environmental Protection Agency
Date Data Arrived at EDR: 03/01/2007	Telephone: 202-564-2501
Date Made Active in Reports: 04/10/2007	Last EDR Contact: 12/17/2008
Number of Days to Update: 40	Next Scheduled EDR Contact: 03/17/2008
	Data Release Frequency: No Update Planned

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009	Source: EPA
Date Data Arrived at EDR: 12/10/2010	Telephone: 202-564-4203
Date Made Active in Reports: 02/25/2011	Last EDR Contact: 10/27/2014
Number of Days to Update: 77	Next Scheduled EDR Contact: 02/09/2015
	Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 07/31/2014	Source: Environmental Protection Agency
Date Data Arrived at EDR: 10/29/2014	Telephone: 202-564-5088
Date Made Active in Reports: 11/06/2014	Last EDR Contact: 01/09/2015
Number of Days to Update: 8	Next Scheduled EDR Contact: 04/27/2015
	Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB’s who are required to notify the EPA of such activities.

Date of Government Version: 07/01/2014	Source: EPA
Date Data Arrived at EDR: 10/15/2014	Telephone: 202-566-0500
Date Made Active in Reports: 11/17/2014	Last EDR Contact: 01/16/2015
Number of Days to Update: 33	Next Scheduled EDR Contact: 04/27/2015
	Data Release Frequency: Annually

MLTS: Material Licensing Tracking System

MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/22/2013	Source: Nuclear Regulatory Commission
Date Data Arrived at EDR: 08/02/2013	Telephone: 301-415-7169
Date Made Active in Reports: 11/01/2013	Last EDR Contact: 12/04/2014
Number of Days to Update: 91	Next Scheduled EDR Contact: 03/23/2015
	Data Release Frequency: Quarterly

RADINFO: Radiation Information Database

The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 10/07/2014	Source: Environmental Protection Agency
Date Data Arrived at EDR: 10/08/2014	Telephone: 202-343-9775
Date Made Active in Reports: 10/20/2014	Last EDR Contact: 01/08/2015
Number of Days to Update: 12	Next Scheduled EDR Contact: 04/20/2015
	Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and ’pointers’ to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 08/16/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 12/09/2014
Next Scheduled EDR Contact: 03/23/2015
Data Release Frequency: Quarterly

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 08/01/2014
Date Data Arrived at EDR: 08/12/2014
Date Made Active in Reports: 11/06/2014
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2011
Date Data Arrived at EDR: 02/26/2013
Date Made Active in Reports: 04/19/2013
Number of Days to Update: 52

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 11/26/2014
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Biennially

FEMA UST: Underground Storage Tank Listing

A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 01/12/2015
Next Scheduled EDR Contact: 04/27/2015
Data Release Frequency: Varies

COAL ASH DOE: Sleam-Electric Plan Operation Data

A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 01/15/2015
Next Scheduled EDR Contact: 04/27/2015
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 09/04/2014
Date Data Arrived at EDR: 09/04/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 46

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 11/11/2014
Next Scheduled EDR Contact: 03/02/2015
Data Release Frequency: Quarterly

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 11/18/2014
Next Scheduled EDR Contact: 02/02/2015
Data Release Frequency: Varies

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/16/2014
Date Data Arrived at EDR: 10/31/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 17

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 12/23/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Annually

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/16/2014
Date Data Arrived at EDR: 10/31/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 17

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 12/23/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Annually

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List

A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 12/12/2014
Next Scheduled EDR Contact: 03/23/2015
Data Release Frequency: Varies

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 07/21/2014
Date Data Arrived at EDR: 10/07/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 01/09/2015
Next Scheduled EDR Contact: 04/20/2015
Data Release Frequency: Varies

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 07/25/2014
Date Data Arrived at EDR: 09/09/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 41

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 11/25/2014
Next Scheduled EDR Contact: 03/16/2015
Data Release Frequency: No Update Planned

PCB TRANSFORMER: PCB Transformer Registration Database

The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 10/31/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Varies

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 11/14/2014
Next Scheduled EDR Contact: 02/23/2015
Data Release Frequency: Quarterly

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 06/04/2014
Date Data Arrived at EDR: 06/12/2014
Date Made Active in Reports: 07/28/2014
Number of Days to Update: 46

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 01/05/2015
Next Scheduled EDR Contact: 04/20/2015
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 10/17/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 3

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 12/29/2015
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 11/11/2011
Date Data Arrived at EDR: 05/18/2012
Date Made Active in Reports: 05/25/2012
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 11/14/2014
Next Scheduled EDR Contact: 02/23/2015
Data Release Frequency: Varies

STATE AND LOCAL RECORDS

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

CA BOND EXP. PLAN: Bond Expenditure Plan

Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6

Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 11/03/2014
Date Data Arrived at EDR: 11/04/2014
Date Made Active in Reports: 12/12/2014
Number of Days to Update: 38

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 11/04/2014
Next Scheduled EDR Contact: 02/16/2015
Data Release Frequency: Quarterly

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995	Source: State Water Resources Control Board
Date Data Arrived at EDR: 08/30/1995	Telephone: 916-227-4364
Date Made Active in Reports: 09/26/1995	Last EDR Contact: 01/26/2009
Number of Days to Update: 27	Next Scheduled EDR Contact: 04/27/2009
	Data Release Frequency: No Update Planned

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 11/17/2014	Source: Department of Resources Recycling and Recovery
Date Data Arrived at EDR: 11/19/2014	Telephone: 916-341-6320
Date Made Active in Reports: 12/24/2014	Last EDR Contact: 11/19/2014
Number of Days to Update: 35	Next Scheduled EDR Contact: 03/02/2015
	Data Release Frequency: Quarterly

UIC: UIC Listing

A listing of wells identified as underground injection wells, in the California Oil and Gas Wells database.

Date of Government Version: 07/14/2014	Source: Deaprtment of Conservation
Date Data Arrived at EDR: 09/17/2014	Telephone: 916-445-2408
Date Made Active in Reports: 10/23/2014	Last EDR Contact: 12/15/2014
Number of Days to Update: 36	Next Scheduled EDR Contact: 03/30/2015
	Data Release Frequency: Varies

NPDES: NPDES Permits Listing

A listing of NPDES permits, including stormwater.

Date of Government Version: 11/17/2014	Source: State Water Resources Control Board
Date Data Arrived at EDR: 11/19/2014	Telephone: 916-445-9379
Date Made Active in Reports: 12/29/2014	Last EDR Contact: 11/19/2014
Number of Days to Update: 40	Next Scheduled EDR Contact: 03/02/2015
	Data Release Frequency: Quarterly

WDS: Waste Discharge System

Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007	Source: State Water Resources Control Board
Date Data Arrived at EDR: 06/20/2007	Telephone: 916-341-5227
Date Made Active in Reports: 06/29/2007	Last EDR Contact: 11/19/2014
Number of Days to Update: 9	Next Scheduled EDR Contact: 03/09/2015
	Data Release Frequency: Quarterly

CORTESE: "Cortese" Hazardous Waste & Substances Sites List

The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 09/29/2014	Source: CAL EPA/Office of Emergency Information
Date Data Arrived at EDR: 09/30/2014	Telephone: 916-323-3400
Date Made Active in Reports: 11/19/2014	Last EDR Contact: 12/29/2014
Number of Days to Update: 50	Next Scheduled EDR Contact: 04/13/2015
	Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List

The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001	Source: Department of Toxic Substances Control
Date Data Arrived at EDR: 01/22/2009	Telephone: 916-323-3400
Date Made Active in Reports: 04/08/2009	Last EDR Contact: 01/22/2009
Number of Days to Update: 76	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

SWRCY: Recycler Database

A listing of recycling facilities in California.

Date of Government Version: 09/16/2014	Source: Department of Conservation
Date Data Arrived at EDR: 09/17/2014	Telephone: 916-323-3836
Date Made Active in Reports: 10/23/2014	Last EDR Contact: 12/15/2014
Number of Days to Update: 36	Next Scheduled EDR Contact: 03/30/2015
	Data Release Frequency: Quarterly

LUST: Geotracker’s Leaking Underground Fuel Tank Report

Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state. For more information on a particular leaking underground storage tank sites, please contact the appropriate regulatory agency.

Date of Government Version: 12/12/2014	Source: State Water Resources Control Board
Date Data Arrived at EDR: 12/15/2014	Telephone: see region list
Date Made Active in Reports: 01/05/2015	Last EDR Contact: 01/21/2015
Number of Days to Update: 21	Next Scheduled EDR Contact: 03/30/2015
	Data Release Frequency: Quarterly

LUST REG 1: Active Toxic Site Investigation

Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board’s LUST database.

Date of Government Version: 02/01/2001	Source: California Regional Water Quality Control Board North Coast (1)
Date Data Arrived at EDR: 02/28/2001	Telephone: 707-570-3769
Date Made Active in Reports: 03/29/2001	Last EDR Contact: 08/01/2011
Number of Days to Update: 29	Next Scheduled EDR Contact: 11/14/2011
	Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List

Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004	Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Date Data Arrived at EDR: 10/20/2004	Telephone: 510-622-2433
Date Made Active in Reports: 11/19/2004	Last EDR Contact: 09/19/2011
Number of Days to Update: 30	Next Scheduled EDR Contact: 01/02/2012
	Data Release Frequency: Quarterly

LUST REG 3: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003	Source: California Regional Water Quality Control Board Central Coast Region (3)
Date Data Arrived at EDR: 05/19/2003	Telephone: 805-542-4786
Date Made Active in Reports: 06/02/2003	Last EDR Contact: 07/18/2011
Number of Days to Update: 14	Next Scheduled EDR Contact: 10/31/2011
	Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List

Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board’s LUST database.

Date of Government Version: 09/07/2004	Source: California Regional Water Quality Control Board Los Angeles Region (4)
Date Data Arrived at EDR: 09/07/2004	Telephone: 213-576-6710
Date Made Active in Reports: 10/12/2004	Last EDR Contact: 09/06/2011
Number of Days to Update: 35	Next Scheduled EDR Contact: 12/19/2011
	Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008	Source: California Regional Water Quality Control Board Central Valley Region (5)
Date Data Arrived at EDR: 07/22/2008	Telephone: 916-464-4834
Date Made Active in Reports: 07/31/2008	Last EDR Contact: 07/01/2011
Number of Days to Update: 9	Next Scheduled EDR Contact: 10/17/2011
	Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing

For more current information, please refer to the State Water Resources Control Board’s LUST database.

Date of Government Version: 09/09/2003	Source: California Regional Water Quality Control Board Lahontan Region (6)
Date Data Arrived at EDR: 09/10/2003	Telephone: 530-542-5572
Date Made Active in Reports: 10/07/2003	Last EDR Contact: 09/12/2011
Number of Days to Update: 27	Next Scheduled EDR Contact: 12/26/2011
	Data Release Frequency: No Update Planned

LUST REG 6V: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005	Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Date Data Arrived at EDR: 06/07/2005	Telephone: 760-241-7365
Date Made Active in Reports: 06/29/2005	Last EDR Contact: 09/12/2011
Number of Days to Update: 22	Next Scheduled EDR Contact: 12/26/2011
	Data Release Frequency: No Update Planned

LUST REG 7: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004	Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Date Data Arrived at EDR: 02/26/2004	Telephone: 760-776-8943
Date Made Active in Reports: 03/24/2004	Last EDR Contact: 08/01/2011
Number of Days to Update: 27	Next Scheduled EDR Contact: 11/14/2011
	Data Release Frequency: No Update Planned

LUST REG 8: Leaking Underground Storage Tanks

California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board’s LUST database.

Date of Government Version: 02/14/2005	Source: California Regional Water Quality Control Board Santa Ana Region (8)
Date Data Arrived at EDR: 02/15/2005	Telephone: 909-782-4496
Date Made Active in Reports: 03/28/2005	Last EDR Contact: 08/15/2011
Number of Days to Update: 41	Next Scheduled EDR Contact: 11/28/2011
	Data Release Frequency: Varies

LUST REG 9: Leaking Underground Storage Tank Report

Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board’s LUST database.

Date of Government Version: 03/01/2001	Source: California Regional Water Quality Control Board San Diego Region (9)
Date Data Arrived at EDR: 04/23/2001	Telephone: 858-637-5595
Date Made Active in Reports: 05/21/2001	Last EDR Contact: 09/26/2011
Number of Days to Update: 28	Next Scheduled EDR Contact: 01/09/2012
	Data Release Frequency: No Update Planned

CA FID UST: Facility Inventory Database

The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994	Source: California Environmental Protection Agency
Date Data Arrived at EDR: 09/05/1995	Telephone: 916-341-5851
Date Made Active in Reports: 09/29/1995	Last EDR Contact: 12/28/1998
Number of Days to Update: 24	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

SLIC: Statewide SLIC Cases

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 12/12/2014	Source: State Water Resources Control Board
Date Data Arrived at EDR: 12/15/2014	Telephone: 866-480-1028
Date Made Active in Reports: 01/05/2015	Last EDR Contact: 01/21/2015
Number of Days to Update: 21	Next Scheduled EDR Contact: 03/30/2015
	Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003	Source: California Regional Water Quality Control Board, North Coast Region (1)
Date Data Arrived at EDR: 04/07/2003	Telephone: 707-576-2220
Date Made Active in Reports: 04/25/2003	Last EDR Contact: 08/01/2011
Number of Days to Update: 18	Next Scheduled EDR Contact: 11/14/2011
	Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004	Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Date Data Arrived at EDR: 10/20/2004	Telephone: 510-286-0457
Date Made Active in Reports: 11/19/2004	Last EDR Contact: 09/19/2011
Number of Days to Update: 30	Next Scheduled EDR Contact: 01/02/2012
	Data Release Frequency: Quarterly

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006	Source: California Regional Water Quality Control Board Central Coast Region (3)
Date Data Arrived at EDR: 05/18/2006	Telephone: 805-549-3147
Date Made Active in Reports: 06/15/2006	Last EDR Contact: 07/18/2011
Number of Days to Update: 28	Next Scheduled EDR Contact: 10/31/2011
	Data Release Frequency: Semi-Annually

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004	Source: Region Water Quality Control Board Los Angeles Region (4)
Date Data Arrived at EDR: 11/18/2004	Telephone: 213-576-6600
Date Made Active in Reports: 01/04/2005	Last EDR Contact: 07/01/2011
Number of Days to Update: 47	Next Scheduled EDR Contact: 10/17/2011
	Data Release Frequency: Varies

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005	Source: Regional Water Quality Control Board Central Valley Region (5)
Date Data Arrived at EDR: 04/05/2005	Telephone: 916-464-3291
Date Made Active in Reports: 04/21/2005	Last EDR Contact: 09/12/2011
Number of Days to Update: 16	Next Scheduled EDR Contact: 12/26/2011
	Data Release Frequency: Semi-Annually

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005	Source: Regional Water Quality Control Board, Victorville Branch
Date Data Arrived at EDR: 05/25/2005	Telephone: 619-241-6583
Date Made Active in Reports: 06/16/2005	Last EDR Contact: 08/15/2011
Number of Days to Update: 22	Next Scheduled EDR Contact: 11/28/2011
	Data Release Frequency: Semi-Annually

SLIC REG 6L: SLIC Sites

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004	Source: California Regional Water Quality Control Board, Lahontan Region
Date Data Arrived at EDR: 09/07/2004	Telephone: 530-542-5574
Date Made Active in Reports: 10/12/2004	Last EDR Contact: 08/15/2011
Number of Days to Update: 35	Next Scheduled EDR Contact: 11/28/2011
	Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004	Source: California Regional Quality Control Board, Colorado River Basin Region
Date Data Arrived at EDR: 11/29/2004	Telephone: 760-346-7491
Date Made Active in Reports: 01/04/2005	Last EDR Contact: 08/01/2011
Number of Days to Update: 36	Next Scheduled EDR Contact: 11/14/2011
	Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008	Source: California Region Water Quality Control Board Santa Ana Region (8)
Date Data Arrived at EDR: 04/03/2008	Telephone: 951-782-3298
Date Made Active in Reports: 04/14/2008	Last EDR Contact: 09/12/2011
Number of Days to Update: 11	Next Scheduled EDR Contact: 12/26/2011
	Data Release Frequency: Semi-Annually

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007	Source: California Regional Water Quality Control Board San Diego Region (9)
Date Data Arrived at EDR: 09/11/2007	Telephone: 858-467-2980
Date Made Active in Reports: 09/28/2007	Last EDR Contact: 08/08/2011
Number of Days to Update: 17	Next Scheduled EDR Contact: 11/21/2011
	Data Release Frequency: Annually

UST: Active UST Facilities

Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 09/17/2014
Date Data Arrived at EDR: 09/17/2014
Date Made Active in Reports: 10/24/2014
Number of Days to Update: 37

Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 01/21/2015
Next Scheduled EDR Contact: 03/30/2015
Data Release Frequency: Semi-Annually

UST MENDOCINO: Mendocino County UST Database

A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 09/23/2009
Date Data Arrived at EDR: 09/23/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 8

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 12/24/2014
Next Scheduled EDR Contact: 03/16/2015
Data Release Frequency: Annually

HIST UST: Hazardous Substance Storage Container Database

The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

LIENS: Environmental Liens Listing

A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 10/02/2014
Date Data Arrived at EDR: 10/03/2014
Date Made Active in Reports: 11/20/2014
Number of Days to Update: 48

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 12/05/2014
Next Scheduled EDR Contact: 03/23/2015
Data Release Frequency: Varies

SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 10/27/2014
Date Data Arrived at EDR: 10/29/2014
Date Made Active in Reports: 12/10/2014
Number of Days to Update: 42

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 10/29/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Varies

LDS: Land Disposal Sites Listing

The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units.

Date of Government Version: 12/12/2014
Date Data Arrived at EDR: 12/15/2014
Date Made Active in Reports: 01/05/2015
Number of Days to Update: 21

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 01/21/2015
Next Scheduled EDR Contact: 03/30/2015
Data Release Frequency: Quarterly

AST: Aboveground Petroleum Storage Tank Facilities

A listing of aboveground storage tank petroleum storage tank locations.

Date of Government Version: 08/01/2009
Date Data Arrived at EDR: 09/10/2009
Date Made Active in Reports: 10/01/2009
Number of Days to Update: 21

Source: California Environmental Protection Agency
Telephone: 916-327-5092
Last EDR Contact: 12/23/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing

The State Water Resources Control Board and nine Regional Water Quality Control Boards partner with the Department of Defense (DoD) through the Defense and State Memorandum of Agreement (DSMOA) to oversee the investigation and remediation of water quality issues at military facilities.

Date of Government Version: 12/12/2014
Date Data Arrived at EDR: 12/15/2014
Date Made Active in Reports: 01/05/2015
Number of Days to Update: 21

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 01/21/2015
Next Scheduled EDR Contact: 03/30/2015
Data Release Frequency: Quarterly

NOTIFY 65: Proposition 65 Records

Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 10/21/1993
Date Data Arrived at EDR: 11/01/1993
Date Made Active in Reports: 11/19/1993
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 12/18/2014
Next Scheduled EDR Contact: 04/06/2015
Data Release Frequency: No Update Planned

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program’s oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder’s office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 09/08/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/22/2014
Number of Days to Update: 42

Source: DTSC and SWRCB
Telephone: 916-323-3400
Last EDR Contact: 12/09/2014
Next Scheduled EDR Contact: 03/23/2015
Data Release Frequency: Semi-Annually

VCP: Voluntary Cleanup Program Properties

Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC’s costs.

Date of Government Version: 11/03/2014	Source: Department of Toxic Substances Control
Date Data Arrived at EDR: 11/04/2014	Telephone: 916-323-3400
Date Made Active in Reports: 12/12/2014	Last EDR Contact: 11/04/2014
Number of Days to Update: 38	Next Scheduled EDR Contact: 02/16/2015
	Data Release Frequency: Quarterly

DRYCLEANERS: Cleaner Facilities

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 06/28/2014	Source: Department of Toxic Substance Control
Date Data Arrived at EDR: 07/03/2014	Telephone: 916-327-4498
Date Made Active in Reports: 08/21/2014	Last EDR Contact: 12/22/2014
Number of Days to Update: 49	Next Scheduled EDR Contact: 03/23/2015
	Data Release Frequency: Annually

WIP: Well Investigation Program Case List

Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009	Source: Los Angeles Water Quality Control Board
Date Data Arrived at EDR: 07/21/2009	Telephone: 213-576-6726
Date Made Active in Reports: 08/03/2009	Last EDR Contact: 12/23/2014
Number of Days to Update: 13	Next Scheduled EDR Contact: 04/13/2015
	Data Release Frequency: Varies

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 06/30/2014	Source: Department of Toxic Substances Control
Date Data Arrived at EDR: 09/02/2014	Telephone: 916-255-6504
Date Made Active in Reports: 09/24/2014	Last EDR Contact: 01/12/2015
Number of Days to Update: 22	Next Scheduled EDR Contact: 04/27/2015
	Data Release Frequency: Varies

ENF: Enforcement Action Listing

A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 11/10/2014	Source: State Water Resoruces Control Board
Date Data Arrived at EDR: 11/12/2014	Telephone: 916-445-9379
Date Made Active in Reports: 12/12/2014	Last EDR Contact: 11/07/2014
Number of Days to Update: 30	Next Scheduled EDR Contact: 02/09/2015
	Data Release Frequency: Varies

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 11/03/2014	Source: Department of Toxic Substances Control
Date Data Arrived at EDR: 11/04/2014	Telephone: 916-323-3400
Date Made Active in Reports: 12/12/2014	Last EDR Contact: 11/04/2014
Number of Days to Update: 38	Next Scheduled EDR Contact: 02/16/2015
	Data Release Frequency: Quarterly

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 10/15/2014
Date Made Active in Reports: 11/19/2014
Number of Days to Update: 35

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 01/16/2015
Next Scheduled EDR Contact: 04/27/2015
Data Release Frequency: Annually

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 03/25/2014
Date Made Active in Reports: 04/28/2014
Number of Days to Update: 34

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 12/24/2014
Next Scheduled EDR Contact: 04/06/2015
Data Release Frequency: Varies

HAULERS: Registered Waste Tire Haulers Listing

A listing of registered waste tire haulers.

Date of Government Version: 09/08/2014
Date Data Arrived at EDR: 09/09/2014
Date Made Active in Reports: 10/22/2014
Number of Days to Update: 43

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 11/12/2014
Next Scheduled EDR Contact: 03/02/2015
Data Release Frequency: Varies

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control’s (DTSC’s) Site Mitigation and Brownfields Reuse Program’s (SMBRP’s) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 11/03/2014
Date Data Arrived at EDR: 11/04/2014
Date Made Active in Reports: 12/12/2014
Number of Days to Update: 38

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 11/04/2014
Next Scheduled EDR Contact: 02/16/2015
Data Release Frequency: Quarterly

MWMP: Medical Waste Management Program Listing

The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 08/20/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/23/2014
Number of Days to Update: 43

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 12/09/2014
Next Scheduled EDR Contact: 03/23/2015
Data Release Frequency: Varies

HWT: Registered Hazardous Waste Transporter Database

A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 10/14/2014
Date Data Arrived at EDR: 10/15/2014
Date Made Active in Reports: 11/19/2014
Number of Days to Update: 35

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 01/13/2015
Next Scheduled EDR Contact: 04/27/2015
Data Release Frequency: Quarterly

HWP: EnviroStor Permitted Facilities Listing

Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 11/24/2014
Date Data Arrived at EDR: 11/25/2014
Date Made Active in Reports: 12/30/2014
Number of Days to Update: 35

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 11/25/2014
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Quarterly

PROC: Certified Processors Database

A listing of certified processors.

Date of Government Version: 09/16/2014
Date Data Arrived at EDR: 09/17/2014
Date Made Active in Reports: 10/23/2014
Number of Days to Update: 36

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 12/15/2014
Next Scheduled EDR Contact: 03/30/2015
Data Release Frequency: Quarterly

WMUDS/SWAT: Waste Management Unit Database

Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 11/05/2014
Next Scheduled EDR Contact: 02/23/2015
Data Release Frequency: No Update Planned

TRIBAL RECORDS

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 01/15/2015
Next Scheduled EDR Contact: 04/27/2015
Data Release Frequency: Semi-Annually

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands

Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 10/29/2014
Next Scheduled EDR Contact: 02/16/2015
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 03/01/2013
Date Data Arrived at EDR: 03/01/2013
Date Made Active in Reports: 04/12/2013
Number of Days to Update: 42

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 12/09/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Quarterly

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 11/04/2014	Source: EPA Region 8
Date Data Arrived at EDR: 11/07/2014	Telephone: 303-312-6271
Date Made Active in Reports: 11/17/2014	Last EDR Contact: 10/27/2014
Number of Days to Update: 10	Next Scheduled EDR Contact: 02/09/2015
	Data Release Frequency: Quarterly

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 02/01/2013	Source: EPA Region 1
Date Data Arrived at EDR: 05/01/2013	Telephone: 617-918-1313
Date Made Active in Reports: 11/01/2013	Last EDR Contact: 10/31/2014
Number of Days to Update: 184	Next Scheduled EDR Contact: 02/09/2015
	Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 10/06/2014	Source: EPA Region 6
Date Data Arrived at EDR: 10/29/2014	Telephone: 214-665-6597
Date Made Active in Reports: 11/17/2014	Last EDR Contact: 10/27/2014
Number of Days to Update: 19	Next Scheduled EDR Contact: 02/09/2015
	Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 07/30/2014	Source: EPA Region 4
Date Data Arrived at EDR: 08/12/2014	Telephone: 404-562-8677
Date Made Active in Reports: 08/22/2014	Last EDR Contact: 10/27/2014
Number of Days to Update: 10	Next Scheduled EDR Contact: 02/09/2015
	Data Release Frequency: Semi-Annually

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 05/20/2014	Source: EPA Region 10
Date Data Arrived at EDR: 06/10/2014	Telephone: 206-553-2857
Date Made Active in Reports: 08/22/2014	Last EDR Contact: 10/27/2014
Number of Days to Update: 73	Next Scheduled EDR Contact: 02/09/2015
	Data Release Frequency: Quarterly

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 11/03/2014	Source: EPA, Region 5
Date Data Arrived at EDR: 11/05/2014	Telephone: 312-886-7439
Date Made Active in Reports: 11/17/2014	Last EDR Contact: 10/27/2014
Number of Days to Update: 12	Next Scheduled EDR Contact: 02/09/2015
	Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 05/22/2014	Source: EPA Region 7
Date Data Arrived at EDR: 08/22/2014	Telephone: 913-551-7003
Date Made Active in Reports: 09/18/2014	Last EDR Contact: 10/27/2014
Number of Days to Update: 27	Next Scheduled EDR Contact: 02/09/2015
	Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 02/01/2013
Date Data Arrived at EDR: 05/01/2013
Date Made Active in Reports: 01/27/2014
Number of Days to Update: 271

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 10/31/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 07/30/2014
Date Data Arrived at EDR: 08/12/2014
Date Made Active in Reports: 08/22/2014
Number of Days to Update: 10

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Semi-Annually

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 11/03/2014
Date Data Arrived at EDR: 11/05/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 12

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 10/06/2014
Date Data Arrived at EDR: 10/29/2014
Date Made Active in Reports: 11/06/2014
Number of Days to Update: 8

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Semi-Annually

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 08/20/2014
Date Data Arrived at EDR: 08/22/2014
Date Made Active in Reports: 09/18/2014
Number of Days to Update: 27

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 11/04/2014
Date Data Arrived at EDR: 11/07/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 10

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Quarterly

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 08/14/2014	Source: EPA Region 9
Date Data Arrived at EDR: 08/15/2014	Telephone: 415-972-3368
Date Made Active in Reports: 08/22/2014	Last EDR Contact: 10/27/2014
Number of Days to Update: 7	Next Scheduled EDR Contact: 02/09/2015
	Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 05/20/2014	Source: EPA Region 10
Date Data Arrived at EDR: 06/10/2014	Telephone: 206-553-2857
Date Made Active in Reports: 08/15/2014	Last EDR Contact: 10/27/2014
Number of Days to Update: 66	Next Scheduled EDR Contact: 02/09/2015
	Data Release Frequency: Quarterly

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 09/29/2014	Source: EPA, Region 1
Date Data Arrived at EDR: 10/01/2014	Telephone: 617-918-1102
Date Made Active in Reports: 11/06/2014	Last EDR Contact: 12/31/2014
Number of Days to Update: 36	Next Scheduled EDR Contact: 04/13/2015
	Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008	Source: EPA, Region 7
Date Data Arrived at EDR: 04/22/2008	Telephone: 913-551-7365
Date Made Active in Reports: 05/19/2008	Last EDR Contact: 04/20/2009
Number of Days to Update: 27	Next Scheduled EDR Contact: 07/20/2009
	Data Release Frequency: Varies

EDR PROPRIETARY RECORDS

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A	Source: EDR, Inc.
Date Data Arrived at EDR: N/A	Telephone: N/A
Date Made Active in Reports: N/A	Last EDR Contact: N/A
Number of Days to Update: N/A	Next Scheduled EDR Contact: N/A
	Data Release Frequency: No Update Planned

EDR US Hist Auto Stat: EDR Exclusive Historic Gas Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR US Hist Cleaners: EDR Exclusive Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR’s review was limited to those categories of sources that might, in EDR’s opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR’s HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Resources Recycling and Recovery in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Department of Resources Recycling and Recovery
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the State Water Resources Control Board in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

COUNTY RECORDS

ALAMEDA COUNTY:

Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 10/21/2014
Date Data Arrived at EDR: 11/07/2014
Date Made Active in Reports: 12/12/2014
Number of Days to Update: 35

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 12/29/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Semi-Annually

Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 10/21/2014
Date Data Arrived at EDR: 11/07/2014
Date Made Active in Reports: 12/15/2014
Number of Days to Update: 38

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 12/29/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA Facility List

Cupa Facility List

Date of Government Version: 09/08/2014
Date Data Arrived at EDR: 09/09/2014
Date Made Active in Reports: 09/24/2014
Number of Days to Update: 15

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 12/05/2014
Next Scheduled EDR Contact: 03/23/2015
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA Facility Listing

Cupa facility list.

Date of Government Version: 11/20/2014
Date Data Arrived at EDR: 11/24/2014
Date Made Active in Reports: 01/07/2015
Number of Days to Update: 44

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 01/12/2015
Next Scheduled EDR Contact: 04/27/2015
Data Release Frequency: No Update Planned

CALVERAS COUNTY:

CUPA Facility Listing

Cupa Facility Listing

Date of Government Version: 10/06/2014
Date Data Arrived at EDR: 10/07/2014
Date Made Active in Reports: 11/19/2014
Number of Days to Update: 43

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 01/12/2015
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA Facility List

Cupa facility list.

Date of Government Version: 06/11/2014
Date Data Arrived at EDR: 06/13/2014
Date Made Active in Reports: 07/07/2014
Number of Days to Update: 24

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 11/07/2014
Next Scheduled EDR Contact: 02/23/2015
Data Release Frequency: Varies

CONTRA COSTA COUNTY:

Site List

List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 11/17/2014
Date Data Arrived at EDR: 11/19/2014
Date Made Active in Reports: 01/06/2015
Number of Days to Update: 48

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 11/03/2014
Next Scheduled EDR Contact: 02/16/2015
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA Facility List

Cupa Facility list

Date of Government Version: 11/03/2014
Date Data Arrived at EDR: 11/04/2014
Date Made Active in Reports: 12/12/2014
Number of Days to Update: 38

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 11/03/2014
Next Scheduled EDR Contact: 02/16/2015
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA Facility List

CUPA facility list.

Date of Government Version: 11/19/2014
Date Data Arrived at EDR: 11/21/2014
Date Made Active in Reports: 12/29/2014
Number of Days to Update: 38

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 11/03/2014
Next Scheduled EDR Contact: 02/16/2015
Data Release Frequency: Varies

FRESNO COUNTY:

CUPA Resources List

Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 09/30/2014
Date Data Arrived at EDR: 10/14/2014
Date Made Active in Reports: 11/19/2014
Number of Days to Update: 36

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 01/05/2015
Next Scheduled EDR Contact: 04/20/2015
Data Release Frequency: Semi-Annually

HUMBOLDT COUNTY:

CUPA Facility List

CUPA facility list.

Date of Government Version: 09/10/2014
Date Data Arrived at EDR: 09/11/2014
Date Made Active in Reports: 09/25/2014
Number of Days to Update: 14

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 11/26/2014
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Varies

IMPERIAL COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 11/03/2014
Date Data Arrived at EDR: 11/04/2014
Date Made Active in Reports: 12/12/2014
Number of Days to Update: 38

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Varies

INYO COUNTY:

CUPA Facility List
Cupa facility list.

Date of Government Version: 09/10/2013
Date Data Arrived at EDR: 09/11/2013
Date Made Active in Reports: 10/14/2013
Number of Days to Update: 33

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 11/19/2014
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Varies

KERN COUNTY:

Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 07/22/2014
Date Data Arrived at EDR: 11/12/2014
Date Made Active in Reports: 12/19/2014
Number of Days to Update: 37

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 11/05/2014
Next Scheduled EDR Contact: 02/23/2015
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA Facility List
A listing of sites included in the county’s Certified Unified Program Agency database. California’s Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 11/21/2014
Date Data Arrived at EDR: 11/25/2014
Date Made Active in Reports: 12/30/2014
Number of Days to Update: 35

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 11/21/2014
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Varies

LAKE COUNTY:

CUPA Facility List
Cupa facility list

Date of Government Version: 10/20/2014
Date Data Arrived at EDR: 10/21/2014
Date Made Active in Reports: 01/05/2015
Number of Days to Update: 76

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 01/19/2015
Next Scheduled EDR Contact: 05/04/2015
Data Release Frequency: Varies

LOS ANGELES COUNTY:

San Gabriel Valley Areas of Concern

San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office.

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206

Source: EPA Region 9
Telephone: 415-972-3178
Last EDR Contact: 12/18/2014
Next Scheduled EDR Contact: 04/06/2015
Data Release Frequency: No Update Planned

HMS: Street Number List

Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 03/31/2014
Date Data Arrived at EDR: 06/06/2014
Date Made Active in Reports: 07/17/2014
Number of Days to Update: 41

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 01/12/2015
Next Scheduled EDR Contact: 04/27/2015
Data Release Frequency: Semi-Annually

List of Solid Waste Facilities

Solid Waste Facilities in Los Angeles County.

Date of Government Version: 10/20/2014
Date Data Arrived at EDR: 10/22/2014
Date Made Active in Reports: 12/12/2014
Number of Days to Update: 51

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 01/20/2015
Next Scheduled EDR Contact: 05/04/2015
Data Release Frequency: Varies

City of Los Angeles Landfills

Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 03/05/2009
Date Data Arrived at EDR: 03/10/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 29

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 01/19/2015
Next Scheduled EDR Contact: 05/04/2015
Data Release Frequency: Varies

Site Mitigation List

Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 01/07/2014
Date Data Arrived at EDR: 02/25/2014
Date Made Active in Reports: 03/25/2014
Number of Days to Update: 28

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 01/19/2015
Next Scheduled EDR Contact: 05/04/2015
Data Release Frequency: Annually

City of El Segundo Underground Storage Tank

Underground storage tank sites located in El Segundo city.

Date of Government Version: 10/20/2014
Date Data Arrived at EDR: 10/22/2014
Date Made Active in Reports: 12/15/2014
Number of Days to Update: 54

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 01/19/2015
Next Scheduled EDR Contact: 05/04/2015
Data Release Frequency: Semi-Annually

City of Long Beach Underground Storage Tank

Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 07/28/2014
Date Data Arrived at EDR: 07/28/2014
Date Made Active in Reports: 08/20/2014
Number of Days to Update: 23

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Annually

City of Torrance Underground Storage Tank

Underground storage tank sites located in the city of Torrance.

Date of Government Version: 01/13/2014
Date Data Arrived at EDR: 03/27/2014
Date Made Active in Reports: 04/28/2014
Number of Days to Update: 32

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 01/12/2015
Next Scheduled EDR Contact: 04/27/2015
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA Facility List

A listing of sites included in the county’s Certified Unified Program Agency database. California’s Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 10/02/2014
Date Data Arrived at EDR: 10/03/2014
Date Made Active in Reports: 11/20/2014
Number of Days to Update: 48

Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 11/26/2014
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Varies

MARIN COUNTY:

Underground Storage Tank Sites

Currently permitted USTs in Marin County.

Date of Government Version: 10/08/2014
Date Data Arrived at EDR: 10/22/2014
Date Made Active in Reports: 12/15/2014
Number of Days to Update: 54

Source: Public Works Department Waste Management
Telephone: 415-499-6647
Last EDR Contact: 01/05/2015
Next Scheduled EDR Contact: 04/20/2015
Data Release Frequency: Semi-Annually

MERCED COUNTY:

CUPA Facility List

CUPA facility list.

Date of Government Version: 11/25/2014
Date Data Arrived at EDR: 11/26/2014
Date Made Active in Reports: 12/29/2014
Number of Days to Update: 33

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 11/21/2014
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Varies

MONO COUNTY:

CUPA Facility List

CUPA Facility List

Date of Government Version: 09/02/2014
Date Data Arrived at EDR: 09/05/2014
Date Made Active in Reports: 09/24/2014
Number of Days to Update: 19

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 11/26/2014
Next Scheduled EDR Contact: 03/16/2015
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA Facility Listing

CUPA Program listing from the Environmental Health Division.

Date of Government Version: 06/09/2014
Date Data Arrived at EDR: 06/11/2014
Date Made Active in Reports: 07/09/2014
Number of Days to Update: 28

Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 11/26/2014
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Varies

NAPA COUNTY:

Sites With Reported Contamination

A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 12/05/2011
Date Data Arrived at EDR: 12/06/2011
Date Made Active in Reports: 02/07/2012
Number of Days to Update: 63

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 11/25/2014
Next Scheduled EDR Contact: 03/16/2015
Data Release Frequency: No Update Planned

Closed and Operating Underground Storage Tank Sites

Underground storage tank sites located in Napa county.

Date of Government Version: 01/15/2008
Date Data Arrived at EDR: 01/16/2008
Date Made Active in Reports: 02/08/2008
Number of Days to Update: 23

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 11/25/2014
Next Scheduled EDR Contact: 03/16/2015
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA Facility List

CUPA facility list.

Date of Government Version: 09/16/2014
Date Data Arrived at EDR: 09/18/2014
Date Made Active in Reports: 09/25/2014
Number of Days to Update: 7

Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 12/15/2014
Next Scheduled EDR Contact: 02/16/2015
Data Release Frequency: Varies

ORANGE COUNTY:

List of Industrial Site Cleanups

Petroleum and non-petroleum spills.

Date of Government Version: 11/01/2014
Date Data Arrived at EDR: 11/12/2014
Date Made Active in Reports: 12/12/2014
Number of Days to Update: 30

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 11/05/2014
Next Scheduled EDR Contact: 02/23/2015
Data Release Frequency: Annually

List of Underground Storage Tank Cleanups

Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 11/01/2014
Date Data Arrived at EDR: 11/12/2014
Date Made Active in Reports: 12/12/2014
Number of Days to Update: 30

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 11/05/2014
Next Scheduled EDR Contact: 02/23/2015
Data Release Frequency: Quarterly

List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 11/01/2014	Source: Health Care Agency
Date Data Arrived at EDR: 11/10/2014	Telephone: 714-834-3446
Date Made Active in Reports: 12/15/2014	Last EDR Contact: 11/10/2014
Number of Days to Update: 35	Next Scheduled EDR Contact: 02/23/2015
	Data Release Frequency: Quarterly

PLACER COUNTY:

Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 09/22/2014	Source: Placer County Health and Human Services
Date Data Arrived at EDR: 09/23/2014	Telephone: 530-745-2363
Date Made Active in Reports: 11/21/2014	Last EDR Contact: 12/05/2014
Number of Days to Update: 59	Next Scheduled EDR Contact: 03/23/2015
	Data Release Frequency: Semi-Annually

RIVERSIDE COUNTY:

Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 10/08/2014	Source: Department of Environmental Health
Date Data Arrived at EDR: 10/10/2014	Telephone: 951-358-5055
Date Made Active in Reports: 11/20/2014	Last EDR Contact: 12/22/2014
Number of Days to Update: 41	Next Scheduled EDR Contact: 01/05/2015
	Data Release Frequency: Quarterly

Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 10/08/2014	Source: Department of Environmental Health
Date Data Arrived at EDR: 10/10/2014	Telephone: 951-358-5055
Date Made Active in Reports: 11/25/2014	Last EDR Contact: 12/22/2014
Number of Days to Update: 46	Next Scheduled EDR Contact: 04/06/2015
	Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 02/06/2014	Source: Sacramento County Environmental Management
Date Data Arrived at EDR: 04/08/2014	Telephone: 916-875-8406
Date Made Active in Reports: 04/29/2014	Last EDR Contact: 01/07/2015
Number of Days to Update: 21	Next Scheduled EDR Contact: 04/20/2015
	Data Release Frequency: Quarterly

Master Hazardous Materials Facility List
Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 10/21/2014	Source: Sacramento County Environmental Management
Date Data Arrived at EDR: 10/28/2014	Telephone: 916-875-8406
Date Made Active in Reports: 12/15/2014	Last EDR Contact: 01/05/2015
Number of Days to Update: 48	Next Scheduled EDR Contact: 04/20/2015
	Data Release Frequency: Quarterly

SAN BERNARDINO COUNTY:

Hazardous Material Permits

This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 08/06/2014
Date Data Arrived at EDR: 08/07/2014
Date Made Active in Reports: 09/30/2014
Number of Days to Update: 54

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 11/10/2014
Next Scheduled EDR Contact: 02/23/2015
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 09/23/2013
Date Data Arrived at EDR: 09/24/2013
Date Made Active in Reports: 10/17/2013
Number of Days to Update: 23

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 12/04/2014
Next Scheduled EDR Contact: 03/23/2015
Data Release Frequency: Quarterly

Solid Waste Facilities

San Diego County Solid Waste Facilities.

Date of Government Version: 10/31/2014
Date Data Arrived at EDR: 11/21/2014
Date Made Active in Reports: 12/29/2014
Number of Days to Update: 38

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Varies

Environmental Case Listing

The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 12/04/2014
Next Scheduled EDR Contact: 03/23/2015
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

Local Oversite Facilities

A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 11/05/2014
Next Scheduled EDR Contact: 02/23/2015
Data Release Frequency: Quarterly

Underground Storage Tank Information

Underground storage tank sites located in San Francisco county.

Date of Government Version: 11/29/2010
Date Data Arrived at EDR: 03/10/2011
Date Made Active in Reports: 03/15/2011
Number of Days to Update: 5

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 11/05/2014
Next Scheduled EDR Contact: 02/23/2015
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

San Joaquin Co. UST

A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 06/20/2014
Date Data Arrived at EDR: 06/23/2014
Date Made Active in Reports: 07/11/2014
Number of Days to Update: 18

Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 01/05/2015
Next Scheduled EDR Contact: 04/06/2015
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA Facility List

Cupa Facility List.

Date of Government Version: 11/21/2014
Date Data Arrived at EDR: 11/24/2014
Date Made Active in Reports: 12/30/2014
Number of Days to Update: 36

Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 11/21/2014
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Varies

SAN MATEO COUNTY:

Business Inventory

List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 10/06/2014
Date Data Arrived at EDR: 10/10/2014
Date Made Active in Reports: 11/19/2014
Number of Days to Update: 40

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 12/15/2014
Next Scheduled EDR Contact: 03/30/2015
Data Release Frequency: Annually

Fuel Leak List

A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 09/15/2014
Date Data Arrived at EDR: 09/16/2014
Date Made Active in Reports: 10/22/2014
Number of Days to Update: 36

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 12/11/2014
Next Scheduled EDR Contact: 03/30/2015
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA Facility Listing

CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28

Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 11/19/2014
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Varies

SANTA CLARA COUNTY:

Cupa Facility List

Cupa facility list

Date of Government Version: 11/25/2014
Date Data Arrived at EDR: 11/26/2014
Date Made Active in Reports: 12/30/2014
Number of Days to Update: 34

Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 11/21/2014
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Varies

HIST LUST - Fuel Leak Site Activity Report

A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LOP Listing

A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 03/03/2014
Date Data Arrived at EDR: 03/05/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 13

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 11/25/2014
Next Scheduled EDR Contact: 03/16/2015
Data Release Frequency: Annually

Hazardous Material Facilities

Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 11/10/2014
Date Data Arrived at EDR: 11/10/2014
Date Made Active in Reports: 12/15/2014
Number of Days to Update: 35

Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 11/07/2014
Next Scheduled EDR Contact: 02/23/2015
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA Facility List

CUPA facility listing.

Date of Government Version: 11/24/2014
Date Data Arrived at EDR: 11/25/2014
Date Made Active in Reports: 12/31/2014
Number of Days to Update: 36

Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 11/21/2014
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA Facility List

Cupa Facility List.

Date of Government Version: 09/16/2014
Date Data Arrived at EDR: 09/18/2014
Date Made Active in Reports: 10/22/2014
Number of Days to Update: 34

Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 11/26/2014
Next Scheduled EDR Contact: 03/09/2015
Data Release Frequency: Varies

SOLANO COUNTY:

Leaking Underground Storage Tanks

A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 11/17/2014
Date Data Arrived at EDR: 11/24/2014
Date Made Active in Reports: 01/05/2015
Number of Days to Update: 42

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 12/11/2014
Next Scheduled EDR Contact: 03/30/2015
Data Release Frequency: Quarterly

Underground Storage Tanks

Underground storage tank sites located in Solano county.

Date of Government Version: 06/19/2014
Date Data Arrived at EDR: 06/26/2014
Date Made Active in Reports: 07/25/2014
Number of Days to Update: 29

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 12/11/2014
Next Scheduled EDR Contact: 03/30/2015
Data Release Frequency: Quarterly

SONOMA COUNTY:

Cupa Facility List

Cupa Facility list

Date of Government Version: 09/30/2014
Date Data Arrived at EDR: 10/02/2014
Date Made Active in Reports: 11/20/2014
Number of Days to Update: 49

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 12/29/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Varies

Leaking Underground Storage Tank Sites

A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 10/01/2014
Date Data Arrived at EDR: 10/03/2014
Date Made Active in Reports: 11/20/2014
Number of Days to Update: 48

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 12/29/2014
Next Scheduled EDR Contact: 04/13/2015
Data Release Frequency: Quarterly

SUTTER COUNTY:

Underground Storage Tanks

Underground storage tank sites located in Sutter county.

Date of Government Version: 09/08/2014
Date Data Arrived at EDR: 09/09/2014
Date Made Active in Reports: 10/24/2014
Number of Days to Update: 45

Source: Sutter County Department of Agriculture
Telephone: 530-822-7500
Last EDR Contact: 12/05/2014
Next Scheduled EDR Contact: 03/23/2015
Data Release Frequency: Semi-Annually

TUOLUMNE COUNTY:

CUPA Facility List

Cupa facility list

Date of Government Version: 10/28/2014
Date Data Arrived at EDR: 10/29/2014
Date Made Active in Reports: 12/12/2014
Number of Days to Update: 44

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Varies

VENTURA COUNTY:

Business Plan, Hazardous Waste Producers, and Operating Underground Tanks

The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 10/29/2014
Date Data Arrived at EDR: 11/24/2014
Date Made Active in Reports: 12/29/2014
Number of Days to Update: 35

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 11/17/2014
Next Scheduled EDR Contact: 03/02/2015
Data Release Frequency: Quarterly

Inventory of Illegal Abandoned and Inactive Sites

Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 12/01/2011
Date Data Arrived at EDR: 12/01/2011
Date Made Active in Reports: 01/19/2012
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 01/05/2015
Next Scheduled EDR Contact: 04/20/2015
Data Release Frequency: Annually

Listing of Underground Tank Cleanup Sites

Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 11/17/2014
Next Scheduled EDR Contact: 03/02/2015
Data Release Frequency: Quarterly

Medical Waste Program List

To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 09/26/2014
Date Data Arrived at EDR: 10/29/2014
Date Made Active in Reports: 12/12/2014
Number of Days to Update: 44

Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 10/27/2014
Next Scheduled EDR Contact: 02/09/2015
Data Release Frequency: Quarterly

Underground Tank Closed Sites List

Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 08/26/2014
Date Data Arrived at EDR: 09/17/2014
Date Made Active in Reports: 10/28/2014
Number of Days to Update: 41

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 12/15/2014
Next Scheduled EDR Contact: 03/30/2015
Data Release Frequency: Quarterly

YOLO COUNTY:

Underground Storage Tank Comprehensive Facility Report
Underground storage tank sites located in Yolo county.

Date of Government Version: 09/23/2014	Source: Yolo County Department of Health
Date Data Arrived at EDR: 09/30/2014	Telephone: 530-666-8646
Date Made Active in Reports: 11/25/2014	Last EDR Contact: 12/18/2014
Number of Days to Update: 56	Next Scheduled EDR Contact: 04/06/2015
	Data Release Frequency: Annually

YUBA COUNTY:

CUPA Facility List
CUPA facility listing for Yuba County.

Date of Government Version: 11/17/2014	Source: Yuba County Environmental Health Department
Date Data Arrived at EDR: 11/18/2014	Telephone: 530-749-7523
Date Made Active in Reports: 12/30/2014	Last EDR Contact: 11/17/2014
Number of Days to Update: 42	Next Scheduled EDR Contact: 02/16/2015
	Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 07/30/2013	Source: Department of Energy & Environmental Protection
Date Data Arrived at EDR: 08/19/2013	Telephone: 860-424-3375
Date Made Active in Reports: 10/03/2013	Last EDR Contact: 11/17/2014
Number of Days to Update: 45	Next Scheduled EDR Contact: 03/02/2015
	Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2011	Source: Department of Environmental Protection
Date Data Arrived at EDR: 07/19/2012	Telephone: N/A
Date Made Active in Reports: 08/28/2012	Last EDR Contact: 01/12/2015
Number of Days to Update: 40	Next Scheduled EDR Contact: 04/27/2015
	Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 11/01/2014	Source: Department of Environmental Conservation
Date Data Arrived at EDR: 11/05/2014	Telephone: 518-402-8651
Date Made Active in Reports: 11/24/2014	Last EDR Contact: 11/05/2014
Number of Days to Update: 19	Next Scheduled EDR Contact: 02/16/2015
	Data Release Frequency: Annually

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2013	Source: Department of Environmental Protection
Date Data Arrived at EDR: 07/21/2014	Telephone: 717-783-8990
Date Made Active in Reports: 08/25/2014	Last EDR Contact: 01/19/2015
Number of Days to Update: 35	Next Scheduled EDR Contact: 05/04/2015
	Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2013	Source: Department of Environmental Management
Date Data Arrived at EDR: 07/15/2014	Telephone: 401-222-2797
Date Made Active in Reports: 08/13/2014	Last EDR Contact: 11/26/2014
Number of Days to Update: 29	Next Scheduled EDR Contact: 03/09/2015
	Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2013	Source: Department of Natural Resources
Date Data Arrived at EDR: 06/20/2014	Telephone: N/A
Date Made Active in Reports: 08/07/2014	Last EDR Contact: 12/12/2014
Number of Days to Update: 48	Next Scheduled EDR Contact: 03/30/2015
	Data Release Frequency: Annually

Oil/Gas Pipelines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association’s annual survey of hospitals.
Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.
Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.
Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics’ primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.
Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics’ primary database on private school locations in the United States.
Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

California Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines, prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

STREET AND ADDRESS INFORMATION

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APPENDIX E
NETR ENVIRONMENTAL LIEN SEARCH REPORT

netr
Real Estate Research
& Information
NETROnline.com

The NETR Environmental Lien Search Report

FIRST SOLAR DESERT QUARTZITE SOLAR PROJECT
RIVERSIDE COUNTY, CALIFORNIA

2055 East Rio Salado Parkway
Tempe, Arizona 85281

Monday, December 15, 2014

Project Number: L14-02666

Telephone: 480-967-6752
Fax: 480-966-9422

ENVIRONMENTAL LIEN REPORT

The NETR Environmental LienSearch Report provides results from a search of available current land title records for environmental cleanup liens and other activity and use limitations, such as engineering controls and institutional controls.

A network of professional, trained researchers, following established procedures, uses client supplied property information to:

- search for parcel information and/or legal description;
- search for ownership information;
- research official land title documents recorded at jurisdictional agencies such as recorders' office, registries of deed, county clerks' offices, etc.;
- access a copy of the deed;
- search for environmental encumbering instrument(s) associated with the deed;
- provide a copy of any environmental encumbrance(s) based upon a review of key words in the instrument(s) (title, parties involved and description); and
- provide a copy of the deed or cite documents reviewed;

Thank you for your business
Please contact NETR at 480-967-6752
with any questions or comments

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ENVIRONMENTAL LIEN REPORT

The NETR Environmental Lien Search Report is intended to assist in the search for environmental liens filed in land title records.

TARGET PROPERTY INFORMATION

ADDRESS

First Solar Desert Quartzite Solar Project
Riverside County, California

RESEARCH SOURCE

Source: Riverside County Assessor
Riverside County Recorder

DEED INFORMATION

Type of Instrument: Corporation Grant Deed

Grantor: N. R. L. L., Inc., a California corporation

Grantee: Ayuan K. Chao and Hsien C. Chao

Deed Dated: 12/11/1998
Deed Recorded: 01/04/1999
Instrument: 2011

Type of Instrument: Grant Deed

Grantor: Hsien Chang Chao, who acquired title in error as Chao Hsien Chang & Ayuan Kao Chao, husband and wife, as to Parcel A; and Hsien C. Chao & Ayuan K. Chao, husband and wife, as to Parcel B

Grantee: Yuan-Jiun Nicole Chao, a single woman

Deed Dated: 12/26/2012
Deed Recorded: 01/09/2013
Instrument: 2013-0013993

Type of Instrument: Grant Deed

Grantor: Yuan-Jiun Nicole Chao, a single woman

Grantee: A.Yuan Kao Chao, a married woman as her sole and separate property

Deed Dated: 10/22/2014
Deed Recorded: 01/30/2014
Instrument: 2014-0412871

LEGAL DESCRIPTION

The Northeast Quarter of Section 15, Township 7 South, Range 21 East of the San Bernardino Principal Meridian, Riverside County, State of California

ENVIRONMENTAL LIEN REPORT

Assessor's Parcel Number(s): 879-110-001-3

ENVIRONMENTAL LIEN

Environmental Lien: Found ☐ Not Found ☒

OTHER ACTIVITY AND USE LIMITATIONS (AULs)

Other AULs: Found ☐ Not Found ☒

RECORDED AT THEREQUEST OF:

N.R.L.L., INC.

ITEM t 38-112

WHEN RECORDED MAIL TO:
MAIL FUTURE TAX STATEMENTS TO:

Ayuan Chao
21725 Harjorio Avenue
Torrance, CA 90503

002011

RECEIVED FOR REOORD
AT8:00AM

JAN -41999

PAID
Doc.Tranarsrrair
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CORPORATION GRANT D ED

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DOCUMENTARY TRANSFER TAX.COMPUTED ONFULL VALUE OF PROPERTY CONVEYED •,.2c.05
I8JUNINCORPORATED AREA· OR·0 CITY OF
AND FOR VALUABLE CONSIDERATION,RECEIPT OF WHICHIS HEREBY ACKNOWLEDGED,
N.R,L,L,, INC., A CALIFORNIA CORPORATION
A CORPORATION ORGANIZED UNDER THE LAWS OF THE STATE Of CALIFORNIA, HEREBY GRANTS TO
Ayuan X. Chao and Beien C, Chao

1'HE FOLLOWING DESCRIBED REAL PR01>£RTY IN THE COUNTY OF B.l.ve i:si da ,
STATE OF Cali.fornia

THE NORTHEAST QUARTER OF SECTION 15, TOIINSHIP 7 SOUTH, RANGE 21 EAST, SAN BERNARDINO BASE ANO MERIDIAN. (OlUNCORPOIU\TEO)
APN: 879-110-001

DATED 12-11-98

N.R.L.L., INC.,
A CALIFORNIA CORPORATION

BY
ROBERT D. FRIEDMAN, PRESIDENT

BY
CRETARY

STATE OF CALIFO!UTTA SS .
COUNTY Of Qoa<.:.::RANG=E=------

ON21J,9t, BEFORE ME :l:."-f --l CJ. LA"Y -PUBUC,
PERSONALLY APPEARED ROBERT D. FRIEDMAN PRESIDENT JEFFRE P. FRIEDEN SECRETARY
[XI PERSONALLY KNOWN TO ME - OR - I I PROVED TO ME ON THE BASIS OF SATISFACTORY EVIDENCE TO 13E THEPERSONISI WHOSE NAMEISI IS/ARE SUBSCRIBED TO THE WITHIN INSTRUMENT AND ACKNOWLEDGED TO ME 1"1-iAT HE/SHE/fHEY EXECUTED THE SAME IN HIS/HER/THEIR AUTHORIZED CAI'ACITYUESI ANO THAT BY HIS/HER/THEIR SIGNATUREISI ON THE INSTRUMENT THE PERSONISI, OR THE ENTITY UPON BEHALF OF WHICH THEPERSONISI ACTED, EXECUTED THEINSTRUMENT.

WITNESS MY HAND ANOOFFICIAL SEAL

SUZANNE K. BAKER
COMM. #1196540
NOTARY PUBLIC-CALIFORNIA
ORANGE COUNTY
My Comm. Expires SEPT 19, 2002

RIVERSIDE

DOC# 2013-0013993
01/09/2013 02:07P Fee:28.00
Page 1 of 2
Recorded in Official Records
County of Riverside
Larry W. Ward
Assessor, County Clerk & Recorder

29.50

RECORDING REQUESTED BY

DocStar Services, LLC

AND WHEN RECORDED MAIL THIS DEED AND, UNLESS OTHERWISE SHOWN BELOW, MAIL TAX S TATEMEN T TO·

Name Yuan-Jiun Nicole Chao
s1reet 3902 Miller Way
Address Sacramento, CA 95817

City&
State
Zip

Title Order No. 4921-CJC Escrow No. NIA

S	R	U	PAGE	SIZE	DA	MISC	LONG	RFD	COPY
M	A	L							

SPACE ABOVE THIS LINE **FOR RECORDER'S** USE

Grant Deed

C
512

THE UNDERSIGNED GRANTOR (S) DECLARE (S)

DOCUMENTARY TRANSFER **TAX** IS$ 0.00, No Sale

☒ unincorporated area ☐ City of

Parcel No. 879-110-001-3 & 812-200-017-9

☐ computed on full value of interest or property conveyed, or

☐ computed on full value less value of liens or encumbrances remaining at time of sale, and

FOR A VALUABLE CONSIDERATION, receipt of which is hereby acknowledged,

Hsien Chang Chao (who acquired title in error as Chao Hsien Chang) and Ayuan Kao Chao, Husband and Wife as to Parcel B below; and Hsien C. Chao and Ayuan K. Chao, Husband and Wife as to Parcel A below

hereby GRANT(S) to

Yuan-Jiun Nicole Chao, a Single Woman

the following described real property in the Unincorporated Area

county of Riverside , state of California

See Exhibit "A" Attached hereto and made part hereof for a complete list of Legal Descriptions referred to herein as Parcels A and B

Commonly Known As: Vacant Land

Dated December 26, 2012

Hsien Chang Chao, also known as Hsien C. Chao

Ayuan Kao Chao, also known as Ayuan K. Chao

STATE OF CALIFORNIA
COUNTY OF San Bernardino

On January 8, 2013 before me,

J. Torres, Notary Public

(here insert name and tiUe of the officer)

. personally appeared Hsien Chang Chao and Ayuan Kao Chao

who proved to me on the a · satisfactory evidence to be the person(Sj,whose name(s) i are bscri the within instrument and a edged tome he/she ecuted the sa his/he authorized capacity(ies). and that by his/he signa s) on the instrument the person(s), or the *entity* upon behalf of which the person(s) acted. executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the stale of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature

HDL1
J. TORRES
COMM. #1953626
NOTARY PUBLIC - CALIFORNIA
SAN BERNARDINO COUNTY
My Comm. Expires Sept. 24, 2015
HDL1

(This area tor official notartal Mal)

MAIL TAX STAT MENTS TO PARTY SHOWN ON FOLLOWING LINE; IF NO PARTY SHOWN, MAIL AS DIRECTED ABOVE

Same as Above

Name Street Address Cily & State

Exhibit "A"

Parcel A: (APN: 879-110-001-3)

The Northeast Quarter of Section 15, Township 7 South, Range 21 East, San Bernardino Base and Meridian, (Unincorporated)

Common ly Known As: Vacant Land

Parcel B: (**APN: 812-200-017-9)**

The North ½ of the Southeast ¼ of the Northwest ¼ of the Southwest ¼ of the Southwest¼ Section 15, Township 5 South, Range 22 East, San Bernardino Base and Meridian, in the County of Riverside, State of California, according to the Official Plat thereof.

Commonly Known As: Vacant Land

RECORDING REQUESTED BY

DocStar Servjces, LLC.

AND VvHEN RECORDED MAIL THIS DEED AND, UNLESS OTHERWISE SHOWN BELOW, MAIL TAX STATEMENT TO:

Name A-Yuan Kao Chao
Street 21725 Marjorie Avenue
Address Torrance, CA 92503

City&
State
Zip

Title Order No. 8419-CJC Escrow No. NIA

DOC# 2014-0412871
10/30/2014 12:21P Fee:25.00
Page 1 of 1
Recorded *in* **Official Records**
County of Riverside
Larry U. **Ward**
Assessor, County Clerk & Recorder

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Grant Deed

THE UNDERSIGNED GRANTOR (S) DECLARE (S)

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unincorporated area City of T.R.A.085-000

Parcel No. 879-110-001-3

computedon full value of interest or property conveyed, or

☐ computedon full value Jess value of liens or encumbrances remaining at time of sale, and

FOR A VALUABLE CONSIDERATION, receipt of which is hereby acknowledged,

Yuan-Jiun Nicole Chao, (Daughter of the Grantee Herein) a Single Woman

hereby GRANT(S) to

A-Yuan Kao Chao, a Married Woman as Her Sole and Separate Property

the following described real property in the Unincorporated Area

County of Riverside , state of California

The Northeast Quarter of Section 15, Township 7 South, Range 21 East, San Bernardino Base and Meridian, (Unincorporated)
Commonly Known As: Vacant Land

Dated October 22, 2014

STATE OF CALIFORNI
COUNTY OF ..S.am, Er(Jl.,y,.u..-,CL-1'

Yua

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P.u'tt, L, Mi2Frcdt- /V fo.07/v,f'c..
(here insert name and title of the officer)

.notary public, personally appeared Yuan-Jlun Nicole Chao••••••••

who proved lo me on the basis of satisfactory evidence to be the person whose name(is/are subscribed to the within instrument and acknowledged to me that helshe/tllay executed the same in IM/her/lneir authorized capacity(le.s), and that by his/her/their signature(\l. on the instrument the person('$.), or the entity upon behalf of which the person(acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the state of California that the foregoing paragraph is true and correct.

WITNESS my hand ando al ;:;

Signature v I

Commission # 2042282
Notary Public - Calilornla
San Francisco County

(This area for official notarial seal)

MAIL TAX STATEMENTS TO PARTY SHOWN ON FOLLOWING LINE; IF NOP ARTY SHOWN, MAIL AS DIRECTED ABOVE

Same as Above

Name Street Address City & Slate

APPENDIX F
AAI USER/SITE HISTORY QUESTIONNAIRES

ASTM E 1527-13 User Questionnaire

FSE Desert Quartzite Solar Project Site
Riverside County, California

In order to qualify for the protection offered under the EPA All Appropriate Inquires (AAI) Standard, the **User** (entities seeking to use the ASTM E 1527-13 Practice to complete an environmental site assessment of the property; i.e. Lenders and/or Borrowers) must provide the following information (if available) to the *environmental professional* (URS). Failure to conduct these inquires could result in a determination that AAI is not complete. This information should be the collective knowledge of the entities relying on the Phase I.

Please note that you are not being asked to evaluate the property, but rather to provide your knowledge of information on the property.

Person Interviewed/Title: Lien Dinh, Real Estate Manager
Date: January 12, 2015

1. Environmental liens that are filed or recorded against the *property* (40 CFR 312.25).

Did a search of recorded land title records (or judicial records where appropriate) identify any environmental liens filed or recorded against the *property* under federal, tribal, state or local law? (**Note:** If unknown, a review of title records or an environmental lien search is recommended)

Yes____No x____If you answer yes, please include an explanation in the space provided below:

2. Activity and use limitations that are in place on the *property* or that have been filed or recorded against the *property* (40 CFR 312.26(a)(1)(v) and (vi)).

Did a search of recorded land title records (or judicial records where appropriate) identify any AULs, such as *engineering controls*, land use restrictions, or *institutional controls* that are in place at the *property* and/or have been filed or recorded against the *property* under federal, tribal, state or local law?

Engineering Controls are defined as physical modifications to a site or facility to reduce or eliminate the potential for exposure to hazardous substances or petroleum products in the soil or ground water on the property). *Institutional Controls* are defined as a legal or administrative restriction on the use of, or access to, a site or facility to 1) reduce or eliminate the potential for exposure to hazardous substances or petroleum products in the soil or ground water on the property, or 2) to prevent activities that could interfere with the effectiveness of a response action, in order to ensure maintenance of a condition of no significant risk to public health or the environment.

Yes____No x____If you answer yes, please include an explanation in the space provided below:

3. Specialized knowledge or experience of the person seeking to qualify for the LLP* (40 CFR 312.28).

**Landowner Liability Protection (LLP)* offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2001

Do you have any specialized knowledge or experience related to the *property* or nearby properties? For example, are you involved in the same line of business as the current or former *occupants* of the *property* or an adjoining *property* so that you would have specialized knowledge of the chemicals and processes used by this type of business?

Yes____No x____If you answer yes, please include an explanation in the space provided below:

4. Relationship of the purchase price to the fair market value of the *property* if it were not contaminated (40 CFR 312.29).

Does the purchase price being paid for this *property* reasonably reflect the fair market value of the *property*?

Yes x No If you answer no, please include an explanation in the space provided below, including whether the lower purchase price is because contamination is known or believed to be present at the *property*?

5. Commonly known or *reasonably ascertainable* information about the *property* (40 CFR 312.30).

Are you aware of commonly known or *reasonably ascertainable* information about the *property* that would help the *environmental professional* to identify conditions indicative of releases or threatened releases? For example:

a. Do you know the past uses of the *property*?
Yes x No_____

b. Do you know of specific chemicals that are present or once were present at the *property*?
Yes___No x

c. Do you know of spills or other chemical releases that have taken place at the *property*?
Yes___No x

d. Do you know of any environmental cleanups that have taken place at the *property*?
Yes___No x

If you answered yes to any of the questions above, please include an explanation in the space provided below: The BLM portion of the property has remained undeveloped desert land. The private parcel was formerly used for farming, however, it has not been farmed in the last 15 years.

6. The degree of obviousness of the presence or likely presence of contamination at the *property*, and the ability to detect the contamination by appropriate investigation (40 CFR 312.31).

Based on your knowledge and experience related to the *property*, are there any *obvious* indicators that point to the presence or likely presence of contamination at the *property*?

Yes___No x If you answer yes, please include an explanation in the space provided below:

ASTM E 1527-13 User Questionnaire

In addition to the above questions, certain information should be collected, if available, and provided to the *environmental professional*. This information is intended to assist the *environmental professional*, but is not necessarily required to qualify for one of the LLPs.

1. The reason why the ESA is being performed (i.e. sale, purchase, exchange, etc.).
   First Solar plans to develop a solar power plant on the property. First Solar is entering into an option to purchase the 160-acre private parcel on the property with the landowner.

2. The complete name, correct address and/or parcel number for the property (a map or other documentation showing property location and boundaries is helpful).
   The parcels number for the property are: U.S. Department of the Interior, Bureau of Land Management (BLM) APNs 879-080-025, 879-080-020, 879-080-021, 879-090-031, 879-080-024, 879-090-033, 879-090-034, 879-090-035, 879-110-006, 879-110-007, 879-110-008, 879-110-009, 879-110-010, 879-110-012, 879-110-011, and one privately owned 160-acre parcel (APN 879-110-001).

3. A description of the property (i.e. acreage, type, square footage, number of buildings, other structures, age of buildings, above/underground storage tanks, etc.).
   The First Solar Desert Quartzite Solar Project Site (Solar Facility Site and the 600-foot-wide study corridor for the Gen-Tie Line) consist of approximately 4,843 acres of primarily undeveloped public lands administered by the U.S. Department of the Interior and one private parcel consisting of approximately 160 acres.

4. Knowledge or previous owners and/or previous uses of the property?
   The property was purchased with the intended use for farming, but the lack of water on the property made it cost prohibitive for the landowner.

5. Current or previous deeds?
   First Solar maintains deed

6. The site contact name and number.
   BLM Contact - Mr. Cedric C. Perry, Project Manager: (951 697-5388
   Private Parcel Contact Ayaun Chao: (310) 316-0660 Or Nicole Chao: (267) 216-5039

7. Previous reports available? Any other available documentation, correspondence, etc. concerning the environmental condition of the property?
   None

Site History Questionnaire
Phase I ESA

SITE HISTORY INTERVIEW

Telephone interview conducted by Anthony Schuetze on January 6, 2015

Name and title of person interviewed
Nicole Chao (310-408-2896), daughter of current owners.

Date of Interview
January 6, 2015

Current Owner of the Property
Chao Family for approximately 15 years

Past Owners of the Property (give dates)
Unknown, used for farming

Current Use of the Property
When purchased property, had anticipated using for farming but never developed for farming due to the lack of water on-site. Briefly stored a mobile home trailer on-site that was never occupied and it was removed after it was vandalized and burned.

Past Use of the Property (give dates)
Previously used for farming

What types of structures are and were historically located on the property? Are there residences? If so is there evidence of a heating oil tank, or septic system?
No current structures and no knowledge of previous structures.

Were hazardous materials historically used on the property? What types? (Pesticides, fertilizers, heating oil)
No hazardous materials used or stored on-site and no knowledge of previous.

Was chemical (pesticide) use or mixing conducted on the property?
No chemical use, mixing or storage on-site.

What types of wastes if any were historically generated on the property? How were they disposed of?
Unknown historic waste, had history of farm prior to family purchase.

What types of wastes are currently generated on the property?
No known waste generated on-site.

Have there been any previous environmental investigations of the property? Are there any reports that describe the geology of the subject property?
No knowledge of previous environmental investigations.

Is there evidence of Asbestos, PCBs, mercury, lead based paint issues with any structures needing to be demolished (observation only, no sampling)?
No knowledge of these materials.

Is there evidence of refuse, trash, or evidence of dumping or waste disposal activities?
No knowledge of anything dumped on-site, never occupied.
The reported trash observed by URS in the northeast corner of the property is unknown how long it has been there and who is responsible for dumping.

Is there evidence of soil staining, vegetation abnormalities, evidence of spills?
No knowledge of these features.

Have there ever been USTs or ASTs on the subject property. If so, list the type and age of each tank (This would include agricultural tanks)
No knowledge of these features.

Are there vaults, utility access points?
No knowledge of these features.

Evidence of underground utilities/piping?
No knowledge of these features.

Are any wells located on the property? If so describe type and age.
No knowledge of these features.
The suspect well observed by URS in the northeast corner of the property is unknown, it was their knowledge there was not water access on-site.

Are any pipelines on the property?
No knowledge of these features.

APPENDIX R

NOISE TECHNICAL REPORT

NOISE TECHNICAL REPORT

FOR THE
DESERT QUARTZITE SOLAR PROJECT

RIVERSIDE COUNTY, CALIFORNIA

Prepared for:

Desert Quartzite, LLC
135 Main Street, 6th Floor
San Francisco, California 94105

Prepared by:

URS
URS is an AECOM company.
4225 Executive Square, Suite 1600
La Jolla, California 92037
Phone (858) 812-9292

Project Number 60419825.28907534.30003

December 2015

TABLE OF CONTENTS

Section **Page**

1.0 PROJECT OVERVIEW 1-1

1.1 INTRODUCTION 1-1
1.2 PROJECT BACKGROUND 1-3
1.3 SUMMARY OF PROJECT CONSTRUCTION ACTIVITIES AND SCHEDULE 1-3

2.0 EXISTING BASELINE CONDITIONS 2-1

2.1 ASSESSMENT METHODOLOGY 2-1

2.1.1 Acoustical Terminology 2-1
2.1.2 Instrumentation 2-2
2.1.3 Survey Duration 2-2

2.2 BASELINE FIELD SURVEY RESULTS 2-3

3.0 IMPACT ASSESSMENT 3-1

3.1 REGULATORY FRAMEWORK 3-1

3.1.1 Federal 3-1
3.1.2 State of California 3-2
3.1.3 Riverside County 3-2

3.2 IMPACT THRESHOLDS 3-3

3.2.1 Project Construction 3-3
3.2.2 Project Operation 3-4

3.3 METHODOLOGIES 3-4

3.3.1 Project Construction 3-4
3.3.2 Project Operation 3-6

3.4 RESULTS AND FINDINGS 3-8

Section **Page**

3.4.1 Project Construction 3-8
3.4.2 Project Operation 3-16

4.0 APPLICANT-RECOMMENDED MITIGATION MEASURES 4-18

4.1 ON-SITE CONSTRUCTION 4-1
4.2 CONSTRUCTION TRAFFIC 4-2
4.3 ON-SITE OPERATIONAL ACTIVITIES 4-2
4.4 OPERATIONS TRAFFIC 4-2

5.0 REFERENCES 5-1
6.0 LIST OF PREPARERS 6-1

Tables

Table 1-1 Construction Overview for Assumed 25-month Schedule 1-4
Table 2-1 Short-term Sound Level Measurement Results 2-3
Table 3-1 Project Daytime Operation Sound-generating Sources 3-7
Table 3-2 Predicted Daytime On-site Project Construction Noise per Activity at ST03 3-9
Table 3-3 Predicted Daytime On-site Project Construction Noise per Activity at ST05 3-10
Table 3-4 Predicted Daytime On-site Project Construction Noise per Activity at Nearest Noise-sensitive Receptor 3-11
Table 3-5 Predicted Nighttime On-site Project Construction Noise per Activity at ST03 3-13
Table 3-6 Predicted Nighttime On-site Project Construction Noise per Activity at ST05 3-14
Table 3-7 Predicted Nighttime On-site Project Construction Noise per Activity at Nearest Noise-sensitive Receptor 3-15
Table 3-8 Predicted Project Operation Noise Levels 3-17

Figures

Follows Page

Figure 1-1 Regional Vicinity Map 1-4
Figure 1-2 Preliminary Site Plan 1-4
Figure 2-1 Ambient Sound Measurement Locations and Nearest Noise Sensitive Receptor 2-4
Figure 3-1 Desert Quartzite Solar Project – Wind Neutral (Calm) 3-18
Figure 3-2 Desert Quartzite Solar Project – Temperature Inversion 3-18
Figure 3-3 Desert Quartzite Solar Project – 29.5 Feet per Second Winds from North 3-18

Figures (Continued) **Follows Page**

Figure 3-4 Desert Quartzite Solar Project – 29.5 Feet per Second Winds from South 3-18

Appendices

Appendix A Fundamentals of Noise
Appendix B Field Measurement Photographs
Appendix C Long-term Sound Level Measurement Data Detail
Appendix D Noise Impact Calculations

SECTION 1.0
PROPOSED ACTION AND ALTERNATIVES

1.1 INTRODUCTION

Desert Quartzite, LLC (Applicant) proposes to develop and construct a 300-megawatt (MW) alternating current photovoltaic solar facility known as the Desert Quartzite Solar Project (Project). The overall Project includes the solar generation facility, an on-site substation, and the generation-tie (gen-tie) line. The proposed Project is located in eastern Riverside County near Blythe, California. The proposed solar facility and the approximately 3-mile-long, 230-kilovolt (kV) gen-tie line interconnection to the existing Southern California Edison (SCE) Colorado River Substation (CRSS) are located primarily on lands administered by the U.S. Department of the Interior, Bureau of Land Management (BLM) (BLM CACA# 04937; 5,115 acres). The Project site also includes 160 acres of private land (APN 879-110-001). The overall Project site encompasses approximately 5,275 acres. The proposed solar facility would be constructed within an approximately 3,714-acre fenced portion of the overall Project site. The gen-tie line study corridor encompasses approximately 445 acres of BLM lands within the overall Project site. A vicinity map of the proposed Project (i.e., including BLM and privately-owned lands) is presented on Figure 1-1 and the proposed preliminary site layout is presented on Figure 1-2. Figures 1-1 and 1-2 are presented at the end of Section 1.0.

Site access will be via Interstate 10 (I-10) at the State Route (SR)-78 to SR-78 (south)/ Neighbours Boulevard to 16th Avenue/Seeley Avenue (west). Project construction is anticipated to require from approximately 25 to 48 months to complete, and is expected to start in late 2016. This analysis is based on an assumed approximately 25-month construction timeframe which is considered to be worst case for impact assessment purposes. The construction workforce is estimated to result in an average 450 (round trip) vehicle trips per day (21 working days per month), with a maximum of 810 (round trip) vehicle trips per day during peak construction. The workforce is expected to commute to the site from within an average distance of 35 miles from the Project site and is expected to arrive at the Project site by 7 a.m. and to depart at 5 p.m. each day (i.e., avoid 7–9 a.m. peak traffic period but not the 4–6 p.m. peak period); it is common that a fairly large portion of the workforce voluntarily carpools regularly. In addition to commute trips by construction workers, approximately 14,400 truck deliveries of equipment, materials, and fuel for on-site construction equipment are estimated to be required over the course of the construction period. Construction of the proposed Project is expected to require a total of up to 10-15 oversize loads for transformers and motor graders. Equipment, material, and fuel deliveries are planned to occur during non-peak traffic hours. Construction phase-related truck deliveries are estimated to require one-way distances (within the boundaries of the Mojave Desert Air Quality Management District) as follows: equipment and material deliveries at 30.5 miles; aggregate and concrete at 13 miles; and fuel at 10 miles.

Construction activities will include site preparation and grading, solar array foundation installation (which may include post driving), equipment installation, on-site substation and operations and maintenance building construction, gen-tie tower and conductor installation along the gen-tie route, equipment testing, and site cleanup and restoration. Typical construction equipment considered in this analysis includes graders, scrapers, dozers, loaders, tractors, tractor discs, skid steers, roller/vibrator/padders, trenchers, post drivers, forklifts, pumps, generators, and trucks. Construction of the proposed Project will require ground disturbance during site preparation activities within the 3,714-acre fenced portion of the site as well as along the gen-tie corridor. The operational workforce is anticipated to be 5 employees. The solar facilities would not operate or generate noise at night.

It is currently estimated that the maximum water usage for an approximate 25-month construction timeframe is 1,400 acre feet (AF) or approximately 700 AF per year on average. During construction, water will be needed primarily for dust control and soil compaction, with small amounts used for sanitary and other purposes. During operations, the Project will use no water directly for electricity generation. The operational phase of the Project is expected to require up to 38 AF per year (AFY) of water. The Project plans to utilize groundwater from either existing local well(s) or via installation of on-site groundwater wells. The applicant is also considering trucking water to the Project Site for at least the initial months of construction if an on-site water supply well(s) is not yet installed and functional. It is possible that trucking water to the Project Site could be required for the entire length of construction which would potentially require up to approximately 57,000 water deliveries (assuming 8,000-gallon capacity water trucks). All water deliveries to the Project site would be required by the applicant to occur during non-peak traffic hours. It is assumed that water deliveries would originate from a water supply source within 10 miles of the Project site.

The purpose of this study is to provide scientific and technical data regarding the existing noise environment within the study area and the proposed Project's potential to change the area's noise environment. The Project information supporting this analysis is based primarily on the Applicant's revised Desert Quartzite Solar Project Plan of Development (POD) submitted to the BLM in May 2014, as amended. The POD will continue to be updated by the Applicant to provide current and accurate Project information. If warranted, Applicant measures are proposed or recommended in this study to address adverse changes to the existing ambient noise environment as a result of the Project. This study is submitted to the BLM and Riverside County to support their independent review and evaluation of the environmental impacts of the Project pursuant to applicable Federal, State, and local laws. The POD is part of the BLM Right-of-Way (ROW) grant application process which for this Project includes preparation of an Environmental Impact Statement in accordance with the National Environmental Policy Act (NEPA). The proposed Project is also expected to require a Conditional Use Permit (CUP) from Riverside County which will require compliance with the California Environmental Quality Act (e.g., Environmental Impact Report). Therefore, it is currently planned that a joint EIS/EIR will be prepared by the BLM and Riverside County.

1.2 PROJECT BACKGROUND

The fundamental purpose of the Project is to construct, operate, and eventually decommission a clean, renewable source of solar electricity that helps meet California's growing demand for power and helps fulfill national and State renewable energy and greenhouse gas (GHG) goals. Solar energy provides a sustainable, renewable source of power that helps reduce fossil fuel dependence and GHG emissions. The proposed Project will help California meet its Renewable Portfolio Standard (RPS) goal, which is currently 50 percent of electrical power retail sales by 2030 under Senate Bill (SB) 350. The Project supports Secretary of the Interior Salazar's Orders 3283 and 3285, which make developing renewable energy a top national priority. The Project will also help the State achieve the 2006 Global Warming Solutions Act (Assembly Bill [AB] 32) GHG reduction targets, which require California's GHG emissions to be reduced to 1990 levels by 2020. The Project would furthermore support the County's energy policy goal to contribute to California's long-term renewable energy development and GHG reduction goals.

When fully operational, the 300 MW Project would deliver over 1.5 billion kilowatt-hours of clean, renewable energy annually. This is equivalent to the amount of energy needed to serve over 90,000 California homes each year. When compared to the carbon dioxide (CO_2) emissions that would be emitted if the same amount of electricity was generated from fossil fuels, implementing the Project will avoid emissions of over 165,000 metric tons of CO_2 annually – the equivalent of taking almost 32,000 automobiles off the road. The electricity generated by the Project will be sold to one or more utilities or other retail customers.

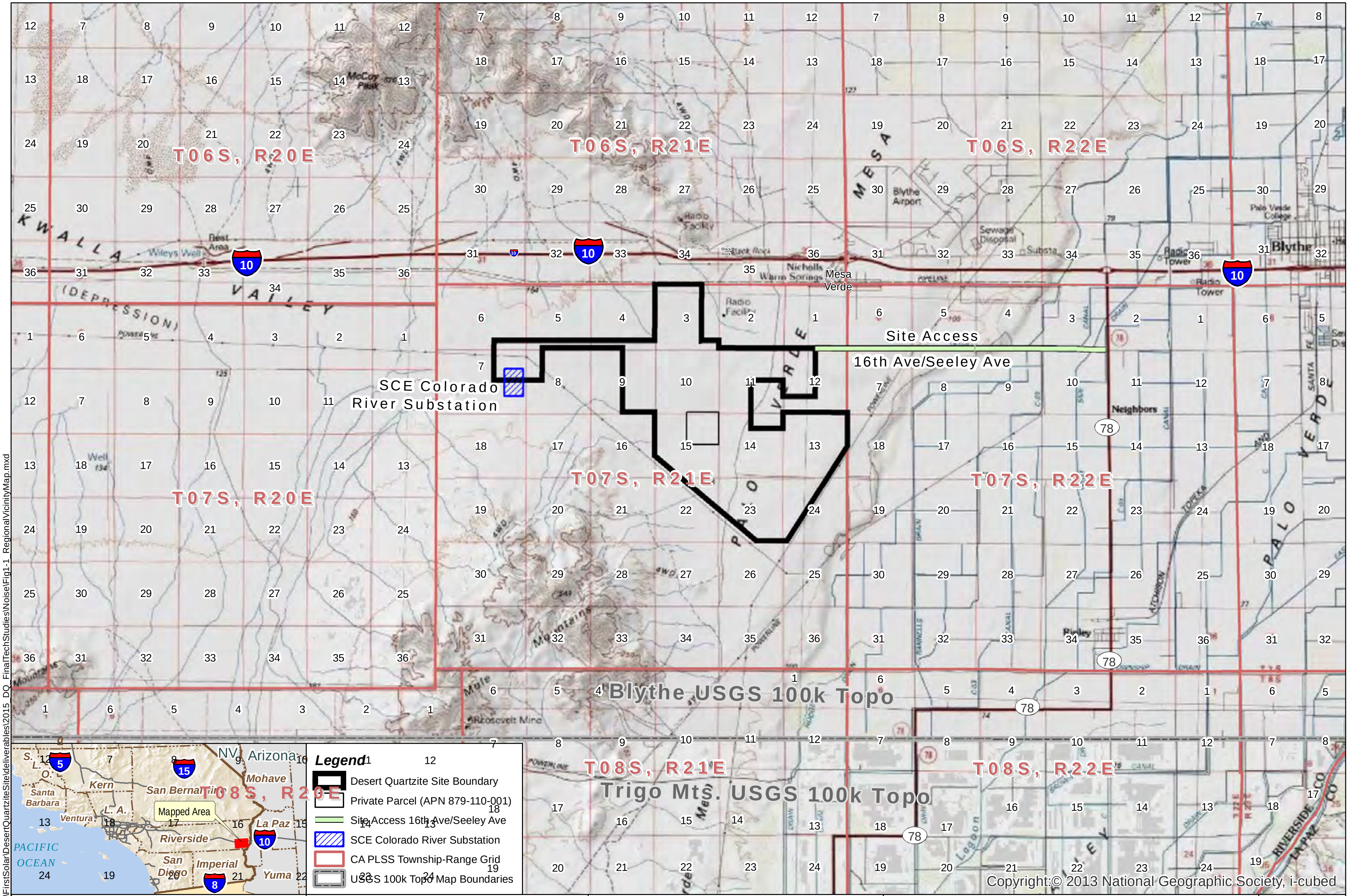
1.3 SUMMARY OF PROJECT CONSTRUCTION ACTIVITIES AND SCHEDULE

Construction of the proposed Project is planned to consist of nine primary activities. The currently estimated timeframes and maximum workforce numbers for an assumed 25-month construction schedule are presented in Table 1-1.

TABLE 1-1
CONSTRUCTION OVERVIEW FOR ASSUMED 25-MONTH SCHEDULE

Activity #	Timeframe	Duration (Months)	Working Days	Max No. Workers[1]	Activity Description
1	Dec. 2016 – Jan. 2017	2	42	60	Move On (grading of laydown, construction trailers, and parking areas)
2	Jan. 2017 – June 2018	18	378	80	Grading – site preparation/ clearing/grading and balance of retention basins
3	Mar. 2017 – Aug. 2018	18	378	160	Construction – solar array structural components (posts, tilts, rails, trackers)
4	Apr. 2017 – Sept. 2018	18	378	80	Trenching – PCS excavation, PCS placement, underground cable trenching
5	May 2017 – Oct. 2018	18	378	310	Construction – solar module installation
6	Apr. 2018 – Sept. 2018	6	126	60	Construction – substation
7	Apr. 2018 – Sept. 2018	6	126	60	Construction – Gen-Tie
8	Apr. 2018 – Sept. 2018	6	126	60	Construction – Operations and Maintenance Building
9	July 2018 – Dec. 2018	6	126	60	Construction – testing, cleanup, and restoration

[1] Peak workforce estimated at 810 workers due to overlapping of construction activities. Workforce numbers may vary.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T07S, R20E
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T07S, R22E
T08S, R20E
T08S, R21E
T08S, R22E
Site Access
16th Ave/Seeley Ave
SCE Colorado River Substation
Blythe USGS 100k Topo
Trigo Mts. USGS 100k Topo
Blythe
Mesa Verde
Nicholls Warm Springs
Blythe Airport
Palo Verde College
Neighbors
Ripley
Wileys Well
McCoy Peak
Palo Verde
Mule Mountains
Roosevelt Mine
10
78
Legend
Desert Quartzite Site Boundary
Private Parcel (APN 879-110-001)
Site Access 16th Ave/Seeley Ave
SCE Colorado River Substation
CA PLSS Township-Range Grid
USGS 100k Topo Map Boundaries
NV
Arizona
Mapped Area
Santa Barbara
Kern
San Bernardino
Mohave
L. A.
Ventura
Riverside
La Paz
San Diego
Imperial
Yuma
PACIFIC OCEAN
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10
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Noise Technical Study
Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

N

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0 5,000 10,000 Feet

Source: [1] Bing Maps Aerial Imagery Web Mapping Service - (c) 2010 Microsoft Corporation and its datas upplier (Image Date: 3/13/2011), [2] California Geospatial Information Library PLS, [3] ESRI StreetMap USA (2007).

Figure 1-1. Regional Vicinity Map

2015

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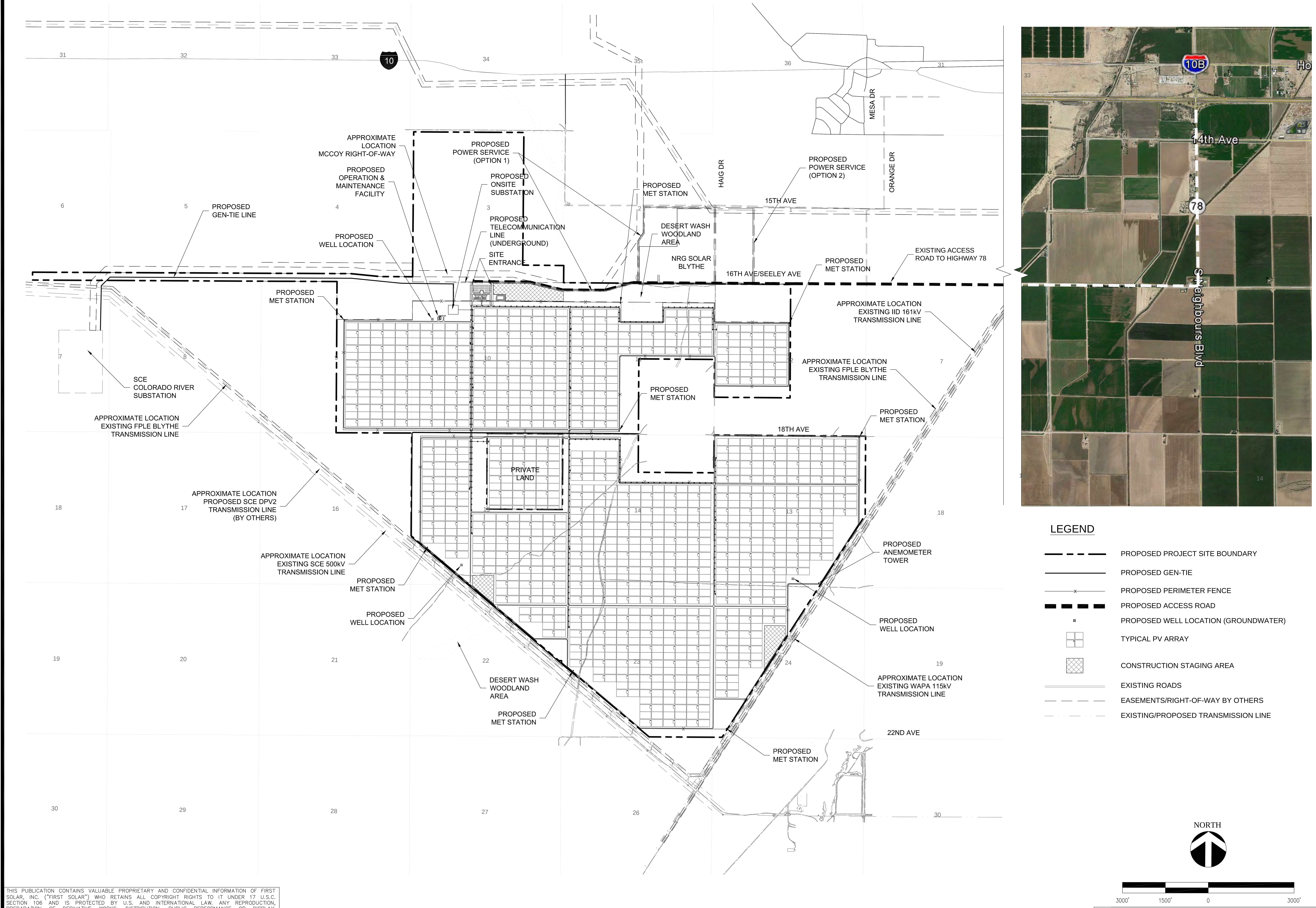

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32
33
10
34
35
36
31
MESA DR
ORANGE DR
HAIG DR
15TH AVE
APPROXIMATE LOCATION MCCOY RIGHT-OF-WAY
PROPOSED POWER SERVICE (OPTION 1)
PROPOSED OPERATION & MAINTENANCE FACILITY
PROPOSED ONSITE SUBSTATION
PROPOSED MET STATION
PROPOSED POWER SERVICE (OPTION 2)
6
5
4
3
2
1
PROPOSED GEN-TIE LINE
PROPOSED TELECOMMUNICATION LINE (UNDERGROUND)
DESERT WASH WOODLAND AREA
PROPOSED WELL LOCATION
SITE ENTRANCE
NRG SOLAR BLYTHE
16TH AVE/SEELEY AVE
PROPOSED MET STATION
EXISTING ACCESS ROAD TO HIGHWAY 78
PROPOSED MET STATION
APPROXIMATE LOCATION EXISTING IID 161kV TRANSMISSION LINE
7
8
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APPROXIMATE LOCATION EXISTING FPLE BLYTHE TRANSMISSION LINE
SCE COLORADO RIVER SUBSTATION
PROPOSED MET STATION
APPROXIMATE LOCATION EXISTING FPLE BLYTHE TRANSMISSION LINE
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18TH AVE
PRIVATE LAND
APPROXIMATE LOCATION PROPOSED SCE DPV2 TRANSMISSION LINE (BY OTHERS)
18
17
16
14
13
18
PROPOSED ANEMOMETER TOWER
APPROXIMATE LOCATION EXISTING SCE 500kV TRANSMISSION LINE
PROPOSED MET STATION
PROPOSED WELL LOCATION
PROPOSED WELL LOCATION
19
20
21
22
23
24
19
DESERT WASH WOODLAND AREA
APPROXIMATE LOCATION EXISTING WAPA 115kV TRANSMISSION LINE
PROPOSED MET STATION
22ND AVE
PROPOSED MET STATION
30
29
28
27
26
25
30
10B
Ho
33
14th Ave
78
S Neighbours Blvd
14
LEGEND
PROPOSED PROJECT SITE BOUNDARY
PROPOSED GEN-TIE
PROPOSED PERIMETER FENCE
PROPOSED ACCESS ROAD
PROPOSED WELL LOCATION (GROUNDWATER)
TYPICAL PV ARRAY
CONSTRUCTION STAGING AREA
EXISTING ROADS
EASEMENTS/RIGHT-OF-WAY BY OTHERS
EXISTING/PROPOSED TRANSMISSION LINE
NORTH
3000'
1500'
0
3000'

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DESERT QUARTZITE, LLC
135 MAIN STREET, 6TH FLOOR
SAN FRANCISCO, CALIFORNIA 94105
PHONE: (415) 935-2500

DESERT QUARTZITE
SOLAR PROJECT
RIVERSIDE COUNTY
CALIFORNIA

REV	DATE	REVISION DESCRIPTION	BY	CHK	APP

FS JOB #:
PROJ. DEVT. ENGR: RH
PROJ. MGR. ENV.:
SCALE: 1"=1500' @ 24"x36" SHEET
COPYRIGHT BY: DESERT QUARTZITE, LLC

SHEET TITLE

FIGURE 1-2

PRELIMINARY SITE PLAN

SHEET 2 OF 14

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SECTION 2.0
EXISTING BASELINE CONDITIONS

2.1 ASSESSMENT METHODOLOGY

To quantify the acoustical baseline conditions of the Project site and its vicinity, existing outdoor ambient sound levels were measured at a set of representative receiver locations in August of 2014. Selection of the representative receiver locations considered the location of the Project site, the proposed access route to the Project site along 16th Avenue/Seeley Avenue from SR-78 and I-10, as well as the location of potentially sensitive receptors that could be impacted by noise generated associated with Project construction and operation activities. Observed meteorological settings and other environmental conditions were also documented as part of this field measurement survey. The selected measurement locations are shown on Figure 2-1 and include short-term (ST) and long-term (LT) measurement locations. The nearest noise sensitive receptor (NNSR) is located approximately 3,700 feet north of the northeastern Project boundary (where it coincides with 16th Avenue/Seeley Avenue) in between the Project site and the community of Nicholls Warm Springs/Mesa Verde. The NNSR appeared to be an occupied mobile home/trailer at the time of the field reconnaissance in August 2014. The next two closest potentially affected sensitive receptors are designated as ST03 and ST05 which located approximately 5,200 and 5,350 feet from the Project site’s northeast boundary, respectively. These two locations are representative of the homes in the community of Nicholls Warm Springs/Mesa Verde closest to the northeastern site boundary. Location ST11 is representative of the northeast corner of the existing NRG Blythe 21 solar facility located adjacent to the proposed Project.

2.1.1 Acoustical Terminology

For purposes of document brevity, a summary of relevant fundamental concepts and an explanation of terms related to noise and vibration is presented in Appendix A. For an expanded introduction to noise fundamentals beyond what is presented in Appendix A refer to an industry-accepted reference text such as Noise & Vibration Control Engineering (Beranek & Ver 1992).

Key acoustical terminology used in this report is as follows:

- dB: decibels; measurement of sound level magnitude
- dBA: decibels, A weighted
- L_{dn}: day-night average noise level
- L_{eq}: energy average sound level during a measured time interval

- L_{max}/L_{min}: root-mean-square of maximum and minimum sound levels, respectively, measured during a monitoring interval
- $L_{10,50,90}$: Measured noise levels exceeded 10, 50, and 90 percent of the time, respectively
- PWL: sound power level
- SPL: sound pressure level

2.1.2 Instrumentation

In August 2014, the following equipment was used in the Project area to measure existing noise levels and document environmental conditions:

- Larson Davis (LD) Model 820 Sound Level Meter (SLM), Serial Number (SN) 1655 with windscreen
- LD Model 720 Sound Level Meter, SN 0436 with windscreen
- LD Field Calibrator Model 150B, SN 2233
- Speedtech Skymaster Anemometer Model SM-28, SN 02393

In addition to the equipment listed above, other equipment utilized to conduct measurements included (but is not limited to) a digital camera, tripod, GPS device, and weatherproof cases.

The LD 820 SLM, used for the short-term (ST) measurements, is an ANSI (American National Standards Institute) Type 1 SLM. The LD 720 SLM, used for the long-term (LT) measurement, is an ANSI Type 2 SLM. Both SLMs had their calibration status field-checked with the LD 150B calibrator before and after each measurement. Both SLMs were confirmed to have been re-calibrated at an approved laboratory less than a year prior to use for measuring existing outdoor ambient sound levels in the vicinity of the project area.

2.1.3 Survey Duration

ST sound level measurements are witnessed by the attending field investigator, so that noteworthy observations regarding perceived sound-producing events, processes or activities (both natural and man-made) may be documented and thus help explain concurrent variances in the measured sound pressure level (SPL).

Aside from initial equipment setup and concluding tear-down, LT sound level monitoring is performed without a field investigator in attendance, so that environmental sound is measured with minimized risk of extraneous noise due to the investigator’s presence and proximity. For purposes of this assessment, LT is at least 24 continuous hours, so that the time-varying sound level of an entire representative diurnal cycle can be measured.

2.2 BASELINE FIELD SURVEY RESULTS

The dominant noise source at and around the vicinity of the site is vehicular traffic from local roadways and Interstate I-10. ST SPL measurements were conducted on August 19 and 20, 2014, for at least 20 consecutive minutes each at a set of 11 representative locations that are depicted on Figure 2-1. Figure 2-1 is presented at the end of Section 2.0. Appendix B presents photographs and summarized descriptions of each measurement location. Table 2-1 presents a summary of noise measurement results.

TABLE 2-1
SHORT-TERM SOUND LEVEL MEASUREMENT RESULTS[1]

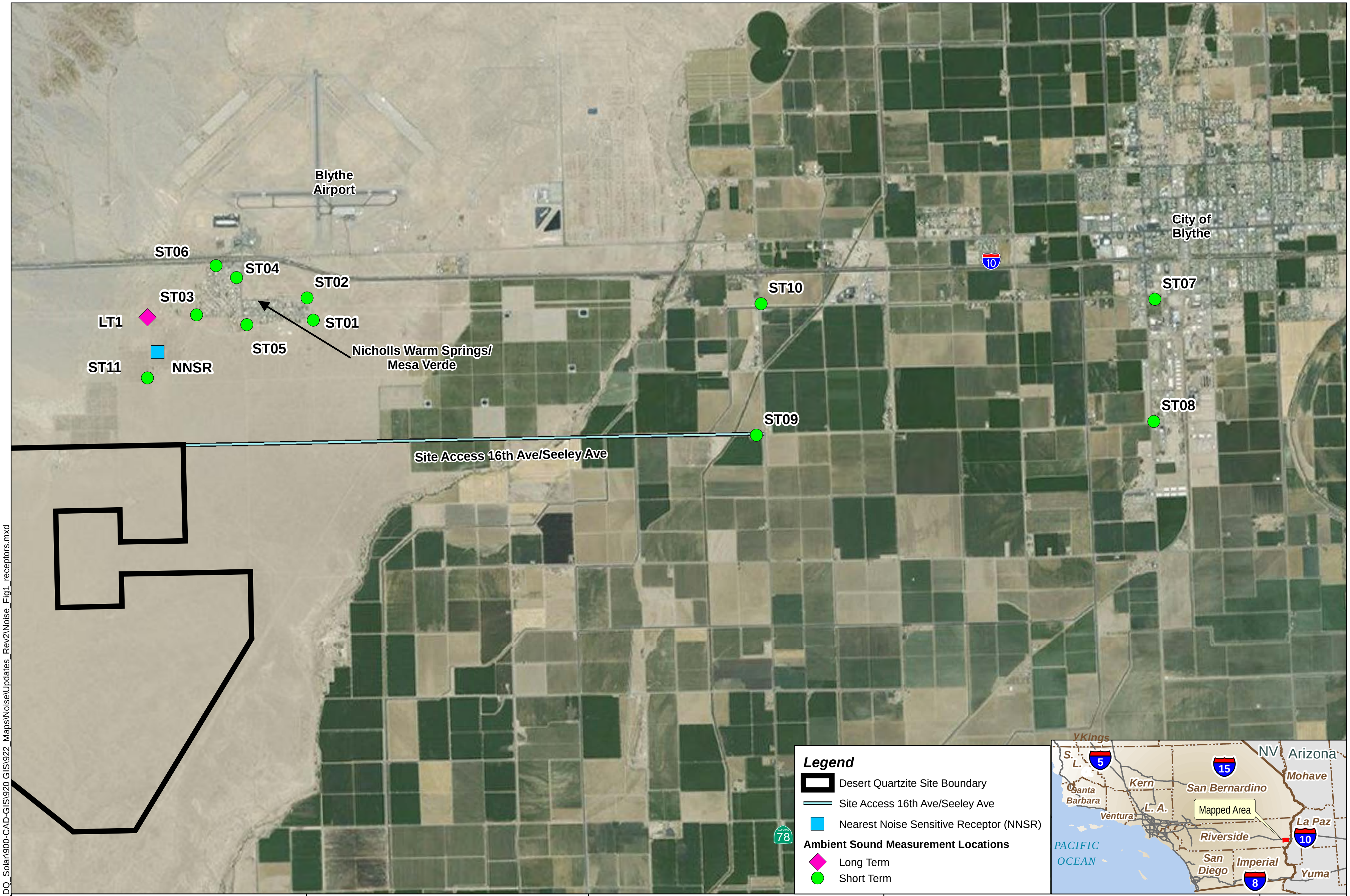
Measurement Location[2]	Date (m/dd/yyyy)	Start Time (hh:mm)	Stop Time (hh:mm)	Duration (Minutes)	L_{eq} (dBA)
ST01	8/19/2014	18:20	18:40	20	44
	8/19/2014	23:17	23:37	20	41
ST02	8/19/2014	18:47	19:07	20	45
	8/19/2014	23:43	00:03	20	46
	8/20/2014	11:59	12:19	20	45
ST03	8/19/2014	22:46	23:06	20	39
	8/20/2014	10:59	11:19	20	39
ST04	8/20/2014	11:29	11:49	20	52
ST05	8/20/2014	12:29	12:49	20	40
ST06	8/20/2014	12:58	13:18	20	63
ST07	8/20/2014	14:33	14:53	20	54
ST08	8/20/2014	15:04	15:24	20	59
ST09	8/20/2014	15:34	15:54	20	51
ST10	8/20/2014	16:10	16:30	20	57
ST11	8/20/2014	17:46	18:06	20	41

[1] Source: Ambient noise field measurements by URS personnel in August 2014.

[2] Refer to Figure 2-1 for measurement locations.

One LT SPL measurement was also conducted from August 19 to August 20, 2014 over a 25 consecutive hour time period. Like the ST positions, the LT location is shown on Figure 2-1. A plot of the measured SPL over the 25-hour measurement period is presented as Figure C-1 in Appendix C.

Weather conditions in the Project area were observed and measured using the Speedtech Skymaster SM-28. Observed wind speeds during the ST measurements were generally gusty – up to 9 miles per hour – from the south and southwest. The measured temperature during conduct of ST measurements ranged from 89 to 104 degrees Fahrenheit with a relative humidity ranging from 26 percent to 60 percent. Observed cloud cover ranged from clear skies to approximately 70 percent overcast. Depending on measurement location, background sounds perceived during the field survey included the following sources: nearby and distant roadway traffic, insects, birds, rustling leaves, speech, music, dog barks, aircraft overflights, HVAC units, and distant thunder. Operation noise from the existing NRG Blythe 21 solar facility was not distinctly audible or noted during the field noise survey.


Blythe Airport
City of Blythe
ST06
ST04
ST02
ST03
ST01
LT1
ST05
ST11
NNSR
Nicholls Warm Springs/ Mesa Verde
ST10
ST07
ST08
ST09
Site Access 16th Ave/Seeley Ave
10
78
Legend
Desert Quartzite Site Boundary
Site Access 16th Ave/Seeley Ave
Nearest Noise Sensitive Receptor (NNSR)
Ambient Sound Measurement Locations
Long Term
Short Term
Kings
S. L.
5
15
NV
Arizona
Mohave
Santa Barbara
Kern
San Bernardino
L. A.
Ventura
Mapped Area
La Paz
PACIFIC OCEAN
Riverside
10
San Diego
Imperial
Yuma
8

Noise Analysis
Desert Quartzite Solar Project
Riverside County, CA

URS (an AECOM Company)

0 0.5 1 Miles

0 3,000 6,000 Feet

Source: [1] Aerial Imagery (NAIP 2014), [2] Roads, Boundaries, Cities, River (Esri 2012). [3] Noise Contours, Measurement Locations (URS 2014). [4] Project Features (First Solar 2014).

Figure 2-1. Ambient Sound Measurement Locations and Nearest Noise Sensitive Receptor

2015

P:\ 60416049825 DQ Solar\900-CAD-GIS\920 GIS\922 Maps\Noise\Updates Rev2\Noise Fig1 receptors.mxd

SECTION 3.0
IMPACT ASSESSMENT

3.1 REGULATORY FRAMEWORK

The following subsections summarize the federal, state, and local noise regulations, ordinances, standards and guidance that are relevant to the assessment of noise impacts from the Project to the existing ambient outdoor sound environment.

3.1.1 Federal

3.1.1.1 National Environmental Policy Act of 1969

NEPA establishes a public, interdisciplinary framework for Federal agencies reviewing projects under their jurisdiction to consider environmental impacts. NEPA's basic policy is to assure that all branches of government give proper consideration to the environment prior to undertaking any major federal action that significantly affects the environment.

The BLM, as lead Federal agency for the Project, is responsible for preparation of an Environmental Impact Statement (EIS) in compliance with NEPA to evaluate the environmental impacts of the portions of this Project on federal lands. The Desert Quartzite Solar plant and the Project gen-tie line are located on lands administered and managed by the BLM. NEPA compliance is required for these portions of the Project through preparation of a Draft and Final EIS, for which information from this Noise Technical Report would support. BLM is also responsible for Native American consultation, including government to government consultation.

The President's Council on Environmental Quality (CEQ) developed guidelines and procedures to assist Federal agencies with NEPA procedures so that environmental justice concerns are effectively identified and addressed. This includes guidelines for public participation, alternatives, and mitigation.

3.1.1.2 Occupational Safety and Health Act

On-site occupational noise exposure levels set by the Occupational Safety and Health Act of 1970 (OSHA) are regulated via California Occupational Safety and Health Administration (Cal-OSHA). The maximum time-weighted average noise exposure level of workers is 90 decibels (dB), A weighted (dBA), over an eight-hour work shift (29 Code of Federal Regulations [CFR] § 1910.95).

3.1.2 State of California

3.1.2.1 California Environmental Quality Act Impact Determination

Per California Environmental Quality Act (CEQA) guidance, Appendix G (as listed for Noise), the Project would be considered as having a significant impact when there would be:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies

b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, exposure of people residing or working in the project area to excessive noise levels

f) For a project within the vicinity of a private airstrip, exposure of people residing or working in the project area to excessive noise levels

3.1.2.2 California Vehicle Code

Noise limits for highway vehicles are regulated under the California Vehicle Code, §§ 23130 and 23130.5. The limits are enforceable on the highways by the California Highway Patrol and the County Sheriff's Office.

3.1.3 Riverside County

The Project is located within unincorporated Riverside County; hence, relevant portions of the Riverside County General Plan Noise Element and the Noise Ordinance apply with respect to defining appropriate noise impact assessment criteria for the Project.

3.1.3.1 Riverside County General Plan

The Noise Element of the Riverside County General Plan (Riverside County 2014a) includes noise compatibility guidance, which is based on the California State Planning Law. According to Table N-2 within the Noise Element, Stationary Source Land Use Noise Standards, preferred noise level standards for (exterior) residential land uses are as follows:

- From 7:00 a.m. to 10:00 p.m., 65 L_{eq} (10 minute)

- From 10:00 p.m. to 7:00 a.m., 45 L_{eq} (10 minute)

The Land Use Compatibility for Community Noise Exposure, included in the Noise Element, indicates that residential-low density, single family, duplex, and mobile homes are normally acceptable up to 60 dBA of day-night average sound level (L_{dn}) or CNEL. Application notes found in Appendix I of the Riverside County General Plan Noise Element (Riverside County 2014b) indicate that “temporary construction activities are not covered by the standard“; hence, the 10-minute Leq limits identified above would not apply to on-site Project construction noise.

3.1.3.2 Ordinance 847

Riverside County’s Ordinance No. 847 lists maximum nighttime and daytime sound levels for occupied property by General Plan land use designation (Riverside County 2014). The most restrictive limit that would apply at the nearest occupied receptors are classified as Rural Residential. Table 1 of this ordinance indicates the maximum decibel level allowed in Rural Residential is a daytime and nighttime limit of 45 dBA L_{max} when measured at the exterior of an occupied property.

Section 2 of Ordinance No. 847 does, however, exempt from its provisions the following construction activities:

- Private construction projects located one-quarter of a mile or more from an inhabited dwelling; or
- Private construction projects located within one-quarter of a mile from an inhabited dwelling, provided that:
    - Construction does not occur between the hours of 6 p.m. and 6 a.m. during the months of June through September, and
    - Construction does not occur between the hours of 6 p.m. and 7 a.m. during the months of October through May.

3.2 IMPACT THRESHOLDS

3.2.1 Project Construction

3.2.1.1 On-site Noise

With respect to on-site Project construction activity, the impact indicators per CEQA Appendix G a) would be as follows:

- Riverside County – Ordinance 847. A daytime or nighttime noise limit of 45 dBA L_{max}, but only if the distance between the Project site and the nearest receptor is less than one quarter-mile away from the nearest inhabited dwelling, and construction occurs:
    - Between the hours of 6 a.m. and 6 p.m. during the months of June through September; or
    - Between the hours of 7 a.m. and 6 p.m. during the months of October through May.

The impact indicator per CEQA Appendix G d) would be a quantified increase in the outdoor ambient sound level due to the Project. For purposes of this assessment (consistent with other agencies such as the California Energy Commission's interpretation of noise impact significance), a temporary increase in ambient sound level greater than 10 dBA would be considered a significant impact. Since the outer boundary of the Project site is more than 0.25 mile away from the nearest identified representative noise-sensitive receptor, noise from on-site construction activity would only be considered a significant impact if its acoustical contribution caused an increase above baseline outdoor ambient sound level by more than 10 dBA.

3.2.1.2 Construction Traffic

Section 2.k. of Riverside County Ordinance 847 exempts motor vehicles (other than off-highway) from its thresholds; thus, this analysis assesses traffic noise impact on the basis of outdoor ambient noise level increase. As presented previously in Section 3.2.1.1, a predicted outdoor ambient noise level increase of more than 10 dBA would be considered a significant impact.

3.2.2 Project Operation

With respect to a) from Section 3.1.2.1, impact criteria associated with aggregate noise from stationary sources would include the following daytime and nighttime sound levels from the Riverside County General Plan Noise Element and the County's Noise Ordinance:

- From 7:00 a.m. to 10:00 p.m., 65 dBA L_{eq} (10 minute); and
- From 10:00 p.m. to 7:00 a.m., 45 Leq (10 minute).

3.3 METHODOLOGIES

3.3.1 Project Construction

3.3.1.1 On-site Noise

Project construction noise was estimated for each construction activity by determining the contributing sound sources and calculating their aggregate sound propagation to a studied representative receptor location. The key assumptions for this analysis included in this method are as follows:

- Free-field conditions, including the following attenuation factors:
    - Ground absorption effects (but no greater than 4.8 dBA reduction, regardless of distance traversed by the sound path, consistent with International Organization for Standardization [ISO] 9613-2 [ISO 1996]); and
    - Atmospheric absorption of -1 dBA per 1,000 feet of distance traveled.
- For a given construction activity, all pieces of concerned equipment and vehicles are assumed to operate—on average—from the same source point location or from two points as follows:
    - Activities 1 (move on) and 2 (grading) – geographic centroid of the Project site (see Figure D-1 in Appendix D);
    - Activities 3 (structures), 4 (trenching) and 5 (structures) – half of equipment at the geographic centroid of the Project site, other half at the power conversion station (PCS) nearest to the noise-sensitive receptor under study; and
    - Activities 6 (substation), 7 (gen-tie), 8 (O&M building) and 9 (testing/clean-up/restoration) – substation location.
    - Each piece of equipment or vehicle is assigned a reference Lmax value at a reference distance (e.g., 50 feet), and an “acoustical usage factor” (AUF) that the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) User’s Guide (FHWA 2006) describes as an estimated portion of a construction operation time period when the Lmax value can be expected. These reference sound level and AUF values are presented for each construction activity (9) in Appendix D.
- Apart from the aforementioned approximated effect of atmospheric absorption (i.e., -1 dBA per 1,000 feet), this construction noise analysis considers three cases of meteorological conditions for each of the phases. From an available set of six single-digit numerical codes (1 through 6), these cases are Conservation of Clean Air and Water in Europe (CONCAWE) meteorological categories as follows:
    - Category 2 (“CAT-2”) – Pasquill stability category D, with wind speed greater than 3 meters per second (mps) and traveling away from the receptor position. In other words, this describes the scenario where a receptor position is “upwind” of a noise source (i.e., noise propagates “against the current” of wind flow towards the receptor location) and would thus be considered the quietest or most favorable case.

- Category 4 (“CAT-4”) – Pasquill stability category D, with winds varying as +/- 0.5 mps. This scenario represents “calm” conditions at a receptor position, with essentially no meteorological influence.
- Category 6 (“CAT-6”) – Pasquill stability category D, with wind speed greater than 3 meters per second (mps) and traveling towards the receptor position. In other words, this describes the scenario where a receptor position is “downwind” of a noise source (i.e., noise propagates “with the current” of wind flow towards the receptor location) and hence the loudest or least favorable of the three cases. This CAT-6 category can also describe conditions of stability category G, with wind speed between 0.5 and 3 mps traveling towards the receptor position.

The estimated aggregate SPL from concurrent construction activities was predicted at each of three representative noise-sensitive receptors as follows: ST03 and ST05 from the baseline ambient noise measurement survey as described in Section 2.2; and NNSR, an apparent residential land use located between baseline noise survey locations LT1 and ST11 as shown on Figure 2-1.

This predicted aggregate Project construction noise SPL at each representative noise-sensitive receptor was then logarithmically added to the baseline ambient sound level, then compared arithmetically with the baseline ambient sound level in order to determine if the difference (i.e., between construction noise and the baseline) is greater than 10 dBA.

3.3.1.2 Construction Traffic

Changes in roadway traffic noise level emanating from a given roadway segment or intersection of interest that experiences variances in traffic volumes can be estimated with the following mathematical expression:

Change in L_{eq} = 10*LOG (traffic increase factor)

The traffic increase factor is the ratio of the traffic volumes being compared. In this analysis, average daily traffic (ADT) and peak hourly traffic volumes are studied. For example, an intersection expected to experience an increase in traffic volume of 93 percent, with vehicle speeds and other parameters unchanged, the above expression would predict a change of 10*LOG(1.93) = 2.85 dBA. This change in decibels would then be compared with the impact assessment criterion of 10 dBA to determine significance.

3.3.2 Project Operation

The Cadna/A® Noise Prediction Model (Version 4.5.147) was used to estimate the propagation of sound from aggregate project operations and thereby predict SPL at various distances from the project, including specific locations such as the representative noise-sensitive receptors selected for the ambient sound survey. Cadna/A is a Windows-based software program that predicts and assesses noise levels near industrial noise sources based on ISO 9613-2 algorithms for noise propagation calculations (ISO 1996). The software can accept sound power levels (in dB re: 1 picoWatt) in octave-band center frequency resolution to describe the multiple sound propagation sources of the site processes or activity to be modeled. The calculations account for classical sound wave divergence plus attenuation factors resulting from air absorption, basic ground effects, and barrier/shielding. The advantage of using Cadna/A is that it can handle the three-dimensional (3-D) sound propagation complexity of considering realistic intervening natural and man-made topographical barrier effects, including those resulting from terrain features and from structures such as major buildings, storage tanks, and large equipment.

3.3.2.1 Model Setup and Scenarios

The Project configuration was imported into a Cadna/A model space from available project CAD files provided by the Applicant. The equipment or project feature point-type sound sources considered active or operational are shown in detail in Table 3-1. Apart from the single electrical substation, three hundred fourteen (314) PCS inverters and transformers were included in the model.

TABLE 3-1
PROJECT DAYTIME OPERATION
SOUND-GENERATING SOURCES

Individual Noise Source Type	Sound Power Level (dBA)
PCS Inverter(s), up to 1 MW inside acoustically louvered enclosure	87
PCS Transformer	81
Substation	99

Source:
California Energy Commission (CEC 2011); GL Garrad Hassan Canada Inc. (2013).

Four meteorological cases or “scenarios” were considered as distinct Cadna/A analysis runs as follows:

- **Scenario 1 – Neutral.** No wind, CONCAWE Pasquill stability category “D.”
- **Scenario 2 – Neutral.** No wind, CONCAWE stability category “G”. The difference from #1 is the stability class “G”, which during calm conditions near the ground simulates the potential for a “temperature inversion” whereby air masses stratify and provide a means for sound to travel farther (and hence, attenuate less) than it would under category “D” conditions.
- **Scenario 3.** Wind from a 0 degrees (north) heading at 9 mps (29.5 feet per second [fps]), with CONCAWE stability category “D.”

- **Scenario 4.** Wind from a 180 degrees (south) heading at 9 mps (29.5 fps), with CONCAWE stability category "D."

The latter two scenarios have directions based on what appears in the Air Quality and Global Climate Change Technical Report for the Blythe Mesa Solar Project (Bureau of Land Management 2014). Additional model configuration settings and assumptions are as follows:

- **Outdoor temperature.** 10 degrees Celsius (°C).
- **Relative humidity.** 70 percent.
- **Average ground absorption.** 0.25 (representing a conservative blend of hard, reflective surfaces that tend towards zero, and highly absorptive ground cover that approaches unity).
- **No terrain.** The Project site and vicinity can generally be characterized as relatively flat with little or no natural terrain features that would be expected to cause significant occlusion to direct sound paths between the Project and the nearest noise-sensitive receptors. Hence, terrain was conservatively ignored for this acoustical analysis.
- **Horizontal tracker actuators.** While the Project may involve module arrays featuring single-axis trackers, the drive motors are expected to operate intermittently throughout the day and are therefore not considered a significant aggregate noise source to model.

3.4 RESULTS AND FINDINGS

3.4.1.1 On-site Construction

Tables 3-2, 3-3, and 3-4 present predicted sound pressure levels (SPL) from daytime Project on-site construction activities at the three indicated nearest representative noise-sensitive receptors under down-wind meteorological conditions (CONCAWE CAT-6), which can be considered the worst (i.e., higher resultant noise levels) of the three studied (CAT-2, CAT-4 and CAT-6) because it represents either of two situations:

- High-velocity winds (>3 mps, under stability class D) are traveling in the same direction as Project noise propagation with respect to the receptor location, so the latter is essentially carried "downstream" towards the receptor.
- Modest-velocity winds (0.5 to 3 mps) in a stability class G environment are traveling in the same direction as Project noise propagation with respect to the receptor location.

Table 3-4 indicates that from Month 6 through Month 21 of the anticipated Project construction schedule, concurrent activities that include both Activity 3 and Activity 5 would cause aggregate construction noise levels at NNSR to be over 10 dBA higher than the

TABLE 3-2
PREDICTED DAYTIME ON-SITE PROJECT CONSTRUCTION NOISE PER ACTIVITY AT ST03

Month	Construction Activity Noise (Estimated dBA per Indicated Activity) under CONCAWE CAT-6 Conditions									Aggr. (dBA)	Base (dBA)	Future (dBA)	Diff. (dBA)
	1	2	3	4	5	6	7	8	9				
1	33									33	39	40	1
2	33	32								36	39	41	2
3		32								32	39	40	1
4		32	45							45	39	46	7
5		32	45	36		26				46	39	47	8
6		32	45	36	45	26				48	39	49	10
7		32	45	36	45	26				48	39	49	10
8		32	45	36	45	26				48	39	49	10
9		32	45	36	45	26				48	39	49	10
10		32	45	36	45	26				48	39	49	10
11		32	45	36	45	26				48	39	49	10
12		32	45	36	45	26				48	39	49	10
13		32	45	36	45	26				48	39	49	10
14		32	45	36	45	26				48	39	49	10
15		32	45	36	45	26				48	39	49	10
16		32	45	36	45	26				48	39	49	10
17		32	45	36	45	26	27	24		48	39	49	10
18		32	45	36	45	26	27	24		48	39	49	10
19		32	45	36	45	26	27	24		48	39	49	10
20			45	36	45	26	27	24	27	48	39	49	10
21			45	36	45	26	27	24	27	48	39	49	10
22				36	45	26	27	24	27	46	39	47	8
23					45				27	45	39	46	7
24									27	27	39	39	0
25									27	27	39	39	0

Sources: First Solar (2015); FHWA (2006); AECOM (2015).

Notes:

Aggr. = aggregate predicted noise level from all activities.

Base = measured baseline (i.e., existing outdoor ambient sound level).

Future = logarithmic sum of Aggr. and Base.

Diff. = arithmetic difference (in dBA) between Future and Base. A difference of > 10 dBA indicates a noise impact (value in **bold**).

TABLE 3-3
PREDICTED DAYTIME ON-SITE PROJECT CONSTRUCTION NOISE PER ACTIVITY AT ST05

	Construction Activity Noise (Estimated dBA per Indicated Activity) under CONCAWE CAT-6 Conditions												
Month	1	2	3	4	5	6	7	8	9	Aggr. (dBA)	Base (dBA)	Future (dBA)	Diff. (dBA)
1	32									32	40	41	1
2	32	31								34	40	41	1
3		31								31	40	41	1
4		31	43							43	40	45	5
5		31	43	34		24				44	40	45	5
6		31	43	34	43	24				47	40	48	8
7		31	43	34	43	24				47	40	48	8
8		31	43	34	43	24				47	40	48	8
9		31	43	34	43	24				47	40	48	8
10		31	43	34	43	24				47	40	48	8
11		31	43	34	43	24				47	40	48	8
12		31	43	34	43	24				47	40	48	8
13		31	43	34	43	24				47	40	48	8
14		31	43	34	43	24				47	40	48	8
15		31	43	34	43	24				47	40	48	8
16		31	43	34	43	24				47	40	48	8
17		31	43	34	43	24	24	21		47	40	48	8
18		31	43	34	43	24	24	21		47	40	48	8
19		31	43	34	43	24	24	21		47	40	48	8
20			43	34	43	24	24	21	25	46	40	47	7
21			43	34	43	24	24	21	25	46	40	47	7
22				34	43	24	24	21	25	44	40	45	5
23					43				25	43	40	45	5
24									25	25	40	40	0
25									25	25	40	40	0

Sources: First Solar (2015); FHWA (2006); AECOM (2015).

Notes:

Aggr. = aggregate predicted noise level from all activities.

Base = measured baseline (i.e., existing outdoor ambient sound level).

Future = logarithmic sum of Aggr. and Base.

Diff. = arithmetic difference (in dBA) between Future and Base. A difference of > 10 dBA indicates a noise impact (value in **bold**).

TABLE 3-4
PREDICTED DAYTIME ON-SITE PROJECT CONSTRUCTION NOISE PER ACTIVITY AT NEAREST NOISE-SENSITIVE RECEPTOR

	Construction Activity Noise (Estimated dBA per Indicated Activity) under CONCAWE CAT-6 Conditions												
Month	1	2	3	4	5	6	7	8	9	Aggr. (dBA)	Base (dBA)	Future (dBA)	Diff. (dBA)
1	36									36	41	42	1
2	36	36								39	41	43	2
3		36								36	41	42	1
4		36	49							50	41	51	10
5		36	49	41		29				50	41	51	10
6		36	49	41	49	29				53	41	53	12
7		36	49	41	49	29				53	41	53	12
8		36	49	41	49	29				53	41	53	12
9		36	49	41	49	29				53	41	53	12
10		36	49	41	49	29				53	41	53	12
11		36	49	41	49	29				53	41	53	12
12		36	49	41	49	29				53	41	53	12
13		36	49	41	49	29				53	41	53	12
14		36	49	41	49	29				53	41	53	12
15		36	49	41	49	29				53	41	53	12
16		36	49	41	49	29				53	41	53	12
17		36	49	41	49	29	30	27		53	41	53	12
18		36	49	41	49	29	30	27		53	41	53	12
19		36	49	41	49	29	30	27		53	41	53	12
20			49	41	49	29	30	27	31	53	41	53	12
21			49	41	49	29	30	27	31	53	41	53	12
22				41	49	29	30	27	31	50	41	51	10
23					49				31	49	41	50	9
24									31	31	41	41	0
25									31	31	41	41	0

Sources: First Solar (2015); FHWA (2006); AECOM (2015).

Notes:

Aggr. = aggregate predicted noise level from all activities.

Base = measured baseline (i.e., existing outdoor ambient sound level).

Future = logarithmic sum of Aggr. and Base.

Diff. = arithmetic difference (in dBA) between Future and Base. A difference of > 10 dBA indicates a noise impact (value in **bold**).

Noise levels presented for Months 6 -21 include post driving machines and do not consider noise mitigation.

measured baseline daytime outdoor ambient sound level and thus a temporary, but significant noise impact. For other construction months, and for noise-sensitive receptors (NSR) ST03 and ST05, noise impacts are predicted to be less than significant. Under upwind and calm meteorological conditions (CONCAWE CAT-2 and CAT-4, respectively), no significant impacts would be expected during the day for all three NSR locations.

Tables 3-5, 3-6, and 3-7 present predicted SPL from nighttime Project on-site construction activities at the three indicated nearest representative noise-sensitive receptors under down-wind meteorological conditions (CONCAWE CAT-6). While construction activities are not expected to occur at night, some limited quantities of certain equipment such as generators (to provide lighting and HVAC for offices and security personnel on-site) are anticipated to operate through nighttime hours.

The rightmost columns of Tables 3-5, 3-6, and 3-7 show that no significant impacts are expected due to predicted construction noise at night. Under upwind and calm meteorological conditions (CONCAWE CAT-2 and CAT-4, respectively), no significant impacts would be expected during the night for all three NSR locations. To support this assertion, Appendix D provides a set of six tables that present estimates of construction noise per activity, during daytime and nighttime, for each of these CONCAWE CAT-6, CAT-4 and CAT-2 meteorological conditions.

3.4.1.2 Construction Traffic

Due to the expected travel route for commuting construction personnel and deliveries of construction materials and equipment, there would be roadway traffic increase on SR-78 and 16th Avenue/Seeley Avenue, along which some representative noise-sensitive receptors are located such as those near measurement locations ST09 and ST10 (refer to Figure 2-1. Although the noise from individual truck or passenger vehicle pass-bys associated with Project construction traffic would generally be no louder than that of current individual vehicle pass-bys along these roadways, the quantity of such noise events would increase due to Project construction traffic within a given time period and thus cause a corresponding increase in existing outdoor ambient noise level over that time period. As supported by field survey observations, this analysis assumes that roadway noise is a dominant acoustical contributor to the outdoor ambient noise level at noise-sensitive receptors in proximity to the SR-78 and 16th Avenue/Seeley Avenue roadways.

Currently, ADT for the SR-78/16th Avenue/Seeley Avenue intersection is a total of 2,222 vehicles. Project construction would add up to an estimated 2,075 vehicle trips to this ADT; hence, the anticipated future ADT for this intersection would be 4,297 and represent nearly a 93 percent ADT increase. The expected change in traffic noise level (Leq) over the 24-hour period would be 10*LOG(1.93) = 2.85 dBA. Based on the Project construction traffic analysis, the current afternoon peak hour traffic volume of 183 for this intersection could

TABLE 3-5
PREDICTED NIGHTTIME ON-SITE PROJECT CONSTRUCTION NOISE PER ACTIVITY AT ST03

Month	Construction Activity Noise (Estimated dBA per Indicated Activity) under CONCAWE CAT-6 Conditions									Aggr. (dBA)	Base (dBA)	Future (dBA)	Diff. (dBA)
	1	2	3	4	5	6	7	8	9				
1	24									24	39	39	0
2	24	24								27	39	39	0
3		24								24	39	39	0
4		24	31							32	39	40	1
5		24	31			20				32	39	40	1
6		24	31			20				32	39	40	1
7		24	31			20				32	39	40	1
8		24	31			20				32	39	40	1
9		24	31			20				32	39	40	1
10		24	31			20				32	39	40	1
11		24	31			20				32	39	40	1
12		24	31			20				32	39	40	1
13		24	31			20				32	39	40	1
14		24	31			20				32	39	40	1
15		24	31			20				32	39	40	1
16		24	31			20				32	39	40	1
17		24	31			20	20			33	39	40	1
18		24	31			20	20			33	39	40	1
19		24	31			20	20			33	39	40	1
20			31			20	20		23	33	39	40	1
21			31			20	20		23	33	39	40	1
22						20	20		23	26	39	39	0
23									23	23	39	39	0
24									23	23	39	39	0
25									23	23	39	39	0

Sources: First Solar (2015); FHWA (2006); AECOM (2015).
Notes:
Aggr. = aggregate predicted noise level from all activities.
Base = measured baseline (i.e., existing outdoor ambient sound level).
Future = logarithmic sum of Aggr. and Base.
Diff. = arithmetic difference (in dBA) between Future and Base. A difference of > 10 dBA indicates a noise impact (value in **bold**).

TABLE 3-6

PREDICTED NIGHTTIME ON-SITE PROJECT CONSTRUCTION NOISE PER ACTIVITY AT ST05

	Construction Activity Noise (Estimated dBA per Indicated Activity) under CONCAWE CAT-6 Conditions												
Month	1	2	3	4	5	6	7	8	9	Aggr. (dBA)	Base (dBA)	Future (dBA)	Diff. (dBA)
1	22									23	40	40	0
2	22	22								25	40	40	0
3		22								23	40	40	0
4		22	30							30	40	40	0
5		22	30			17				31	40	41	1
6		22	30			17				31	40	41	1
7		22	30			17				31	40	41	1
8		22	30			17				31	40	41	1
9		22	30			17				31	40	41	1
10		22	30			17				31	40	41	1
11		22	30			17				31	40	41	1
12		22	30			17				31	40	41	1
13		22	30			17				31	40	41	1
14		22	30			17				31	40	41	1
15		22	30			17				31	40	41	1
16		22	30			17				31	40	41	1
17		22	30			17	17			31	40	41	1
18		22	30			17	17			31	40	41	1
19		22	30			17	17			31	40	41	1
20			30			17	17		20	31	40	41	1
21			30			17	17		20	31	40	41	1
22						17	17		20	24	40	40	0
23									20	20	40	40	0
24									20	20	40	40	0
25									20	20	40	40	0

Sources: First Solar (2015); FHWA (2006); AECOM (2015).

Notes:

Aggr. = aggregate predicted noise level from all activities.

Base = measured baseline (i.e., existing outdoor ambient sound level).

Future = logarithmic sum of Aggr. and Base.

Diff. = arithmetic difference (in dBA) between Future and Base. A difference of > 10 dBA indicates a noise impact (value in **bold**).

TABLE 3-7

PREDICTED NIGHTTIME ON-SITE PROJECT CONSTRUCTION NOISE PER ACTIVITY AT NEAREST NOISE-SENSITIVE RECEPTOR

	Construction Activity Noise (Estimated dBA per Indicated Activity) under CONCAWE CAT-6 Conditions												
Month	1	2	3	4	5	6	7	8	9	Aggr. (dBA)	Base (dBA)	Future (dBA)	Diff. (dBA)
1	27									27	41	41	0
2	27	27								30	41	41	0
3		27								27	41	41	0
4		27	36							37	41	42	1
5		27	36			23				37	41	42	1
6		27	36			23				37	41	42	1
7		27	36			23				37	41	42	1
8		27	36			23				37	41	42	1
9		27	36			23				37	41	42	1
10		27	36			23				37	41	42	1
11		27	36			23				37	41	42	1
12		27	36			23				37	41	42	1
13		27	36			23				37	41	42	1
14		27	36			23				37	41	42	1
15		27	36			23				37	41	42	1
16		27	36			23				37	41	42	1
17		27	36			23	23			37	41	42	1
18		27	36			23	23			37	41	42	1
19		27	36			23	23			37	41	42	1
20			36			23	23		26	37	41	42	1
21			36			23	23		26	37	41	42	1
22						23	23		26	29	41	41	0
23									26	26	41	41	0
24									26	26	41	41	0
25									26	26	41	41	0

Sources: First Solar (2015); FHWA (2006); AECOM (2015).

Notes:

Aggr. = aggregate predicted noise level from all activities.

Base = measured baseline (i.e., existing outdoor ambient sound level).

Future = logarithmic sum of Aggr. and Base.

Diff. = arithmetic difference (in dBA) between Future and Base. A difference of > 10 dBA indicates a noise impact (value in **bold**).

increase by as much as 810 to an estimated total of 993 during the Project work force evening commute. This afternoon peak hour traffic increase factor of 5.43 would result in an hourly L_{eq} increase of nearly 7.34 dBA.

Based on the impact criterion, and because both the anticipated change in daily L_{eq} and the afternoon peak hour L_{eq} are less than 10 dBA, the increase in traffic noise due to Project construction would be considered less than significant.

3.4.1.3 Construction Occupational Noise Exposure

Outdoor sound levels within the Project boundary during construction may exceed the OSHA 90 dBA threshold near certain operating or idling powered mobile and stationary equipment, but these levels will diminish with distance from these sources. Consistent with OSHA/Cal-OSHA guidance and regulatory compliance requirements, Project contractors will need to post warnings with respect to areas that may be noise level hazards and provide construction workers with OSHA approved hearing protection devices (HPD) as part of an applicable hearing conservation program.

3.4.1.4 Construction Laydown, Staging and Parking Areas

As shown on Figure 1-2, there are three construction laydown and parking areas located generally along the north (near the proposed substation), southwest and southeast segments of the Project site boundary. Of the three locations, the northern construction laydown/staging area near the site entrance is expected to be subject to the most noise generating activity. Contractors and equipment suppliers will use the laydown areas during construction to coordinate delivery of equipment and materials, construction, and construction worker parking and processing. The primary noise source for the construction laydown areas would be a truck staging area (e.g., where a dump truck may idle with its engine running). Assuming a dump truck (reference SPL at 50 feet = 76 dBA L_{max}, and 40 percent acoustical usage factor, per FWHA RCNM Table 1) and an operating forklift (75 dBA L_{eq} at 50 feet, with 20 percent acoustical usage factor, per FWHA RCNM Table 1) are the loudest two types of equipment at this location, the composite noise level would be 79 dBA L_{max} at 50 feet. Since the closest representative NSR to the northern laydown/staging area is NNSR which is located approximately 8,200 feet away, the expected noise level from this laydown/staging area would be no greater than 22 dBA. Therefore, the noise effect from the construction laydown area(s) is anticipated to be less than significant.

3.4.2 Project Operation

3.4.2.1 On-site Operational Activities

Table 3-8 presents predicted SPL from Project on-site operation at the three indicated nearest representative NSR. Similar to tables of construction noise prediction results from Section

TABLE 3-8
PREDICTED PROJECT OPERATION NOISE LEVELS

	ST03								NNSR			
Meteorological Condition	PL (dBA)	BL (dBA)	Future (dBA)	Diff. (dBA)	PL (dBA)	BL (dBA)	Future (dBA)	Diff. (dBA)	PL (dBA)	BL (dBA)	Future (dBA)	Diff. (dBA)
Wind neutral[1]	29	39	39	0	28	40	40	0	31	41	41	0
Temperature inversion[2]	33	39	40	1	32	40	41	1	35	41	42	1
9 mps wind from N[3]	26	39	39	0	ST05 25	40	40	0	28	41	41	0
9 mps wind from S[4]	33	39	40	1	32	40	41	1	35	41	42	1

Sources: AECOM (2015).

Notes:

[1] Calm meteorological conditions (winds less than 0.5 meters per second [mps] in any direction), CONCAWE Stability Class D.

[2] Calm meteorological conditions (no wind), CONCAWE Stability Class G.

[3] Winds are from the north, at 9 mps (29.5 feet per second [fps]), CONCAWE Stability Class D.

[4] Winds are from the south, at 9 mps (29.5 fps), CONCAWE Stability Class D.

ST03 = short-term (ST) baseline ambient sound level survey position “ST03.”
ST05 = short-term (ST) baseline ambient sound level survey position “ST05.”
NNSR = nearest noise-sensitive receptor (“unknown structures” located between LT1 and ST11).
PL = predicted sound pressure level, dBA.
BL = measured baseline level (from daytime short-term measurement in field), dBA.
Future = logarithmic sum of PL and BL.
Diff. = arithmetic difference (in dBA) between Future and BL. A difference of > 10 dBA indicates a noise impact (value in **bold**).

3.4.1.1, predicted operation noise levels (PL) are compared with measured existing baseline ambient outdoor sound levels (BL) associated with these NSR to show that Project operation noise is expected to be quieter than existing outdoor ambient sound levels.

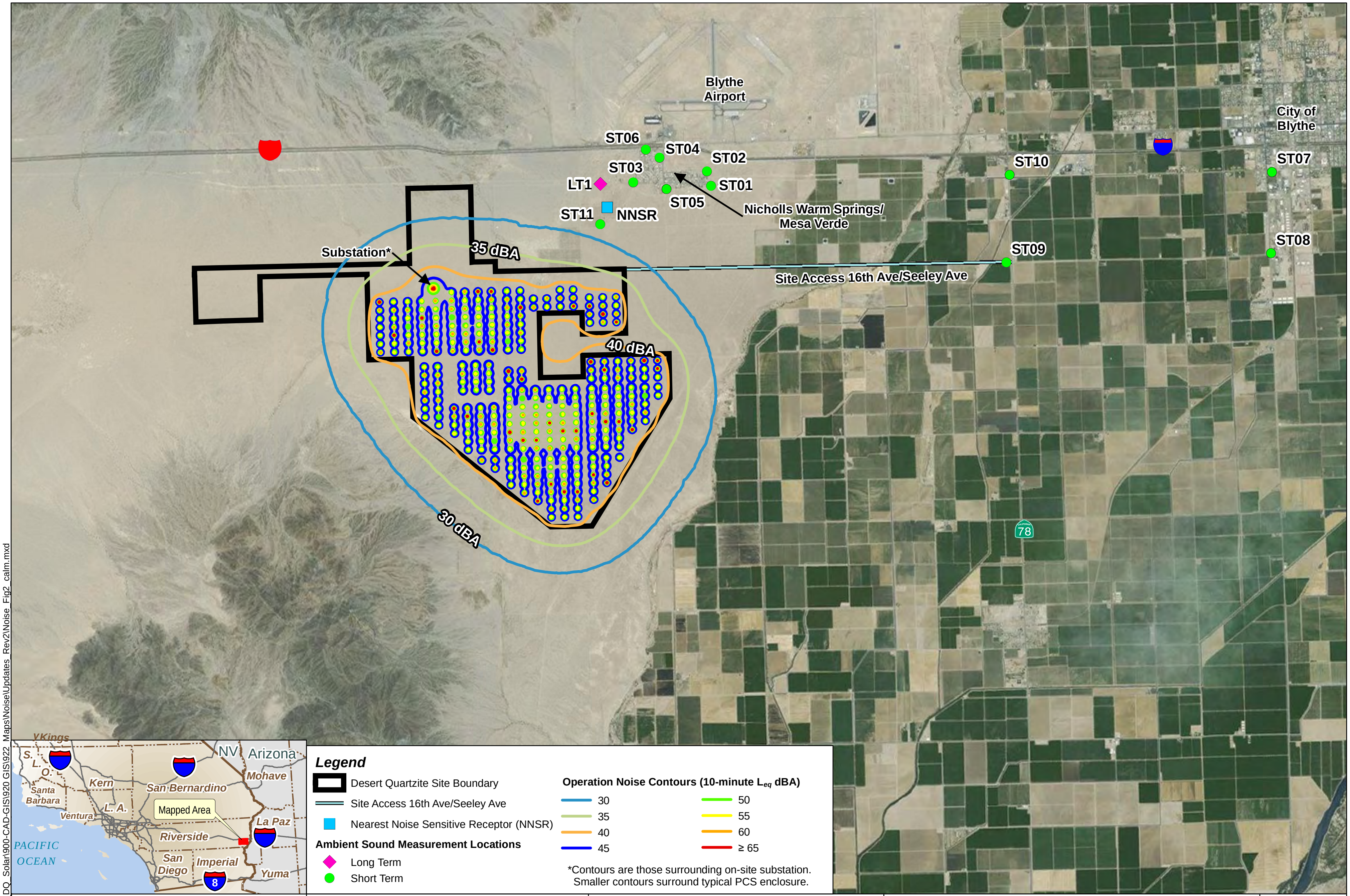
Not only are anticipated Project operations noise levels less than measured existing outdoor ambient sound levels, they are all less than 45 dBA L_{eq} (10-minute period) as required by the Riverside County Noise Element. Hence, Project operations noise under all four meteorological conditions are not anticipated to cause significant noise impacts at the three nearest studied NSR. Figures 3-1 through 3-4 (presented at the end of Section 3.0) display predicted Project operation noise isopleths (a.k.a. “contours”) for the same four meteorological conditions listed in Table 3-8.

CEQA Appendix G, Environmental Checklist Form, XII. Noise, includes several indicators for potential noise impacts from projects. Based on the impact assessment findings presented above for on-site operational activities, the following additional conclusions are made relative to potential noise-related impacts during Project operations:

- Project operations would not generate excessive ground-borne vibration or noise levels.
- Project operations would not result in a substantial permanent increase in ambient noise levels in the Project vicinity above levels that exist without the Project.
- Although the closest Project boundary is located approximately 2 miles southwest of the Blythe Airport, Project operations would not expose people working or residing in the Project area to excessive noise levels.

3.4.2.2 Operations Traffic

Operations traffic for the Project involves only a small quantity of vehicles that should result in no more than a modest increase in existing levels of roadway traffic—much less than a doubling of ADT in the peak morning or afternoon hourly volumes. Using the expression from Section 3.3.1.2 that estimates change in traffic noise based on traffic volume variance, such a change in the traffic noise level would be less than 3 dBA and hence considered a less than significant impact when using the same impact criteria for construction traffic.


Blythe
Airport
City of
Blythe
ST06
ST04
ST02
ST03
LT1
ST01
ST05
ST11
NNSR
Nicholls Warm Springs/
Mesa Verde
ST10
ST07
ST08
ST09
Substation*
35 dBA
Site Access 16th Ave/Seeley Ave
40 dBA
30 dBA
78
Kings
S.
L.
O.
Kern
San Bernardino
NV
Arizona
Mohave
Santa
Barbara
Ventura
L. A.
Mapped Area
La Paz
Riverside
PACIFIC
OCEAN
San
Diego
Imperial
8
Yuma
Legend
Desert Quartzite Site Boundary
Site Access 16th Ave/Seeley Ave
Nearest Noise Sensitive Receptor (NNSR)
Ambient Sound Measurement Locations
Long Term
Short Term
Operation Noise Contours (10-minute L_eq dBA)
30
35
40
45
50
55
60
≥ 65
*Contours are those surrounding on-site substation.
Smaller contours surround typical PCS enclosure.

Noise Analysis
Desert Quartzite Solar Project
Riverside County, CA

URS (an AECOM Company)

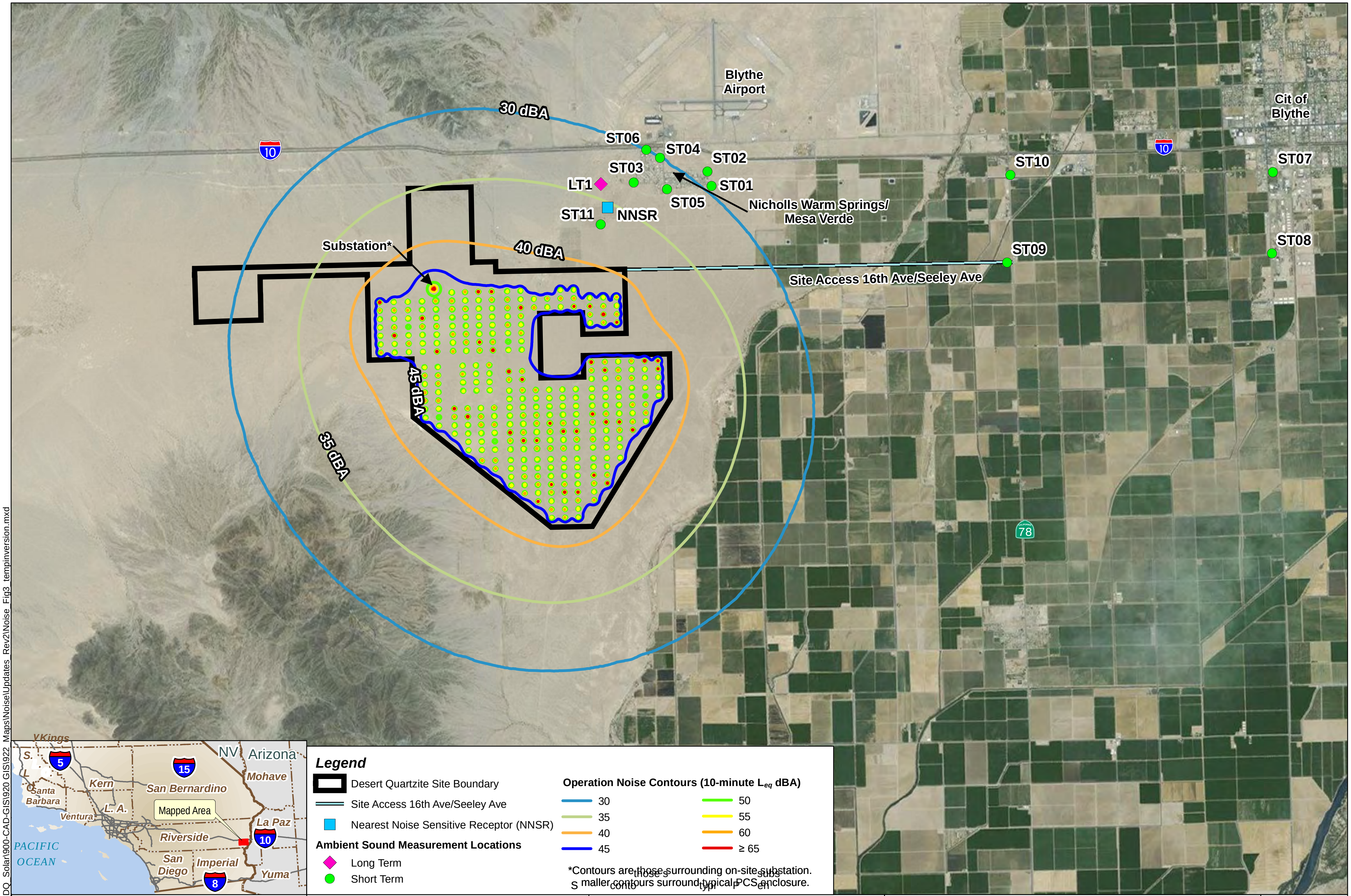
N
0
0.75
1.5
Miles
0
4,000
8,000
Feet

Source: [1] Aerial Imagery (NAIP 2014), [2] Roads, Boundaries, Cities, River (Esri 2012). [3] Noise Contours, Measurement Locations (URS 2014). [4] Project Features (First Solar 2014).

Figure 3-1. Desert Quartzite Solar Project Wind Neutral (Calm)

2015

P:\ 6041\60419825 DQ Solar\900-CAD-GIS\920 GIS\922 Maps\Noise\Updates Rev2\Noise Fig2 calm.mxd


Blythe Airport
Cit of Blythe
30 dBA
35 dBA
40 dBA
45 dBA
10
10
78
ST01
ST02
ST03
ST04
ST05
ST06
ST07
ST08
ST09
ST10
ST11
LT1
NNSR
Nicholls Warm Springs/ Mesa Verde
Substation*
Site Access 16th Ave/Seeley Ave
Kings
S. L. O.
Santa Barbara
Kern
San Bernardino
NV
Arizona
Mohave
Ventura
L. A.
Mapped Area
La Paz
Riverside
PACIFIC OCEAN
San Diego
Imperial
Yuma
5
15
10
8
Legend
Desert Quartzite Site Boundary
Site Access 16th Ave/Seeley Ave
Nearest Noise Sensitive Receptor (NNSR)
Ambient Sound Measurement Locations
Long Term
Short Term
Operation Noise Contours (10-minute L_{eq} dBA)
30
35
40
45
50
55
60
≥ 65
*Contours are those surrounding on-site substation. Smaller contours surround typical PCS enclosure.

Noise Analysis
Desert Quartzite Solar Project
Riverside County, CA

URS (an AECOM Company)

0 0.75 1.5 Miles

0 4,000 8,000 Feet

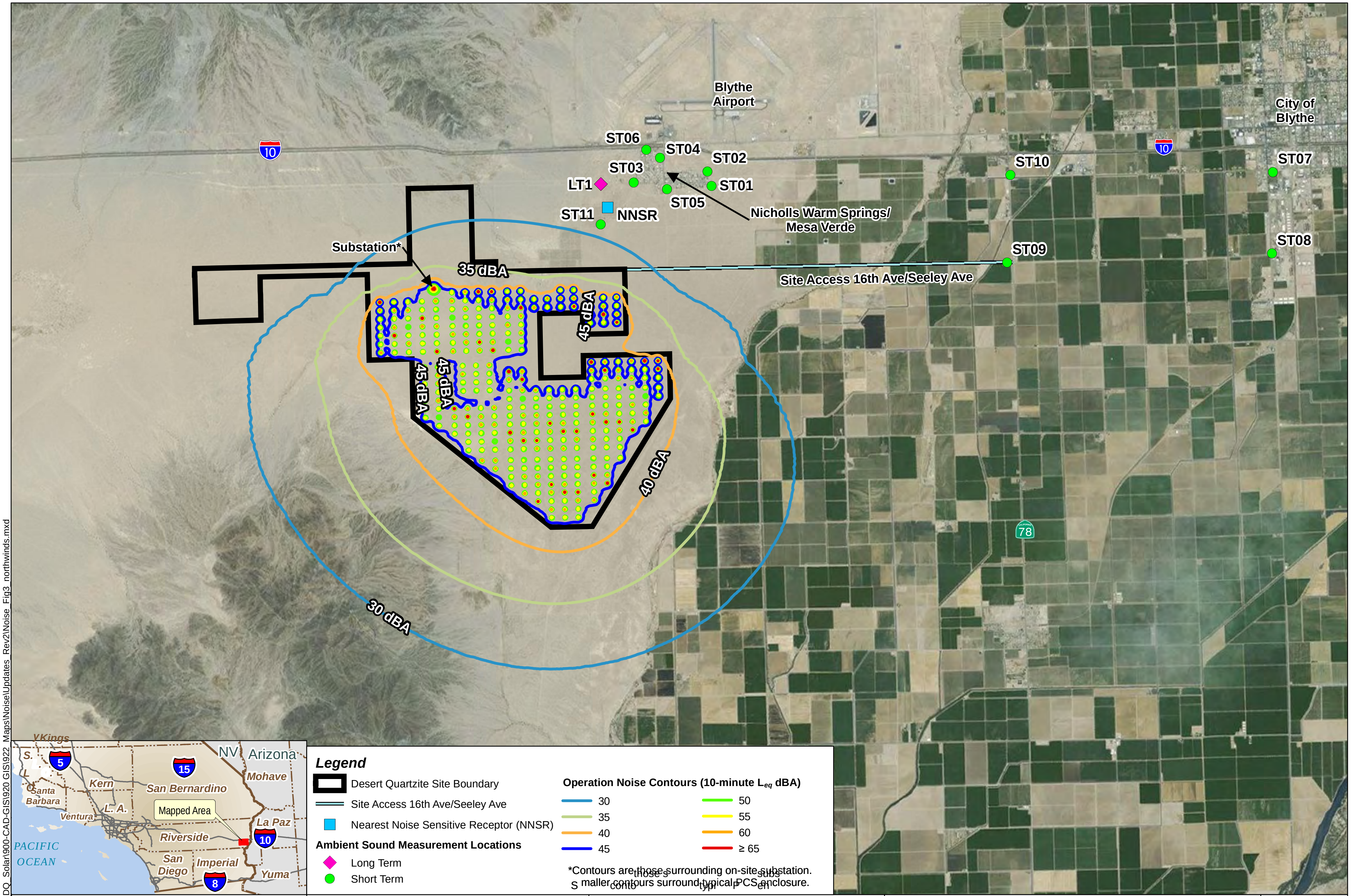
N

Source: [1] Aerial Imagery (NAIP 2014), [2] Roads, Boundaries, Cities, River (Esri 2012). [3] Noise Contours, Measurement Locations (URS 2014). [4] Project Features (First Solar 2014).

Figure 3-2. Desert Quartzite Solar Project Temperature Inversion

2015

P:\ 60416041\60419825 DQ Solar\900-CAD-GIS\920 GIS\922 Maps\Noise\Updates Rev2\Noise Fig3 tempinversion.mxd


Blythe Airport
City of Blythe
10
ST06
ST04
ST02
ST03
LT1
ST01
ST05
ST10
ST07
ST11
NNSR
Nicholls Warm Springs/ Mesa Verde
ST09
ST08
Substation*
35 dBA
Site Access 16th Ave/Seeley Ave
45 dBA
45 dBA
45 dBA
40 dBA
30 dBA
78
Kings
S.
L.
Santa Barbara
Kern
5
15
NV
Arizona
Mohave
San Bernardino
Ventura
L. A.
Mapped Area
La Paz
Riverside
10
PACIFIC OCEAN
San Diego
Imperial
8
Yuma

Legend

▭ Desert Quartzite Site Boundary

═ Site Access 16th Ave/Seeley Ave

🟦 Nearest Noise Sensitive Receptor (NNSR)

Ambient Sound Measurement Locations

◆ Long Term

● Short Term

Operation Noise Contours (10-minute L_{eq} dBA)

30	50
35	55
40	60
45	≥ 65

*Contours are those surrounding on-site substation. Smaller contours surround typical PCS enclosure.

Noise Analysis
Desert Quartzite Solar Project
Riverside County, CA

URS (an AECOM Company)

0 0.75 1.5 Miles

0 4,000 8,000 Feet

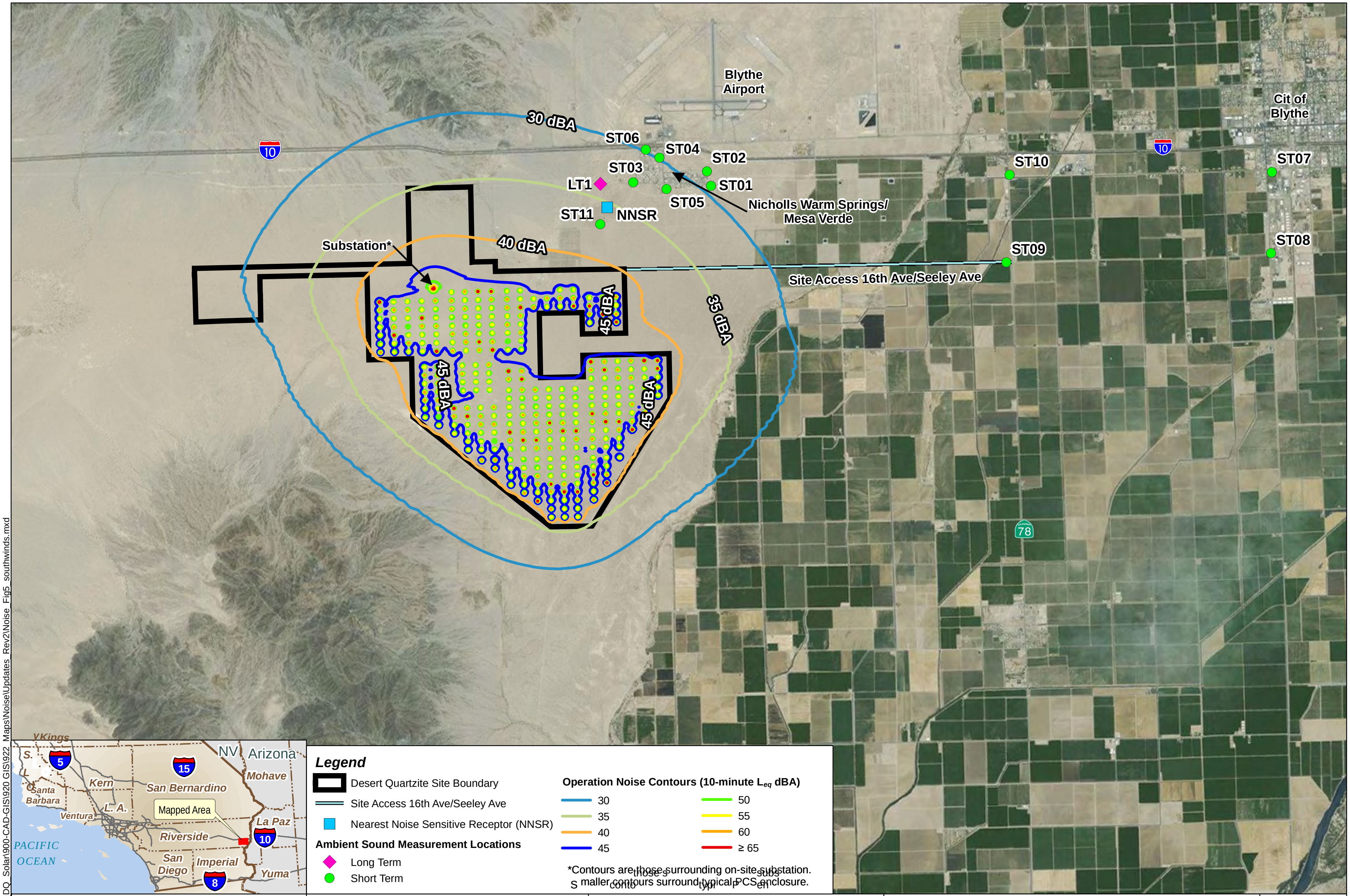
N

Source: [1] Aerial Imagery (NAIP 2014), [2] Roads, Boundaries, Cities, River (Esri 2012). [3] Noise Contours, Measurement Locations (URS 2014). [4] Project Features (First Solar 2014).

Figure 3-3. Desert Quartzite Solar Project
29.5 Feet Per Second
Winds From North

2015

P:\ 6041\60419825 DQ Solar\900-CAD-GIS\920 GIS\922 Maps\Noise\Updates Rev2\Noise Fig3 northwinds.mxd


Blythe Airport
Cit of Blythe
10
30 dBA
ST06
ST04
ST02
ST03
LT1
ST01
ST05
Nicholls Warm Springs/ Mesa Verde
ST11
NNSR
ST10
ST07
ST09
ST08
Substation*
40 dBA
45 dBA
35 dBA
Site Access 16th Ave/Seeley Ave
78
Kings
S. L.
Santa Barbara
Kern
Ventura
L. A.
San Bernardino
Mapped Area
NV
Arizona
Mohave
La Paz
Riverside
PACIFIC OCEAN
San Diego
Imperial
Yuma
5
15
10
8

Legend

- Desert Quartzite Site Boundary
- Site Access 16th Ave/Seeley Ave
- Nearest Noise Sensitive Receptor (NNSR)

Ambient Sound Measurement Locations

- ◆ Long Term
- ● Short Term

Operation Noise Contours (10-minute L_{eq} dBA)

30	50
35	55
40	60
45	≥ 65

*Contours are those surrounding on-site substation. Smaller contours surround typical PCS enclosure.

Noise Analysis
Desert Quartzite Solar Project
Riverside County, CA

URS (an AECOM Company)

0 0.75 1.5 Miles

0 4,000 8,000 Feet

N

Source: [1] Aerial Imagery (NAIP 2014), [2] Roads, Boundaries, Cities, River (Esri 2012). [3] Noise Contours, Measurement Locations (URS 2014). [4] Project Features (First Solar 2014).

Figure 3-4. Desert Quartzite Solar Project
29.5 Feet Per Second
Winds From South

2015

P:\ 6041\60419825 DQ Solar\900-CAD-GIS\920 GIS\922 Maps\Noise\Updates Rev2\Noise Fig5 southwinds.mxd

SECTION 4.0
APPLICANT-RECOMMENDED MITIGATION MEASURES

The following are mitigation measures recommended by the Project Applicant that, when properly designed and implemented, should enable Project noise levels to be rendered less than significant impacts to the affected environment.

4.1 ON-SITE CONSTRUCTION

During months 6 through 21 of Project construction, solar array post-installation machines would be active during concurrent construction Activities 3 and 5. Noise from operation of these post-installation machines, as shown in the construction noise prediction model detail for these two Activities in Appendix D, is clearly dominant (i.e., compared to the noise contribution from other concurrent construction vehicles and processes) and would cause the expected impactful ambient noise increase as shown in Table 3-4.

Sound level measurements of pile-driving machines considered similar to the post-installation machines anticipated for usage on this Project are discussed in Appendix I of the AV Solar Ranch One (AVSR1) Project EIR (County of Los Angeles 2010) as follows:

> “Noise measurements specific to vertical hydraulic pile drivers were conducted to verify the noise emission data. Based on noise measurement data conducted during pile driving operations at a similar facility, noise levels for this class of equipment under operating conditions similar to the operating conditions expected during the construction of the proposed Project, are 88 dBA Leq at a distance of 50 feet from the front of the equipment and 81 dBA Leq at a distance of 50 feet from the rear of the equipment.”

Since the predictive construction noise analysis for this Project assumed a FHWA RCNM reference L_{max} and AUF that results in an L_{eq} similar to the above-referenced 88 dBA value from AVSR1, careful orientation of these post-installation machines on the Project site during construction can potentially exploit what appears to be a 7 dBA noise reduction opportunity. In other words, where post installation occurs within 6,560 feet (2 kilometer [km]) of NNSR, the post installation machine(s) should be oriented or turned so that the quieter (i.e., 81 dBA Leq at 50 feet) “rear” side of the equipment faces the direction of NNSR. Applying this equipment installation technique would result in aggregate construction noise levels to be lower during Months 6 through 21 and yield outdoor ambient noise increments at NNSR that would be less than 10 dBA and thus a less than significant noise impact. Beyond this 6,560-foot (2-km) radial distance from NNSR, specific post machine installation orientation that faces the equipment rear towards NNSR would not be required to keep predicted construction noise at less than impactful levels.

4.2 CONSTRUCTION TRAFFIC

No mitigation measures are needed as noise impacts are anticipated to be less than significant without mitigation. Nevertheless, this assessment assumes that construction vehicles will be maintained according to manufacturers' instructions and recommendations and feature factory-approved exhaust mufflers. In addition, trucks hauling materials and equipment will comply with local ordinances and regulations with respect to travel speed and (as applicable) limitations on usage of compression-type braking.

4.3 ON-SITE OPERATIONAL ACTIVITIES

No mitigation measures are needed as noise impacts are anticipated to be less than significant without mitigation.

4.4 OPERATIONS TRAFFIC

No mitigation measures are needed as noise impacts are anticipated to be less than significant without mitigation.

SECTION 5.0
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SECTION 6.0
LIST OF PREPARERS

Mark Storm, INCE Bd. Cert., AECOM, Senior Project Engineer, Acoustics & Noise Control Practice.

Cole Martin, INCE, AECOM, Noise Analyst, Acoustics & Noise Control Practice.

APPENDIX A

FUNDAMENTALS OF NOISE

FUNDAMENTALS OF NOISE

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity and that interferes with or disrupts normal activities. Although prolonged exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance of the noise, and its appropriateness in the setting; the time of day and the type of activity during which the noise occurs; and the sensitivity of the individual.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the pitch of the sound and is measured in Hertz (Hz), while intensity describes the sound's loudness and is measured in decibels (dB). Decibels are measured using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above approximately 110 dB begin to be felt inside the human ear as discomfort and eventually pain at 120 dB and higher levels. The minimum change in the sound level of individual events that an average human ear can detect is about 1 to 2 dB. A 3 to 5 dB change is readily perceived. An increase in sound level of about 10 dB is usually perceived by the average person as a doubling (or if decrease of 10 dB, halving) of the sound's loudness.

Due to the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically; however, some simple rules are useful in dealing with sound levels. For instance, if a sound's energy is doubled, the sound level increases by 3 dB, regardless of the initial sound level. By way of example: 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB.

Sound level is usually expressed by reference to a known standard. This report refers to SPL and sound power level (PWL). In expressing sound pressure on a logarithmic scale, the sound pressure is compared to a reference value of 20 micropascals. SPL depends not only on the power of the source, but also on the distance from the source and on the acoustical characteristics of the space surrounding the source. PWL, on the other hand, is independent of these environmental factors. To help distinguish the two descriptors, one may use a lighting analogy: the wattage of a light bulb when turned on inside a large room may be a constant 100 watts, but the brightness or intensity of the light changes with receptor distance and other parameters. For example, if the room walls were painted white, which is reflective, they would make the room appear brighter. On the other hand, walls painted black (a light-absorptive color) would decrease apparent brightness.

Hz is a measure of how many times each second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates a number of times per second. When the drum skin vibrates 100 times per second it generates a sound pressure wave that is oscillating at 100 Hz, and this pressure oscillation is perceived by the ear/brain as a tonal pitch of 100 Hz. Sound frequencies between 20 and 20,000 Hz are within the range of sensitivity of the best human ear.

Sound from a tuning fork contains a single frequency (a pure tone), but most sounds one hears in the environment do not consist of a single frequency and instead are composed of a broad band of frequencies differing in sound level. The method commonly used to quantify environmental sounds consists of evaluating all frequencies of a sound according to a weighting system that reflects the typical frequency-dependent sensitivity of average healthy human hearing. This is called “A-weighting,” and the sound level measured is in A-weighted decibels (dBA). In practice, the level of a noise source is measured using a sound level meter that includes a filter corresponding to the dBA curve of decibel adjustment per octave band center frequency to a flat, or unweighted SPL.

Although sound level value may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a mixture of noise from distant sources that creates a relatively steady background noise in which no particular source is identifiable. A single descriptor called the equivalent sound level (L_{eq}) may be used to describe sound that is changing in level. L_{eq} is the energy-averaged sound level during a measured time interval. It is the equivalent constant sound level that would have to be produced by a given source to equal the acoustic energy contained in the fluctuating sound level measured. In addition to the energy-average level, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the maximum sound level (L_{max}) and minimum sound level (L_{min}) indicators that represent the root-mean-square maximum and minimum noise levels measured during the monitoring interval. The L_{min} value obtained for a particular monitoring location is often called the acoustic floor for that location.

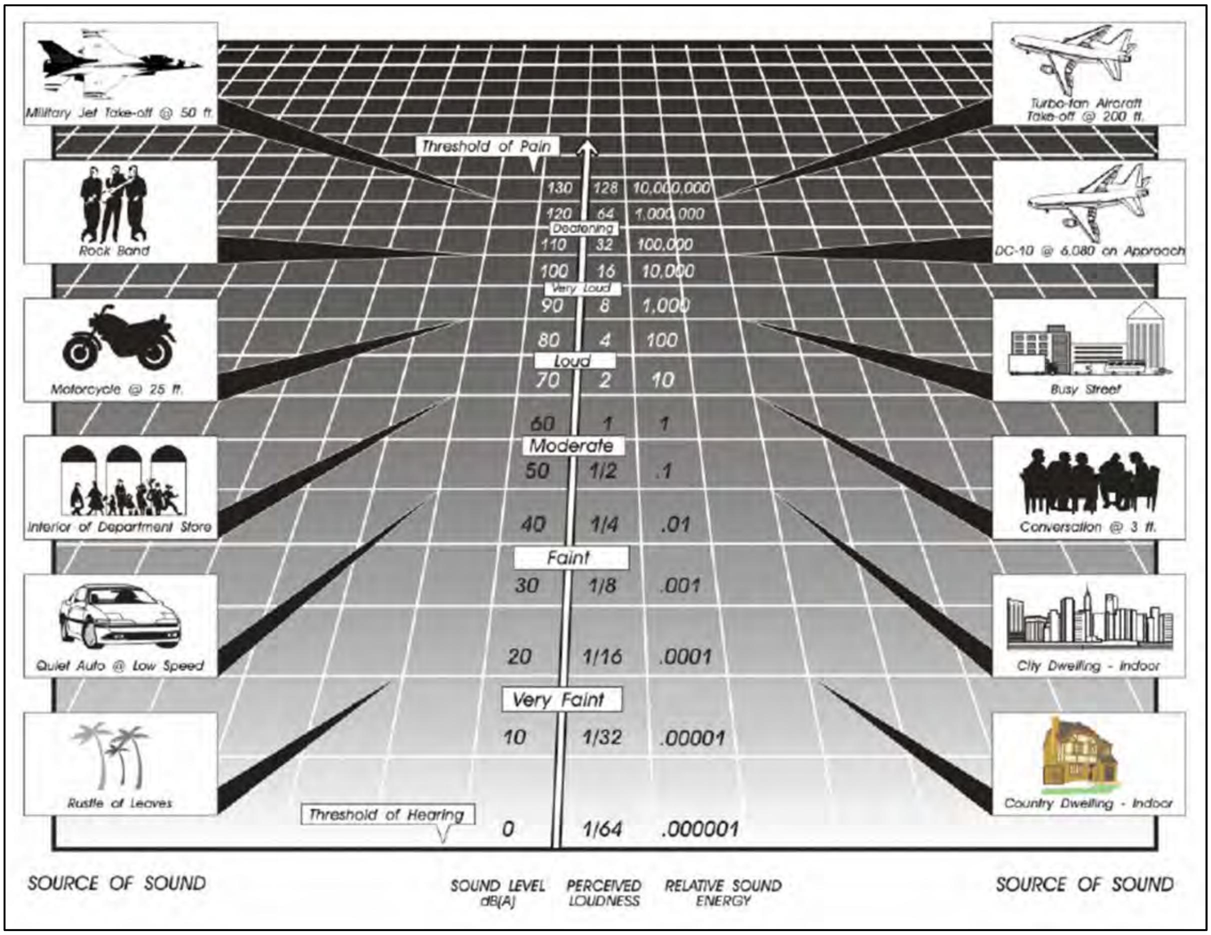
To describe the time-varying character of environmental noise, the statistical noise descriptors L_{10}, L_{50}, and L_{90} are commonly used. They are the noise levels exceeded 10 percent, 50 percent, and 90 percent of the measured time interval. Sound levels associated with the L_{10} typically describe transient or short-term events. Half of the sounds during the measurement interval are softer than L_{50} and half are louder, so it is often called the “median” sound level. Levels associated with L_{90} often describe background noise conditions and/or continuous, steady-state sound sources.

One common way to assess average noise level over a complete diurnal cycle is a sound descriptor known as the day-night average noise level (L_{dn}), defined as the A-weighted average sound level for a 24-hour day with a 10-dB penalty added to nighttime sound levels

(10:00 p.m. to 7:00 a.m.) in order to compensate for increased sensitivity to noise during usually quieter nighttime hours. Note that because of the applied nighttime penalty, this L_{dn} value is different from an L_{eq} representing a continuous 24-hour period.

Sound levels of typical noise sources and environments are given in Figure A-1 to provide a frame of reference for the range of decibel values one may hear.

FIGURE A-1
SOUND PRESSURE LEVELS OF TYPICAL NOISE SOURCES AND NOISE ENVIRONMENTS



Source: County of Riverside General Plan (2014).

APPENDIX B
FIELD MEASUREMENT PHOTOGRAPHS

	Photograph 1 **Date:** 08/19/14 **Comments:** ST01: Short-term measurement, reference position on the northeast corner of the Citrus Dr. and Nichols Rd. intersection. Camera facing north.
	Photograph 2 **Date:** 08/19/14 **Comments:** ST01: Short-term measurement, reference position on the northeast corner of the Citrus Dr. and Nichols Rd. intersection. Camera facing south.

Photograph 3

Date: 08/19/14

Comments:
ST02: Short-term measurement, reference position on the northwest corner of the Citrus Dr. and Green St. intersection.

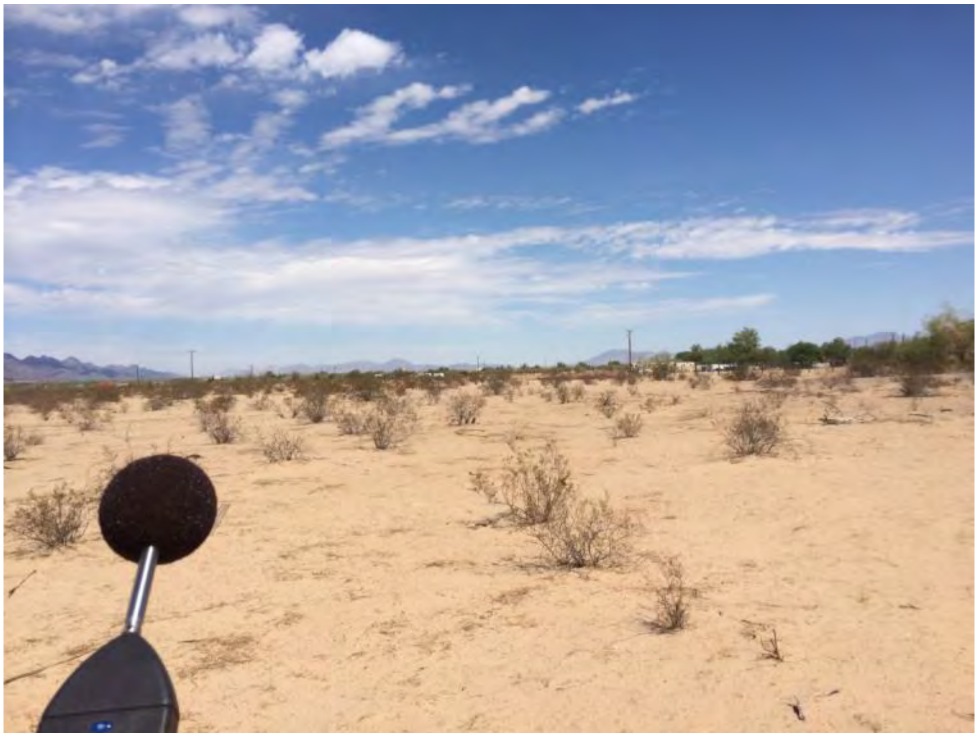
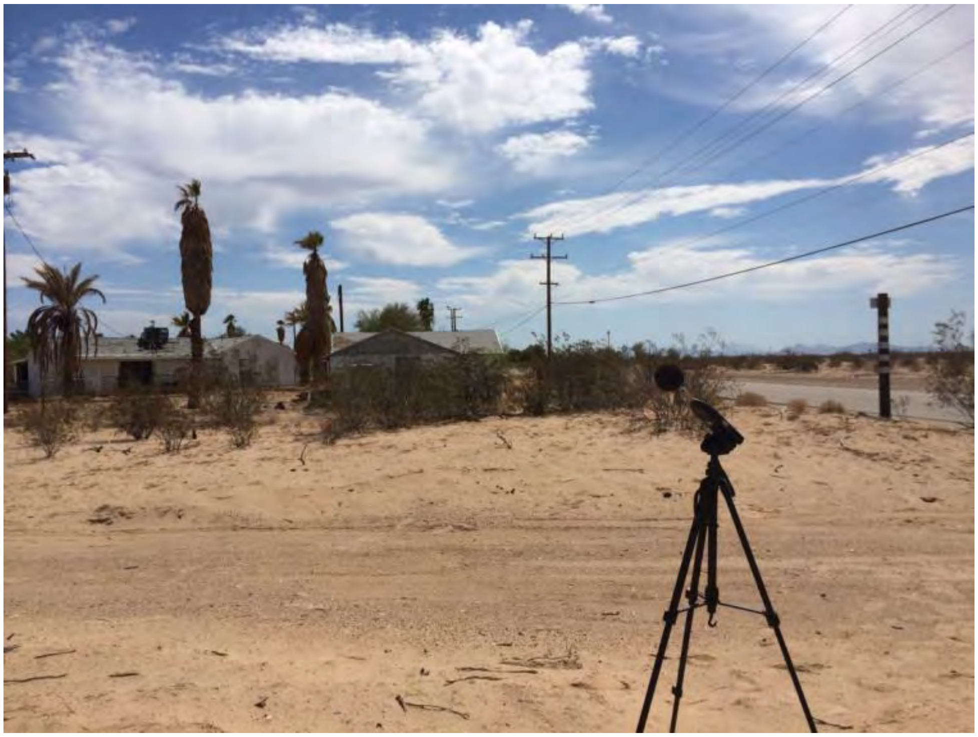
Camera facing north.

Photograph 4

Date: 08/19/14

Comments:
ST02: Short-term measurement, reference position on the northwest corner of the Citrus Dr. and Green St. intersection.

Camera facing southwest.

	**Photograph 5** **Date:** 08/20/14 **Comments:** ST03: Short-term measurement, reference position in a vacant lot north of Blythe Way and west of Cottonwood Dr. Camera facing north.
	**Photograph 6** **Date:** 08/20/14 **Comments:** ST03: Short-term measurement, reference position in a vacant lot north of Blythe Way and west of Cottonwood Dr. Camera facing east.

Photograph 7

Date: 08/20/14

Comments:
ST04: Short-term measurement, reference position adjacent to the daycare on the northwest corner of the Mesa Dr. and Pepper Dr. intersection. Camera facing north.

Photograph 8

Date: 08/20/14

Comments:
ST04: Short-term measurement, reference position adjacent to the daycare on the northwest corner of the Mesa Dr. and Pepper Dr. intersection. Camera facing south.

	Photograph 9 **Date:** 08/20/14 **Comments:** ST05: Short-term measurement, reference position on the southeast corner of the Mesa Dr. and Nichols Rd. intersection. Camera facing north.
	Photograph 10 **Date:** 08/20/14 **Comments:** ST05: Short-term measurement, reference position on the southeast corner of the Mesa Dr. and Nichols Rd intersection. Camera facing west.

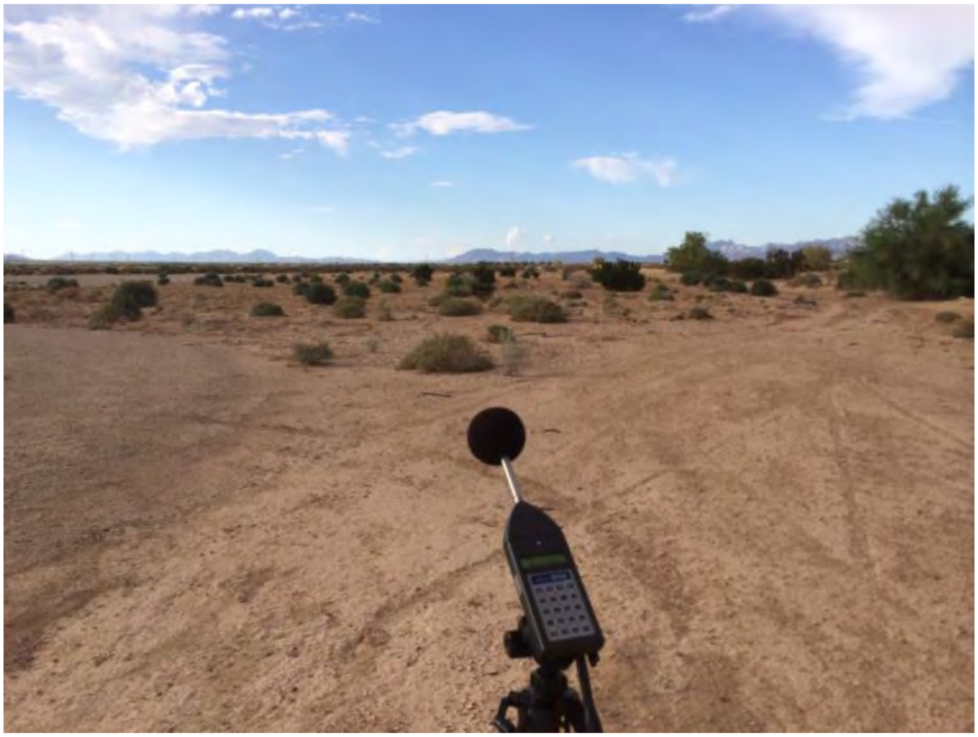
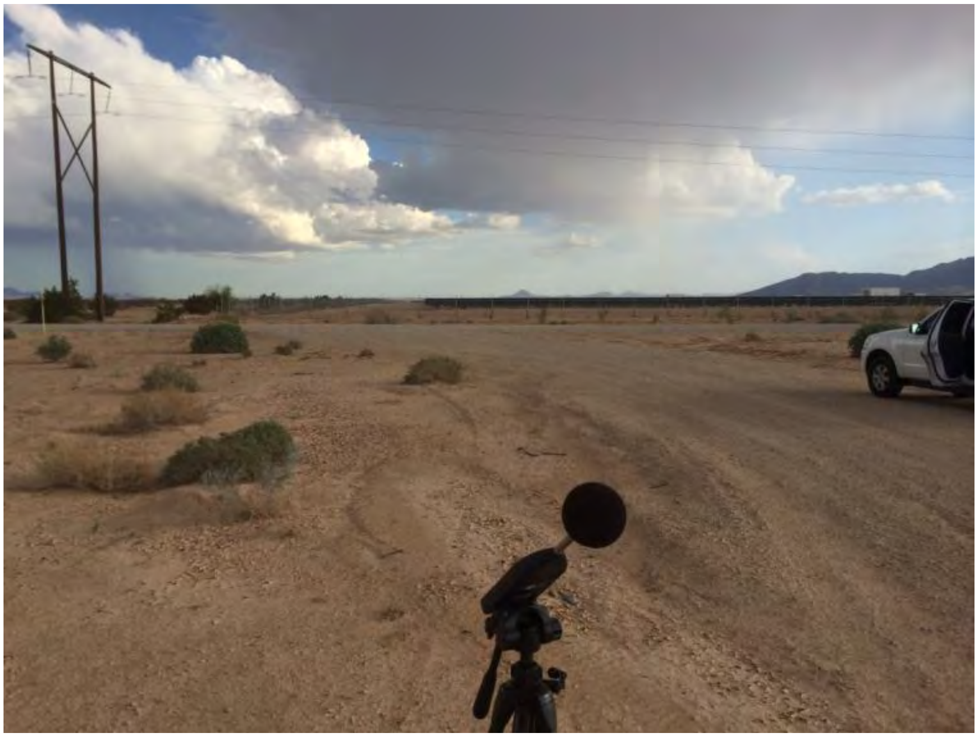
	Photograph 11 **Date:** 08/20/14 **Comments:** ST06: Short-term measurement, reference position north of the intersection at Evergreen Dr. and Bellwood Dr. Camera facing north.
	Photograph 12 **Date:** 08/20/14 **Comments:** ST06: Short-term measurement, reference position northeast of the intersection at Evergreen Dr. and Bellwood Dr. Camera facing south.

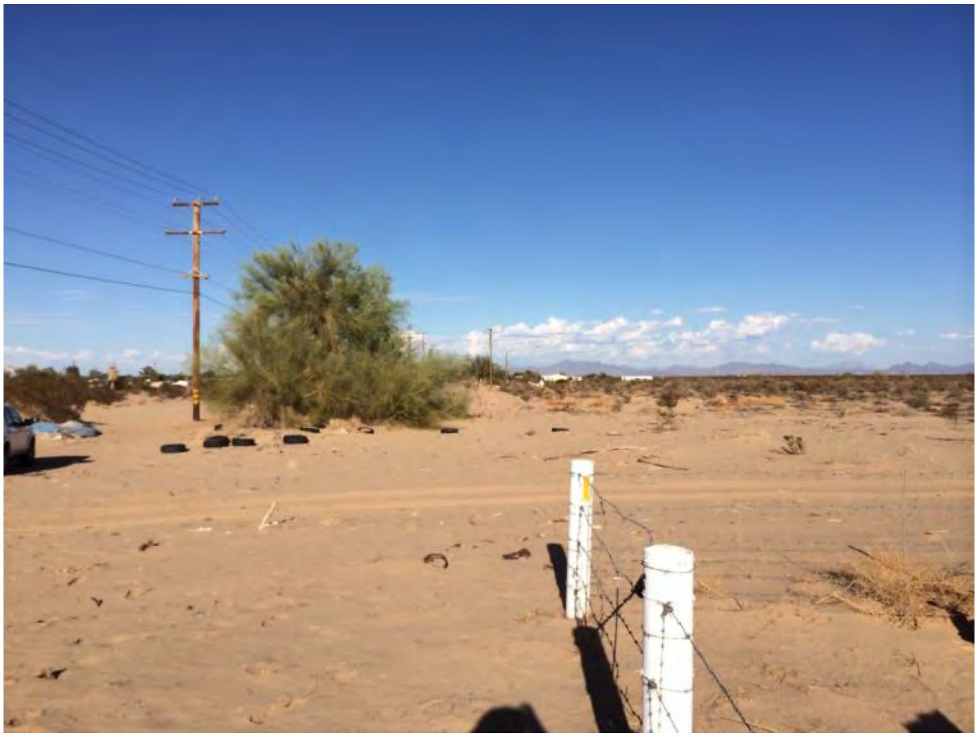
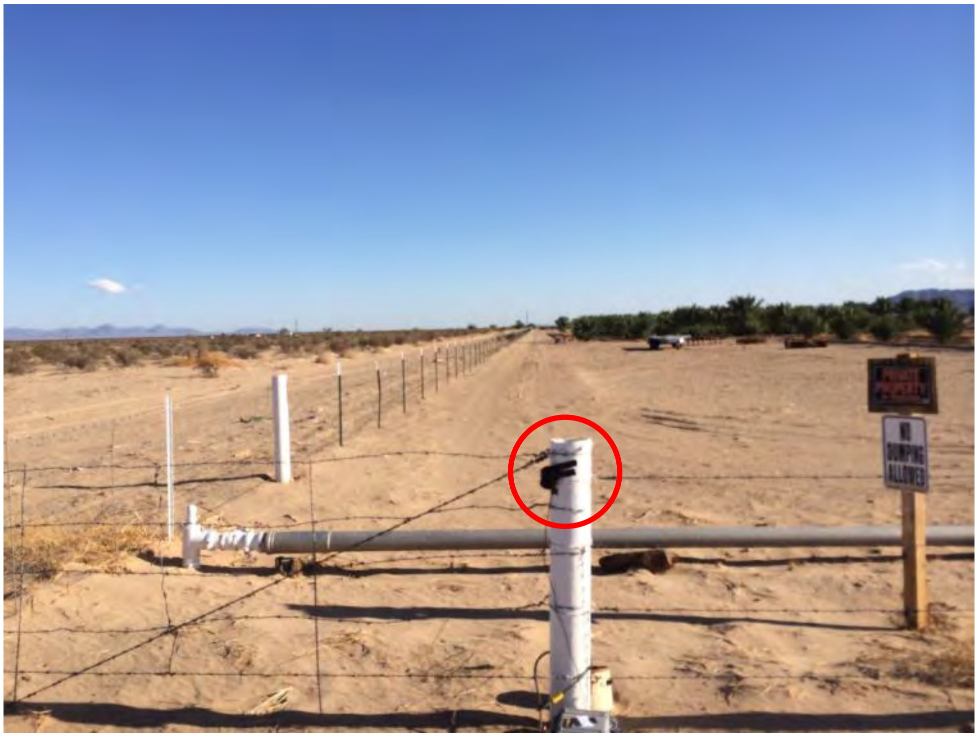
	Photograph 13 **Date:** 08/20/14 **Comments:** ST07: Short-term measurement, reference position near the southeast corner of the playground at Miller Park. Camera facing west.
	Photograph 14 **Date:** 08/20/14 **Comments:** ST07: Short-term measurement, reference position near the southeast corner of the playground at Miller Park. Camera facing north.

	Photograph 15 **Date:** 08/20/14 **Comments:** ST08: Short-term measurement, reference position on the northeast corner of the Lovekins Blvd. and 16th Ave. intersection. Camera facing south.
	Photograph 16 **Date:** 08/20/14 **Comments:** ST08: Short-term measurement, reference position on the northeast corner of the Lovekins Blvd. and 16th Ave. intersection. Camera facing southwest.

	Photograph 17 **Date:** 08/20/14 **Comments:** ST09: Short-term measurement, reference position on the southwest corner of the Neighbours Blvd./SR-78 and 16th Ave. intersection. Camera facing north.
	Photograph 18 **Date:** 08/20/14 **Comments:** ST09: Short-term measurement, reference position on the southwest corner of the Neighbours Blvd./SR-78 and 16th Ave. intersection. Camera facing east.

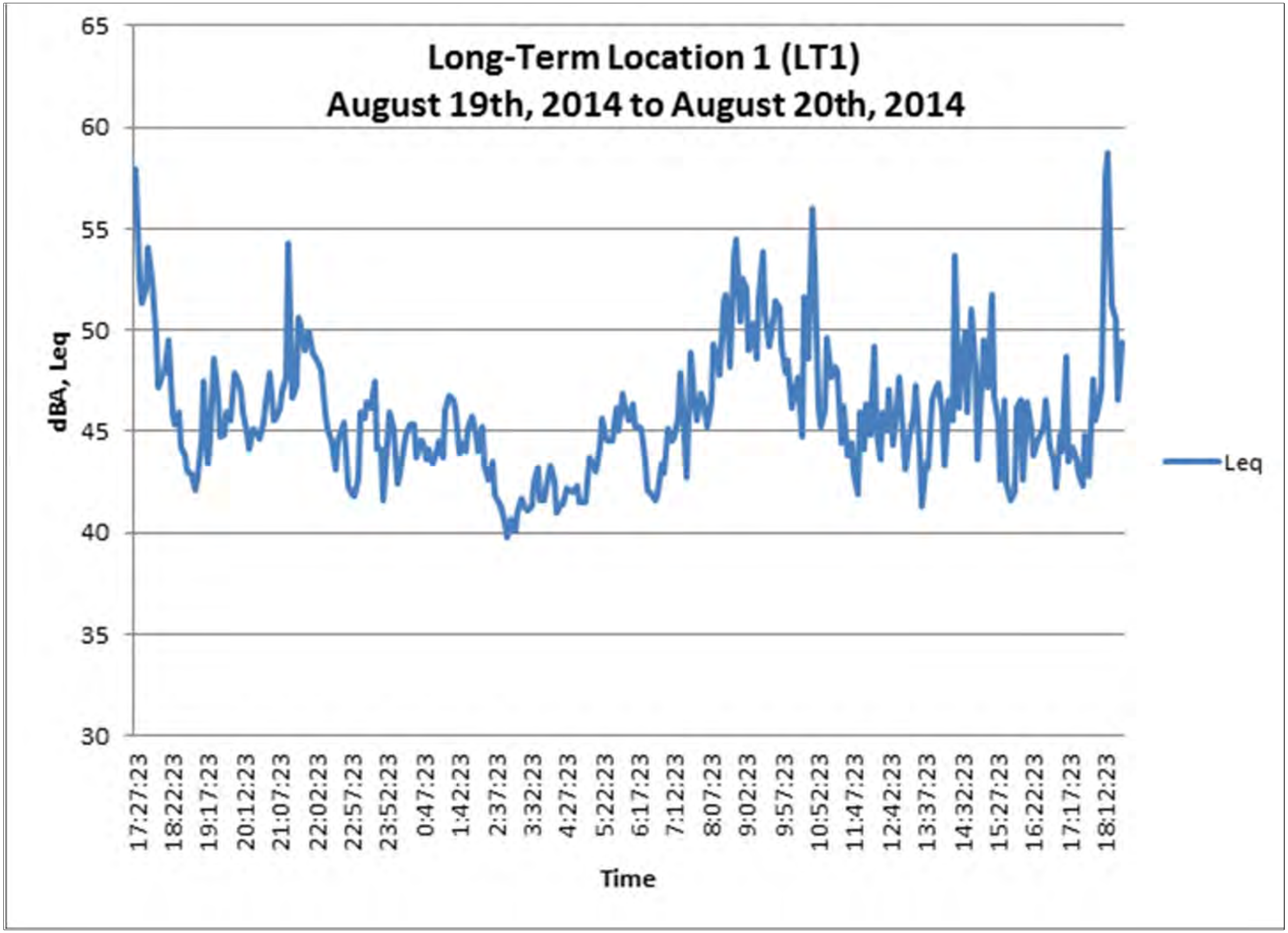
	Photograph 19 **Date:** 08/20/14 **Comments:** ST10: Short-term measurement, reference position on the northeast corner of the Neighbours Blvd./SR-78 and 14th Ave. intersection. Camera facing south.
	Photograph 20 **Date:** 08/20/14 **Comments:** ST10: Short-term measurement, reference position on the northeast corner of the Neighbours Blvd./SR-78 and 14th Ave. intersection. Camera facing west.

	**Photograph 21** **Date:** 08/20/14 **Comments:** ST11: Short-term measurement, reference position to the north of the existing PV facility and southwest of the nearest residence. Camera facing north.
	**Photograph 22** **Date:** 08/20/14 **Comments:** ST11: Short-term measurement, reference position to the north of the existing PV facility and southwest of the nearest residence. Camera facing south.

	**Photograph 23** **Date:** 08/19/14 - 08/20/14 **Comments:** LT01: Long-term measurement, reference position at the end of Blythe Way, attached to the fence of a tree farm. Camera facing east.
	**Photograph 24** **Date:** 08/19/14-08/20/14 **Comments:** LT01: Long-term measurement, reference position at the end of Blythe Way, attached to the fence of a tree farm. Camera facing south.

APPENDIX C
LONG-TERM SOUND LEVEL MEASUREMENT DATA DETAIL

LONG-TERM SOUND LEVEL MEASUREMENT DATA DETAIL



APPENDIX D
NOISE IMPACT CALCULATIONS

NOISE IMPACT CALCULATIONS

This appendix briefly summarizes the methodology and calculations developed for estimating noise levels associated with construction (Section D.1) and operation (Section D.2) of the Desert Quartzite Solar Project (Project) with an assumed 25-month construction schedule. Although the Applicant's proposed Project construction work hours are from 7 a.m. to 5 p.m., noise impact calculations are also included for potential nighttime work as a worst-case analysis in the event nighttime work is required.

D.1 CONSTRUCTION NOISE PREDICTION DETAIL

The following images present the Excel worksheets used to calculate the aggregate construction noise level predictions by construction activity (9) for each of the three studied noise-sensitive receptors (NSR) in proximity to the Project. For the purposes of this noise analysis, references herein to a "central PCS" pertain to a centrally-located power conversion station within the overall proposed Project site layout as shown on Figure D-1, which also shows the "PCS nearest to NNSR" location that is closer to the Project's northern boundary.

FIGURE D-1
LOCATION OF PROJECT GEOGRAPHIC CENTROID OR “CENTRAL PCS”

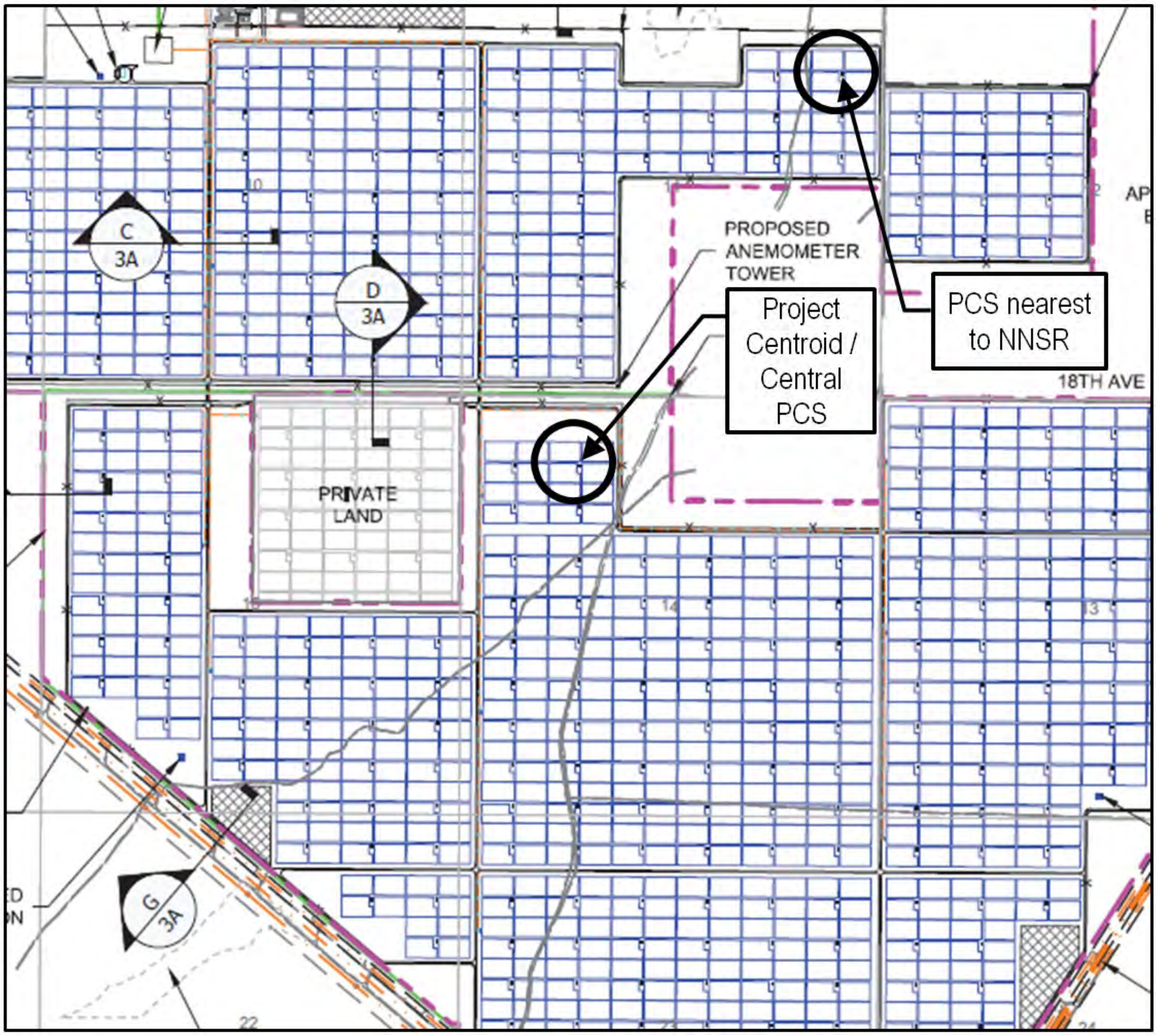
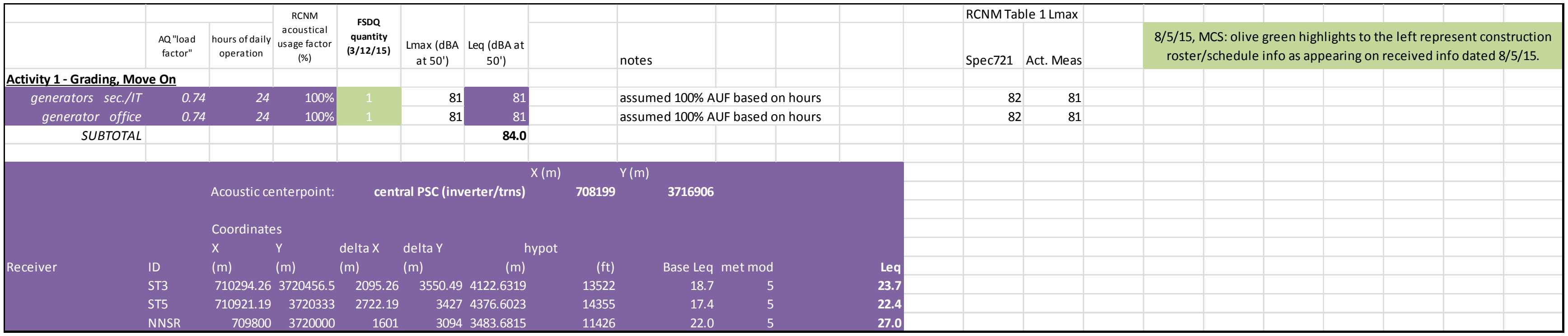

C
3A
D
3A
10
PROPOSED
ANEMOMETER
TOWER
Project
Centroid /
Central
PCS
PCS nearest
to NNSR
AP
E
18TH AVE
PRIVATE
LAND
14
13
G
3A
ED
ON
22

FIGURE D-2

PREDICTION OF ACTIVITY 1 – DAYTIME CONSTRUCTION NOISE

													RCNM Table 1 Lmax			
	AQ "load factor"	hours of daily operation (as of 8/5/15)	RCNM acoustical usage factor (%)	**FSDQ quantity (8/5/15)**	Lmax (dBA at 50')	Leq (dBA at 50')		notes					Spec721	Act. Meas		8/5/15, MCS: olive green highlights to the left represent construction roster/schedule info as appearing on received info dated 8/5/15.
Activity 1 - Grading, Move On																9/2/15, MCS: blue highlights to the left represent construction
water truck	*0.38*	*8*	40%	2	76	75		as RCNM dump truck					84	76		roster/schedule info as appearing on received info dated 8/19/15.
water pull	*0.41*	*8*	50%	2	85	85		as RCNM other equipment > 5HP					85	85		
motor grader	*0.41*	*6*	40%	3	85	86		as RCNM grader					85	85		
scraper	*0.4*	*6*	40%	3	84	85		as RCNM scraper					85	84		
dozer	*0.4*	*6*	40%	1	82	78		as RCNM dozer					85	82		
loader	*0.36*	*6*	20%	2	79	75		as RCNM front end loader					80	79		
tractor disk	*0.42*	*6*	40%	2	84	83		as RCNM tractor					84	84		
tractor buster	*0.42*	*6*	40%	2	84	83		as RCNM tractor					84	84		
roller/vibrator/padder	*0.38*	*6*	20%	1	80	73		as RCNM roller					85	80		
skid steer	*0.4*	*6*	50%	3	80	82		as RCNM other equipment > 5HP					80	80		based on PWL from data from Bobcat S850, T-870 literature
generator office	*0.74*	*24*	100%	1	81	81		assumed 100% AUF based on hours					82	81		
generators - sec./IT	*0.74*	*24*	100%	1	81	81		assumed 100% AUF based on hours					82	81		
truck cut fill hauling	*0.38*	*4*	40%	10	76	82		as RCNM dump truck					84	76		
well water pump	*0.74*	*8*	50%	2	77	77		as RCNM pumps					77	81		
SUBTOTAL						**93.3**										
							X (m)	Y (m)								
		Acoustic centerpoint:				**central PSC (inverter/trns)**	**708199**	**3716906**								
		Coordinates														
		X	Y	delta X	delta Y	hypot										
Receiver	ID	(m)	(m)	(m)	(m)	(m)	(ft)	Base Leq	met mod		**Leq**					
	ST3	710294.26	3720456.5	2095.26	3550.49	4122.6319	13522	28.0	-5		**33.0**					
	ST5	710921.19	3720333	2722.19	3427	4376.6023	14355	26.7	-5		**31.7**					
	NNSR	709800	3720000	1601	3094	3483.6815	11426	31.4	-5		**36.4**					

FIGURE D-3
PREDICTION OF ACTIVITY 1 – NIGHTTIME CONSTRUCTION NOISE



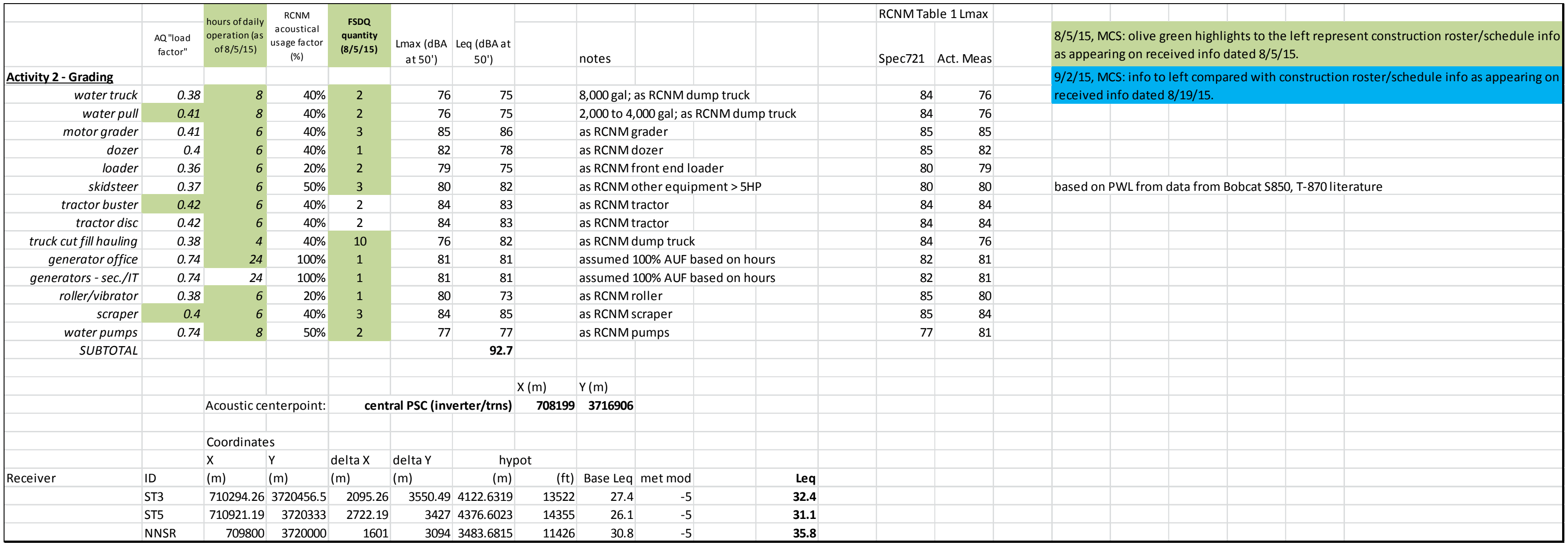
	AQ "load factor"	hours of daily operation	RCNM acoustical usage factor (%)	**FSDQ quantity (3/12/15)**	Lmax (dBA at 50')	Leq (dBA at 50')		notes	RCNM Table 1 Lmax Spec721	Act. Meas
Activity 1 - Grading, Move On										
generators sec./IT	*0.74*	*24*	100%	1	81	81		assumed 100% AUF based on hours	82	81
generator office	*0.74*	*24*	100%	1	81	81		assumed 100% AUF based on hours	82	81
SUBTOTAL						**84.0**				

8/5/15, MCS: olive green highlights to the left represent construction roster/schedule info as appearing on received info dated 8/5/15.

			X (m)	Y (m)
Acoustic centerpoint:	**central PSC (inverter/trns)**		**708199**	**3716906**

Receiver	ID	Coordinates X (m)	Y (m)	delta X (m)	delta Y (m)	hypot (m)	(ft)	Base Leq	met mod	**Leq**
	ST3	710294.26	3720456.5	2095.26	3550.49	4122.6319	13522	18.7	5	**23.7**
	ST5	710921.19	3720333	2722.19	3427	4376.6023	14355	17.4	5	**22.4**
	NNSR	709800	3720000	1601	3094	3483.6815	11426	22.0	5	**27.0**

FIGURE D-4
PREDICTION OF ACTIVITY 2 – DAYTIME CONSTRUCTION NOISE



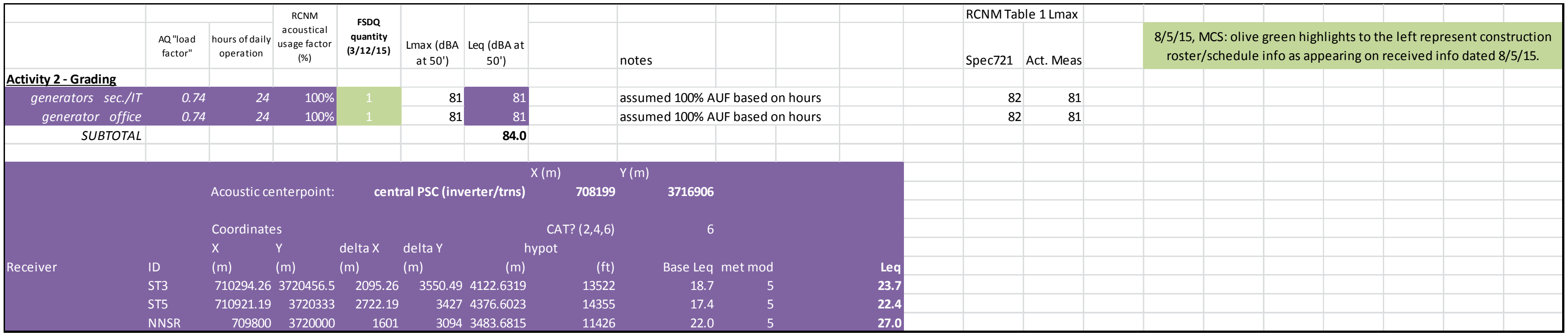
								RCNM Table 1 Lmax		
	AQ "load factor"	hours of daily operation (as of 8/5/15)	RCNM acoustical usage factor (%)	**FSDQ quantity (8/5/15)**	Lmax (dBA at 50')	Leq (dBA at 50')	notes	Spec721	Act. Meas	8/5/15, MCS: olive green highlights to the left represent construction roster/schedule info as appearing on received info dated 8/5/15.
Activity 2 - Grading										9/2/15, MCS: info to left compared with construction roster/schedule info as appearing on received info dated 8/19/15.
water truck	*0.38*	*8*	40%	2	76	75	8,000 gal; as RCNM dump truck	84	76	
water pull	*0.41*	*8*	40%	2	76	75	2,000 to 4,000 gal; as RCNM dump truck	84	76	
motor grader	*0.41*	*6*	40%	3	85	86	as RCNM grader	85	85	
dozer	*0.4*	*6*	40%	1	82	78	as RCNM dozer	85	82	
loader	*0.36*	*6*	20%	2	79	75	as RCNM front end loader	80	79	
skidsteer	*0.37*	*6*	50%	3	80	82	as RCNM other equipment > 5HP	80	80	based on PWL from data from Bobcat S850, T-870 literature
tractor buster	*0.42*	*6*	40%	2	84	83	as RCNM tractor	84	84	
tractor disc	*0.42*	*6*	40%	2	84	83	as RCNM tractor	84	84	
truck cut fill hauling	*0.38*	*4*	40%	10	76	82	as RCNM dump truck	84	76	
generator office	*0.74*	*24*	100%	1	81	81	assumed 100% AUF based on hours	82	81	
generators - sec./IT	*0.74*	*24*	100%	1	81	81	assumed 100% AUF based on hours	82	81	
roller/vibrator	*0.38*	*6*	20%	1	80	73	as RCNM roller	85	80	
scraper	*0.4*	*6*	40%	3	84	85	as RCNM scraper	85	84	
water pumps	*0.74*	*8*	50%	2	77	77	as RCNM pumps	77	81	
SUBTOTAL						**92.7**				

		X (m)	Y (m)
Acoustic centerpoint:	**central PSC (inverter/trns)**	**708199**	**3716906**

		Coordinates								
		X	Y	delta X	delta Y	hypot				
Receiver	ID	(m)	(m)	(m)	(m)	(m)	(ft)	Base Leq	met mod	**Leq**
	ST3	710294.26	3720456.5	2095.26	3550.49	4122.6319	13522	27.4	-5	**32.4**
	ST5	710921.19	3720333	2722.19	3427	4376.6023	14355	26.1	-5	**31.1**
	NNSR	709800	3720000	1601	3094	3483.6815	11426	30.8	-5	**35.8**

FIGURE D-5

PREDICTION OF ACTIVITY 2 –NIGHTTIME CONSTRUCTION NOISE



	AQ "load factor"	hours of daily operation	RCNM acoustical usage factor (%)	**FSDQ quantity (3/12/15)**	Lmax (dBA at 50')	Leq (dBA at 50')	notes	RCNM Table 1 Lmax Spec721	RCNM Table 1 Lmax Act. Meas
Activity 2 - Grading									
generators sec./IT	*0.74*	*24*	100%	1	81	81	assumed 100% AUF based on hours	82	81
generator office	*0.74*	*24*	100%	1	81	81	assumed 100% AUF based on hours	82	81
SUBTOTAL						**84.0**			

8/5/15, MCS: olive green highlights to the left represent construction roster/schedule info as appearing on received info dated 8/5/15.

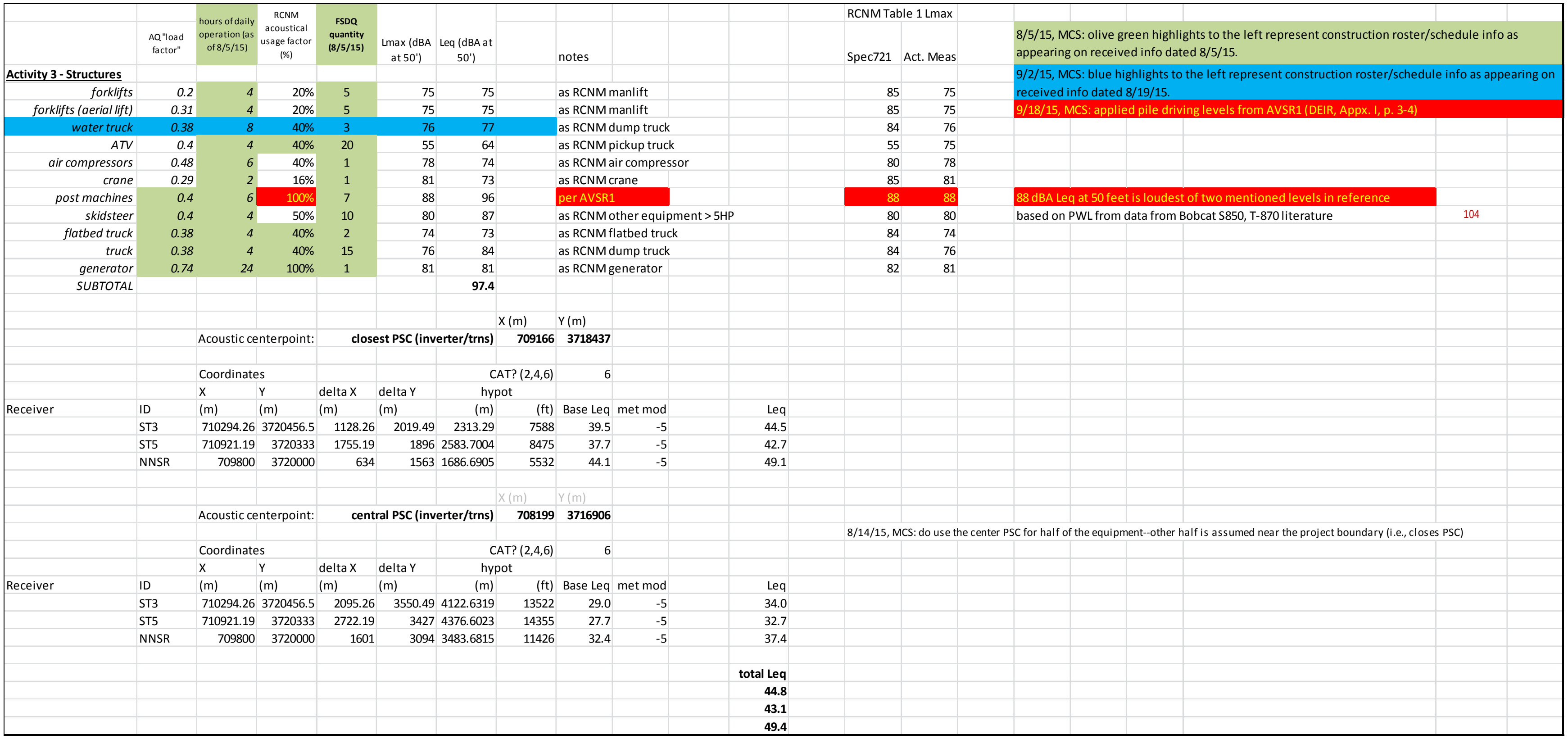
		X (m)	Y (m)
Acoustic centerpoint:	**central PSC (inverter/trns)**	**708199**	**3716906**

Coordinates

CAT? (2,4,6) 6

Receiver	ID	X (m)	Y (m)	delta X (m)	delta Y (m)	hypot (m)	(ft)	Base Leq	met mod	**Leq**
	ST3	710294.26	3720456.5	2095.26	3550.49	4122.6319	13522	18.7	5	**23.7**
	ST5	710921.19	3720333	2722.19	3427	4376.6023	14355	17.4	5	**22.4**
	NNSR	709800	3720000	1601	3094	3483.6815	11426	22.0	5	**27.0**

FIGURE D-6
PREDICTION OF ACTIVITY 3 – DAYTIME CONSTRUCTION NOISE



	AQ "load factor"	hours of daily operation (as of 8/5/15)	RCNM acoustical usage factor (%)	**FSDQ quantity (8/5/15)**	Lmax (dBA at 50')	Leq (dBA at 50')	notes	RCNM Table 1 Lmax Spec721	Act. Meas		
										8/5/15, MCS: olive green highlights to the left represent construction roster/schedule info as appearing on received info dated 8/5/15.	
Activity 3 - Structures										9/2/15, MCS: blue highlights to the left represent construction roster/schedule info as appearing on received info dated 8/19/15.	
forklifts	*0.2*	*4*	20%	5	75	75	as RCNM manlift	85	75		
forklifts (aerial lift)	*0.31*	*4*	20%	5	75	75	as RCNM manlift	85	75	9/18/15, MCS: applied pile driving levels from AVSR1 (DEIR, Appx. I, p. 3-4)	
water truck	*0.38*	*8*	40%	3	76	77	as RCNM dump truck	84	76		
ATV	*0.4*	*4*	40%	20	55	64	as RCNM pickup truck	55	75		
air compressors	*0.48*	*6*	40%	1	78	74	as RCNM air compressor	80	78		
crane	*0.29*	*2*	16%	1	81	73	as RCNM crane	85	81		
post machines	*0.4*	*6*	100%	7	88	96	per AVSR1	88	88	88 dBA Leq at 50 feet is loudest of two mentioned levels in reference	
skidsteer	*0.4*	*4*	50%	10	80	87	as RCNM other equipment > 5HP	80	80	based on PWL from data from Bobcat S850, T-870 literature	104
flatbed truck	*0.38*	*4*	40%	2	74	73	as RCNM flatbed truck	84	74		
truck	*0.38*	*4*	40%	15	76	84	as RCNM dump truck	84	76		
generator	*0.74*	*24*	100%	1	81	81	as RCNM generator	82	81		
SUBTOTAL						**97.4**					

							X (m)	Y (m)			
		Acoustic centerpoint:				**closest PSC (inverter/trns)**	**709166**	**3718437**			
		Coordinates				CAT? (2,4,6)		6			
		X	Y	delta X	delta Y	hypot					
Receiver	ID	(m)	(m)	(m)	(m)	(m)	(ft)	Base Leq	met mod	Leq	
	ST3	710294.26	3720456.5	1128.26	2019.49	2313.29	7588	39.5	-5	44.5	
	ST5	710921.19	3720333	1755.19	1896	2583.7004	8475	37.7	-5	42.7	
	NNSR	709800	3720000	634	1563	1686.6905	5532	44.1	-5	49.1	
							X (m)	Y (m)			
		Acoustic centerpoint:				**central PSC (inverter/trns)**	**708199**	**3716906**			
											8/14/15, MCS: do use the center PSC for half of the equipment--other half is assumed near the project boundary (i.e., closes PSC)
		Coordinates				CAT? (2,4,6)		6			
		X	Y	delta X	delta Y	hypot					
Receiver	ID	(m)	(m)	(m)	(m)	(m)	(ft)	Base Leq	met mod	Leq	
	ST3	710294.26	3720456.5	2095.26	3550.49	4122.6319	13522	29.0	-5	34.0	
	ST5	710921.19	3720333	2722.19	3427	4376.6023	14355	27.7	-5	32.7	
	NNSR	709800	3720000	1601	3094	3483.6815	11426	32.4	-5	37.4	
										total Leq	
										44.8	
										43.1	
										49.4	

FIGURE D-7
PREDICTION OF ACTIVITY 3 – NIGHTTIME CONSTRUCTION NOISE

8/5/15, MCS: olive green highlights to the left represent construction roster/schedule info as appearing on received info dated 8/5/15.

	AQ "load factor"	hours of daily operation	RCNM acoustical usage factor (%)	**FSDQ quantity (3/12/15)**	Lmax (dBA at 50')	Leq (dBA at 50')	notes	RCNM Table 1 Lmax Spec721	Act. Meas
Activity 3 - Structures									
generators	*0.74*	*24*	100%	1	81	81	assumed 100% AUF based on hours	82	81
SUBTOTAL						**81.0**			

		X (m)	Y (m)
Acoustic centerpoint:	**closest PSC (inverter/trns)**	**709166**	**3718437**

Coordinates — CAT? (2,4,6) 6

Receiver	ID	X (m)	Y (m)	delta X (m)	delta Y (m)	hypot (m)	(ft)	Base Leq	met mod	Leq
	ST3	710294.26	3720456.5	1128.26	2019.49	2313.29	7588	26.1	5	31.1
	ST5	710921.19	3720333	1755.19	1896	2583.7004	8475	24.3	5	29.3
	NNSR	709800	3720000	634.00	1563	1686.6905	5532	30.7	5	35.7

		X (m)	Y (m)
Acoustic centerpoint:	**central PSC (inverter/trns)**	**708199**	**3716906**

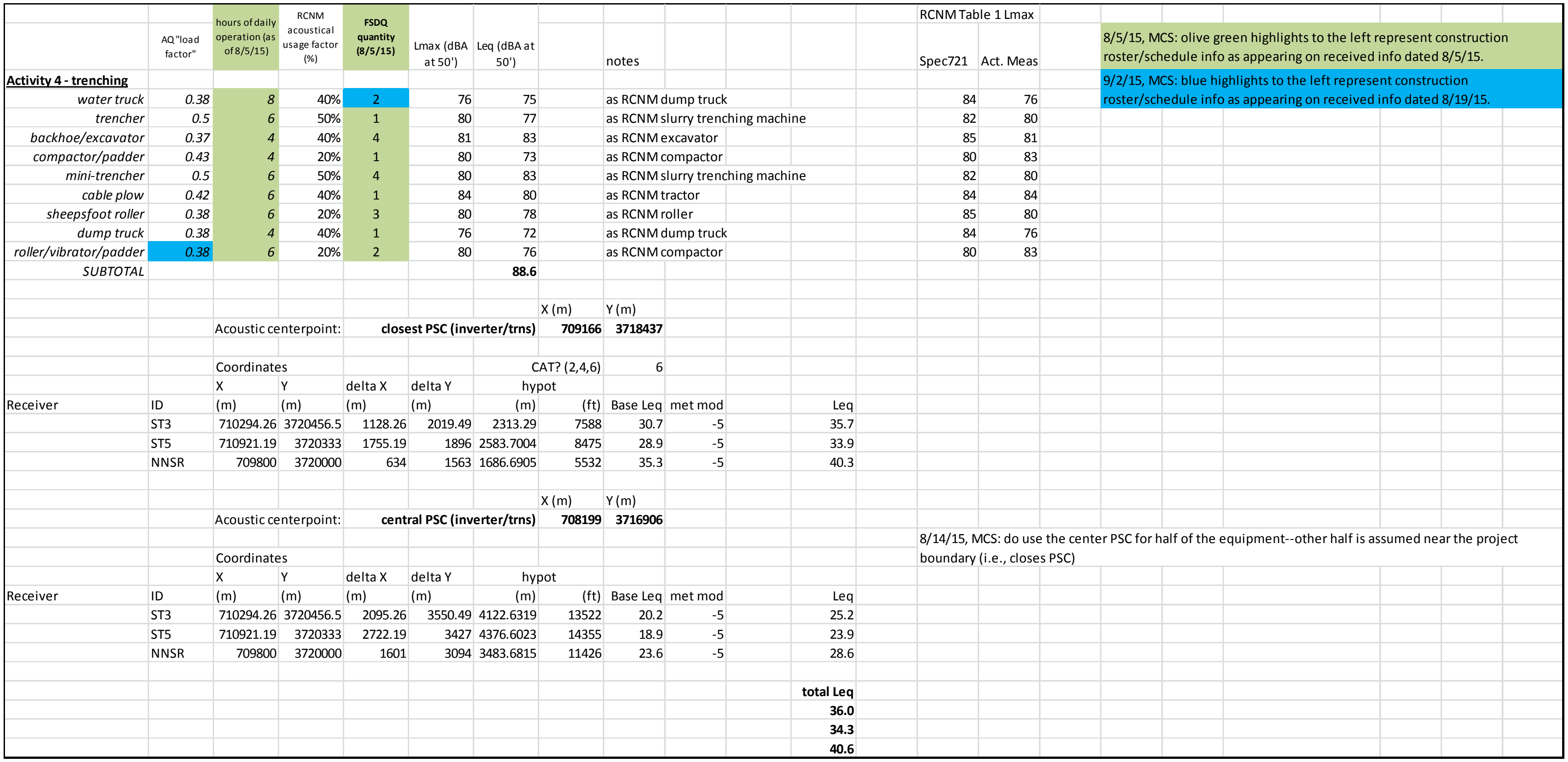
8/14/15, MCS: do use the center PSC for half of the equipment--other half is assumed near the project boundary (i.e., closes PSC)

Coordinates — CAT? (2,4,6) 6

Receiver	ID	X (m)	Y (m)	delta X (m)	delta Y (m)	hypot (m)	(ft)	Base Leq	met mod	Leq
	ST3	710294.26	3720456.5	2095.26	3550.49	4122.6319	13522	15.6	5	20.6
	ST5	710921.19	3720333	2722.19	3427	4376.6023	14355	14.4	5	19.4
	NNSR	709800	3720000	1601	3094	3483.6815	11426	19.0	5	24.0

total Leq
31.5
29.7
36.0

FIGURE D-8
PREDICTION OF ACTIVITY 4 – DAYTIME CONSTRUCTION NOISE



	AQ "load factor"	hours of daily operation (as of 8/5/15)	RCNM acoustical usage factor (%)	FSDQ quantity (8/5/15)	Lmax (dBA at 50')	Leq (dBA at 50')	notes	RCNM Table 1 Lmax Spec721	Act. Meas.
Activity 4 - trenching									
water truck	*0.38*	*8*	40%	2	76	75	as RCNM dump truck	84	76
trencher	*0.5*	*6*	50%	1	80	77	as RCNM slurry trenching machine	82	80
backhoe/excavator	*0.37*	*4*	40%	4	81	83	as RCNM excavator	85	81
compactor/padder	*0.43*	*4*	20%	1	80	73	as RCNM compactor	80	83
mini-trencher	*0.5*	*6*	50%	4	80	83	as RCNM slurry trenching machine	82	80
cable plow	*0.42*	*6*	40%	1	84	80	as RCNM tractor	84	84
sheepsfoot roller	*0.38*	*6*	20%	3	80	78	as RCNM roller	85	80
dump truck	*0.38*	*4*	40%	1	76	72	as RCNM dump truck	84	76
roller/vibrator/padder	*0.38*	*6*	20%	2	80	76	as RCNM compactor	80	83
SUBTOTAL						**88.6**			

8/5/15, MCS: olive green highlights to the left represent construction roster/schedule info as appearing on received info dated 8/5/15.

9/2/15, MCS: blue highlights to the left represent construction roster/schedule info as appearing on received info dated 8/19/15.

		X (m)	Y (m)
Acoustic centerpoint:	**closest PSC (inverter/trns)**	**709166**	**3718437**

Coordinates — CAT? (2,4,6) 6

Receiver	ID	X (m)	Y (m)	delta X (m)	delta Y (m)	hypot (m)	(ft)	Base Leq	met mod	Leq
	ST3	710294.26	3720456.5	1128.26	2019.49	2313.29	7588	30.7	-5	35.7
	ST5	710921.19	3720333	1755.19	1896	2583.7004	8475	28.9	-5	33.9
	NNSR	709800	3720000	634	1563	1686.6905	5532	35.3	-5	40.3

		X (m)	Y (m)
Acoustic centerpoint:	**central PSC (inverter/trns)**	**708199**	**3716906**

8/14/15, MCS: do use the center PSC for half of the equipment--other half is assumed near the project boundary (i.e., closes PSC)

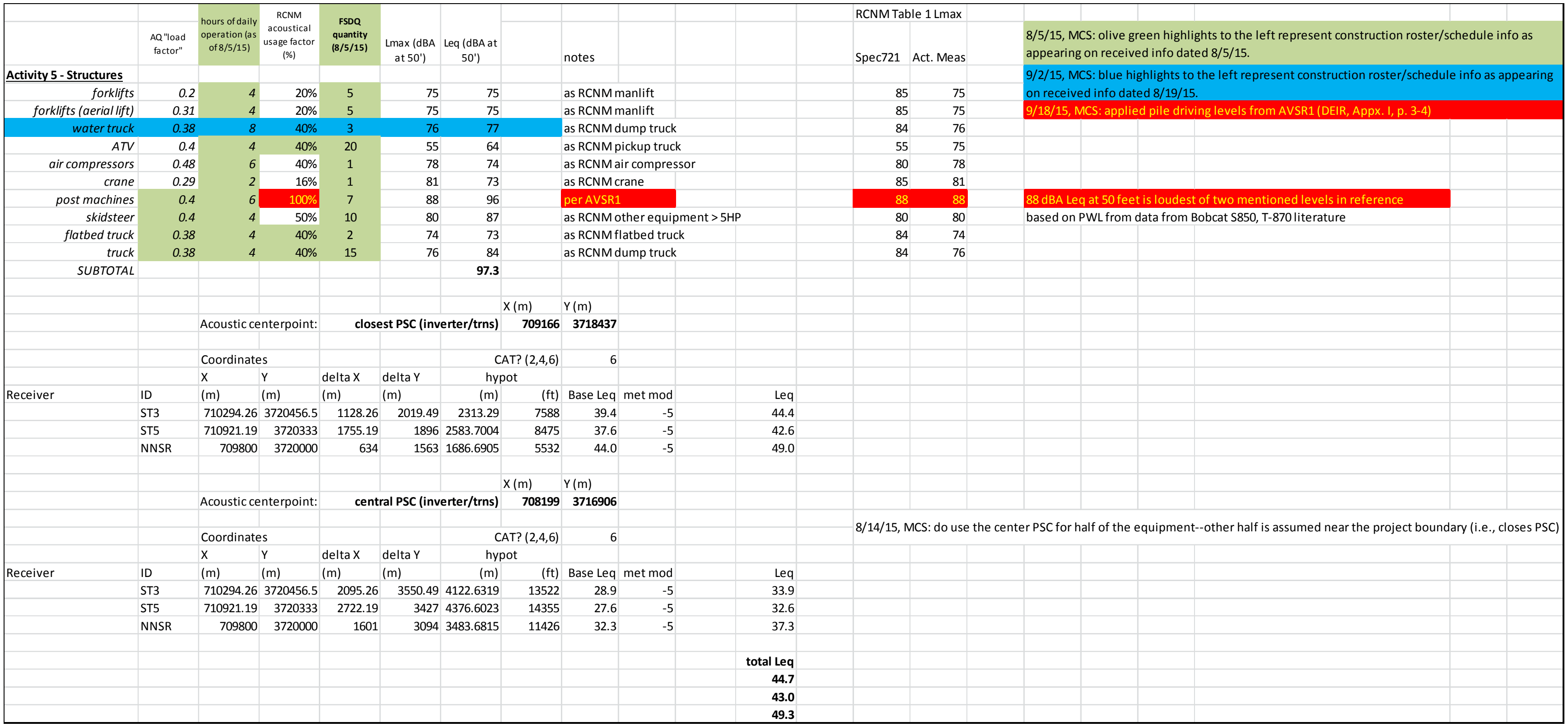
Coordinates

Receiver	ID	X (m)	Y (m)	delta X (m)	delta Y (m)	hypot (m)	(ft)	Base Leq	met mod	Leq
	ST3	710294.26	3720456.5	2095.26	3550.49	4122.6319	13522	20.2	-5	25.2
	ST5	710921.19	3720333	2722.19	3427	4376.6023	14355	18.9	-5	23.9
	NNSR	709800	3720000	1601	3094	3483.6815	11426	23.6	-5	28.6

total Leq
36.0
34.3
40.6

FIGURE D-9

PREDICTION OF ACTIVITY 5 DAYTIME CONSTRUCTION NOISE



	AQ "load factor"	hours of daily operation (as of 8/5/15)	RCNM acoustical usage factor (%)	FSDQ quantity (8/5/15)	Lmax (dBA at 50')	Leq (dBA at 50')	notes	RCNM Table 1 Lmax Spec721	Act. Meas	
										8/5/15, MCS: olive green highlights to the left represent construction roster/schedule info as appearing on received info dated 8/5/15.
Activity 5 - Structures										9/2/15, MCS: blue highlights to the left represent construction roster/schedule info as appearing on received info dated 8/19/15.
forklifts	*0.2*	*4*	20%	5	75	75	as RCNM manlift	85	75	
forklifts (aerial lift)	*0.31*	*4*	20%	5	75	75	as RCNM manlift	85	75	9/18/15, MCS: applied pile driving levels from AVSR1 (DEIR, Appx. I, p. 3-4)
water truck	*0.38*	*8*	40%	3	76	77	as RCNM dump truck	84	76	
ATV	*0.4*	*4*	40%	20	55	64	as RCNM pickup truck	55	75	
air compressors	*0.48*	*6*	40%	1	78	74	as RCNM air compressor	80	78	
crane	*0.29*	*2*	16%	1	81	73	as RCNM crane	85	81	
post machines	*0.4*	*6*	100%	7	88	96	per AVSR1	88	88	88 dBA Leq at 50 feet is loudest of two mentioned levels in reference
skidsteer	*0.4*	*4*	50%	10	80	87	as RCNM other equipment > 5HP	80	80	based on PWL from data from Bobcat S850, T-870 literature
flatbed truck	*0.38*	*4*	40%	2	74	73	as RCNM flatbed truck	84	74	
truck	*0.38*	*4*	40%	15	76	84	as RCNM dump truck	84	76	
SUBTOTAL						**97.3**				

		X (m)	Y (m)
Acoustic centerpoint:	**closest PSC (inverter/trns)**	**709166**	**3718437**

Coordinates

CAT? (2,4,6) 6

Receiver	ID	X (m)	Y (m)	delta X (m)	delta Y (m)	hypot (m)	(ft)	Base Leq	met mod	Leq
	ST3	710294.26	3720456.5	1128.26	2019.49	2313.29	7588	39.4	-5	44.4
	ST5	710921.19	3720333	1755.19	1896	2583.7004	8475	37.6	-5	42.6
	NNSR	709800	3720000	634	1563	1686.6905	5532	44.0	-5	49.0

		X (m)	Y (m)
Acoustic centerpoint:	**central PSC (inverter/trns)**	**708199**	**3716906**

8/14/15, MCS: do use the center PSC for half of the equipment--other half is assumed near the project boundary (i.e., closes PSC)

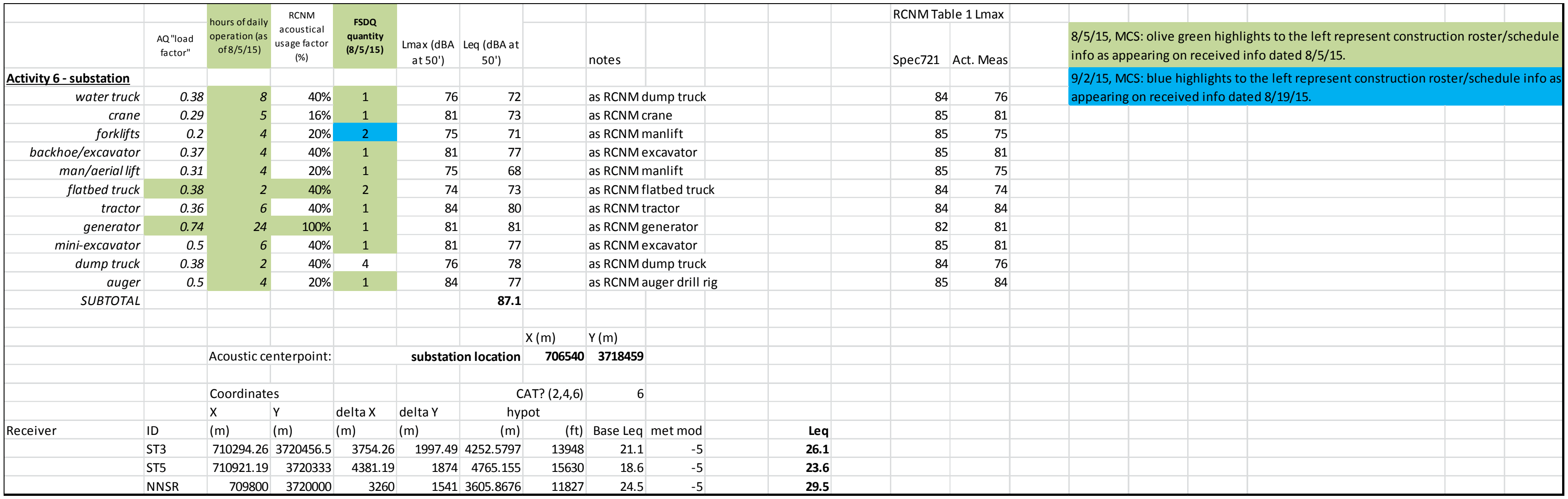
Coordinates

CAT? (2,4,6) 6

Receiver	ID	X (m)	Y (m)	delta X (m)	delta Y (m)	hypot (m)	(ft)	Base Leq	met mod	Leq
	ST3	710294.26	3720456.5	2095.26	3550.49	4122.6319	13522	28.9	-5	33.9
	ST5	710921.19	3720333	2722.19	3427	4376.6023	14355	27.6	-5	32.6
	NNSR	709800	3720000	1601	3094	3483.6815	11426	32.3	-5	37.3

total Leq
44.7
43.0
49.3

FIGURE D-10
PREDICTION OF ACTIVITY 6 DAYTIME CONSTRUCTION NOISE



													RCNM Table 1 Lmax		
	AQ "load factor"	hours of daily operation (as of 8/5/15)	RCNM acoustical usage factor (%)	**FSDQ quantity (8/5/15)**	Lmax (dBA at 50')	Leq (dBA at 50')		notes					Spec721	Act. Meas	8/5/15, MCS: olive green highlights to the left represent construction roster/schedule info as appearing on received info dated 8/5/15.
Activity 6 - substation															9/2/15, MCS: blue highlights to the left represent construction roster/schedule info as appearing on received info dated 8/19/15.
water truck	*0.38*	*8*	40%	1	76	72		as RCNM dump truck					84	76	
crane	*0.29*	*5*	16%	1	81	73		as RCNM crane					85	81	
forklifts	*0.2*	*4*	20%	2	75	71		as RCNM manlift					85	75	
backhoe/excavator	*0.37*	*4*	40%	1	81	77		as RCNM excavator					85	81	
man/aerial lift	*0.31*	*4*	20%	1	75	68		as RCNM manlift					85	75	
flatbed truck	*0.38*	*2*	40%	2	74	73		as RCNM flatbed truck					84	74	
tractor	*0.36*	*6*	40%	1	84	80		as RCNM tractor					84	84	
generator	*0.74*	*24*	100%	1	81	81		as RCNM generator					82	81	
mini-excavator	*0.5*	*6*	40%	1	81	77		as RCNM excavator					85	81	
dump truck	*0.38*	*2*	40%	4	76	78		as RCNM dump truck					84	76	
auger	*0.5*	*4*	20%	1	84	77		as RCNM auger drill rig					85	84	
SUBTOTAL						**87.1**									
							X (m)	Y (m)							
		Acoustic centerpoint:				**substation location**	**706540**	**3718459**							
		Coordinates				CAT? (2,4,6)		6							
		X	Y	delta X	delta Y	hypot									
Receiver	ID	(m)	(m)	(m)	(m)	(m)	(ft)	Base Leq	met mod		**Leq**				
	ST3	710294.26	3720456.5	3754.26	1997.49	4252.5797	13948	21.1	-5		**26.1**				
	ST5	710921.19	3720333	4381.19	1874	4765.155	15630	18.6	-5		**23.6**				
	NNSR	709800	3720000	3260	1541	3605.8676	11827	24.5	-5		**29.5**				

FIGURE D-11

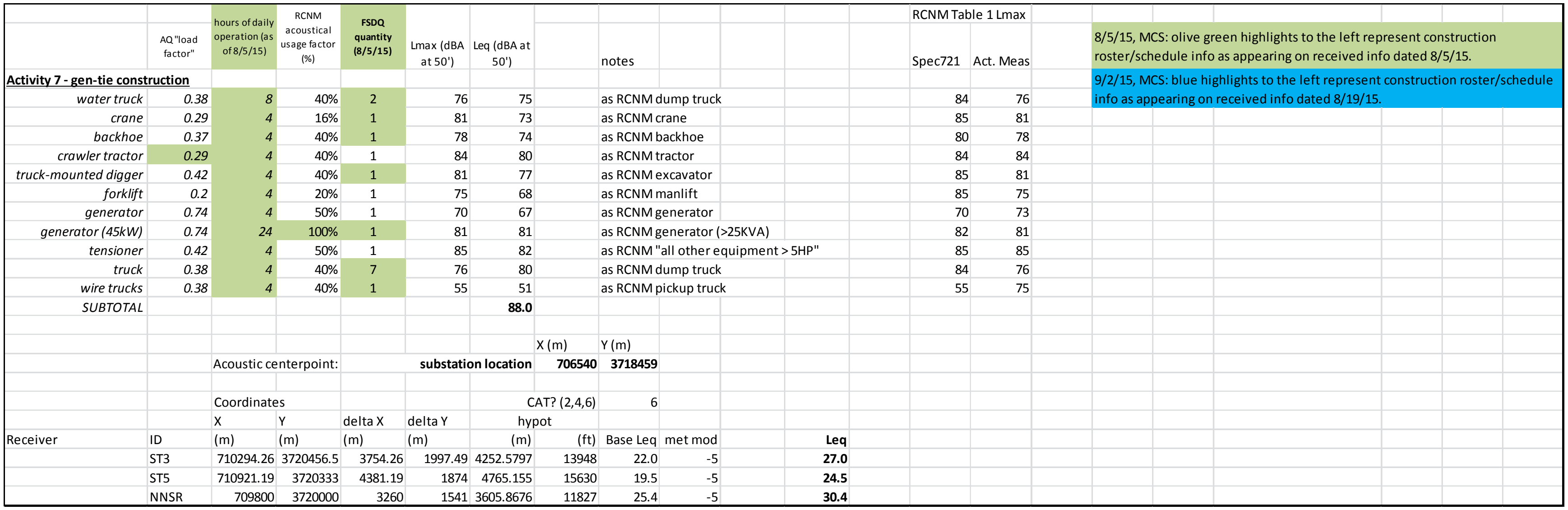
PREDICTION OF ACTIVITY 6 NIGHTTIME CONSTRUCTION NOISE

	AQ "load factor"	hours of daily operation (as of 8/5/15)	RCNM acoustical usage factor (%)	**FSDQ quantity (8/5/15)**	Lmax (dBA at 50')	Leq (dBA at 50')	notes	RCNM Table 1 Lmax Spec721	 Act. Meas
Activity 6 - substation									
generator	*0.74*	*24*	100%	1	81	81	as RCNM generator	82	81
SUBTOTAL						**81.0**			

8/5/15, MCS: olive green highlights to the left represent construction roster/schedule info as appearing on received info dated 8/5/15.

							X (m)	Y (m)		
		Acoustic centerpoint:				**substation location**	**706540**	**3718459**		
		Coordinates					CAT? (2,4,6)	6		
Receiver	ID	X (m)	Y (m)	delta X (m)	delta Y (m)	hypot (m)	(ft)	Base Leq	met mod	**Leq**
	ST3	710294.26	3720456.5	3754.26	1997.49	4252.5797	13948	15.0	5	**20.0**
	ST5	710921.19	3720333	4381.19	1874	4765.155	15630	12.5	5	**17.5**
	NNSR	709800	3720000	3260	1541	3605.8676	11827	18.4	5	**23.4**

FIGURE D-12
PREDICTION OF ACTIVITY 7 DAYTIME CONSTRUCTION NOISE



	AQ "load factor"	hours of daily operation (as of 8/5/15)	RCNM acoustical usage factor (%)	FSDQ quantity (8/5/15)	Lmax (dBA at 50')	Leq (dBA at 50')	notes	RCNM Table 1 Lmax Spec721	Act. Meas
Activity 7 - gen-tie construction									
water truck	*0.38*	*8*	40%	2	76	75	as RCNM dump truck	84	76
crane	*0.29*	*4*	16%	1	81	73	as RCNM crane	85	81
backhoe	*0.37*	*4*	40%	1	78	74	as RCNM backhoe	80	78
crawler tractor	*0.29*	*4*	40%	1	84	80	as RCNM tractor	84	84
truck-mounted digger	*0.42*	*4*	40%	1	81	77	as RCNM excavator	85	81
forklift	*0.2*	*4*	20%	1	75	68	as RCNM manlift	85	75
generator	*0.74*	*4*	50%	1	70	67	as RCNM generator	70	73
generator (45kW)	*0.74*	*24*	100%	1	81	81	as RCNM generator (>25KVA)	82	81
tensioner	*0.42*	*4*	50%	1	85	82	as RCNM "all other equipment > 5HP"	85	85
truck	*0.38*	*4*	40%	7	76	80	as RCNM dump truck	84	76
wire trucks	*0.38*	*4*	40%	1	55	51	as RCNM pickup truck	55	75
SUBTOTAL						**88.0**			

8/5/15, MCS: olive green highlights to the left represent construction roster/schedule info as appearing on received info dated 8/5/15.

9/2/15, MCS: blue highlights to the left represent construction roster/schedule info as appearing on received info dated 8/19/15.

		X (m)	Y (m)
Acoustic centerpoint:	**substation location**	**706540**	**3718459**

CAT? (2,4,6) 6

Receiver	ID	Coordinates X (m)	Y (m)	delta X (m)	delta Y (m)	hypot (m)	(ft)	Base Leq	met mod	**Leq**
	ST3	710294.26	3720456.5	3754.26	1997.49	4252.5797	13948	22.0	-5	**27.0**
	ST5	710921.19	3720333	4381.19	1874	4765.155	15630	19.5	-5	**24.5**
	NNSR	709800	3720000	3260	1541	3605.8676	11827	25.4	-5	**30.4**

FIGURE D-13
PREDICTION OF ACTIVITY 7 NIGHTTIME CONSTRUCTION NOISE

8/5/15, MCS: olive green highlights to the left represent construction roster/schedule info as appearing on received info dated 8/5/15.

								RCNM Table 1 Lmax	
	AQ "load factor"	hours of daily operation (as of 8/5/15)	RCNM acoustical usage factor (%)	**FSDQ quantity (8/5/15)**	Lmax (dBA at 50')	Leq (dBA at 50')	notes	Spec721	Act. Meas
Activity 7 - gen-tie construction									
generator (45kW)	*0.74*	*24*	100%	1	81	81	as RCNM generator (>25KVA)	82	81
SUBTOTAL						**81.0**			

		X (m)	Y (m)
Acoustic centerpoint:	**substation location**	**706540**	**3718459**

CAT? (2,4,6) 6

		Coordinates								
Receiver	ID	X (m)	Y (m)	delta X (m)	delta Y (m)	hypot (m)	(ft)	Base Leq	met mod	**Leq**
	ST3	710294.26	3720456.5	3754.26	1997.49	4252.5797	13948	15.0	5	**20.0**
	ST5	710921.19	3720333	4381.19	1874	4765.155	15630	12.5	5	**17.5**
	NNSR	709800	3720000	3260	1541	3605.8676	11827	18.4	5	**23.4**

FIGURE D-14
PREDICTION OF ACTIVITY 8 DAYTIME CONSTRUCTION NOISE

											RCNM Table 1 Lmax		
	AQ "load factor"	hours of daily operation (as of 8/5/15)	RCNM acoustical usage factor (%)	**FSDQ quantity (8/5/15)**	Lmax (dBA at 50')	Leq (dBA at 50')		notes			Spec721	Act. Meas	8/5/15, MCS: olive green highlights to the left represent construction roster/schedule info as appearing on received info dated 8/5/15.
Activity 8 - gen-tie construction													
water truck	*0.38*	*8*	40%	1	76	72		as RCNM dump truck			84	76	
backhoe	*0.37*	*1*	40%	1	78	74		as RCNM backhoe			80	78	
motor grader	*0.41*	*1*	40%	1	85	81		as RCNM grader			85	85	
scraper	*0.4*	*1*	40%	1	84	80		as RCNM scraper			85	84	
truck	*0.38*	*2*	40%	3	76	77		as RCNM dump truck			84	76	
SUBTOTAL						**85.0**							
							X (m)	Y (m)					
		Acoustic centerpoint:				**substation location**	**706540**	**3718459**					
		Coordinates					CAT? (2,4,6)	6					
		X	Y	delta X	delta Y	hypot							
Receiver	ID	(m)	(m)	(m)	(m)	(m)	(ft)	Base Leq	met mod	**Leq**			
	ST3	710294.26	3720456.5	3754.26	1997.49	4252.5797	13948	19.0	-5	**24.0**			
	ST5	710921.19	3720333	4381.19	1874	4765.155	15630	16.5	-5	**21.5**			
	NNSR	709800	3720000	3260	1541	3605.8676	11827	22.4	-5	**27.4**			

FIGURE D-15
PREDICTION OF ACTIVITY 9 DAYTIME CONSTRUCTION NOISE

											RCNM Table 1 Lmax		
	AQ "load factor"	hours of daily operation (as of 8/5/15)	RCNM acoustical usage factor (%)	**FSDQ quantity (8/5/15)**	Lmax (dBA at 50')	Leq (dBA at 50')		notes			Spec721	Act. Meas	8/5/15, MCS: olive green highlights to the left represent construction roster/schedule info as appearing on received info dated 8/5/15.
Activity 9 - gen-tie construction													
water truck	*0.38*	*8*	40%	2	76	75		as RCNM dump truck			84	76	
backhoe	*0.37*	*4*	40%	1	78	74		as RCNM backhoe			80	78	
motor grader	*0.41*	*6*	40%	1	85	81		as RCNM grader			85	85	
scraper	*0.4*	*6*	40%	2	84	83		as RCNM scraper			85	84	
truck	*0.38*	*2*	40%	3	76	77		as RCNM dump truck			84	76	
generator (45kW)	*0.74*	*24*	100%	1	81	81		as RCNM generator (>25KVA)			82	81	
generator (30kW)	*0.74*	*24*	100%	1	81	81		as RCNM generator (>25KVA)			82	81	
water pumps	*0.74*	*8*	50%	1	77	74					77	81	
SUBTOTAL						**88.5**							
							X (m)	Y (m)					
		Acoustic centerpoint:				**substation location**	**706540**	**3718459**					
		Coordinates					CAT? (2,4,6)	6					
		X	Y	delta X	delta Y	hypot							
Receiver	ID	(m)	(m)	(m)	(m)	(m)	(ft)	Base Leq	met mod	**Leq**			
	ST3	710294.26	3720456.5	3754.26	1997.49	4252.5797	13948	22.5	-5	**27.5**			
	ST5	710921.19	3720333	4381.19	1874	4765.155	15630	20.0	-5	**25.0**			
	NNSR	709800	3720000	3260	1541	3605.8676	11827	25.9	-5	**30.9**			

FIGURE D-16

PREDICTION OF ACTIVITY 9 NIGHTTIME CONSTRUCTION NOISE

	AQ "load factor"	hours of daily operation (as of 8/5/15)	RCNM acoustical usage factor (%)	**FSDQ quantity (8/5/15)**	Lmax (dBA at 50')	Leq (dBA at 50')	notes	RCNM Table 1 Lmax Spec721	 Act. Meas
Activity 9 - gen-tie construction									
generator (45kW)	*0.74*	*24*	100%	1	81	81	as RCNM generator (>25KVA)	82	81
generator (30kW)	*0.74*	*24*	100%	1	81	81	as RCNM generator (>25KVA)	82	81
SUBTOTAL						**84.0**			

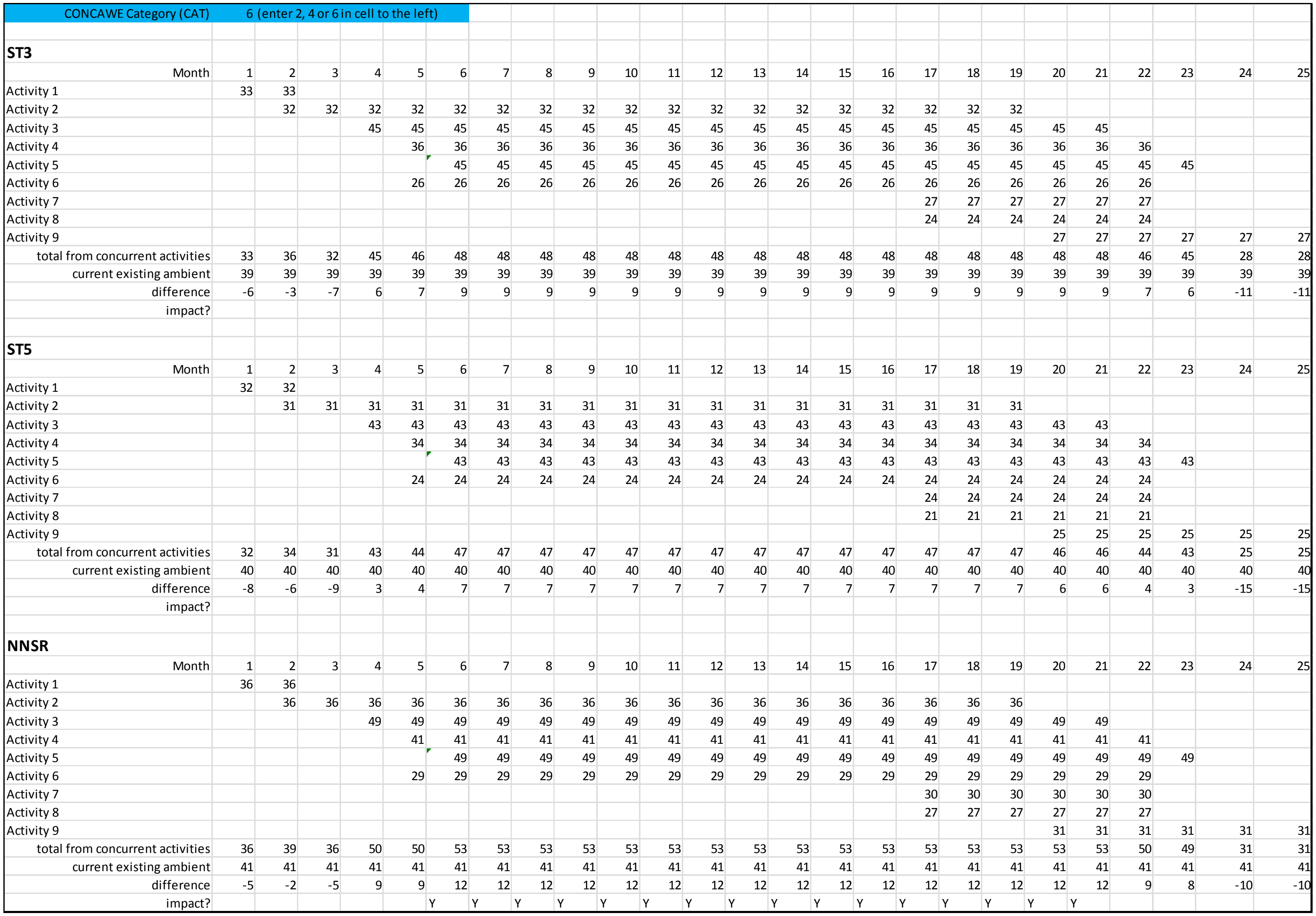
8/5/15, MCS: olive green highlights to the left represent construction roster/schedule info as appearing on received info dated 8/5/15.

		X (m)	Y (m)
Acoustic centerpoint:	**substation location**	**706540**	**3718459**

CAT? (2,4,6) 6

		Coordinates X (m)	 Y (m)	 delta X (m)	 delta Y (m)	 hypot (m)	 (ft)	 Base Leq	 met mod	 **Leq**
Receiver	ID									
	ST3	710294.26	3720456.5	3754.26	1997.49	4252.5797	13948	18.0	5	**23.0**
	ST5	710921.19	3720333	4381.19	1874	4765.155	15630	15.5	5	**20.5**
	NNSR	709800	3720000	3260	1541	3605.8676	11827	21.4	5	**26.4**

FIGURE D-17
PREDICTION OF CONCURRENT DAYTIME NOISE FROM ALL ACTIVITIES – CONCAWE CAT-6



CONCAWE Category (CAT)	6	(enter 2, 4 or 6 in cell to the left)																							
ST3																									
Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Activity 1	33	33																							
Activity 2		32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32						
Activity 3				45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45				
Activity 4					36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36			
Activity 5						45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45		
Activity 6					26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26			
Activity 7																	27	27	27	27	27	27			
Activity 8																	24	24	24	24	24	24			
Activity 9																				27	27	27	27	27	27
total from concurrent activities	33	36	32	45	46	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	46	45	28	28
current existing ambient	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
difference	-6	-3	-7	6	7	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	7	6	-11	-11
impact?																									
ST5																									
Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Activity 1	32	32																							
Activity 2		31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31						
Activity 3				43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43				
Activity 4					34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34			
Activity 5						43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43		
Activity 6					24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24			
Activity 7																	24	24	24	24	24	24			
Activity 8																	21	21	21	21	21	21			
Activity 9																				25	25	25	25	25	25
total from concurrent activities	32	34	31	43	44	47	47	47	47	47	47	47	47	47	47	47	47	47	47	46	46	44	43	25	25
current existing ambient	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
difference	-8	-6	-9	3	4	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	6	4	3	-15	-15
impact?																									
NNSR																									
Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Activity 1	36	36																							
Activity 2		36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36						
Activity 3				49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49				
Activity 4					41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41			
Activity 5						49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49	49		
Activity 6					29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29			
Activity 7																	30	30	30	30	30	30			
Activity 8																	27	27	27	27	27	27			
Activity 9																				31	31	31	31	31	31
total from concurrent activities	36	39	36	50	50	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	50	49	31	31
current existing ambient	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41
difference	-5	-2	-5	9	9	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	9	8	-10	-10
impact?						Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				

FIGURE D-18
PREDICTION OF CONCURRENT NIGHTTIME NOISE FROM ALL ACTIVITIES – CONCAWE CAT-6

CONCAWE Category (CAT)	6 (enter 2, 4 or 6 in cell to the left)																								
ST3																									
Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Activity 1	24	24																							
Activity 2		24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24						
Activity 3				31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31				
Activity 4																									
Activity 5																									
Activity 6					20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20			
Activity 7																	20	20	20	20	20	20			
Activity 8																									
Activity 9																				23	23	23	23	23	23
total from concurrent activities	24	27	24	32	32	32	32	32	32	32	32	32	32	32	32	32	33	33	33	33	33	26	23	23	23
current existing ambient	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
difference	-15	-12	-15	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-6	-6	-6	-6	-6	-13	-16	-16	-16
impact?																									
ST5																									
Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Activity 1	22	22																							
Activity 2		22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22						
Activity 3				30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30				
Activity 4																									
Activity 5																									
Activity 6					17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17			
Activity 7																	17	17	17	17	17	17			
Activity 8																									
Activity 9																				20	20	20	20	20	20
total from concurrent activities	23	25	23	30	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	24	21	21	21
current existing ambient	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
difference	-17	-15	-17	-10	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-16	-19	-19	-19
impact?																									
NNSR																									
Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Activity 1	27	27																							
Activity 2		27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27						
Activity 3				36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36				
Activity 4																									
Activity 5																									
Activity 6					23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23			
Activity 7																	23	23	23	23	23	23			
Activity 8																									
Activity 9																				26	26	26	26	26	26
total from concurrent activities	27	30	27	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	37	29	26	26	26
current existing ambient	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41
difference	-14	-11	-14	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-12	-15	-15	-15
impact?																									

FIGURE D-19
PREDICTION OF CONCURRENT DAYTIME NOISE FROM ALL ACTIVITIES – CONCAWE CAT-4

CONCAWE Category (CAT)	4 (enter 2, 4 or 6 in cell to the left)

ST3																									
Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Activity 1	28	28																							
Activity 2		27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27	27						
Activity 3				40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40				
Activity 4					31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31			
Activity 5						40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40		
Activity 6					21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21			
Activity 7																	22	22	22	22	22	22			
Activity 8																	19	19	19	19	19	19			
Activity 9																				22	22	22	22	22	22
total from concurrent activities	28	31	27	40	41	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	43	41	40	23	23
current existing ambient	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
difference	-11	-8	-12	1	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	1	-16	-16
impact?																									
ST5																									
Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Activity 1	27	27																							
Activity 2		26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26						
Activity 3				38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38				
Activity 4					29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29			
Activity 5						38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38	38		
Activity 6					19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19			
Activity 7																	19	19	19	19	19	19			
Activity 8																	16	16	16	16	16	16			
Activity 9																				20	20	20	20	20	20
total from concurrent activities	27	29	26	38	39	42	42	42	42	42	42	42	42	42	42	42	42	42	42	41	41	39	38	20	20
current existing ambient	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
difference	-13	-11	-14	-2	-1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	-1	-2	-20	-20
impact?																									
NNSR																									
Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Activity 1	31	31																							
Activity 2		31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31						
Activity 3				44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44				
Activity 4					36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36			
Activity 5						44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44	44		
Activity 6					24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24			
Activity 7																	25	25	25	25	25	25			
Activity 8																	22	22	22	22	22	22			
Activity 9																				26	26	26	26	26	26
total from concurrent activities	31	34	31	45	45	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	45	44	26	26
current existing ambient	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41
difference	-10	-7	-10	4	4	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	4	3	-15	-15
impact?																									

FIGURE D-20
PREDICTION OF CONCURRENT NIGHTTIME NOISE FROM ALL ACTIVITIES – CONCAWE CAT-4

CONCAWE Category (CAT)	4 (enter 2, 4 or 6 in cell to the left)																								
ST3																									
Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Activity 1	19	19																							
Activity 2		19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19						
Activity 3				26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26				
Activity 4																									
Activity 5																									
Activity 6					15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15			
Activity 7																	15	15	15	15	15	15			
Activity 8																									
Activity 9																				18	18	18	18	18	18
total from concurrent activities	19	22	19	27	27	27	27	27	27	27	27	27	27	27	27	27	28	28	28	28	28	21	19	19	19
current existing ambient	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
difference	-20	-17	-20	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-12	-11	-11	-11	-11	-11	-18	-20	-20	-20
impact?																									
ST5																									
Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Activity 1	17	17																							
Activity 2		17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17						
Activity 3				25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25				
Activity 4																									
Activity 5																									
Activity 6					12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12			
Activity 7																	12	12	12	12	12	12			
Activity 8																									
Activity 9																				15	15	15	15	15	15
total from concurrent activities	18	21	18	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	19	16	16	16
current existing ambient	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
difference	-22	-19	-22	-14	-14	-14	-14	-14	-14	-14	-14	-14	-14	-14	-14	-14	-14	-14	-14	-14	-14	-21	-24	-24	-24
impact?																									
NNSR																									
Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Activity 1	22	22																							
Activity 2		22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22						
Activity 3				31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31				
Activity 4																									
Activity 5																									
Activity 6					18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18			
Activity 7																	18	18	18	18	18	18			
Activity 8																									
Activity 9																				21	21	21	21	21	21
total from concurrent activities	22	25	22	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	24	22	22	22
current existing ambient	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41
difference	-19	-16	-19	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-17	-19	-19	-19
impact?																									

FIGURE D-21

PREDICTION OF CONCURRENT DAYTIME NOISE FROM ALL ACTIVITIES – CONCAWE CAT-2

CONCAWE Category (CAT)	2 (enter 2, 4 or 6 in cell to the left)

ST3

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Activity 1	16	16																							
Activity 2		15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15						
Activity 3				28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28				
Activity 4					19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19			
Activity 5						28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28		
Activity 6					9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9			
Activity 7																	10	10	10	10	10	10			
Activity 8																	7	7	7	7	7	7			
Activity 9																				10	10	10	10	10	10
total from concurrent activities	17	19	16	28	29	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	29	28	13	13
current existing ambient	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
difference	-22	-20	-23	-11	-10	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-10	-11	-26	-26
impact?																									

ST5

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Activity 1	15	15																							
Activity 2		14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14						
Activity 3				26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26				
Activity 4					17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17			
Activity 5						26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26		
Activity 6					7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7			
Activity 7																	7	7	7	7	7	7			
Activity 8																	4	4	4	4	4	4			
Activity 9																				8	8	8	8	8	8
total from concurrent activities	16	18	15	26	27	30	30	30	30	30	30	30	30	30	30	30	30	30	30	29	29	27	26	12	12
current existing ambient	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
difference	-24	-22	-25	-14	-13	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-11	-11	-13	-14	-28	-28
impact?																									

NNSR

Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Activity 1	19	19																							
Activity 2		19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19						
Activity 3				32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32				
Activity 4					24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24			
Activity 5						32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32		
Activity 6					12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12			
Activity 7																	13	13	13	13	13	13			
Activity 8																	10	10	10	10	10	10			
Activity 9																				14	14	14	14	14	14
total from concurrent activities	20	22	19	33	33	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	33	32	15	15
current existing ambient	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41
difference	-21	-19	-22	-8	-8	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-8	-9	-26	-26
impact?																									

FIGURE D-22
PREDICTION OF CONCURRENT DAYTIME NOISE FROM ALL ACTIVITIES – CONCAWE CAT-2

CONCAWE Category (CAT)	2 (enter 2, 4 or 6 in cell to the left)																								
ST3																									
Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Activity 1	7	7																							
Activity 2		7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7						
Activity 3				14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14				
Activity 4																									
Activity 5																									
Activity 6					3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3			
Activity 7																	3	3	3	3	3	3			
Activity 8																									
Activity 9																				6	6	6	6	6	6
total from concurrent activities	11	12	11	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	11	11	11	11
current existing ambient	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39	39
difference	-28	-27	-28	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-23	-28	-28	-28	-28
impact?																									
ST5																									
Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Activity 1	5	5																							
Activity 2		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5						
Activity 3				13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13				
Activity 4																									
Activity 5																									
Activity 6					0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Activity 7																	0	0	0	0	0	0			
Activity 8																									
Activity 9																				3	3	3	3	3	3
total from concurrent activities	11	11	11	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	10	10	10	10
current existing ambient	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
difference	-29	-29	-29	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-30	-30	-30	-30
impact?																									
NNSR																									
Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Activity 1	10	10																							
Activity 2		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10						
Activity 3				19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19				
Activity 4																									
Activity 5																									
Activity 6					6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6			
Activity 7																	6	6	6	6	6	6			
Activity 8																									
Activity 9																				9	9	9	9	9	9
total from concurrent activities	13	14	13	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	14	12	12	12
current existing ambient	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41
difference	-28	-27	-28	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-27	-29	-29	-29
impact?																									

D.2 OPERATION NOISE PREDICTION DETAIL

The following image presents an assortment of CadnaA (version 4.5.147) Tables, showing receiver locations, point sources, and sound levels—parameters used to calculate the aggregate Project operation noise level predictions (depicted as noise contours across the Project area and immediate vicinity). Please refer to Section 3.3 of the report text for more information on sound propagation model parameters (e.g., meteorological conditions).

FIGURE D-19
CADNAA SOUND PROPAGATION MODEL PARAMETERS FOR PROJECT OPERATION NOISE PREDICTION

Receiver

Name	M.	ID	Level Lr	Limit. Valu	Land Use			Height		Coordinates		
			Day	Day	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)				(m)		(m)	(m)	(m)
LT1		0	26.8	0		x	Total	1.5	r	709676.1	3720426	1.5
ST01		0	22.6	0		x	Total	1.5	r	711754.7	3720390	1.5
ST02		0	21.8	0		x	Total	1.5	r	711677.2	3720668	1.5
ST03		0	25.7	0		x	Total	1.5	r	710294.3	3720456	1.5
ST04		0	23.1	0		x	Total	1.5	r	710791.6	3720925	1.5
ST05		0	24.9	0		x	Total	1.5	r	710921.2	3720333	1.5
ST06		0	23.1	0		x	Total	1.5	r	710533.3	3721073	1.5
ST07		0	-80.2	0		x	Total	1.5	r	722299.1	3720652	1.5
ST08		0	-80.2	0		x	Total	1.5	r	722284.9	3719120	1.5
ST09		0	-80.2	0		x	Total	1.5	r	717308.2	3718947	1.5
ST10		0	-80.2	0		x	Total	1.5	r	717366.8	3720597	1.5
ST11	-	0	-88	0		x	Total	1.5	r	709676.9	3719665	1.5
NSR1		0	27.9	0		x	Total	1.5	r	709800	3720000	1.5

Point Source

Qty	M.	ID	Result. PWL			Lw / Li			Correction			Sound Reduction		Attenuatio	Operating Time			K0	Freq.	Direct.	Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night						X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)	(min)	(dB)	(Hz)		(m)		(m)	(m)	(m)
314		_POINT	87.7	87.7	87.7	Lw	inv++trans		0	0	0							0		(none)	2.28	r	705523.7	3718200	2.28
1		_POINT	99.4	99.4	99.4	Lw	sub		0	0	0							0		(none)	2.51	r	706539.8	3718459	2.51

Sound Levels (local)

Name	ID	Type	Oktave Spectrum (dB)												Source
			Weight.	31.5	63	125	250	500	1000	2000	4000	8000	A	lin	
substation	sub	Lw		96	102	104	99	99	93	88	83	76	99.4	108	Pio Pico
inverter + louver	inv	Lw	A		81.9	73.3	81.1	79.1	69.7	55.2	50.5	78.1	86.6	108.2	Glenarm Noise Impact Assessment
transformer	trans	Lw	A		57.4	69.5	72	77.4	74.6	70.8	65.6	56.5	81	89.4	Glenarm Noise Impact Assessment

APPENDIX S

PRELIMINARY GEOTECHNICAL INVESTIGATION REPORT

PRELIMINARY GEOTECHNICAL INVESTIGATION REPORT

FOR THE

FIRST SOLAR DEVELOPMENT, INC.
DESERT QUARTZITE SOLAR PROJECT
CACA-049397

RIVERSIDE COUNTY, CALIFORNIA
Township 7 South, Range 21 East, San Bernardino Baseline and Meridian

Prepared for:

First Solar Development, Inc.
1111 Broadway, Suite 400
Oakland, California 94607-4165

Prepared by:

URS
130 Robin Hill Road, Suite 100
Santa Barbara, California 93455
(805) 692-00600 ⬥ Fax: (805) 739-1135

URS Project No. 28907270

August 2011

URS

August 8, 2011

Mr. James Cook
First Solar Development, Inc.
1111 Broadway, Suite 400
Oakland, CA 94607-4165

Re: Preliminary Geotechnical Investigation Report
Desert Quartzite Solar Project (CACA 04937)
Riverside County, California
Township 7 South, Range 21 East, San Bernardino Baseline and Meridian

Dear Mr. Cook:

URS Corporation (URS) is pleased to present the results of our preliminary geologic/geotechnical investigation performed for the proposed site development at the Desert Quartzite Solar Project, located in Riverside County, California. The preliminary conclusions and recommendations contained in this report are based on the findings of our literature review and our interpretation of the site geologic and geotechnical conditions based upon this literature review. The purpose of this investigation was to evaluate the geologic/geotechnical constraints to the development of the property. Further site-specific geotechnical investigation, including field investigation, will be required for the final design phase of the project.

Should you have any questions or require additional information, please do not hesitate to contact Robert Urban at 805-361-1109.

Sincerely,
URS Corporation

Robert J. Urban, P.G. #7842, C.E.G. #2428
Exp. 1/31/13
Senior Engineering Geologist

Natalie J. Evans

Natalie Evans, G.I.T. #286
Geologist

URS Corporation
130 Robin Hill Road, Suite 100
Santa Barbara, CA 93117
Tel: 805.692.0600
Fax: 805.964.0259

TABLE OF CONTENTS

Section **Page**

EXECUTIVE SUMMARY ES-1
1.0 INTRODUCTION 1-1

1.1 BACKGROUND 1-1
1.2 SCOPE OF WORK 1-1
1.3 SITE LOCATION AND DESCRIPTION 1-1
1.4 PROPOSED DEVELOPMENT 1-2

2.0 GEOLOGIC SETTING 2-1

2.1 REGIONAL GEOLOGIC AND SEISMIC SETTING 2-1
2.2 GENERAL SITE GEOLOGY 2-1

2.2.1 Quaternary Non Marine (Qpv) 2-2
2.2.2 Quaternary Alluvium (Qa_6) 2-2
2.2.3 Quaternary Dune Sand (Qs) 2-2
2.2.4 Quaternary Dune Sand ($Q\ a_3$) 2-2
2.2.5 Quaternary Alluvium (Qs) 2-3

2.3 FAULTS 2-3
2.4 NRCS SURFACE SOILS INFORMATION 2-4
2.5 GROUNDWATER CONDITIONS 2-5

3.0 GEOLOGIC AND SEISMIC HAZARDS 3-1

3.1 FLOODING 3-1
3.2 SLOPE INSTABILITY/LANDSLIDES 3-1
3.3 SUBSIDENCE 3-1
3.4 POOR SOIL CONDITIONS (EXPANSIVE OR COLLAPSIBLE SOILS) 3-2
3.5 EXCESSIVE SETTLEMENT (ARTIFICIAL FILL) 3-2
3.6 FAULT HAZARDS 3-2

3.6.1 Surface Fault Rupture 3-2
3.6.2 Seismic Ground Shaking 3-3

3.7 LIQUEFACTION 3-3
3.8 TSUNAMIS AND SEICHES 3-5

3.9 GENERAL SOIL EROSION AND STABILITY CONSIDERATIONS........... 3-5

Section **Page**

4.0 SUMMARY 4-1

4.1 CONCLUSIONS AND RECOMMENDATIONS 4-1
4.2 LIMITATIONS.. 4-1

5.0 REFERENCES.. 5-1

List of Tables

Table 1 Summary of Potential Seismic Sources – Faults in Proximity to Site................. 2-3
Table 2 NRCS Surface Soils Properties and Description 2-3
Table 3 Summary of Potential Seismic Sources – Parameters and Estimated Earthquakes for Regional Faults.. 3-4

List of Figures

Figure 1 Topographic Map of Desert Quartzite Solar Project Site
Figure 2 Aerial Map of Desert Quartzite Solar Project Site
Figure 3 Geologic Map of Desert Quartzite Solar Project Site
Figure 4 Regional Fault and Epicenter Map of Desert Quartzite Solar Project Site
Figure 5 Soils Map of Desert Quartzite Solar Project Site

List of Appendices

Appendix A EQFAULT Seismic Parameters

EXECUTIVE SUMMARY

This geotechnical assessment executive summary has been prepared to provide a general overview of the report. The executive summary should be used in conjunction with the entire report for design and/or construction purposes. It should be recognized that specific details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the sections discussed herein.

The Desert Quartzite Solar Project (Site) is located in eastern Riverside County approximately 8 miles southwest of the town of Blythe, California. First Solar Development, Inc. (First Solar) proposes to construct and operate a solar photovoltaic energy-generating project at the Site. The proposed project will include the solar facility, an on-site substation, and an interconnection transmission line (gen-tie) to Southern California Edison's (SCE) Colorado River Substation to the west of the site.

The primary objective of this preliminary geotechnical investigation was to identify potential geologic and geotechnical issues for the Project development. The scope of work performed by URS included a review of readily available information and data on the geotechnical and geological conditions of the project area and preparation of this report.

Based on information obtained from the preliminary review, the Site appears to be suitable for development for the proposed project. A comprehensive geotechnical report should be prepared prior to construction with recommendations to be incorporated into the final design.

The most significant geologic hazard to the project identified in this preliminary study is the potential for moderate seismic shaking likely to occur during the design life of the proposed development. The project Site is located in the seismically active Southern California region within the influence of several fault systems considered to be potentially active. Structures should be designed in accordance with the values and parameters provided in the 2007 California Building Code (CBC) and ASCE 7-05. The preliminary seismic design parameters are provided within the report.

A comprehensive design-level geotechnical investigation should be performed prior to construction. Earthwork on the project should be observed and evaluated by a licensed engineer practicing in the field of geotechnical engineering. The evaluation of earthwork should include observation and testing of engineered fill, subgrade preparation, foundation bearing soils, and other geotechnical conditions exposed during construction.

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SECTION 1.0
INTRODUCTION

1.1 BACKGROUND

First Solar Development, Inc. (First Solar) is considering development of the Desert Quartzite Solar Project (Site), located in eastern Riverside County approximately 10 miles southwest of the town of Blythe, California. Consequently, First Solar retained URS to conduct a preliminary geotechnical investigation to support planning and permitting activities relative to this project. The primary objective of the preliminary investigation was to identify potential geologic and geotechnical issues for the Project development, and to provide geologic/geotechnical information to support the Bureau of Land Management's permitting process for the project.

1.2 SCOPE OF WORK

This investigation is based on a review of readily available information and data on the geotechnical and geological conditions of the project area. The tasks performed for this investigation included the following:

- Review of First Solar's development plans
- Review of available pertinent literature and reports
- Preparation of this report

The primary information available for this study included published regional geologic maps and reports.

1.3 SITE LOCATION AND DESCRIPTION

The Site is approximately 7.5 square miles in size and is located south of U.S. Interstate 10 (I-10), approximately 10 miles southwest of the town of Blythe, California (Figure 1). The Site comprises approximately 4,769 acres located within Sections 3, 4, 9 through 15, 22, 23, and 24, Township 7 South, Range 21 East, San Bernardino Baseline and Meridian.

The Site is situated on the Palo Verde Mesa located within the Mojave Desert geomorphic province of Southern California. The Site is located on a relatively flat area and ranges in elevation from approximately 330 feet above mean sea level (MSL) at the southeast corner to 475 feet MSL in the northwest (USGS 1983). The Palo Verde Mesa is located south of the McCoy Mountains, west of the Palo Verde Valley, north of the Palo Verde Mountains, and northeast of the Mule Mountains.

1.4 PROPOSED DEVELOPMENT

First Solar proposes to construct and operate an approximately 300 megawatt (MW) solar photovoltaic energy facility at the Site. The proposed project includes the following key structures: solar field arrays, an on-site operation and maintenance facility, an on-site substation, and an interconnection transmission line (gen-tie) to SCE’s Colorado River Substation. The proposed project Site boundary, including the proposed gen-tie corridor, is shown on Figure 1 (topographic map) and Figure 2 (aerial map). URS understands that the development plans are preliminary in nature and subject to refinement.

SECTION 2.0
GEOLOGIC SETTING

2.1 REGIONAL GEOLOGIC AND SEISMIC SETTING

The project site is located on the Palo Verde Mesa within the Mojave geomorphic province of southern California. The Mojave Desert is a broad interior fault-bounded wedge consisting of pre-Cambrian gneisses, metamorphosed sedimentary rocks, plutonic rocks, scattered Mesozoic-age volcanics and metavolcanics, and sedimentary strata. The Mojave Desert is bounded by the right-lateral San Andreas fault on the south, the left-lateral Garlock fault on the northwest, and the Colorado River on the east (DMG 1954) and is characterized by isolated mountain ranges separated by vast expanses of desert plains. Dominant northwest-southeast trending faults control topography in this region.

The area surrounding the site is characterized by faults and seismicity driven by movement along the boundary between the North American and Pacific crustal plates. These two plates are passing by each other horizontally, in a right lateral sense (i.e., the North American plate is moving southeastward relative to the Pacific plate) at a rate of about 40 to 50 millimeters (mm)/year. Most of this stress is accommodated by movement on the San Andreas fault, which extends from north of San Francisco to the Gulf of California and marks the southern boundary of the Mojave Desert geomorphic province. The San Andreas fault presents significant seismic risk to California with a high potential for large earthquakes.

The remaining portion of the crustal stress is accommodated by the numerous shorter active faults that flank the San Andreas fault. These shorter faults are also considered to be significant seismic sources. The geoseismic characteristics of these seismic sources are summarized in Section 2.3, including an estimate of the maximum earthquake magnitude that might be generated by each fault. A geologic map is depicted on Figure 3. The location of the site with respect to known active or potentially active faults and epicenters of earthquakes with magnitudes of 4 or greater is shown on the Regional Fault and Epicenter Map, Figure 4.

2.2 GENERAL SITE GEOLOGY

The Palo Verde Mesa is characterized by the nearly level morphology of the mesa and gently to moderately sloping alluvial fans. Fluvial erosion and deposition are the major geomorphic processes in the immediate area. According to the regional geologic mapping of Jennings (CGS 1967), the northern portion of the project site is underlain by metamorphosed sedimentary bedrock of Pre-Cretaceous age. The Cretaceous Period is a geologic period extending from approximately 145 to 65.6 million years ago (Ma). Southwest of the Site, the metamorphosed sedimentary bedrock of Pre-Cretaceous age (greater than 145 Ma) abuts Precambrian age (4,600 to 542 Ma) granitic bedrock. Based on the Jennings' fault activity mapping (CGS 1994), this unconformity is a pre-Quaternary age (2.6 Ma to present) thrust fault system trending northwest immediately southwest of the Site. Stone (USGS 2006) identifies the bedrock types as Jurassic age (199 to 145 Ma) volcanics north of the thrust fault and Jurassic age (199 to 145 Ma) plutonic rocks to the south (USGS 2006). Both Jennings (CGS 1994) and Stone (USGS 2006) map a thrust fault in the same place; however, Jennings' map includes additional fault traces. The Jennings 1994 CGS map identifies a Tertiary age (65 to 2.6 Ma) fault southwest of the site; however, a recent map developed by the USGS depicts detailed Quaternary age (2.6 Ma to present) terrace mapping which identifies terraces of varying ages rather than an offset single terrace that has been offset due to faulting (USGS 2006).

Overlying the Precambrian to Mesozoic age bedrock immediately southwest of the Site are Tertiary age (65 to 2.6 Ma) volcanics of rhyolitic composition (CSG 1994; USGS 2006). These volcanics are of Oligocene age (34 to 23 Ma) to Miocene age (23 to 5.3 Ma), indicating the depositional event(s) took place between 5.3 and 34 million years before present, coinciding with a period of intense plate tectonic activity. In the southeastern corner of the Site, the bedrock is overlain by Pleistocene age (2.6 Ma to 11,700 years before present [BP]) non-marine sediments. Holocene age (11,700 BP to present) alluvium overlays the older units across most of the Site; according to Stone (USGS 2006), the alluvium overlying the western portion of the Site is of Pleistocene age (2.6 Ma to 11,700 BP). Deposits of Holocene age dune sand are present in the northwestern portion of the Site (11,700 BP to present), including along the off-site portion of the gen-tie corridor. The distribution of these various units is depicted on the attached Geologic Map (Figure 2). The general characteristics of each of these geologic map units are described below in the relative order of predominance on the Site, including the proposed gen-tie corridor.

2.2.1 Quaternary Non Marine (Qpv)

Pleistocene age (2.6 Ma to 11,700 BP) alluvial deposits of the ancestral Colorado River comprised of moderately indurated, poorly graded sand, gravel, boulders, silt, and clay.

2.2.2 Quaternary Alluvium (Qa_6)

Holocene age (11,700 BP to present) alluvial fan and alluvial valley deposits comprised of unconsolidated sand, gravel, silt, and clay.

2.2.3 Quaternary Dune Sand (Qs)

Holocene Age (11,700 BP to present) dune sand comprised of actively drifting sand.

2.2.4 Quaternary Alluvium (Qa_3)

Holocene and Pleistocene age (2.6 Ma to present) alluvial fan deposits comprised of unconsolidated sand, gravel, silt, and clay.

2.2.5 Quaternary Alluvium (Qw)

Holocene Age (11,700 BP to present) alluvium of modern washes comprised of unconsolidated sand and gravel derived from local mountain ranges.

2.3 FAULTS

There are no known faults active during the Quaternary located in the Palo Verde Mesa area. The Jennings (CGS 1994) map identifies a Tertiary age (65 to 2.6 Ma) fault southwest of the Site; however, a recent map developed by the USGS depicts detailed quaternary terrace mapping which identifies terraces of varying ages rather than an offset single terrace (CGS 1994; USGS 2006).

The approximate distances of active fault zones from the Site are listed in Table 1.

TABLE 1
SUMMARY OF POTENTIAL SEISMIC SOURCES – FAULTS IN PROXIMITY TO SITE

Fault Name	Approximate Distance from Site (Miles)
Brawley Seismic Zone	58.8
Elmore Ranch	59.2
San Andreas – Southern	59.7
San Andreas – Coachella	59.7
Imperial	66.7
Superstition Hills (San Jacinto)	71.0
Superstition Mountain (San Jacinto)	73.8
Pinto Mountain	81.7
San Jacinto – Borrego	82.3
San Jacinto – Anza	84.1
Pisgah-Bullion Mountain – Mesquite LK	84.6
Laguna Salada	89.0
San Jacinto – Coyote Creek	89.2
Elsinore – Coyote Mountain	92.3
Emerson So. – Copper Mountain	94.3

Eureka Peak	97.9
Burnt Mountain	99.7

2.4 NRCS SURFACE SOILS INFORMATION

Based on review of the U.S. Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS) (previously Soil Conservation Service) soil survey of the Palo Verde Area, the Site is characterized by multiple soil types, generally consisting of silty sands and gravels (USDA 1969). The NRCS mapped soil types at the Site are listed in Table 2. Figure 5 depicts the distribution of soils at the Site.

TABLE 2
NRCS SURFACE SOILS PROPERTIES AND DESCRIPTION

Soil Series	Slope (% Grade)	Depth (Inches)	Classification		Description
			USCS[1]	AASHTO[2]	
Aco	0–1	0–60	SM	A-1, A-2	The Aco series comprises deep, well-drained soil formed in mixed alluvium on terraces above the flood plain.
Carrizo	0–2	0–60	SW-SM, GM	A-1	The Carrizo series comprises deep, well-drained soils formed in mixed sandy and gravelly alluvium on arroyos.
Chuckwalla	0–1	0–60	GC-GM	A-1, A-2, A-4	The Chuckwalla series comprises deep, well-drained soils formed in mixed stratified alluvium on alluvial fan terraces.
Orita	0–1	0–80	SM, GM	A-1, A-2, A-4, A-6	The Orita series comprises deep, well drained soils formed in alluvium on alluvial fan remnants and terraces.
Rositas	0–9	0–72	SM, SP-SM	A-1, A-2, A-3	The Rositas series comprises deep, well-drained soils formed in sandy eolian soils from recent alluvium on sand dunes.

[1] USCS: United Soils Classification System.

[2] AASHTO: American Association of State Highway and Transportation Officials classification.

The Aco series is present throughout the Site and is the predominant soil type on the Site. All of the soils mapped on Site have low potential for expansive soil characteristics, according to the Palo Verde Area soil map (USDA 1969).

As shown on Figure 5, other soil series prevalent on the Site include the Orita and Rositas series as well as the Carrizo series. The mapped soil series on the Site are considered to have high risk of corrosion for uncoated steel and low to moderate risk of corrosion for concrete. Based on the USDA report, there is a low to moderate potential for water- and wind-induced erosion for soil series throughout the Site (USDA 1969).

The USDA report provides an interpretation of soil limitations for septic suitability. Using these interpretations, all of the soil series mapped on the Site are classified as somewhat limited with respect to septic suitability with one exception; the Orita series is classified as very limited suitability for septic system disposal fields (USDA 1969).

2.5 GROUNDWATER CONDITIONS

The depth to groundwater in the Site vicinity is believed to be greater than 100 feet below ground surface (bgs) based on relative site elevation difference above the Colorado River and floodplain (Palo Verde Valley) and measured depth to groundwater at adjacent sites (DWR 1978; Metzger et al 1973). Groundwater levels may fluctuate seasonally with precipitation, regional pumping from wells, irrigation, drainage, and site grading.

SECTION 3.0
GEOLOGIC AND SEISMIC HAZARDS

Geologic and seismic hazards are those hazards that could impact the project due to the surrounding geologic and seismic conditions. Geological hazards include slope instability (landslides), erosion, subsidence, poor soil conditions, excessive settlement, and flooding. Seismic hazards include phenomena that occur during an earthquake such as surface fault rupture, seismic ground shaking, liquefaction, and tsunami waves. The potential impact of these hazards to the Site has been *assessed* and is summarized in the following sections.

3.1 FLOODING

The Site is located in an area designated Zone D within the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps, indicating an area where there are possible but undetermined flood hazards (FIRM map 06065C Panel *06065C3200G). In areas designated Zone D, no analysis of flood hazards has been conducted.

The project Site is located in an arid environment and on relatively high ground northeast of the Mule Mountains, which drain into and through portions of the Site. Based on the TLA site drainage report (TLA 2011), the potential for flooding on the Site is considered moderate.

3.2 SLOPE INSTABILITY/LANDSLIDES

The potential for slope instability is insignificant based on the relatively flat terrain that characterizes the Site (USGS 1975; 1983). Therefore, the potential for hazards related to slope instability, landslides, or debris flows is considered low; however, considering the potential for flooding on Site, the hazard of episodic debris flows may be present based on Site hydraulic analysis (TLA 2011).

3.3 SUBSIDENCE

Land subsidence can be caused by various natural phenomena, including tectonic movement, hydro compaction, or consolidation. The extraction of water or petroleum from sedimentary source rocks can also cause the permanent collapse of the pore space previously occupied by the removed fluid. Sufficient subsidence resulting from these phenomena may cause damage to nearby engineered structures.

Based on review of available literature, subsidence has not been documented within the vicinity of the project site (USGS 2002; DWR 1978) and available literature does not indicate significant quantities of fluids being extracted in the project area. Subsidence is therefore not anticipated to pose a significant hazard to the proposed project.

3.4 POOR SOIL CONDITIONS (EXPANSIVE OR COLLAPSIBLE SOILS)

Expansive soils are fine-grained soils (clay) that can undergo a significant increase in volume with an increase in water content. Changes in the water content of an expansive soil can result in severe distress to structures constructed upon the soil. Based on USDA, NRCS soil maps and descriptions, the on Site surface and near-surface soils are expected to exhibit low expansive potentials. As expansive soils may impact a project, testing should be conducted to identify the degree to which onsite soils may expand.

Collapsible soils are those that undergo settlement upon wetting, even without the application of additional load. The process of collapse with the addition of water is known as hydrocompaction. Hydrocompaction occurs when water weakens or destroys the bonds between soil particles and severely reduces the bearing capacity of the soil. Typical collapsible soils are lightly colored, are low in plasticity and have relatively low densities. Collapsible soils are typically associated with alluvial fans, windblown materials, or colluvium. Because the project Site is largely covered in alluvium and windblown materials, the potential for collapsible soils may exist at the project Site. If collapsible soils are found to occur at the Site, as part of the design level geotechnical investigation mitigation measures may be necessary to reduce or eliminate the hazard. Traditional methods of construction grading generally would employ removal of collapsible soils and replacement with engineered fill. Provided that these mitigation methods are incorporated into the design of the project, collapsible soils are not expected to have a significant impact upon the project.

3.5 EXCESSIVE SETTLEMENT (ARTIFICIAL FILL)

A risk of excessive settlement can be associated with improperly placed and substandard artificial fills. With regard to this potential hazard, based on aerial photograph review and available literature there is no evidence at this time of previous site disturbance which would entail artificial fill; therefore, it is unlikely that excessive settlement of artificial fill would have a negative impact on this project.

3.6 FAULT HAZARDS

3.6.1 Surface Fault Rupture

The “Alquist-Priolo Earthquake Fault Zoning Act” is a state law that regulates development projects near active faults to mitigate the hazard of surface fault rupture. The Act requires that development permits for projects within “Earthquake Fault Zones” be withheld until geologic investigations demonstrate that the sites are not threatened by surface displacement from future fault rupture. To be zoned under the Alquist-Priolo Fault Zoning Act, a fault must be considered active or both sufficiently active and well-defined (CGS 1997). CGS defines an active fault as one that has had surface displacement within Holocene time (about the last 11,000 years), and a sufficiently active fault as one that has evidence of Holocene surface displacement along one or more of its segments or branches (CGS 1997). The CGS considers a fault to be well defined if its trace is clearly detectable as a physical feature at or just below the ground surface.

The State of California has not yet completed mapping the region in which the Site is located for Seismic Hazard Zones. No known active, sufficiently active, or well-defined fault traces have been recognized as crossing the proposed project Site, and the CGS does not delineate any part of the proposed project as being within an Earthquake Fault Zone.

3.6.2 Seismic Ground Shaking

As indicated by the numbers and distribution of recorded earthquake epicenters and the proximity of faults in the region (Figure 3), it is anticipated that the site will be subjected to seismic shaking during the lifetime of the development. The degree of shaking that is felt at a given site depends on the distance from the earthquake source, the type of subsurface material on which the project is situated, and topography. Based on the California Geological Survey interactive Seismic Hazard map (CGS 2008), the Peak Ground Acceleration with a 10 percent chance of exceedance in 50 years would be less than 0.1g. The effect of seismic ground motion to the planned development should be mitigated by proper building design, in accordance to 2007 California Building Code (CBC) and its current amendments. Building codes are designed to limit the degree of damage that would otherwise occur to an un-reinforced building. Additional geotechnical studies should be performed to develop final seismic design recommendations.

The Site is located in Southern California, a seismically active area. The magnitude and type of seismic hazard which may potentially affect the Site is dependent on both proximity to causative faults, and magnitude of seismic event. Table 3 presents distance of fault zones from the Site and the maximum credible earthquake (MCE), calculated using the EQFAULT program, which nearby seismic events may produce.

Based on these calculations, the peak ground acceleration at the Site for a 10 percent Probability of Exceedance in 50 years is estimated to be approximately 0.0373g.

3.7 LIQUEFACTION

Liquefaction is defined as significant and relatively sudden reduction in stiffness and shear strength of saturated sandy soils caused by a seismically induced increase in pore water pressures. Potential for seismically induced liquefaction exists whenever relatively loose, sandy soils exist with high groundwater level and/or potential for long duration, high seismic shaking. The susceptibility of a site to liquefaction is relative to water content, depth, and density of granular sediments as well as the frequency and magnitude of earthquakes in the surrounding area. When liquefaction occurs, the site can experience damage induced by permanent ground movements resulting in differential settlement.

TABLE 3
SUMMARY OF POTENTIAL SEISMIC SOURCES – PARAMETERS AND ESTIMATED EARTHQUAKES FOR REGIONAL FAULTS

		Estimated Maximum Credible Earthquake Event		
Fault Name	Approximate Distance from Site (Miles)	Maximum Earthquake Magnitude (MM[1])	Peak Site Acceleration (g[2])	Estimated Site Intensity (Mod. Merc.[3])
Brawley Seismic Zone	58.8	6.4	0.016	IV
Elmore Ranch	59.2	6.6	0.019	IV
San Andreas – Southern	59.7	7.4	0.037	V
San Andreas – Coachella	59.7	7.1	0.029	V
Imperial	66.7	7.0	0.022	IV
Superstition Hills (San Jacinto)	71.0	6.6	0.014	III
Superstition Mountain (San Jacinto)	73.8	6.6	0.013	III
Pinto Mountain	81.7	7.0	0.015	IV
San Jacinto – Borrego	82.3	6.6	0.010	III
San Jacinto – Anza	84.1	7.2	0.018	IV
Pisgah-Bullion Mountain – Mesquite LK	84.6	7.1	0.016	IV
Laguna Salada	89.0	7.0	0.013	III
San Jacinto – Coyote Creek	89.2	6.8	0.011	III
Elsinore – Coyote Mountain	92.3	6.8	0.010	III
Emerson So. – Copper Mountain	94.3	6.9	0.011	III
Eureka Peak	97.9	6.4	0.006	II
Burnt Mountain	99.7	6.4	0.006	II

[1] MM: moment magnitude.

[2] g: acceleration due to earth’s gravity.

[3] Mod. Merc.: Modified Mercalli Intensity Scale.

Mitigation methods for liquefaction may include identifying potentially liquefiable soils and then either avoiding placing structures within the limits of liquefiable soils, or applying in-situ soil improvement, and using a deep foundation system. In-situ soil improvement methods for liquefiable soil include vibro-replacement, compaction grouting and deep soil mixing. A deep foundation system may consist of driven pre-cast piles or cast-in-drilled-hole piers or caissons. The results of the forthcoming detailed geotechnical investigation relative to liquefaction potential at the site should be incorporated into the final project design.

Based on the relatively deep water table underlying the Site, which is elevated over 100 feet above the floodplain of the Colorado River, the potential for liquefaction is considered to be low (USGS 1983; Metzger et al 1973).

3.8 TSUNAMIS AND SEICHES

A tsunami is a great sea wave (commonly called a tidal wave) produced by a significant undersea disturbance, such as tectonic displacement of the sea floor associated with large, shallow earthquakes. A seiche is a wave generated in an enclosed body of water such as a lake or reservoir. Based on the fact that the Site is situated inland, far from oceans or large, land-locked water bodies, the potential for seismically induced tsunamis or seiches is considered to be low (CGS 1977).

3.9 GENERAL SOIL EROSION AND STABILITY CONSIDERATIONS

The soils present at the Site have a low to moderate susceptibility to wind and water erosion (USDA 1969). Preventative measures to reduce seasonal flooding and erosion should be incorporated into site grading and drainage plans. Dust control should be implemented during construction, and soil stabilization measures should be implemented, where necessary.

The upper soils at the Site are expected to be relatively loose to medium-dense and may be unsuitable in their present condition to support structures in the vicinity of the operations and maintenance facility and the on-site substation. The soils within the building and structural areas may require moisture conditioning, over-excavation, and recompaction to improve bearing capacity and to reduce the potential for differential settlement from static loading. It is expected that these potential issues will be investigated as part of the forthcoming detailed geotechnical investigation and addressed, as applicable, in the final project design.

SECTION 4.0
SUMMARY

4.1 CONCLUSIONS AND RECOMMENDATIONS

The geology and seismic conditions of the project site have been evaluated in terms of their impact on the proposed project. Based on the findings of the preliminary site investigation, the project Site is generally suitable for the proposed development. Provided that standard geotechnical practices are followed and standard mitigation methods are incorporated into the final design of the development, it is anticipated that geologic hazards will not significantly impact the project. The primary geotechnical consideration for the project is the potential for moderate seismic shaking likely to occur during the design life of the proposed development. The project Site is located in the seismically active Southern California region within the influence of several fault systems considered to be potentially active. Structures should be designed in accordance with the values and parameters provided in the 2007 California Building Code (CBC) and ASCE 7-05. The seismic design parameters are provided within the report.

The published literature clearly indicates that the mapped faults near the Site are not active. Therefore, from a fault rupture hazard standpoint there is no requirement to establish a development setback zone for these faults.

Finally, URS notes that this is a preliminary assessment of engineering geologic/geotechnical conditions of the Site. For any given aspect of the development, final geotechnical conclusions and recommendations should be provided in a separate report after specific, final project plans are developed, and on-site geotechnical explorations and testing are performed.

4.2 LIMITATIONS

This report presents preliminary interpretations and recommendations pertaining to the subject site based on the assumption that surface and subsurface conditions do not deviate appreciably from those indicated by the available literature and reports (as cited in this preliminary report). The scope of this preliminary engineering geology and geotechnical investigation did not include any field investigations. The potential for encountering conditions different from those assumed cannot be discounted. Professional judgments presented in this report are based on evaluations of the available literature gathered, on our understanding of the proposed project construction, and on our general experience in the geotechnical engineering and engineering geology field. The judgments presented meet the standard of care of our profession at this time and location in work performed under similar circumstances.

SECTION 5.0
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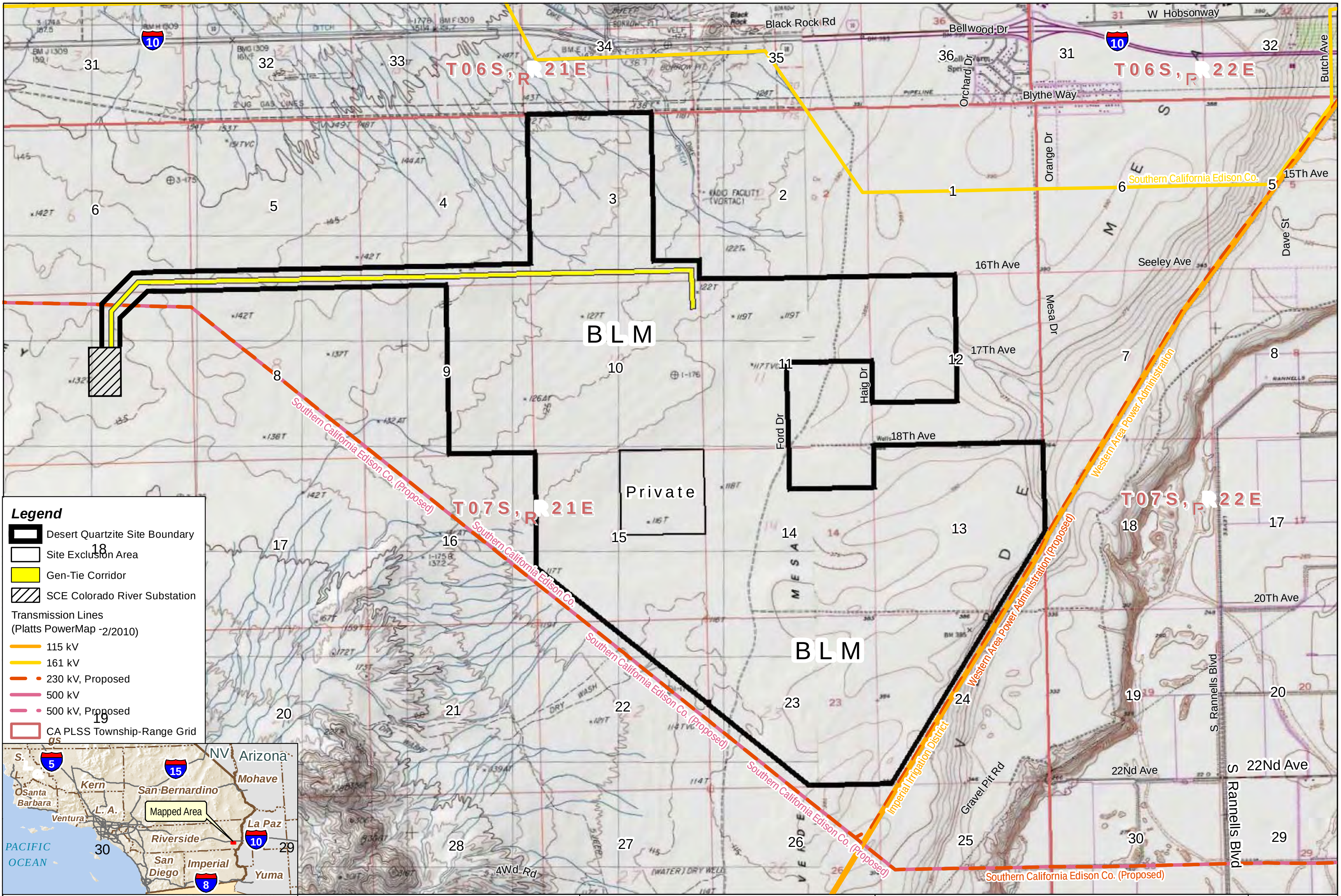
FIGURES

T/Ladd/FirstSolar/DesertQuartzite/811-281A


Legend
▬ Desert Quartzite Site Boundary
☐ Site Exclusion Area
🟨 Gen-Tie Corridor
▨ SCE Colorado River Substation
Transmission Lines
(Platts PowerMap -2/2010)
115 kV
161 kV
230 kV, Proposed
500 kV
500 kV, Proposed
CA PLSS Township-Range Grid
T06S, R21E
T06S, R22E
T07S, R21E
T07S, R22E
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BLM
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Orchard Dr
Blythe Way
Orange Dr
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Dave St
16Th Ave
Seeley Ave
Mesa Dr
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Haig Dr
Ford Dr
18Th Ave
Western Area Power Administration
Western Area Power Administration (Proposed)
Southern California Edison Co. (Proposed)
Southern California Edison Co.
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Santa Barbara
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Mapped Area
Riverside
La Paz
PACIFIC OCEAN
San Diego
Imperial
Yuma
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First Solar - Desert Quartzite
Solar Project, Riverside County, CA

URS Corporation

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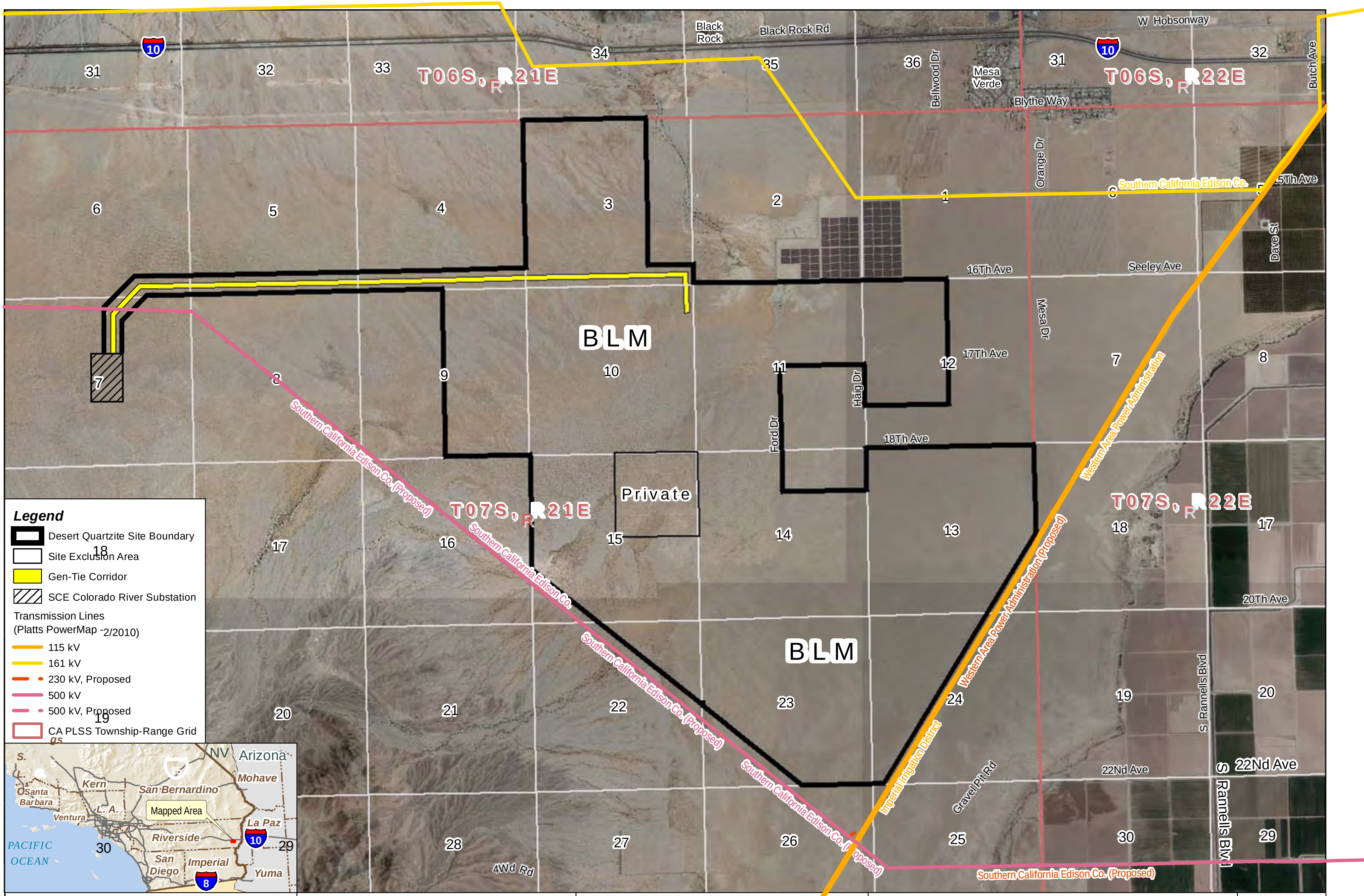
Source: [1] USGS 1:24,000-scale topographic map created with TOPO!, [2] California Geospatial Information Library PLS, [3] ESRI StreetMap USA (2007), [4] Platts PowerMap for power infrastructure.

Figure 1. Topographic Map of Desert Quartzite Solar Project Site

2011


Legend
Desert Quartzite Site Boundary
Site Exclusion Area
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Transmission Lines
(Platts PowerMap -2/2010)
115 kV
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T06S, R21E
T06S, R22E
T07S, R21E
T07S, R22E
BLM
BLM
Private
Black Rock
Black Rock Rd
W Hobsonway
Mesa Verde
Blythe Way
Bellwood Dr
Orange Dr
Butch Ave
Southern California Edison Co.
15Th Ave
16Th Ave
Seeley Ave
Dave St
17Th Ave
Mesa Dr
Haig Dr
Ford Dr
18Th Ave
20Th Ave
22Nd Ave
S Rannells Blvd
Gravel Pit Rd
4Wd Rd
Imperial Irrigation District
Western Area Power Administration
Western Area Power Administration (Proposed)
Southern California Edison Co.
Southern California Edison Co. (Proposed)
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6 5 4 3 2 1 6
7 8 9 10 11 12 7 8
18 17 16 15 14 13 18 17
19 20 21 22 23 24 19 20
30 28 27 26 25 30 29
NV
Arizona
Mohave
Kern
San Bernardino
Santa Barbara
Ventura
L. A.
Mapped Area
Riverside
La Paz
PACIFIC OCEAN
San Diego
Imperial
Yuma

First Solar -Desert Quartzite
Solar Project, Riverside County, CA

URS Corporation

0 0.25 0.5 0.75 1 Miles

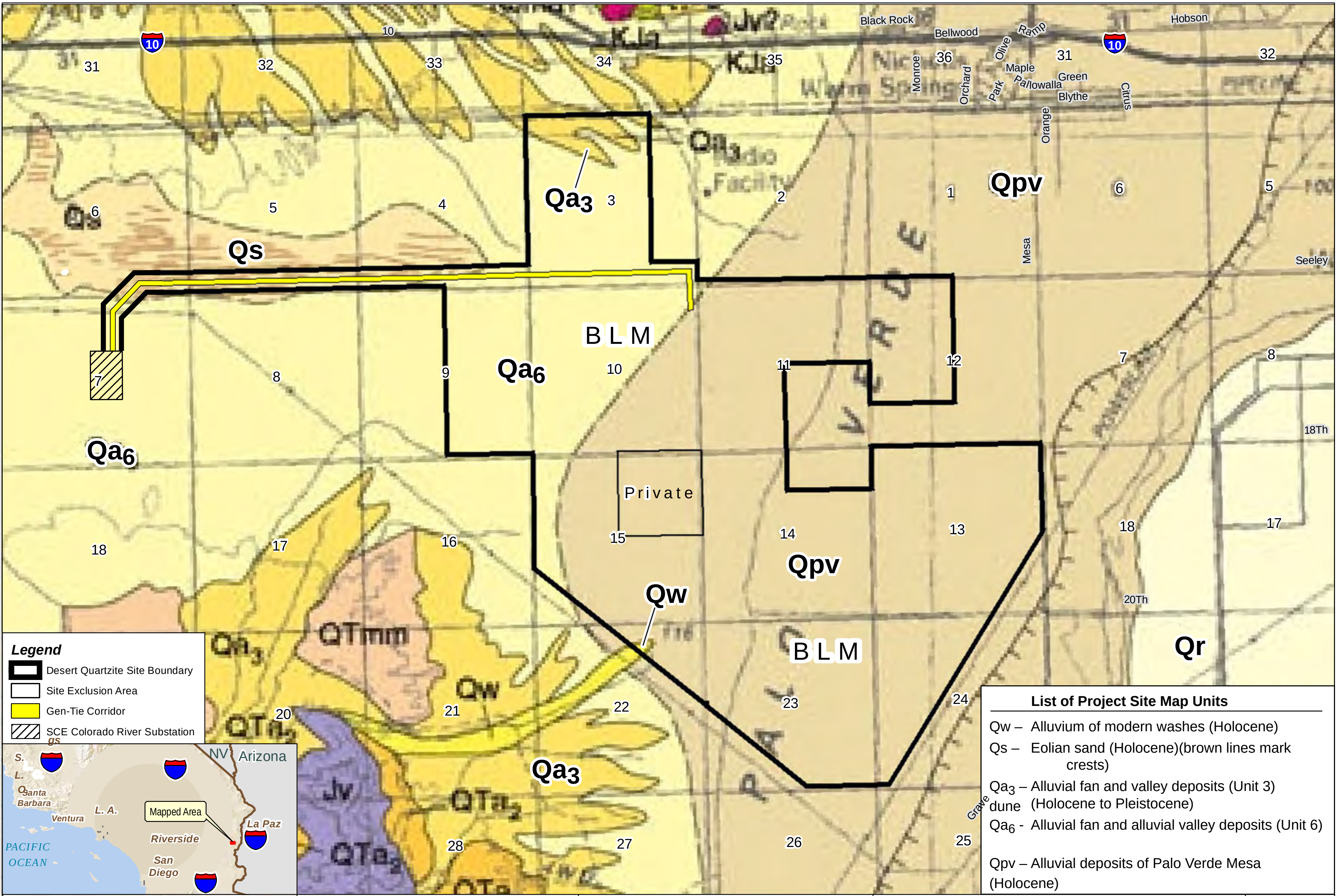
0 1,000 2,000 3,000 4,000 5,000 Feet

Source: [1] National Agriculture Imagery Program (NAIP) Orthoimagery for Zone 11 California State Quarter Quadrangles, Aerial Photography Field Office (2010-04-28 image date, 1m res.), [2] California Geospatial Information Library PLS, [3] ESRI StreetMap USA (2007), [4] Platts PowerMap for power infrastructure.

Figure 2. Aerial Map of Desert Quartzite Solar Project Site

2011

T/Ladd/FirstSolar/DesertQuartzite/811-282A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Black Rock
Bellwood
Olive
Ramp
Hobson
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35
36
31
32
Monroe
Orchard
Park
Maple
Pallowalla
Green
Blythe
Citrus
Orange
Mesa
Seeley
Qa3
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Qpv
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Qs
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BLM
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Grave
S.
L.
Santa Barbara
Ventura
L. A.
Mapped Area
Riverside
San Diego
PACIFIC OCEAN
NV
Arizona
La Paz

Legend

- ▬ Desert Quartzite Site Boundary
- ☐ Site Exclusion Area
- 🟨 Gen-Tie Corridor
- ▨ SCE Colorado River Substation

List of Project Site Map Units

Qw – Alluvium of modern washes (Holocene)

Qs – Eolian sand (Holocene)(brown lines mark crests)

Qa_3 – Alluvial fan and valley deposits (Unit 3)
dune (Holocene to Pleistocene)

Qa_6 - Alluvial fan and alluvial valley deposits (Unit 6)

Qpv – Alluvial deposits of Palo Verde Mesa (Holocene)
(Pleistocene)

First Solar - Desert Quartzite Solar Project, Riverside County, CA

URS Corporation

0 0.25 0.5 0.75 1 Miles

0 1,000 2,000 3,000 4,000 5,000 Feet

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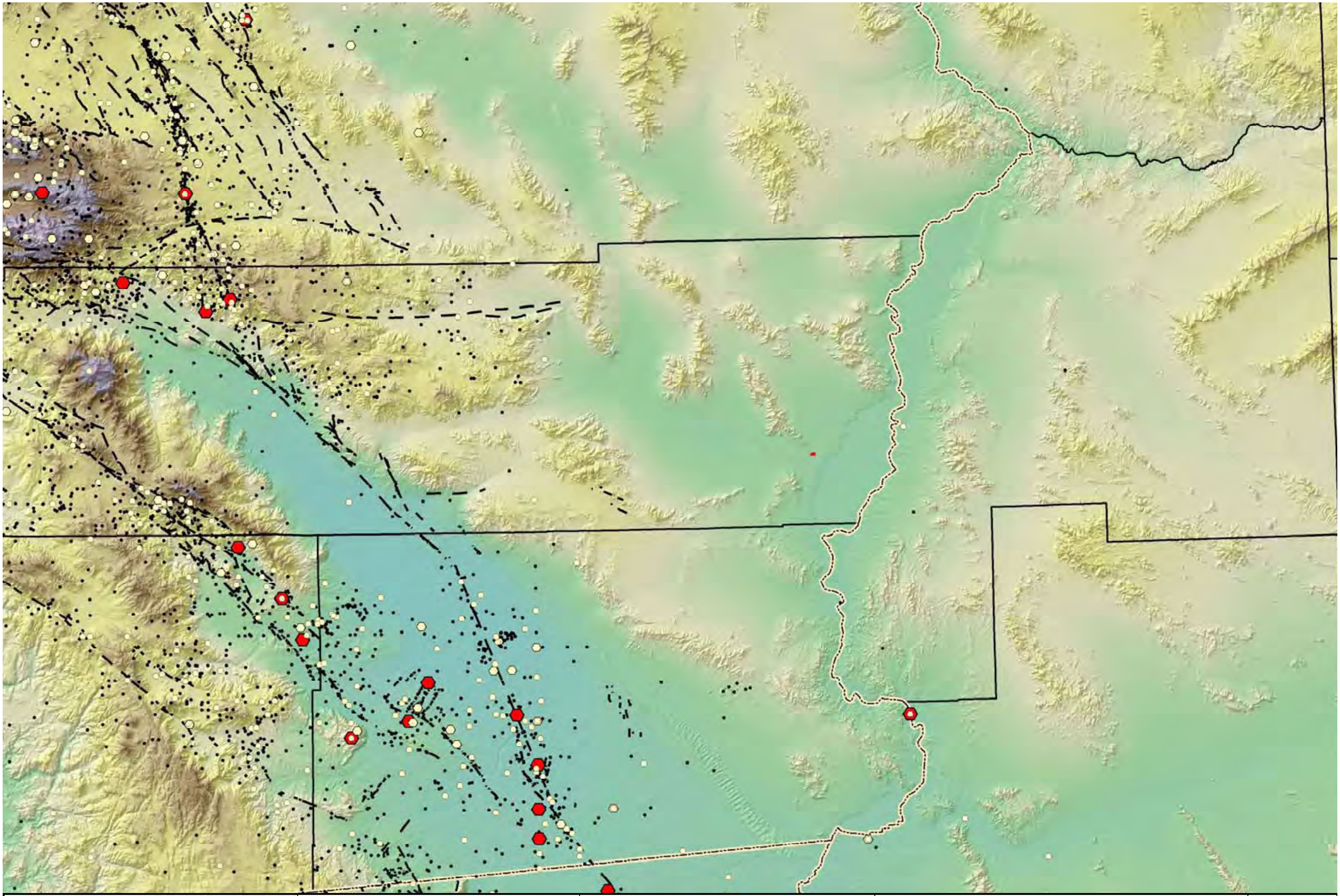
Source:
U.S.G.S 1:100,000 Geologic Map of the West Half of the Blythe 30'x60' quadrangle, Riverside Co., CA & La Paz Co., AZ, dated 1988-1990 & 2004.
Digital basemap by Techni Graphic Systems, Inc., and Paul Stone.

Figure 3. Geologic Map of Desert Quartzite Solar Project Site

2011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First Solar - Desert Quartzite Solar Project, Riverside County, CA

URS Corporation

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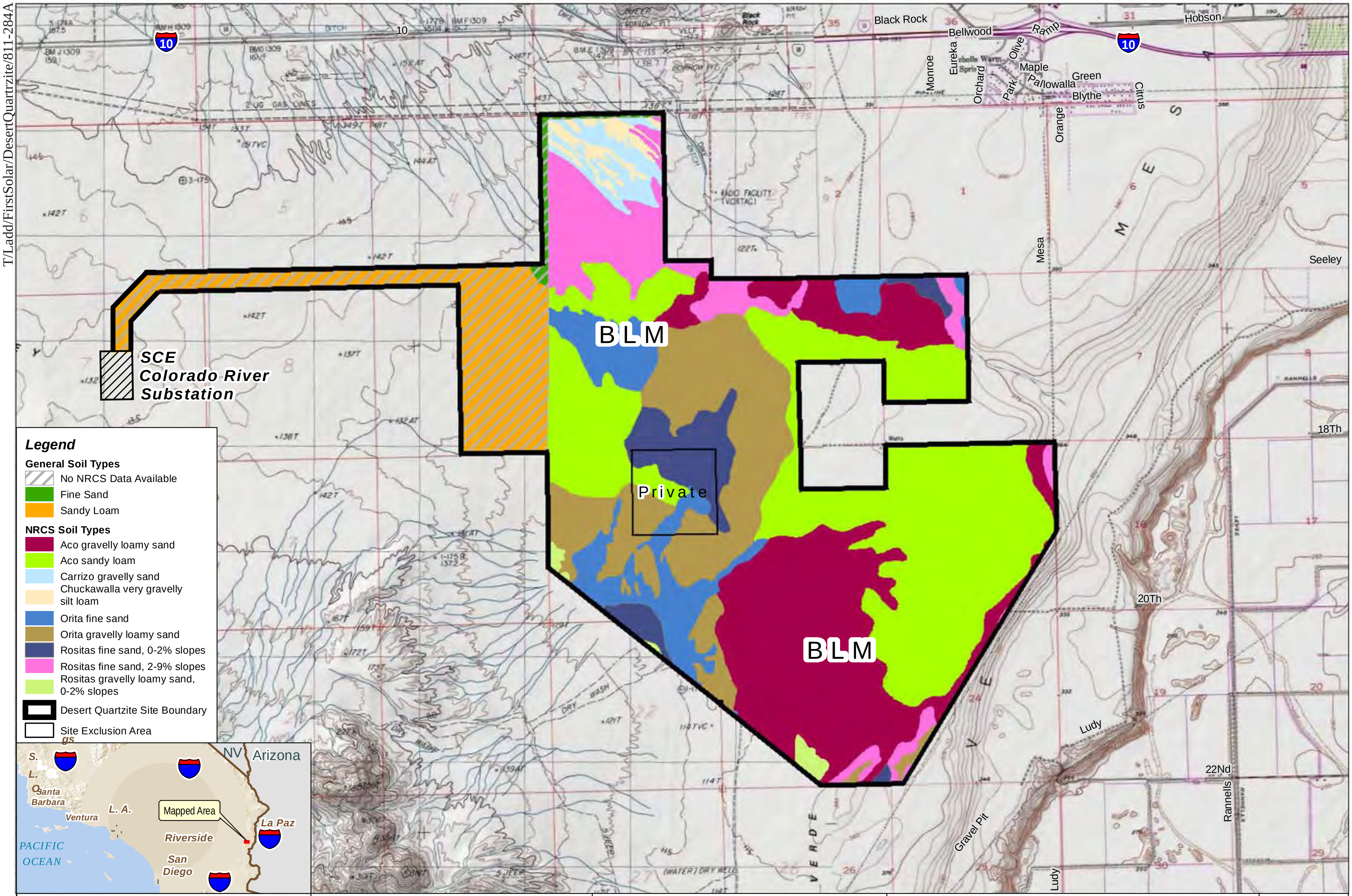
Fault Source: CGS CD 2000-006
Epicenter Source: CGS 1800-2000 Earthquake Catalog and California Earthquake Data Center (SCEDC)
Source: U.S. Geological NASA Survey Shuttle Radar Topography Mission (SRTM) 2 Arc Seconds, Tele Atlas North America, Inc, ESRI.

Figure 4. Regional Fault and Epicenter Map of Desert Quartzite Solar Project Site

2011

T/Ladd/FirstSolar/DesertQuartzite/811-284A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Bellwood
Ramp
Hobson
Monroe
Eureka
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Orchard
Park
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Orange
Mesa
Seeley
18Th
20Th
22Nd
Rannells
Ludy
Gravel Pit
BLM
Private
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SCE
Colorado River
Substation
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General Soil Types
▨ No NRCS Data Available
🟩 Fine Sand
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NRCS Soil Types
🟥 Aco gravelly loamy sand
🟩 Aco sandy loam
🟦 Carrizo gravelly sand
🟨 Chuckawalla very gravelly silt loam
🟦 Orita fine sand
🟫 Orita gravelly loamy sand
🟦 Rositas fine sand, 0-2% slopes
🟪 Rositas fine sand, 2-9% slopes
🟩 Rositas gravelly loamy sand, 0-2% slopes
▭ Desert Quartzite Site Boundary
☐ Site Exclusion Area
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S.
L.
Santa Barbara
Ventura
L. A.
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Riverside
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San Diego
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0 0.25 0.5 0.75 1 Miles
0 1,000 2,000 3,000 4,000 5,000 Feet

First Solar - Desert Quartzite Solar Project, Riverside County, CA

URS Corporation

Source: [1] USGS 1:24,000-scale topographic map created with TOPO!, [2] USDA-NRCS Soil Survey of the Palo Verde Area (USDA, 1969).

Figure 5. Soils Map of Desert Quartzite Solar Project Site

2011

APPENDIX A
EQFAULT SEISMIC PARAMETERS

\Project\First Solar\SAh - First Solar.grf

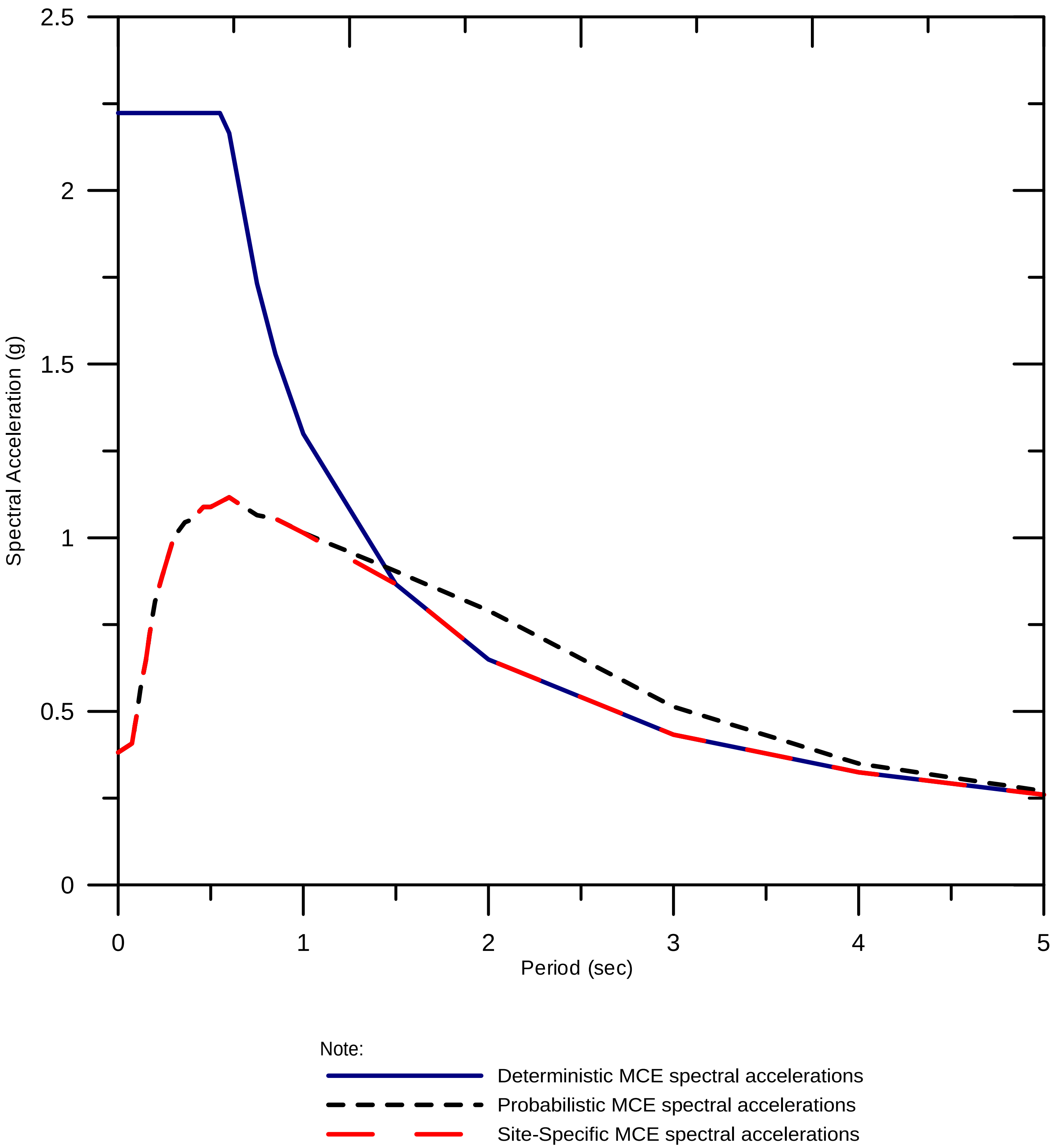


Figure 1 - MAXIMUM CREDIBLE EARTHQUAKE (MCE)
ACCELERATION RESPONSE SPECTRUM
FIRST SOLAR DESERT QUARTZITE

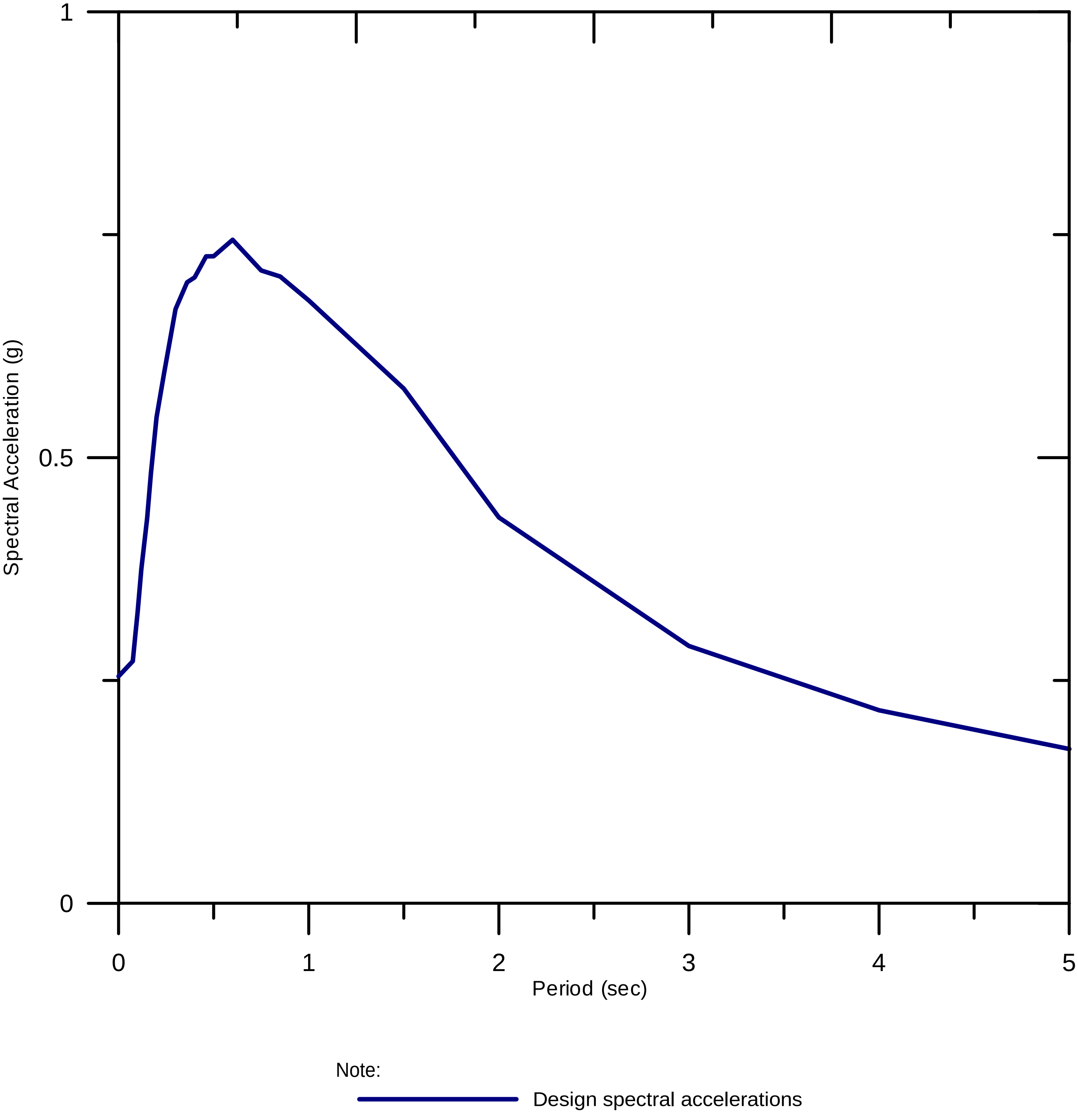


Figure 2 - SITE-SPECIFIC DESIGN RESPONSE SPECTRUM -
FIRST SOLAR DESERT QUARTZITE

```
             ***********************
             *                                      *
             *                    E Q F A U L T     *
             *                                      *
             *                    Version 3.00      *
             *                                      *
             ***********************

            DETERMINISTIC ESTIMATION OF
          PEAK ACCELERATION FROM DIGITIZED FAULTS


JOB NUMBER:
                      DATE: 08-01-2011

JOB NAME: First Solar Desert Quartzite

CALCULATION NAME:

FAULT-DATA-FILE NAME: CDMGFLTE.DAT


SITE COORDINATES:
  SITE LATITUDE:   33.5620
  SITE LONGITUDE:   114.7069

SEARCH RADIUS:   100  mi

ATTENUATION RELATION:  21) Sadigh et al. (1997) Horiz. - Rock
 UNCERTAINTY (M=Median, S=Sigma): M        Number of Sigmas:  0.0
  DISTANCE MEASURE:   clodis
 SCOND:    0
 Basement Depth:    5.00 km     Campbell SSR:        Campbell SHR:
 COMPUTE PEAK HORIZONTAL ACCELERATION

FAULT-DATA FILE USED:  CDMGFLTE.DAT


MINIMUM DEPTH VALUE (km):  0.0
```

```
                                           ---------------
                                           EQFAULT SUMMARY
                                           ---------------



                                    -----------------------------
                                    DETERMINISTIC SITE PARAMETERS
                                    -----------------------------

Page  1
-------------------------------------------------------------------------------
                                |              |ESTIMATED MAX. EARTHQUAKE EVENT
                                | APPROXIMATE  |-------------------------------
          ABBREVIATED           |   DISTANCE   | MAXIMUM  |   PEAK   |EST. SITE
          FAULT  NAME           |   mi   (km)  |EARTHQUAKE|   SITE   |INTENSITY
                                |              | MAG.(Mw) | ACCEL. g |MOD.MERC.
================================|==============|==========|==========|=========
BRAWLEY SEISMIC ZONE            |  58.8(  94.6)|   6.4    |   0.016  |   IV
ELMORE RANCH                    |  59.2(  95.3)|   6.6    |   0.019  |   IV
SAN ANDREAS - Southern          |  59.7(  96.1)|   7.4    |   0.037  |    V
SAN ANDREAS - Coachella         |  59.7(  96.1)|   7.1    |   0.029  |    V
IMPERIAL                        |  66.7( 107.4)|   7.0    |   0.022  |   IV
SUPERSTITION HILLS (San Jacinto)|  71.0( 114.3)|   6.6    |   0.014  |   III
SUPERSTITION MTN. (San Jacinto) |  73.8( 118.8)|   6.6    |   0.013  |   III
PINTO MOUNTAIN                  |  81.7( 131.5)|   7.0    |   0.015  |   IV
SAN JACINTO - BORREGO           |  82.3( 132.5)|   6.6    |   0.010  |   III
SAN JACINTO-ANZA                |  84.1( 135.3)|   7.2    |   0.018  |   IV
PISGAH-BULLION MTN.-MESQUITE LK |  84.6( 136.2)|   7.1    |   0.016  |   IV
LAGUNA SALADA                   |  89.0( 143.2)|   7.0    |   0.013  |   III
SAN JACINTO-COYOTE CREEK        |  89.2( 143.5)|   6.8    |   0.011  |   III
ELSINORE-COYOTE MOUNTAIN        |  92.3( 148.6)|   6.8    |   0.010  |   III
EMERSON So. - COPPER MTN.       |  94.3( 151.7)|   6.9    |   0.011  |   III
EUREKA PEAK                     |  97.9( 157.5)|   6.4    |   0.006  |   II
BURNT MTN.                      | 99.7 ( 160.5)|   6.4    |   0.006  |   II
*******************************************************************************
-END OF SEARCH-   17 FAULTS FOUND WITHIN THE SPECIFIED SEARCH RADIUS.

THE BRAWLEY SEISMIC ZONE             FAULT IS CLOSEST TO THE SITE.
IT IS ABOUT 58.8 MILES (94.6 km) AWAY.

LARGEST MAXIMUM-EARTHQUAKE SITE ACCELERATION: 0.0373 g
```

Project: First Solar Quartzite Site
Project No. 28907270
By: NS

Subject: Site-specific MCE Motion

Solution:

1. Site coefficients Fa and Fv per Table 11.4-1 and Table 11.4.2, respectively:

Site F= No
F_a= 1.5
F_v= 2.2

2. Adjusted MCE spectral response acceleration parameters for Site F:

S_{MS}= 0.59 S_{M1}= 0.34
T_0= 0.12 sec. T_S= 0.58 sec. T_L= 8 sec.

3. Scaling factor Q= 0.67

		MCE SA (g)		Site-Specific MCE	Design SA per Mapped Method	Design SA (5% Damping)	
T (sec.)		PSHE	DSHE				
0		0.38	2.22	0.38	0.16	0.25	
0.075		0.41	2.22	0.41	0.31	0.27	
0.09		0.46	2.22	0.46	0.34	0.30	
0.1		0.49	2.22	0.49	0.36	0.33	
0.12		0.56	2.22	0.56	0.39	0.37	
0.15		0.65	2.22	0.65	0.39	0.43	
0.17		0.72	2.22	0.72	0.39	0.48	
0.2		0.82	2.22	0.82	0.39	0.55	
0.24		0.89	2.22	0.89	0.39	0.59	
0.3		1.00	2.22	1.00	0.39	0.67	
0.36		1.04	2.22	1.04	0.39	0.70	
0.4		1.05	2.22	1.05	0.39	0.70	
0.46		1.09	2.22	1.09	0.39	0.73	
0.5		1.09	2.22	1.09	0.39	0.73	
0.6		1.12	2.17	1.12	0.38	0.74	
0.75		1.06	1.73	1.06	0.31	0.71	
0.85		1.05	1.53	1.05	0.27	0.70	
1		1.01	1.30	1.01	0.23	0.68	
1.5		0.90	0.87	0.87	0.15	0.58	
2		0.79	0.65	0.65	0.11	0.43	
3		0.51	0.43	0.43	0.08	0.29	
4		0.35	0.32	0.32	0.06	0.22	
5		0.27	0.26	0.26	0.05	0.17	

S_{DS}	S_{D1}
0.67	0.87
S_{MS}	S_{M1}
1.00	1.30

APPENDIX T

PRELIMINARY PALEONTOLOGICAL RESOURCE ASSESSMENT TECHNICAL REPORT

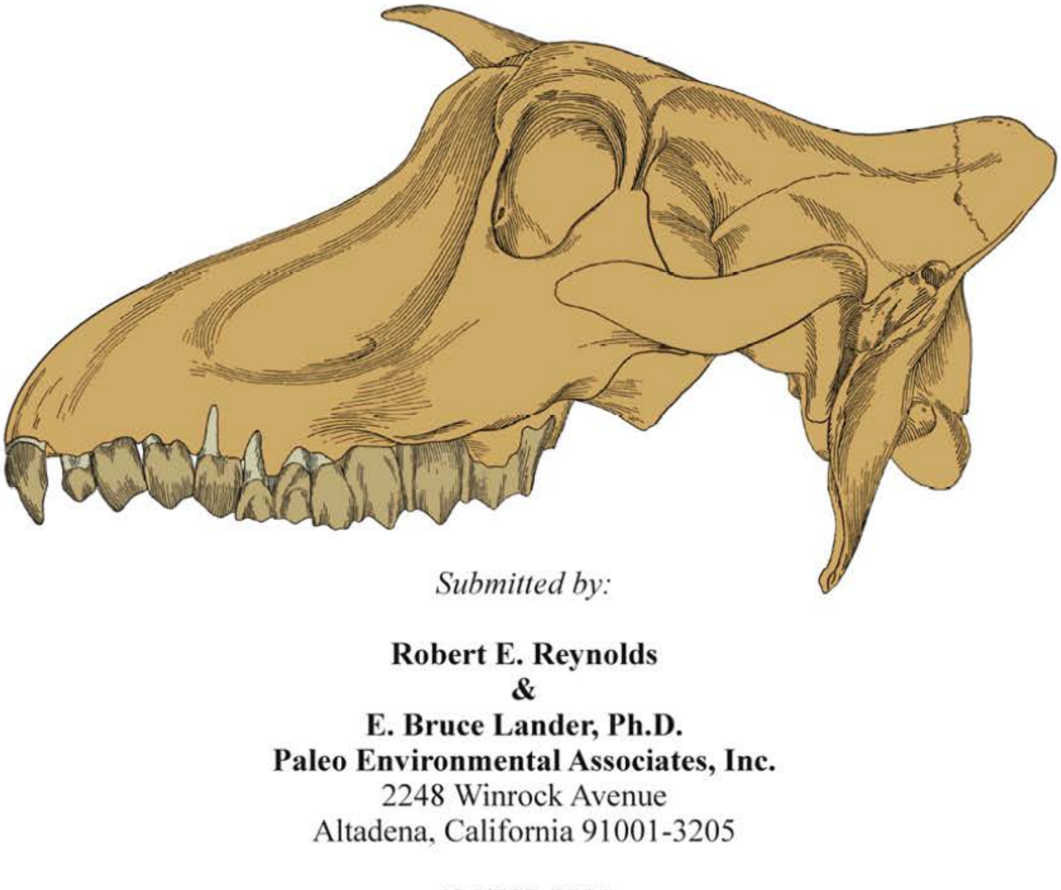
PRELIMINARY PALEONTOLOGICAL RESOURCE ASSESSMENT TECHNICAL REPORT
prepared in support of
DESERT QUARTZITE SOLAR PROJECT
Southeastern Riverside County, California

Submitted to:

Statistical Research, Inc.
21 West Stuart Avenue
Post Office Box 390
Redlands, California 92373-0123

On behalf of:

Desert Quartzite, LLC
135 Main Street, 6th Floor
San Francisco, California 94105



Submitted by:

Robert E. Reynolds
&
E. Bruce Lander, Ph.D.
Paleo Environmental Associates, Inc.
2248 Winrock Avenue
Altadena, California 91001-3205

626/797-9895
paleo@earthlink.net

PEAI
PALEO ENVIRONMENTAL
ASSOCIATES, INCORPORATED

March 2016

2013-13
desert quartzite.doc

PALEO ENVIRONMENTAL ASSOCIATES

PRELIMINARY PALEONTOLOGICAL RESOURCE ASSESSMENT TECHNICAL REPORT

prepared in support of

DESERT QUARTZITE SOLAR PROJECT

Southeastern Riverside County, California

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Altadena, California 91001-3205

626/797-9895
paleo@earthlink.net

March 2016

MANAGEMENT SUMMARY

Statistical Research, Inc., on behalf of Desert Quartzite, LLC, retained Paleo Environmental Associates, Inc., to conduct a paleontological resource literature review, archival search, and preliminary paleontological resource assessment for the Desert Quartzite Solar Project (Project). The approximately 5,010-acre Project site is situated on Federal land (4,850 acres) with a 160-acre private parcel. The Project is located 0.5 mile south of Interstate 10 and 7.0 miles west-southwest of Blythe in southeastern Riverside County, southeastern California. The Project includes development of a photovoltaic solar energy generating farm and a transmission line extending about 3 miles west of the northwestern corner of the Project site.

The Project site is underlain by five continental sedimentary formations of Pliocene through late Pleistocene age. Five soil horizons (paleosols) have developed on these older formations, with two starting development in the late Pleistocene Epoch and three in the Holocene.

The coarse sediments of the Bullhead Alluvium have produced a fossil horse bone. Soils developed on older Pleistocene terrace deposits have produced over 800 continental vertebrate specimens at newly recorded fossil localities 5 to 7 miles south of the Project site in the Rio Mesa Solar Electric Generating Facility (Rio Mesa) Project area. Eolian deposits in the latter project area have yielded reworked Pleistocene fossil remains. Thin Holocene deposits of fans, dunes and active washes cover less than 20 percent of the Project site. Those deposits cover fossiliferous soils and sediments and also might contain reworked fossils. Thus, Pliocene and Pleistocene deposits exposed at the surface, fan deposits and stabilized eolian deposits in the shallow subsurface, and surficial older soils in the Project site all have potential for containing scientifically important vertebrate fossil remains.

Each stratigraphic unit in the Project area was evaluated using the United States Bureau of Land Management (BLM) Potential Fossil Yield Classification (PFYC) System. The privately owned parcel inholding was compared with the Riverside County paleontological impact sensitivity map where Riverside County has jurisdiction under California Environmental Quality Act (CEQA). Based on this evaluation, the mapped deposits within the Project site have the following potential:

(1) The Pliocene Bullhead Alluvium (Tba) and Pleistocene terrace deposits (Qot) have a very high potential for producing scientifically important vertebrate fossil remains and are assignable to Class 3a and Class 5a.
(2) Two late Pleistocene soils are developed over the mapped sediments (Item No. 1 above) and based on local fossil occurrences are assignable to Class 5b.
(3) Shallow subsurface fan deposits of probable Pleistocene age have moderate to unknown (Class 3b) potential for containing vertebrate remains.
(4) The stabilized portions of the eolian deposits have a moderate to unknown (Class 3b) potential for containing vertebrate remains.
(5) Active, thin alluvial fan, dune, and wash deposits have a low potential for containing fossil remains (Class 2).

Project-related earth-moving activities might result in the disturbance or loss of fossil remains and associated specimen and locality data at previously unrecorded fossil localities. Consequently, it is recommended that a preconstruction field survey of the entire Project site be conducted to verify the potential for fossil remains being encountered by Project construction. During the survey, fossils found exposed at the surface will be subject to a treatment plan developed in support of Project construction. Results of the survey will be used to develop a Project-specific paleontological resource impact mitigation plan/program (PRIMP) to be implemented during Project-related earth-moving activities. The Project PRIMP will be based on standard mitigation measures issued by the Society of Vertebrate Paleontology.

This preliminary paleontological resource inventory and impact assessment recommends that:
(1) a preconstruction field survey of the entire Project site be conducted,
(2) fossils found during the survey be recovered and fully treated, and
(3) a Project-specific PRIMP be developed and implemented during earth-moving activities associated with Project construction.

The PRIMP, which will be based on the results of this inventory/assessment and the preconstruction field survey, will include:

(1) a worker awareness training program that will provide information on fossil recognition and procedures to be implemented when fossil remains are discovered (e.g., temporary avoidance of fossil site by earth-moving equipment, notification of Project and PRIMP personnel);
(2) activities to be conducted by qualified paleontologic monitors as part of paleontologic monitoring of earth-moving activities in portions of the Project area determined to have moderate or high sensitivity during the preconstruction field survey;
(3) fossil recovery techniques to be used by the monitors or other PRIMP personnel;
(4) methods for recording specimens, potentially fossiliferous sediment samples, and associated specimen, sample, and locality data;
(5) procedures for collecting and processing sediment samples that might contain fossil remains too small to be seen by a monitor in the field;
(6) a treatment plan for dealing with all remains recovered by monitoring and sample processing; and
(7) preparation of a comprehensive final mitigation program report of results and finding for submission to the BLM and the designated museum repository.

Implementation and completion of the PRIMP would reduce adverse Project-related impacts on the paleontological resources of the Project site to a less-than-significant level.

TABLE OF CONTENTS

page
Management Summary i
Table of Contents iii
Introduction 1
  Project Location and Description 1
  Purpose of Study 1
  Personnel 2
Methods 3
Setting 3
  Geomorphology 3
  Geology 3
  Paleontological Resources 6
Preliminary Paleontological Resource Assessment 9
  Introduction 9
  PFYC System Evaluations of Stratigraphic Units 12
    Bullhead Alluvium 12
    Old Terrace Deposits 12
    Stabilized Alluvial Fan Deposits 12
    Stabilized and Active Eolian and Dune Deposits 12
Recommendations 12
Literature Cited 15

TABLES

1 Soils underlying Desert Quartzite Solar Project site 6
2 Vertebrate taxonomic list, old terrace deposits, Rio Mesa Project site 8
3 Significance criteria for evaluating paleontological resources 9
4 PFYC of stratigraphic units in Desert Quartzite Project area 10

FIGURES

1 Topographic map, Desert Quartzite, LLC, Desert Quartzite Solar Project, northeastern Riverside County, California 2
2 Topographic and surficial geologic map, Desert Quartzite, LLC, Desert Quartzite Solar Project, northeastern Riverside County, California 4
3 Topographic and soils map, Desert Quartzite, LLC, Desert Quartzite Solar Project, northeastern, Riverside County, California 7
4 Topographic and preliminary paleontological resource impact sensitivity map, Desert Quartzite, LLC, Desert Quartzite Solar Project, northeastern Riverside County, California 11

APPENDICES

A Acronyms, Abbreviations, and Initialisms 17
B Relevant Federal and State Legislation Regarding Paleontological Resources 18
C BLM Criteria for Evaluating Paleontological Resources (Instruction Memorandum No. 2008-009) 22
D Society of Vertebrate Paleontology Standard Procedures for Assessment and Mitigation of Adverse Impacts to Paleontological Resources 32
E Resumes of Key Personnel 44
F Results of Paleontological Resource Archival Searches 83

INTRODUCTION

Paleontological resources include (1) fossil remains or specimens, (2) the corresponding fossil localities, (3) the respective fossil-bearing layers or the entire stratigraphic or sedimentary units, and (4) associated specimen data and geologic or geographic locality data. Fossil remains are any indication of past life, particularly the bones and teeth of vertebrates, the shells of invertebrates, the tests of microfossils, and the wood and leaves of land plants, as well as impressions and trackways. In response to the National Environmental Policy Act of 1969 (NEPA), the United States Bureau of Land Management (BLM) and the Society of Vertebrate Paleontology (SVP) consider fossil specimens, particularly vertebrate remains, scientifically highly important or significant if they represent (1) remains that are identifiable with respect to element and lower-level taxon (e.g., family, genus, or species), (2) a new or rare species, (3) a topotype specimen (a specimen collected from the same locality and stratigraphic interval as the specimen on which the species represented was based), (4) a geographic or temporal range extension, (5) an age-diagnostic species, (6) an environmentally sensitive species, or (7) a specimen more complete than, or a skeletal element different from, those previously available for the species. Time-diagnostic species can confirm, refine, or correct previous estimates regarding the geologic age of the fossil-bearing strata. Remains of an environmentally sensitive species can enhance the understanding of paleoenvironments. These criteria would apply to any fossil remains occurring in the Desert Quartzite Solar Project (Project) area.

Statistical Research, Inc., retained Paleo Environmental Associates, Inc. (PEAI), on behalf of Desert Quartzite, LLC, to conduct paleontological resource archival searches and a literature review, to compile an initial baseline resource inventory, and to prepare a preliminary impact assessment in support of Project construction. No paleontological field survey was conducted as part of this study. The Project site is situated on public land administered by the BLM, California Desert District, and contains an inholding of private land.

PROJECT LOCATION AND DESCRIPTION

The 5,010-acre Project site is 0.5 mile south of Interstate 10 (I-10) and 7 miles west of Blythe in southeastern Riverside County, California (Figure 1). The proposed Project will include development of a photovoltaic solar energy generating farm and an associated 3-mile-long gen-tie line. Project construction will require earth-disturbing activities including disking, grading, cut and fill, and trenching. Some excavations might reach depths of 10 feet.

The Project area is reached from I-10 by exiting at Mesa Drive and proceeding south to Blythe Way, then west for 2.5 miles to the Project site. The study area for this evaluation includes the Project area and a surrounding 1.0-mile-wide buffer zone. Topographic map coverage of the Project area is provided at a scale of 1:100,000 by the United States Geological Survey (USGS) Blythe 30 x 60 Minute Quadrangle (1965), and at a scale of 1:24,000 by the USGS Roosevelt Mine (1983) and Ripley (1952, photorevised 1970, 1976) Quadrangles, California—Riverside County, 7.5-Minute Series (Topographic). The Project area includes all or parts of sections 3–7, 9–15, and 22–24 of Township 7 South and Range 21 East of the San Bernardino Base and Meridian.

PURPOSE OF STUDY

The Project site is on public land administered by the BLM, California Desert District, and contains an inholding of private land under the jurisdiction of County of Riverside. This paleontological resource inventory and impact assessment provides (1) a baseline paleontological resource inventory of the Project site that focuses on stratigraphic units and fossil localities therein, and the taxa represented by the remains recovered from each unit in and near the project area, (2) a preliminary evaluation of the potential productivity of a unit using the BLM Potential Fossil Yield Classification (PFYC) system (Appendix C), and (3) recommendations for mitigating any adverse impact on paleontological resources that would accompany construction-related earth-moving activities at the Project site.

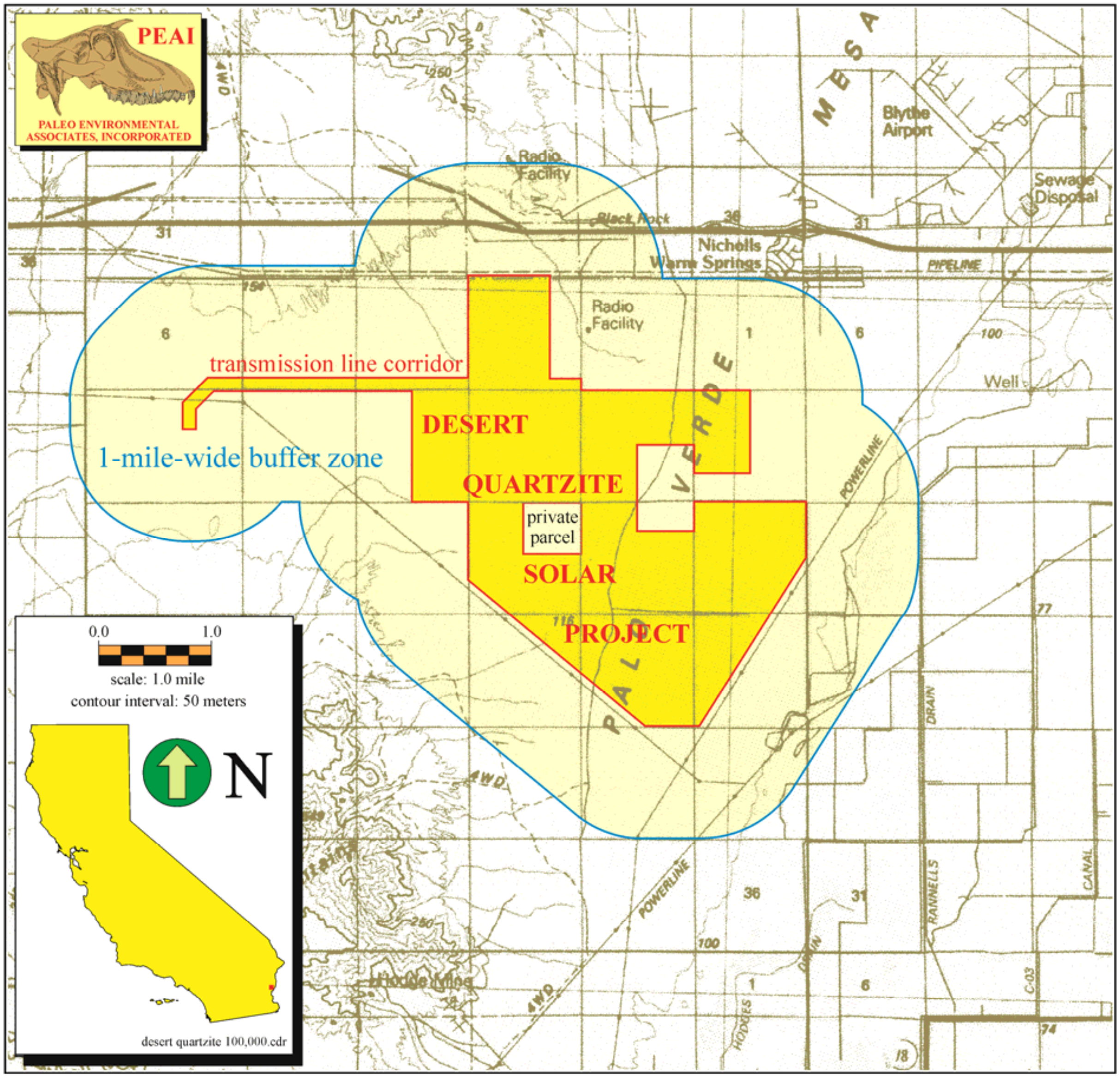

PEAI
PALEO ENVIRONMENTAL ASSOCIATES, INCORPORATED
MESA
Blythe Airport
Radio Facility
Black Rock
Nicholls Warm Springs
Sewage Disposal
PIPELINE
Radio Facility
transmission line corridor
DESERT
QUARTZITE
private parcel
SOLAR
PROJECT
PALO VERDE
1-mile-wide buffer zone
Well
POWERLINE
POWERLINE
DRAIN
RANNELLS
CANAL
HODGES
Hodge Mine
4WD
0.0
1.0
scale: 1.0 mile
contour interval: 50 meters
N
desert quartzite 100,000.cdr

Figure 1.—Topographic map, Desert Quartzite, LLC, Desert Quartzite Solar Project, northeastern Riverside County, California. Base map: United States Geological Survey Blythe 30 x 60 Minute Quadrangle (1986).

PERSONNEL

This preliminary paleontological resource assessment report was prepared by Mr. Robert E. Reynolds, PEAI senior vertebrate paleontologist, with the assistance of Dr. E. Bruce Lander, PEAI principal paleontologist. Dr. Lander has a Ph.D. degree in paleontology. Each author has decades of experience conducting research on the vertebrate paleontological resources of the Mojave Desert Province and preparing paleontological resource assessments in support of other major construction projects in the region. Mr. Reynolds has prepared such documents using the PFYC system, which is now required by the BLM for conducting paleontological resource assessments in support of projects on Federal land. Resumes are provided in Appendix D.

A BLM cultural resource use permit is required for conducting a paleontological resource field survey on Federal land. A valid permit for conducting such an investigation (BLM Permit No. CA-13-06P; expiration date 8-2016) is held by Mr. Reynolds. A Paleontological Fieldwork Authorization will be requested from the BLM Palm Springs Field Office before the recommended preconstruction field study is conducted.

METHODS

As part of this inventory and assessment, surficial geologic maps of the Project area by Stone (1990, 2006) and Hayhurst and Bedrossian (2010) were reviewed to determine if any potentially fossil-bearing stratigraphic or sedimentary unit underlay the area. Outcrop data compiled during the literature review were compared with Google Earth aerial imagery covering the Project site. Paleontological and geologic literature were reviewed to document the occurrence of any previously recorded and published fossil locality in sedimentary and soil units in or near the Project area from the same units as those exposed therein. Archival searches were conducted at the Natural History Museum of Los Angeles County Department of Vertebrate Paleontology (LACM) and the San Bernardino County Museum (SBCM) for additional information on any such fossil locality and to document the occurrence of any other previously recorded but unpublished fossil locality from stratigraphic units in or near the Project site (see Appendix E). R. E. Reynolds' field notes were reviewed for additional pertinent information. The results of the data searches were used to compile a paleontological resource inventory of the Project area by stratigraphic unit and to assess the paleontological productivity of each unit using the BLM PFYC system. A field survey was beyond the scope of this preliminary assessment, but a preconstruction survey is recommended for the next phase of the inventory and assessment.

SETTING

The Project area lies very near the eastern margin of the southeastern Mojave Desert Province, which is bounded to the east by the Colorado River (Jahns, 1954). The floor of Chuckwalla Valley west of the Project site is 360 feet above mean sea level and the surface of the Colorado River to the east is at 330 feet. The Big Maria Mountains north of the Project area and the Mule Mountains to the southwest reach elevations of 2,400 and 1,100 feet, respectively. Elevations in the northwestern project area range from 476 feet along the transmission line corridor to 364 feet along the eastern margin of the project. The Project area sits on Palo Verde Mesa, which is covered by creosote scrub brush, palo verde, ironwood, and ocotillo.

GEOMORPHOLOGY

Geomorphic terraces in the Project area grade lower from northwest to southeast and constrain the age of underlying sedimentary formations and the sequence of erosion across the Project site. At the northern end of the Project area, the concordant upper surfaces developed on the Bullhead Alluvium outcrops indicate initial planation of the oldest local deposit at an elevation of 463 feet. Those deposits and the erosional surface were later incised by an incursion of the Colorado River, when it had a higher base level than today. That incision event was followed by depositional and subsequent planation events that produced the Palo Verde Mesa Upper Terrace (unit Qpv of Stone 2006 = unit Qot of Hayhurst and Bedrossian 2010) at an elevation of 430 feet at the northern end and 360 feet at the southern end of the Project area.

After planation of the Palo Verde Mesa Upper Terrace, the Colorado River cut those deposits before laying down late Pleistocene "middle terrace deposits" and "lower terrace deposits" (Holocene unit Qr of Stone 2006 = unit Qa of Hayhurst and Bedrossian 2010). The latter two units are 130 feet lower than the Upper Terrace. The date on a "middle terrace" soils of 13,600 years old at the Rio Mesa Project site (J. D. Stewart, January 2016 personal communication to R. E. Reynolds, PEAI) is latest Pleistocene in age and supports an earlier late Pleistocene or Rancholabrean North American Land Mammal Age (NALMA) assignment for the Palo Verde Mesa Upper Terrace on which the Project site is located.

GEOLOGY

The surficial geologic map of the Project area (Figure 2) is based on mapping by Hayhurst and Bedrossian (2010), which incorporated data from maps by Stone (2006, 1990). None of those maps records the outcrops of the Bullhead Alluvium (Reynolds et al. 2008) at the northern end of the Project site.

The mountain ranges in the southeastern Mojave Desert Province are composed mostly of Mesozoic granitic and metamorphic basement rocks, early Miocene sedimentary strata, and extrusive volcanic rocks. Outside the Project area, the Big Maria Mountains to the north and the McCoy Mountains to the northwest contain late Paleozoic to middle Mesozoic sediments metamorphosed by intrusion of Cretaceous granitic plutons. The Mule Mountains to the southwest contain plutonic and volcanic rocks of Triassic to Jurassic age. Early Miocene strata are located on the

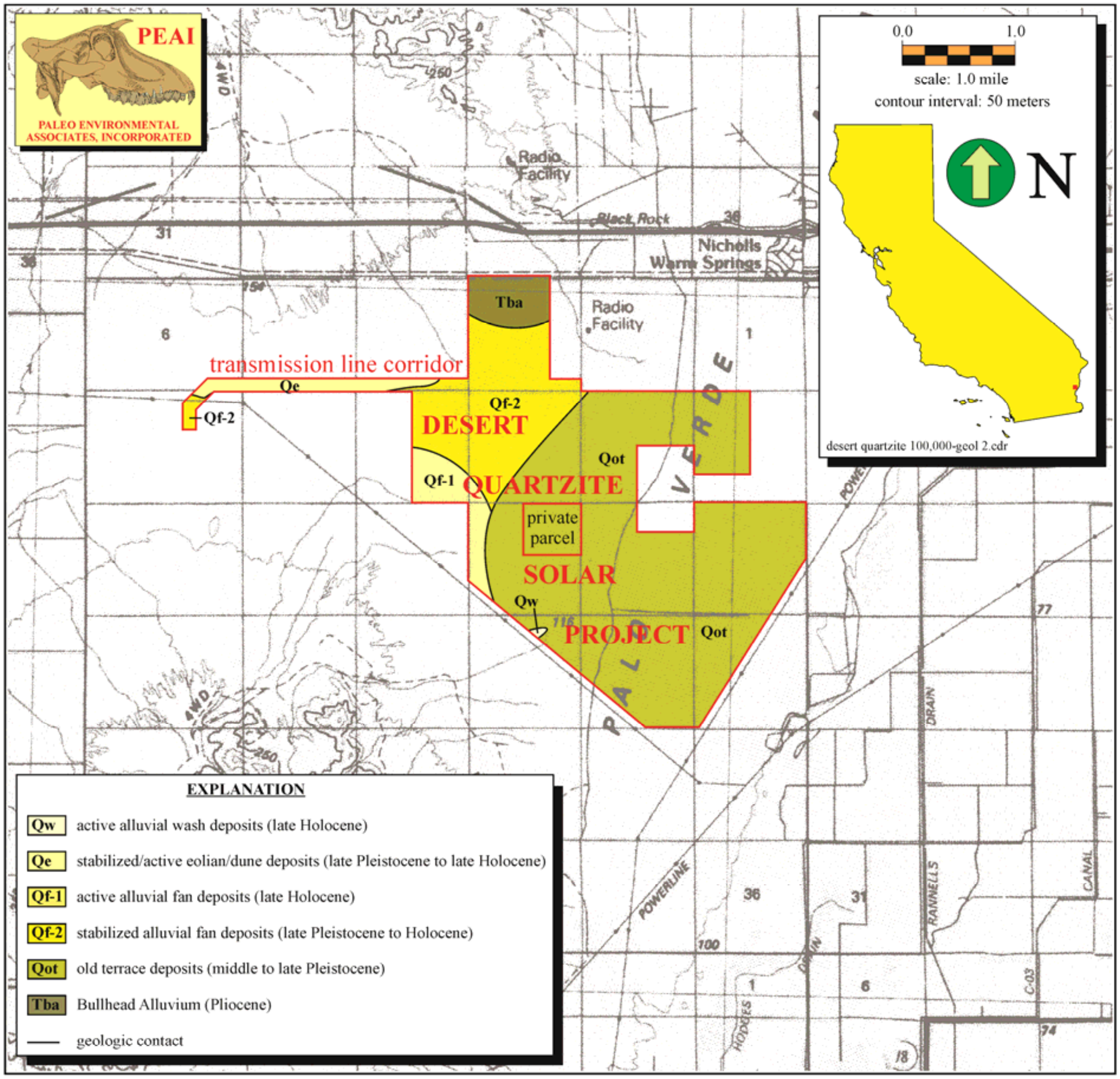

PEAI
PALEO ENVIRONMENTAL ASSOCIATES, INCORPORATED
0.0
1.0
scale: 1.0 mile
contour interval: 50 meters
N
desert quartzite 100,000-geol 2.cdr
Radio Facility
Black Rock
Nicholls Warm Springs
Radio Facility
transmission line corridor
Tba
Qe
Qf-2
Qf-2
DESERT
QUARTZITE
Qf-1
Qot
private parcel
SOLAR
Qw
PROJECT
Qot
PALO VERDE
POWERLINE
RANNELLS
DRAIN
CANAL
HODGES
EXPLANATION
Qw active alluvial wash deposits (late Holocene)
Qe stabilized/active eolian/dune deposits (late Pleistocene to late Holocene)
Qf-1 active alluvial fan deposits (late Holocene)
Qf-2 stabilized alluvial fan deposits (late Pleistocene to Holocene)
Qot old terrace deposits (middle to late Pleistocene)
Tba Bullhead Alluvium (Pliocene)
geologic contact

Figure 2.—Topographic and surficial geologic map, Desert Quartzite, LLC, Desert Quartzite Solar Project, northeastern Riverside County, California. Base map: United States Geological Survey Blythe 30 x 60 Minute Quadrangle (1986). Geology after Stone (2006) and Hayhurst and Bedrossian (2010), and based locally on photointerpretation of Google Earth satellite image covering Project site.

southwestern side of the Mule Mountains. The early Pliocene Bouse Formation is exposed southeast and southwest of Blythe along both sides of the Colorado River. The Bouse Formation contains the Lawlor Tuff, which has been dated at 4.83 million years (Ma) in age, and has produced fossil remains representing marine fishes and mollusks from a previous Gulf of California embayment. The Bouse Formation has not been mapped west of Blythe by Stone 1990, 2006) or Hayhurst and Bedrossian (2010).

Fanglomerates from the adjacent mountain ranges fringe their lower slopes and become progressively finer-grained towards the valley center, where they interfinger with sedimentary strata deposited by the ancestral Colorado River. Those strata have yielded scientifically important fossil remains that constrain the ages of river activity and terrain development in the Project region.

The oldest sedimentary deposit at the Project site is the Bullhead Alluvium, which crops out at the northern end of the Project site (K. A. Howard, 2015 personal communication to R. E. Reynolds, PEAI). These sediments were deposited between 3 and 4 Ma ago. The remainder of the Project site is underlain by four continental stratigraphic units of later Quaternary age, including (1) middle to late Pleistocene terrace deposits (unit Qot) laid down by the Colorado River, (2) late Pleistocene and Holocene alluvial fan deposits (units Qf-2, Qf-1, respectively), (3) late Holocene eolian and dune deposits (unit Qe), and (4) late Holocene active wash deposits (unit Qw) (Figure 2; see Stone 1990, 2006, Hayhurst and Bedrossian 2010).

The Bullhead Alluvium is distinguished by its well-rounded quartzite and chert pebbles, which were derived from sources on the Colorado Plateau. Its poorly constrained age is younger than the Pliocene Bouse Formation (4.83 Ma old) and older than the early Pleistocene Colorado River deposits (unit Qt), or between 3 and 4 Ma and Pliocene in age. Cross-bedding suggests that the gravels constituting the Bullhead Alluvium were deposited on the project by a southwestward meander of the Colorado River during the middle Pliocene Epoch (Reynolds et al. 2008). Northeast of the Project site, very old alluvial valley deposits (unit QTmw of Stone 2006 = unit Qvoa of Hayhurst and Bedrossian 2010) consist of gravels laid down by the Colorado River and might be laterally equivalent to the Bullhead Alluvium. At the northern end of the Project site, outcrops of Bullhead Alluvium have concordant summits, suggesting that erosion planed a terrace that is older than the upper terrace of Palo Verde Mesa.
Fluvial sediments deposited by the Colorado River and that include "...massive to thin-bedded pinkish silt and fine silty sand...interbedded locally with derived alluvial gravels" (Bell et al. 1978) are referred to as the Chemehuevi Formation by others (see Agenbroad et al. 1992). Near Blythe, the Chemehuevi Formation is exposed only on the Arizona side of the Colorado River. Although it was not recognized on the western side of the river by Stone (1990, 2006) or Hayhurst and Bedrossian (2010), it might underlie the middle to late Pleistocene, old terrace deposits (unit Qpv of Stone 2006 = unit Qot of Hayhurst and Bedrossian 2010) west of Blythe.

The ancestral Colorado River laid down old terrace deposits exposed at the Project site (unit Qpv of Stone, 2006 = unit Qot of Hayhurst and Bedrossian 2010) and cut into the older Bullhead Alluvium. The old terrace deposits, called the Upper Terrace of Palo Verde Mesa, extend to the south along the eastern flank of the Mule Mountains, where they underlie the Rio Mesa Project site. The Upper Terrace of Palo Verde Mesa is the oldest surface in the region, and underlies the southeastern two thirds of the Project area at elevations between 400 and 364 feet (Figure 2). Palo Verde Mesa and the Upper Terrace slope to the south to an elevation of about 335 feet near the Rio Mesa Project area.

Active late Holocene alluvial fan deposits (unit Qa-6 of Stone = unit Qf of Hayhurst and Bedrossian 2010) consist of gravels derived from the Big Maria and the Mule Mountains. Those alluvial fan deposits underlie the western edge of the Project area (Figure 2).

Active late Holocene eolian and dune deposits (unit Qs of Stone 2006 = unit Qe of Hayhurst and Bedrossian 2010) are composed of wind-blown sand derived from the playa to the west in Chuckwalla Valley. The lower and older stabilized dune deposits were laid down during the late Pleistocene Epoch, when westerly winds moved sand from the dry playa. This eolian process from Ford's Dry Lake continues today, covering the Project area with an unstable layer of mobile sand. The dune deposits cover most of the transmission line corridor (Figure 2). The Rositas and Orita Series of soils developed in locally thick sequences of aeolian sand west of the Project area from 35 to 25 thousand years (ky) (Rendell et al. 1994) ago. Lancaster and Tchakerian (2003) identified buried soils in the dunes that marked periods of non-deposition and stability 20 to 15, 14, and 4 ky years ago. A similar sequence might be present in the Project area. Eastward aeolian transport and fluvial erosion are stripping the surface of Palo Verde Mesa and exposing the underlying older sediments (units Tba, Qot, Qf2, Qe).

Late Holocene active alluvial wash deposits (unit Qw of Stone 2006, Hayhurst and Bedrossian 2010) are mapped in a small area along the southwestern margin of the Project site (Figure 2), and are expected to occur in other washes at the Project site.

The youngest sediments east of the Project area (between Palo Verde Mesa and Colorado River) are late Holocene alluvial valley deposits referred to as the Lower Terrace of the Colorado River (unit Qr of Stone 2006 = unit Qa of Hayhurst and Bedrossian 2010). The Lower Terrace lies at an elevation of 260 feet and represents sediments remaining from river meanders that cut through older sediments.

This mapped geologic sequence is supplemented with a soils map by Lerch et al. (2016) that defines five different soils and provides their relative ages (Figure 3, Table 1). Because soils develop on exposed surfaces of sedimentary units, soil ages are younger than the sediments on which they sit.

Table 1.—Soils underlying Desert Quartzite Solar Project site. Adapted from Lerch et al. (2016).

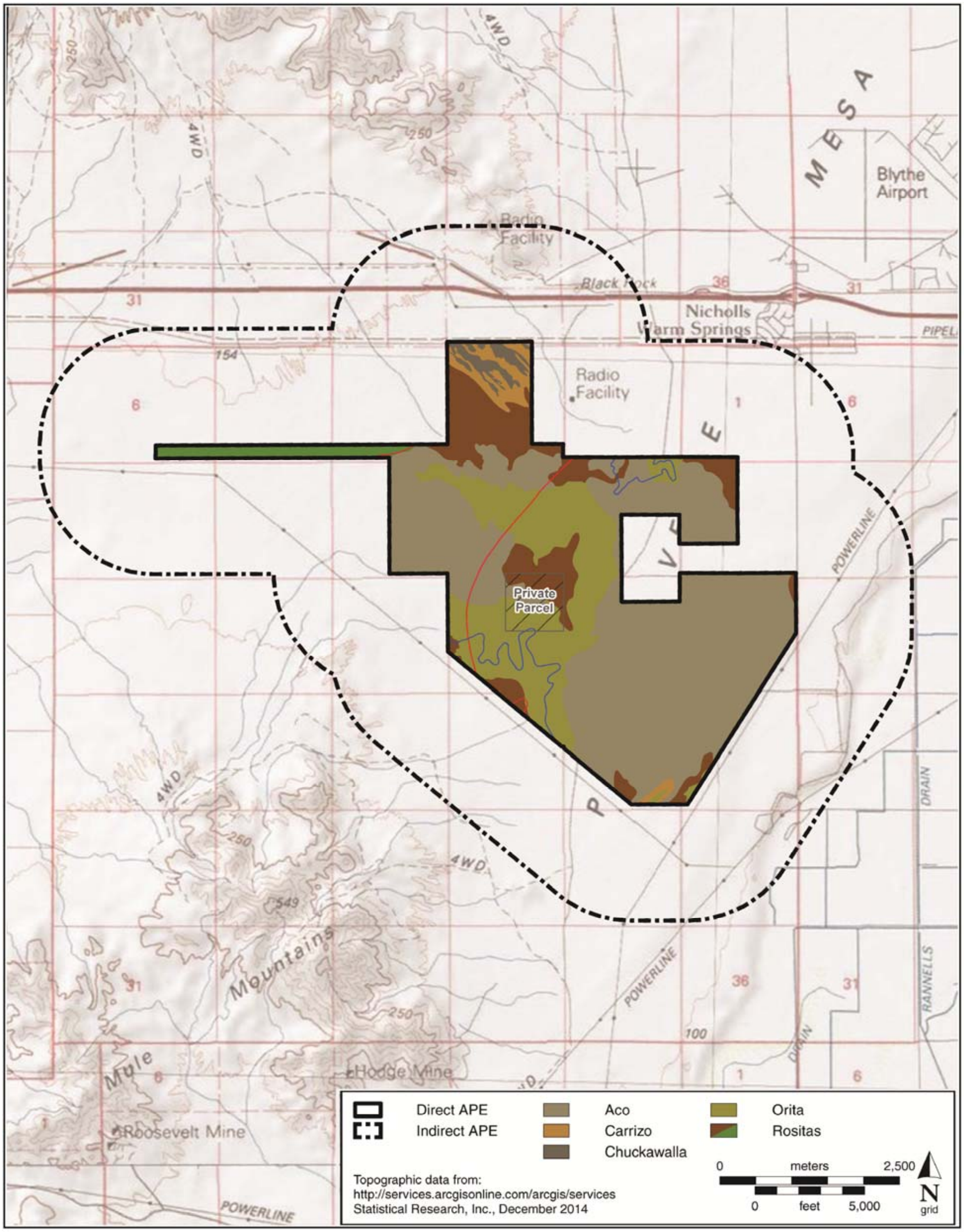
Soil	Age	Developed On Unit (symbol in Figure 2)	Color in Figure 3
Chuckawalla	Late Pleistocene	Tba	Dark gray
Aco	Late Pleistocene/early Holocene	Qot, Qf-2	Greenish gray
Orita	Late Holocene	Qot, Qf-2	Olive green
Rositas	Late Pleistocene	Qot, Qf-1,-2, Qe, Qw	Brown & green
Carrizo	Late Holocene	Tba, Qot	Tan

PALEONTOLOGICAL RESOURCES

The eastern portion of Riverside County has produced few fossil records older than 5 Ma in age. The older remains include petrified wood of Cretaceous age from the McCoy Mountains Formation (Stone 1990) and middle Miocene camel tracks from the western side of the Mule Mountains (R. E. Reynolds, personal observation 1997). The number of fossil occurrences increases with successively younger sediments whose deposition accompanied development of the Colorado River Trough and the embayment that extended northward from the Gulf of California about 5 Ma ago. Fossil fish and mollusk remains are recorded from the Bouse Formation to the northeast at Parker (Reynolds et al. 1992, 2007) and southeast of Blythe near Cibola, Arizona (Reynolds et al. 2008, Reynolds and Berry 2008). The Bouse Formation is not mapped at the Project site.

Early to middle Pleistocene, very old alluvial valley deposits (unit Tba of Figure 2 = unit QTmw of Stone 2006 and unit Qvoa of Hayhurst and Bedrossian 2010) are present as previously unmapped outcrops at the northern end of the Project site. Exposures of the unit at the Project site were established based on photointerpretation of a Google Earth satellite image covering the site. The gravels, referred to the Bullhead Alluvium by Reynolds (2008), have produced the fossilized rib of a horse south of Topock, Arizona (K. A. Howard, 2008 personal communication to R. E. Reynolds). The Bullhead Alluvium at the Project site has a moderate potential for containing significant vertebrate fossils.

Mammoth fossils from the Chemehuevi Formation are discussed by Agenbroad et al. (1992). They represent species of late Irvingtonian and early Rancholabrean age, ranging in age from at least 300 ky to just 102 ky, the latter based on a uranium-thorium radiometric age determination for a tusk from Ehrenberg, Arizona. The Chemehuevi Formation might underlie the old terrace deposits (unit Qot herein) in the Project area (see Figure 2).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MESA
Blythe Airport
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Nicholls Warm Springs
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Figure 3.—Topographic and soils map, Desert Quartzite, LLC, Desert Quartzite Solar Project, northeastern Riverside County, California. Base map: United States Geological Survey Blythe 30 x 60 Minute Quadrangle (1986). Soils mapping after Lerch et al. (2016).

The most recent description of late Pleistocene vertebrate fossils near the Project area comes from studies at the Rio Mesa Project site (Stewart 2012, Stewart et al. 2012d), about 6 miles southeast of the Desert Quartzite Solar Project site. Vertebrate fossils from the Rio Mesa Project area were recovered from the same middle to late Pleistocene old terrace deposits (unit Qot herein = unit Qpv of Stone 2006 = unit Qot of Hayhurst and Bedrossian 2010) that underlie the current Project site. A 12-foot-thick paleosol (preserved soil horizon) is exposed at the Rio Mesa Project site (Stewart 2012). Fossils recovered from the "Palo Verde Mesa paleosol" include more than 800 vertebrate specimens representing birds, snakes, lizards, *Gopherus* (desert tortoise), *Sylvilagus* (cottontail), *Lepus* (jackrabbit), rodents, *Taxidea* (badger), bighorn sheep (?), *Odocoileus* (deer), *Equus* (horse), and *Mammuthus* (mammoth) (Table 2; Stewart 2012, Stewart et al. 2012). The mammoth provides an age constraint for the terrace deposits because it is restricted to the Irvingtonian and Rancholabrean NALMAs and the early to late Pleistocene Epoch in North America (Bell et al. 2004). The abundant fossil occurrences at the Rio Mesa Project site (one locality per 5 acres) demonstrates that the old terrace deposits with Pleistocene Chuckawalla and Aco soils in the Project area have a high potential for producing scientifically important vertebrate fossil remains of late Pleistocene age. The level of potential will be determined during the preconstruction field survey.

Stabilized eolian and dune deposits (unit Qe herein = unit Qs of Stone 2006 and unit Qe of Hayhurst and Bedrossian 2010) might be partly latest Pleistocene in age. Other portions of the dune field (also included in unit Qe herein) are remobilized by prevailing westerly winds. Similar Pleistocene stabilized dune fields deposited by winds from the west are found in Colton, on the western side of the Old Dad Mountain, west of Kelso at Flynn, and north of Baker at Silver Lake. Those dune fields have yielded vertebrate fossil remains from the end of the latest Pleistocene pluvial period, less than 17 ky ago (Reynolds 2004). Reworked Pleistocene fossil remains have been found in the eolian deposits of the Rio Mesa Project area (Stewart 2012). Such fossil occurrences suggest that the older, stabilized dune field in the Project area has a potential for producing scientifically important vertebrate fossil remains of latest Pleistocene age.

The active late Holocene alluvial fan deposits (unit Qf-1 herein = unit Qa-6 of Stone 2006 and unit Qf of Hayhurst and Bedrossian 2010) and alluvial wash deposits (unit Qw herein, Stone 2006, and Hayhurst and Bedrossian 2010) have produced no fossil remains in the region. However, fan deposits were being deposited for more than a million years and, consequently, older or stabilized alluvial fan deposits (unit Qf-2 herein) might produce fossils in the shallow subsurface, particularly where there is a deep B soil horizon as documented by Lerch et al. (2016).

This part of the paleontological resource inventory and impact assessment pertains to the privately owned parcel in the Project area. Development of the parcel would be subject to the California Environmental Quality Act (CEQA) and, therefore, the assessment follows Riverside County guidelines for determining the sensitivity of sedimentary units at a project site. The parcel is underlain by old terrace deposits (Figure 2). Based on its documented paleontological productivity (Stewart, 2012; Stewart et al., 2012), the old terrace deposits are reassigned High A and B productivity ratings from the previous Undetermined Potential, indicating that the unit has a high potential for containing fossil remains at the surface and in the subsurface.

Table 2.—Vertebrate taxonomic list, old terrace deposits Rio Mesa Project site. After Stewart (2012).

Higher-Level Taxon (common name)	**Genus, Species**	**Common Name**
Osteichthyes (fishes)	undet. fresh-water fishes	
Amphibia (amphibians)		
Bufonidae (toads)	undet.	toads
Reptilia (reptiles)		
Chelonia (turtles)		
Testudinidae (tortoises)	*Gopherus sp.*	desert tortoises
Lacertilia (lizards)		
Iguanidae (iguanids)	*Dipsosaurus*	desert iguana
	Phrynosoma platyrhinos	desert horned lizard
Serpentes (snakes)		

Colubridae (nonvenomous snakes)	*Phyllorhynchus decurtatus*	spotted leaf-nosed snake
Viparidae (vipers)	*Crotalus sp.*	rattlesnakes
Aves (birds)		
Fringillidae (seed-eating birds)	undet.	finches
Mammalia (mammals)		
Lagomorpha (rabbits/hares)	*Sylvilagus* sp. undet.	cottontails
	Sylvilagus bachmani	brush rabbit
	Lepus californicus	jack rabbit
Rodentia (rodents)	*Dipodomys deserti*	desert kangaroo rat
	Chaetodipus/*Perognathus*	pocket mouse
	Thomomys	pocket gophers
Carnivora (carnivores)		
Mustelidae	*Taxidea taxus*	badger
Perissodactyla (odd-toed ungulates)	*Equus*?	horse?
Artiodactyla(even-toed ungulates)	*Odocoileus*	deer
	Ovis canadensis	bighorn sheep
Proboscidea (proboscideans)		
Elephantidae (elephants)	*Mammuthus*	mammoth

PRELIMINARY PALEONTOLOGICAL RESOURCE ASSESSMENT

INTRODUCTION

This preliminary paleontological resource assessment for the Project complies with the BLM PFYC system (Appendix C), which requires the preparation of an evaluation and an accompanying sensitivity map using the corresponding geologic base. The evaluation is based on the results of a literature review and an archival search.

The assessment found that the Project site is underlain by sediments with moderate to high potentials for containing fossil remains (e.g., Bullhead Alluvium, old terrace deposits, stabilized alluvial fan deposits, certain soils) as well as sediments with undetermined or low potential (e.g., active alluvial fan deposits, eolian and dune deposits, alluvial wash deposits). The PFYC rating of a sedimentary unit is based partly on the scientific importance or significance of the fossil specimens it has produced. All vertebrate fossils are considered significant. The BLM provides specimen-based and context-based criteria for evaluating the significance of a fossil specimen (Table 3).

Table 3.—Significance criteria for evaluating paleontological resources (BLM 2007; see Appendix C).

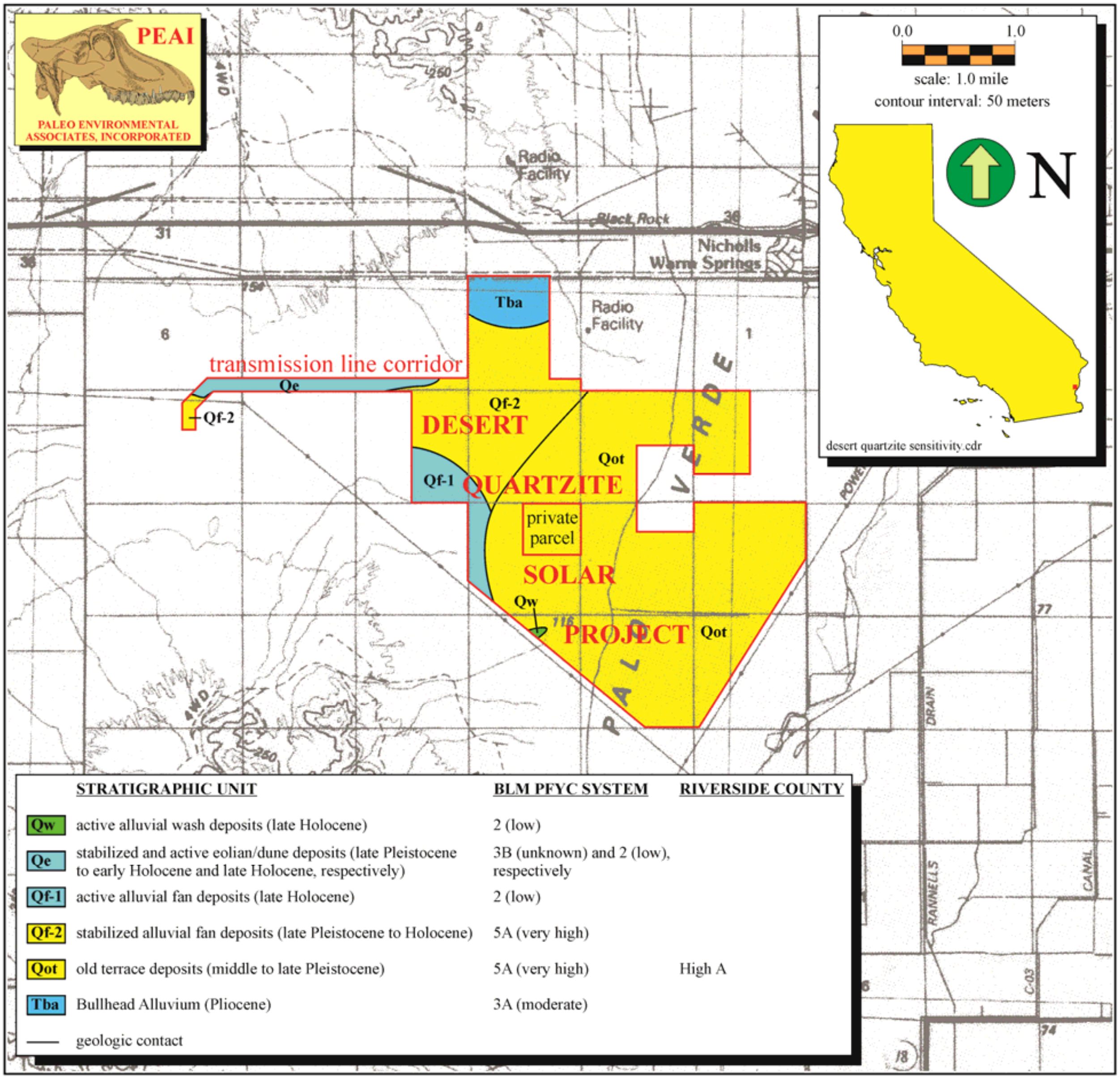
Criterion	**Significance**
Specimen based	• Represents an unknown or undescribed/unnamed taxon. • Represents rare taxon: either absolute rareness or contextual rareness. • Represents a vertebrate taxon (invertebrate specimen might also be significant).
Context based	• Is associated with other evidence of scientific interest, providing taphonomic, environmental, or evolutionary information. • Is evidence that extends and/or constrains the stratigraphic, chronologic, and/or geographic range of a species or higher-level taxonomic group.

The preliminary Project PFYC is presented by rock unit as a paleontological resource impact sensitivity map in Figure 4. The map is based on the most recent surficial geologic map covering the Project area by Hayhurst and Bedrossian (2010). The following discussion includes the Bullhead Alluvium at the northern end of the Project area (K. A. Howard, 2015 personal communication to R. E Reynolds) and adds an outcrop pattern for the Bullhead Alluvium (Figures 2, 4). Symbols in Figure 4 differentiate the distal, stabilized Pleistocene alluvial fans (unit Qf-2) from proximal active Holocene fans (unit Qf-1) near the bases of mountains.

Preliminary research suggests the central portion of the Project area is undergoing active deflation and erosion, thus exposing Pleistocene soils and sediments. The soils map in Figure 3 adds additional age constraints on the sedimentary units. The preliminary PFYC or impact sensitivity of each sedimentary unit exposed in the Project area is presented in Table 4 and Figure 4. The BLM PFYC system is presented in Appendix C.

Table 4.—PFYC of stratigraphic units in Desert Quartzite Solar Project area.

Stratigraphic Unit (age)	**PFYC**	**Description and Basis (BLM IM 2008-009; see Appendix C)**
Bullhead Alluvium (Tba) (Pliocene)	3 (Moderate to Undetermined)	Sediments contain vertebrate fossils, but occurrences are widely scattered.
Old terrace deposits (Qot) (middle to late Pleistocene)	5a (Very High)	Highly fossiliferous geologic units that regularly and predictably produce vertebrate fossils, and that are at risk of human-caused adverse impacts or natural degradation. • Vertebrate fossils are known and documented to occur consistently, predictably, at one locality/five acres. • Unit is exposed. Paleontological resources are highly susceptible to adverse impacts from surface-disturbing actions.
Stabilized Alluvial Fan Deposits (Qf-2) (late Pleistocene to Holocene)	3b (Unknown)	Unit exhibits geologic (stratigraphic) features and preservational conditions that suggest significant fossils could be present.
Stabilized Eolian and Dune Deposits (Qe) (late Pleistocene to Holocene)	3b (Unknown)	Unit exhibits geologic (stratigraphic) features and preservational conditions that suggest significant fossils could be present.
Active Alluvial Fan Deposits (Qf-1) (late Holocene)	2 (Low)	Sedimentary geologic units not likely to contain vertebrate fossils or scientifically significant nonvertebrate fossils. • Units younger than 10,000 years before present.
Active Eolian and Dune Deposits (Qe) (late Holocene)	2 (Low)	Sedimentary geologic units that are not likely to contain vertebrate fossils. • Units younger than 10,000 years before present. • Recent aeolian deposits.
Active Alluvial Wash Deposits (Qw) (late Holocene)	2 (Low)	Sedimentary geologic units that are not likely to contain vertebrate fossils. • Units younger than 10,000 years before present.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QUARTZITE
private parcel
SOLAR
Qw
PROJECT
Qot
PALO VERDE
STRATIGRAPHIC UNIT
BLM PFYC SYSTEM
RIVERSIDE COUNTY
Qw active alluvial wash deposits (late Holocene) 2 (low)
Qe stabilized and active eolian/dune deposits (late Pleistocene to early Holocene and late Holocene, respectively) 3B (unknown) and 2 (low), respectively
Qf-1 active alluvial fan deposits (late Holocene) 2 (low)
Qf-2 stabilized alluvial fan deposits (late Pleistocene to Holocene) 5A (very high)
Qot old terrace deposits (middle to late Pleistocene) 5A (very high) High A
Tba Bullhead Alluvium (Pliocene) 3A (moderate)
geologic contact

Figure 4.—Topographic and preliminary paleontological resource impact sensitivity map, Desert Quartzite, LLC, Desert Quartzite Solar Project, northeastern Riverside County, California. Base map: United States Geological Survey Blythe 30 x 60 Minute Quadrangle (1986). Geology after Stone (2006) and Hayhurst and Bedrossian (2010), and based locally on photointerpretation of Google Earth satellite image covering Project site. Sensitivities for stratigraphic units underlying most of Project site based on BLM PFYC System. Sensitivity for private parcel based on Riverside County paleontological sensitivity map. See Figure 2.

PFYC SYSTEM EVALUATIONS OF STRATIGRAPHIC UNITS IN PROJECT AREA

The Project area encompasses five continental stratigraphic units of Pliocene, Pleistocene, and Holocene age. The preliminary PFYC system class of each unit is discussed below and presented in Table 4 and Figure 4. Those assignments will be finalized after the preconstruction field survey.

Bullhead Alluvium (unit Tba) (Pliocene)

Previously unmapped outcrops at the north end of the Project have characteristics of the Pliocene Bullhead Alluvium. The presence of occasional vertebrate fossil remains allows it to considered to have a moderate to undetermined potential for containing fossil remains and therefore, as assigned to PFYC system Class 3.

Old Terrace Deposits (unit Qot) (middle to late Pleistocene)

As mapped by Stone (2006, unit Qpv) and Hayhurst and Bedrossian (2010, unit Qot), the old terrace deposits are the same as the fossiliferous sediments that underlie the Rio Mesa Project area, about 6 miles south of the Desert Quartzite Solar Project site. The "Palo Verde Mesa Paleosol" of the “old” or “Upper Terrace” deposits has produced over 800 fossil vertebrate specimens of Irvingtonian to Rancholabrean (Pleistocene) age (Stewart 2012). Because the fossil yield from the old terrace deposits is very high, they are considered to have a very high potential for containing fossil remains and, therefore, are assigned to PFYC system Class 5a.

Stabilized Alluvial Fan Deposits (unit Qf-2) (late Pleistocene to Holocene)

Stabilized Alluvial Fan Deposits interfinger with old terrace deposits (unit Qot) and, therefore, might contain a similar fossil vertebrate fauna. The alluvial fan deposits are considered to have an unknown potential for containing fossils and therefore, are assigned to PFYC system Class 3b of the PFYC system.

Stabilized and Active Eolian and Dune Deposits (unit Qe) (late Pleistocene to late Holocene)

Stabilized and active dune deposits in the Rio Mesa Project area to the south have yielded Pleistocene fossil remains (Stewart 2012). Therefore, the stabilized portions of the eolian and dune deposits (Qe) have an unknown potential for containing fossils, and, therefore, are assigned to PFYC system Class 3b.

Active eolian and dune deposits (not mapped separately in Figure 4) underlie the western portion of the Project area. Thicknesses of the sand sheets vary considerably (Lerch et al. 2016), but sometimes exceed 5 feet. The active deposits are too young to contain remains old enough to be considered fossilized. Any fossil remains would likely have been reworked and removed from their original stratigraphic context. These stratigraphic units have a low potential for producing fossils and are assigned to Class 2 of the PFYC system.

These preliminary PFY classifications will be finalized after the preconstruction field survey.

RECOMMENDATIONS

This preliminary paleontological resource impact assessment has determined that earth-moving activities at the Project site have the potential to impact fossil remains and associated specimen and locality data where the area is underlain by paleontologically sensitive deposits (Figure 4). The Project proponent has described construction-related earth-moving activities at the Project site. Such activities include grading, cut and fill, trenching for pipelines and construction of generator tie lines. Some excavation might reach depths of 10 feet. Therefore, a Project-specific paleontological resource impact mitigation plan/program (PRIMP) is recommended for all phases of construction-related earth-moving activities. The plan can be prepared after a paleontological resource preconstruction field survey has been completed.

A preconstruction field survey of the Project area is required to complete the BLM PFYC evaluation. The survey will provide ground truth verification of the preliminary PFYC assignment for each sedimentary unit exposed therein, or justification for changing such an assignment. The final assignments will be used in developing the PRIMP, which will be based on generic SVP (2010) measures (see Appendix D). When implemented, the PRIMP will reduce adverse construction-related impacts on paleontological resources of the Project site to a less-than-significant level.

During the preconstruction field survey, newly discovered fossil localities must be documented and the fossil remains recovered and fully treated (see below). Strata with a demonstrated potential for containing fossil remains (e.g., soils, paleosols, playa or lacustrine strata) should be noted.

Based on the results of this preliminary inventory and impact assessment, it is recommended that

1. a preconstruction field survey be conducted over the entire Project area to verify the PFYC assignment for each stratigraphic unit exposed therein, particularly with regard to eolian and dune deposits,
2. the survey include mapping of the Bullhead Alluvium to clarify its stratigraphic and outcrop relations to other sedimentary units,
3. a Project-specific PRIMP be prepared, based on this assessment, mapping, and preconstruction field survey results, and
4. fossil remains recovered during the survey, as well as those recovered during construction-related earth-moving activities, be dealt with as prescribed in the treatment plan presented below.
    a) the location of any larger fossil specimen will be documented using a hand-held GPS unit and recording NAD 83 UTM coordinates,
    b) the stratigraphic unit and level producing the specimen will be recorded,
    c) corresponding specimen data and geographic and geologic locality data will accompany the specimen during recovery, transport to a laboratory facility, and the treatment process,
    d) specimen stabilization, if necessary, will occur before removal and transport, and will include saturating the remains with hardening solution and enclosing them in protective plaster jacket,
    e) fine-grained sediment surrounding specimen will be test screened to allow for the recovery of smaller fossil remains that are too small to be observed in the field,
    f) larger fine-grained sediment or rock samples with volumes totaling amounts prescribed by SVP (2010) will be collected to allow for the recovery of additional small remains,
    g) each specimen recovered during the field survey or construction-related earth-moving activities will be prepared to point allowing identification to lowest taxonomic level possible,
    h) the skeletal element(s) represented by the specimen will be identified by a knowledgeable paleontologist, who will also identify the specimen to the lowest taxonomic level possible,
    i) the specimen will be catalogued with individual specimen and locality numbers provided by a designated museum repository,
    j) a fossil specimen catalog and a fossil locality inventory will be compiled, and
    k) the entire collection from the Project site will be transferred to the repository, where the collection will be permanently stored, maintained, and made available to qualified investigators for scientific research.

The treatment plan would be implemented under the PRIMP. A curation and storage agreement with the repository must be arranged prior to the preconstruction field survey. A suitable repository would be the Western Science Center in Hemet.

A preliminary PRIMP is being developed based on data from this assessment, and revisions to the PRIMP may occur after the proposed pre-construction survey. When the final PRIMP is completed, it must be approved by the BLM before any Project construction-related earth-moving activity begins and must be implemented during such construction activities when they might disturb potentially fossil-bearing sediments. It is recommended that the PRIMP include:

1. a worker environmental awareness training program to be presented by a Project paleontologist, who will discuss fossil recognition and procedures to be implemented by earth-moving equipment operators when remains are encountered, particularly when a trained paleontologic monitor is not on site (e.g., avoidance of fossil locality, notification of appropriate Project, agency staff, and PRIMP personnel), and who will provide an informational brochure and, as appropriate, a video recording,
2. paleontologic construction monitoring of earth-moving activities by a qualified (trained) monitor in portions of the Project area determined to have moderate or high sensitivity during the preconstruction field survey, thereby allowing for the discovery and recovery of any larger fossil remains exposed by such activities,
3. assignment of additional field staff to recover an unusually large fossil specimen, thereby avoiding any diversion of the monitor from their designated task,
4. collecting and processing fine-grained sediment samples to allow for the recovery of smaller remains,
5. recording of associated specimen data (element, preliminary taxonomic identification,/sample and locality data,

6. full treatment of any remains recovered as a result of monitoring or sample processing (e.g., specimen preparation, identification, curation, cataloging), and
7. preparation of a comprehensive final mitigation report of results and findings for submission to the BLM and the museum repository receiving the fossil collection.

The level of monitoring and the collection of sediment samples would be based on the PFYC assignment for the underling stratigraphic unit, and as determined appropriate based on preconstruction field survey results. The specific project activities requiring monitoring, as well as duration of monitoring in the event resources are not identified by monitoring activities, will be defined in the PRIMP. Acceptance of the final report by the BLM would signify completion of the PRIMP and would demonstrate Project compliance with CEQA, NEPA, BLM guidelines, and mitigation measures developed during the environmental impact review process for the Project.

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APPENDIX A

ACRONYMS, ABBREVIATIONS, AND INITIALISMS

BLM	United States Bureau of Land Management
CEQA	California Environmental Quality Act
Ma	million years
PEAI	Paleo Environmental Associates, Inc.
PFYC	Potential Fossil Yield Classification
PRIMP	paleontological resource impact mitigation plan/program
Project	Desert Quartzite Solar Project
Qe	eolian and dune deposits
Qf	alluvial fan deposits
Qot	old terrace deposits
Qw	alluvial wash deposits
Rio Mesa	Rio Mesa Solar Electric Generating Facility Project
SVP	Society of Vertebrate Paleontology
USGS	United States Geological Survey

APPENDIX B

RELEVANT FEDERAL AND STATE LEGISLATION REGARDING PALEONTOLOGICAL RESOURCES

A number of Federal statutes specifically address paleontological resources. Such statutes would apply to a specific project if that project were on Federal land or involved a Federal agency license, permit, approval, or funding. This section summarizes Federal regulations regarding paleontological resources and how those regulations might affect project development and operation. Policies and/or contact information for Federal land managing and regulatory agencies that have paleontological oversight and responsibilities are provided directly or by hotlink. If a project involves land owned or administered by another Federal or a State agency, that agency should be contacted in order to ascertain specific requirements they might impose with respect to paleontological resources.

Antiquities Act of 1906 (16 United States Code [USC] 431-433). The Antiquities Act of 1906 states, in part "That any person who shall appropriate, excavate, injure or destroy any historic or prehistoric ruin or monument, or any object of antiquity, situated on lands owned or controlled by the Government of the United States, without the permission of the Secretary of the Department of the Government having jurisdiction over the lands on which said antiquities are situated, shall upon conviction, be fined in a sum of not more than five hundred dollars or be imprisoned for a period of not more than ninety days, or shall suffer both fine and imprisonment, in the discretion of the court." Although there is no specific mention of natural or paleontological resources in the Act itself or in the Act's uniform rules and regulations (Title 43 Part 3, Code of Federal Regulations [43 CFR 3]), "objects of antiquity" have been interpreted to include fossils by the National Park Service (NPS), the Bureau of Land Management (BLM), the Forest Service (FS), and other Federal agencies. Permits to collect fossils on lands administered by Federal agencies are authorized under this Act (see "Permit Requirements of Federal Agencies" section, below). Therefore, projects involving Federal land will require permits for both paleontological resource evaluation and mitigation efforts.

Archaeological and Paleontological Salvage (23 USC 305). Statute 23 USC 305 amends the Antiquities Act of 1906. Specifically, the Act states "Funds authorized to be appropriated to carry out this title to the extent approved as necessary, by the highway department of any State, may be used for archaeological and paleontological salvage in that state in compliance with the Act entitled 'An Act for the preservation of American Antiquities,' approved June 8, 1906 (PL 59-209; 16 USC 431-433), and State laws where applicable. This statute allows funding for mitigation of paleontological resources recovered pursuant to Federal aid highway projects, provided that excavated objects and information are to be used for public purposes without private gain to any individual or organization" (Federal Register [FR] 46(19): 9570; [also see FHWA policy section, below]).

National Registry of Natural Landmarks (16 USC 461-467). The National Natural Landmarks (NNL) program was established in 1962 and is administered under the Historic Sites Act of 1935. Implementing regulations were first published in 1980 under 36 CFR 1212 and the program was re-designated as 36 CFR 62 in 1981. A National Natural Landmark is defined as:

> "…an area designated by the Secretary of the Interior as being of national significance to the United States because it is an outstanding example(s) of major biological and geological features found within the boundaries of the United States or its Territories or on the Outer Continental Shelf (36 CFR 62.2)."

National significance describes

> "… an area that is one of the best examples of a biological community or geological feature within a natural region of the United States, including terrestrial communities, landforms, geological features and processes, habitats of native plant and animal species, or fossil evidence of the development of life (36 CFR 62.2)."

Federal agencies (e.g., FHWA) and their agents (e.g., Caltrans) should consider the existence and location of designated NNLs, and of areas found to meet the criteria for national significance, in assessing the effects of their activities on the environment under section 102(2)(c) of the National Environmental Policy Act (NEPA) (42 USC 4321). The NPS is responsible for providing requested information about the National Natural Landmarks Program for these assessments (36 CFR 62.6[f]). However, other than consideration under NEPA, NNLs are afforded no special protection. Furthermore, there is no requirement to evaluate a paleontological resource for listing as an NNL. Finally, project proponents (State and local) are not obligated to prepare an application for listing potential NNLs, should such a resource be encountered during project planning and delivery. For an up-to-date listing of NNLs, visit the National Natural Landmarks website.

National Environmental Policy Act of 1969 (42 USC 4321). The National Environmental Policy Act (NEPA) directs Federal agencies to use all practicable means to "…preserve important historic, cultural, and natural aspects of our national heritage…" (Section 101[b] [(])). Regulations for implementing the procedural provisions of NEPA are found in 40 CFR 1500 1508.

If the presence of a significant environmental resource is identified during the scoping process, Federal agencies and their agents must take the resource into consideration when evaluating project effects. Consideration of paleontological resources may be required under NEPA when a project is proposed for development on Federal land, or land under Federal jurisdiction. The level of consideration depends on the Federal agency involved (see "Identification of Regulatory/Management Agencies" section, below).

- **1872 Mining Law, amended 1988.** Excludes fossils (including petrified wood) from claim or patent. U.S. Forest Service and BLM regulates surface effects of development under this law. BLM regulations specifically state that operators may not knowingly disturb or destroy any scientifically important fossil remains on federal lands; that they notify an authorized officer of such finds; and that said officer shall take action to protect or remove the resource(s).
- **Mineral Leasing Act of 1920 (sec. 30).** Requires and provides for the protection of interest of the United States. Natural resources, including paleontological resources, are commonly regarded as such interests.
- **Executive Order 11593, May 31, 1971, Protection and Enhancement of the Cultural Environment (36 CFR 8921).** Requires Federal agencies to inventory and protect properties under their jurisdiction. National Park Service regulations under 36 CFR provide that fossil specimens may not be disturbed or removed without a permit.
- **Archaeological and Historic Data Preservation Act of 1974 (PL 86-253, as amended by PL 93-921, 16 USC 469), Act of May 24, 1974 (88 Stat 174, sec. 3 a0, 4a).** Provides for the survey, recovery, and preservation of significant scientific, prehistoric, historic, archaeological, or paleontological data when such data may be destroyed or irreparably lost due to a Federal, federally licensed, or federally funded project. A "Statement of Program Approach" was published in the *Federal Register* on March 26, 1979 (40 FR 18117) to advise the manner in which this law will be implemented.
- **Federal Land Management and Policy Act of 1976 (FLPMA, PL 94-579, 43 USC 1701–1782)**. Provides authority for BLM to regulate lands under its jurisdiction, managed in a manner to "protect the quality of scientific, scenic, historic, ecological, environmental...and archaeological values." Authority is given to establish areas of critical environmental concern (ACEC).
- **Surface Mining Control and Reclamation Act of 1977 (SMCRA, PL 95-87, 30 USC 1201–1328).** Regulates surface coal mining and provides designation as unsuitable for surface mining if mining would "...result in significant damage to important cultural, scientific, and esthetic values and natural systems..."
- **Paleontological Resource Management 1998, Bureau of Land Management Handbook H-8270-1** General Procedural Guidance for Paleontological Management.
- **Paleontological Resources Preservation Act, Section 291 of the Omnibus Public Land Management Act of 2009.** The proposed regulations would provide for the preservation, management, and protection of paleontological resources on Federal land.

State of California Legislation

- The following state laws and regulations are applicable or potentially applicable to projects crossing State lands.
- **California Environmental Quality Act of 1970 (CEQA, 13 PRC, 2100, et seq).** Requires identification of potential adverse impacts of a project to any object or site of scientific importance (Div. 1, PRC 5020.1(b)).

- The California Environmental Quality Act (Chapter 1, Section 21002) states that:
- it is the policy of the state that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects, and that the procedures required are intended to assist public agencies in systematically identifying both the significant effects of proposed projects and the feasible alternatives or feasible mitigation measures which will avoid or substantially lessen such significant effects.
- Guidelines for the Implementation of the California Environmental Quality Act, as amended May 10, 1980 (14 Cal. Admin. Code: 15000, et seq). Requires mitigation of adverse impacts to a Paleontological site from development on public land by construction monitoring.
- The CEQA Guidelines (Article 1, Section 15002(a)(3)) state that CEQA is intended to: prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible.
- **Guidelines for the Implementation of CEQA, 1992, Appendix G, section J (Significant effects).** CEQA Guidelines, Appendix G, states, in part, that: A project will “normally” have a significant effect on the environment if it, among other things, will disrupt or adversely affect … a paleontological site except as part of a scientific study. If paleontological resources are identified during the Preliminary Environmental Analysis Report (PEAR), or other initial project scoping studies, as being within the proposed project area, the sponsoring agency must take those resources into consideration when evaluating project effects. The level of consideration may vary with the importance of the resource.
- Periodic review of CEQA-related court cases for decisions related to paleontology is also recommended. These cases can be found at the California Environmental Resources Evaluation System (CERES) web site.
- California Environmental Quality Act, State of California Public Resources Code, 2100-21177 as amended January 1, 1999, Appendix G Environmental Checklist Form. Impacts to known, important paleontological resources are specifically covered under CEQA as potentially significant effects, i.e., the project will have a significant effect on the environment. Specifically, each California project must answer the question: Cultural Resource - would the project directly or indirectly destroy a unique paleontological resource or site or unique geological feature? There are four possible answers: Potentially Significant Impact, Potentially Significant Unless Mitigation Incorporated, Less than Significant Impact, and No Impact.
- **California Coastal Act.** The California Coastal Act authorizes, in part, the California Coastal Commission (CCC) to review permit applications for development within the coastal zone and, where necessary, to require reasonable mitigation measures to offset effects of that development. Permits for development are issued with “special conditions” to ensure implementation of these mitigation measures.
- Section 30244 of the Act, “Archaeological or Paleontological Resources,” states that: Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.
- If the CCC determines that a paleontological resource is present within an applicant’s proposed project area, they generally look for evidence that the applicant has taken the resource into consideration, e.g., through formal survey by a professional paleontologist with implementation of resulting recommendations. If a paleontological site is present, special permit conditions may range from avoidance of the site to construction monitoring and/or salvage of significant fossils. This approach virtually parallels the level of protection afforded to paleontological resources by CEQA. Additionally, the CCC relies heavily on project sponsoring or permitting agencies to ensure compliance with CEQA (and consequently, the California Coastal Act).
- **Warren-Alquist Act (PRC 25000 et seq).** Requires the California Energy Commission to evaluate energy facility sitting in unique areas of scientific concern (Section 26627)
- **Public Resources Code, Section 5097.5 (State 1965, c. 1136, p. 2792).** Section 50987.5 of the California Public Code Section states: No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands, except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor.

- As used in this section, “public lands” means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof. Consequently, Caltrans as well as local project proponents, are required to comply with PRC 5097.5 for their own activities, including construction and maintenance, as well as for permit actions (e.g., encroachment permits) undertaken by others.
- **Public Resources Code, Section 30244.** Requires reasonable mitigation of adverse impacts to paleontological resources from development on public land.
- **California Administrative Code.** Four sections of the California Administrative Code (Title 14, State Division of Beaches and Parks) administered by the California Department of Parks and Recreation CDPR) address paleontological resources. These include:
- Section 4306: Geological Features - “No person shall destroy, disturb, mutilate, or remove earth, sand, gravel, oil, minerals, rocks, or features of caves.”
- Section 4307: Archaeological Features - “No person shall remove, injure, disfigure, deface, or destroy any object of paleontological, archaeological, or historical interest or value.”
- Section 4308: Property - “No person shall disturb, destroy, remove, deface, or injure any property of the state park system. No person shall cut, carve, paint, mark, paste, or fasten on any tree, fence, wall, building, monument, or other property in the state parks, any bill, advertisement, or inscription.”
- Section 4309: Special Permits - “Upon a finding that it will be for the best interest of the state park system and for state park purposes, the director may grant a permit to remove, treat, disturb, or destroy plants or animals or geological, historical, archaeological, or paleontological materials; and any person who has been properly granted such a permit shall to that extent not be liable for prosecution for violation of the foregoing.”
- These sections of the California Administrative Code establish authority and processes to protect paleontological resources while allowing mitigation through the permit process.

Local Laws and Regulations

Various counties have passed ordinances and resolutions related to paleontological resources within their jurisdictions. Examples include the Counties of Orange, Riverside, and San Bernardino. These regulations generally provide additional guidance on assessment and treatment measures for projects subject to CEQA compliance. Project staff members should periodically coordinate with local entities to update their knowledge of local requirements.

APPENDIX C

BUREAU OF LAND MANAGEMENT
CRITERIA FOR EVALUATING PALEONTOLOGICAL RESOURCES
(INSTRUCTION MEMORANDUM NO. 2008-009)
(2007)

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington, D.C. 20240
October 15, 2007

In Reply Refer To:
1610, 8270 (240) P
EMS TRANSMISSION 10/18/2007
Instruction Memorandum No. 2008-009
Expires: 09/30/2009
To: All State Directors
From: Assistant Director, Renewable Resources and Planning

Subject: Potential Fossil Yield Classification (PFYC) System for Paleontological Resources on Public Lands

Program Areas: Paleontological Resources Management, Resource Management Planning, Lands and Realty Management, Minerals Management, Range

Purpose: This Instruction Memorandum (IM) transmits the Bureau of Land Management (BLM) classification system for paleontological resources on public lands. The classification system is based on the potential for the occurrence of significant paleontological resources in a geologic unit, and the associated risk for impacts to the resource based on Federal management actions. Copies of the classification system and implementation guidance are attached.

Policy/Action: The Potential Fossil Yield Classification (PFYC) system will be used to classify paleontological resource potential on public lands in order to assess possible resource impacts and mitigation needs for Federal actions involving surface disturbance, land tenure adjustments, and land-use planning. Implementation of the PFYC system will not mandate changes to existing land use plans, project plans, or other completed efforts. Integration into plans presently being developed is discretionary. All efforts subsequent to issuance of this IM should incorporate the PFYC system. This system will replace the current Condition Classification in the Handbook (H-8270-1) for Paleontological Resource Management.

Timeframe: This guidance is effective immediately for all BLM offices.

Background: This classification system for paleontological resources is intended to provide a more uniform tool to assess potential occurrences of paleontological resources and evaluate possible impacts. It uses geologic units as base data, which is more readily available to all users. It is intended to be applied in broad approach for planning efforts, and as an intermediate step in evaluating specific projects. This is part of a larger effort to update the Handbook H-8270-1 (General Procedural Guidance for Paleontological Resource Management) Chapter III (Assessment & Mitigation) and Chapter II.A.2 and will be incorporated into that Handbook update.

Impact on Budget: Costs for the initial classification of geologic units for those States that have not already determined the classification will be borne by each Office. Implementation of the PFYC system will have no additional costs.

Manual/Handbook Affected: Supersedes H-8270-1 (General Procedural Guidance for Paleontological Resource Management) Chapter II.A.2.

Coordination: The classification system is the product of the BLM's regional paleontologists, other BLM employees, and outside reviewers. This system is very similar to the Forest Service's Fossil Yield Potential Classification and will enable closer coordination of paleontological resource management between the agencies.

Contact: For questions regarding application of this policy and guidance, please contact Lucia Kuizon, National Paleontologist, at (202) 452-5107 or lkuizon@blm.gov.
Signed by: Authenticated by: IM 2008-009, Potential Fossil Yield Classification (PFYC) System for Paleontological Re... Page 1 of 2

http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national.1/18/2010

2 Attachments:
1 – The Potential Fossil Yield Classification (PFYC) System (4 pp)
2 – Guidance for Implementing the PFYC System (5 pp)

Todd S. Christensen Acting, Deputy Assistant Director Renewable Resources and Planning	Robert M. Williams Division of IRM Governance

Guidance for Implementing the Potential Fossil Yield Classification (PFYC) System

Introduction

The Potential Fossil Yield Classification (PFYC) system will aid in assessing the potential for discovery of significant paleontological resources or the impact of surface disturbing activities to these resources.

It is intended to assist in determining proper mitigation approaches for surface disturbing activities, disposal or acquisition actions, recreation possibilities or limitations, and other BLM-approved activities. It will provide consistent information for input and analysis during planning efforts. The PFYC system can also highlight the area's most likely to be a focus of paleontological research efforts or illegal collecting. It is hoped that this system will allow BLM to direct management efforts toward potentially significant areas and reduce efforts in areas of lower potential.

This classification system was originally developed by the Forest Service's Paleontology Center of Excellence and the Region 2 (FS) Paleontology Initiative in 1996. Modifications were made by the BLM's Paleontological Resources staff in subsequent years.

Paleontological resources are closely associated with the geologic rock units containing them; that is, fossils are found more frequently in some rock units than others. The management of paleontological resources can thus be tied to the geologic units present at or near the ground surface, with greater management emphasis aimed at higher potential geologic units.

Uses

This PFYC system is utilized for land use planning efforts and for the preliminary assessment of potential impacts and proper mitigation needs for specific projects. It is intended to provide a tool to assess potential occurrences of significant paleontological resources. It is meant to be applied in broad approach for planning efforts, and as an intermediate step in evaluating specific projects.

There are five Classes with Class 1 being Very Low Potential and Class 5 being Very High Potential. Although granite, lava beds, and other igneous or metamorphic rock types are usually considered to be void of any fossils, outcrops of these rocks may have fissure fillings, cave-like structures, sinkholes, and other features that may preserve significant paleontological resources or information, so the potential is not zero; therefore Class 1 is applied to these rock types usually considered not to contain fossil resources.

It is intended that this system replace the current Condition Classification in the Handbook (H-8270-1), for Paleontological Resource Management. In general, the following is a comparison of the Condition Classification rankings to the new PFYC

Classes: Condition (from H-8270-1)	PFYC Class (this Instruction Memorandum)
Condition 1 – Areas known to contain vertebrate fossils or noteworthy occurrences of invertebrate or plant fossils. (Note: this refers to known localities or groups of localities)	PFYC Class 4 (High) or Class 5 (Very High), based on geologic unit.
Condition 2 – Areas with exposures of geological units or settings that have high potential to contain vertebrate fossils or noteworthy occurrences of invertebrate or plant fossils.	PFYC Class 3 (Moderate), Class 4 (High), or Class 5 (Very High), based on geologic unit.
Condition 3 – Areas that are very unlikely to produce vertebrate fossils or noteworthy occurrences of invertebrate or plant fossils.	PFYC Class 1 (Very Low) or Class 2 (Low).

Assignment of Classes

A separate class ranking is assigned to each recognized geologic formation or member present at the surface. Deposits of young alluvium (post-Pleistocene) or thick soils can often be ignored. However, geologic mapping may not separate the older Pleistocene alluvium which, may contain significant vertebrate fossils, and thus these units need to be carefully considered. Available geologic mapping, depending on map scale, may combine multiple formations or units. In these cases, the assigned classification should use the highest class of those included units. For ease of application, the classifications should be integrated into a Geographic Information System (GIS) based geologic map.

The classification is initially determined by the Regional Paleontologist; the State Office Paleontology Lead in collaboration with the Regional Paleontologist; or by knowledgeable individuals from a paleontology museum, university paleontology department, or consulting firm working under a formal agreement. Several States have already completed an initial classification and are incorporating the system into new planning and mitigation efforts.

To maintain consistency in planning efforts, mitigation requirements, and other management approaches, the classification should be applied to each formation on a state-wide basis, and even across State boundaries. But in some situations, geologic characteristics within formations may change across the State or region and may alter the potential for fossil occurrence. These differences may be a characteristic of the formation, be variable in occurrence, and unmappable at a workable scale; or may indicate a regional gradient, where a formation is highly fossiliferous in one portion of the State, but has lowered potential in another area. A variable occurrence in potential may be included in the general information about the formation. A regional gradient can be addressed by assigning a different class for separate areas.

Multiple class assignments for an individual formation should be applied in consultation with the State Office to maintain consistency across Field Office boundaries.

Over time, additional information may be acquired or developed that may suggest that a change in the class assignment is appropriate, especially from the Unknown Class (3b) to a higher or lower class. The classification should reflect the most current information, and recent research or discoveries may indicate a change is warranted. However, any changes should be measured against existing applications or use of the current classification, such as usage in Resource Management Plans (RMPs) or other planning or management documents.

Application

In planning documents and other general applications, these classes allow for uniform discussion of the paleontologic resource, potential adverse impacts, and management approaches. Assessment of general conditions, such as acres or percentages of each class, or spatial identification of important areas can be determined and presented in simple manner. Identification of areas of potential concern with other resources can be identified using GIS mapping or explained in the text body in simple fashion.

The PFYC classes may also be utilized to assess the possibility of adverse or beneficial impacts from land tenure adjustment (disposal or acquisition) proposals prior to on-the-ground surveys.

A primary purpose of the PFYC is to assess the possible impacts from surface disturbing activities and help determine the need for pre-disturbance surveys and monitoring during construction. This assessment should be an intermediate step in the analysis process; and local conditions such as amount of exposed bedrock should be considered when final mitigation needs are determined. The determination should also be supplemented by occurrences of known fossil localities and local geologic and topographic knowledge.

Mitigation Needs Assessment

Impacts of most surface-disturbing activities, and the need for mitigation efforts, are addressed by the local Field Office. Some larger actions, such as major pipeline projects, may be handled by the State Office, or even as multi-State projects. In all these cases, the assessment of impacts to paleontological resources and need for mitigation can be addressed in similar fashion through a progression of steps. The following outlines the general steps used to apply the PFYC system to this mitigation process.

1. **Identify the proposed action and affected area.** Consider the area directly impacted by the action, as well as areas that may be impacted by vehicle drive ways, equipment parking, storage areas, and increased access. Also consider the depth of disturbance to determine possible subsurface impacts.

2. **Identify the potential impacts to paleontological resources.** Determine the geologic units that may be impacted and the associated PFYC classes, and consult other sources of information about known localities or paleontological research that may have been done previously.

   Based on the PFYC class and any additional resource information, determine the probability of impacting significant paleontological resources. If known localities are in the area of possible impact, determine if those localities can be avoided by altering the proposed action, such as repositioning a well pad location or rerouting a pipeline around a locality.

3. **Determine the need for field survey or other mitigation efforts.** On-the-ground field surveys, on-site

monitoring, spot-checking at key times during construction, or locality avoidance are all possible mitigation approaches to lessen adverse impacts.

- If the PFYC class for the impacted area is Class 1 or 2, and there are no known localities within the area, no further assessment is typically needed.
- If a Class 3a (Moderate Potential) unit underlies the area, the local geologic conditions should be considered, as well as any known localities in the region. It may be necessary to consult with the Regional Paleontologist or other qualified paleontologist to assess the local conditions.
- If a Class 3b (Unknown Potential) unit underlies the area, it may be appropriate to require an on-site preliminary assessment by a qualified paleontologist.
- If the area is a Class 4b (buried bedrock with High Potential) or Class 5b (buried bedrock with Very High Potential), an assessment of the possible impacts to bedrock units must be made. If the proposed action will not penetrate the protective soil or alluvial layer, a pre-work survey or monitoring during the activity may not be necessary. If the potential exists to remove the protective layer and impact the bedrock unit below, it may be prudent to require a pre-work field survey and/or on-site monitoring during disturbance or spot-checks at key times. Because the bedrock unit is typically buried for much of the area in question, a pre-work survey may not always be necessary, as the fossil material may not be visible. However, it may then be more important to have an on-site monitor during disturbance or spot-checks at key times.
- If it is a Class 4a (exposed bedrock with High Potential) or Class 5a (exposed bedrock with Very High Potential) area, it will be necessary in most (Class 4a) or almost all (Class 5a) situations to require a pre-activity field survey of the areas directly and indirectly impacted.

Larger projects may impact multiple geologic units with differing PFYC Classes. In those cases, field survey and monitoring may be applied at differing levels. For example, surveys may be appropriate only on the Class 4 and 5 formations and not the Class 2 formations along a pipeline project. Careful mapping and detailed field notes should reflect the differing survey/monitoring intensities, and should be included in the consultant’s report to BLM.

Appendix B-1

Potential Fossil Yield Classification (PFYC) System

Occurrences of paleontological resources are closely tied to the geologic units (i.e., formations, members, or beds) that contain them. The probability for finding paleontological resources can be broadly predicted from the geologic units present at or near the surface. Therefore, geologic mapping can be used for assessing the potential for the occurrence of paleontological resources.

Using the Potential Fossil Yield Classification (PFYC) system, geologic units are classified based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher potential. This classification is applied to the geologic formation, member, or other distinguishable unit, preferably at the most detailed mappable level. It is not intended to be applied to specific paleontological localities or small areas within units. Although significant localities may occasionally occur in a geologic unit, a few widely scattered important fossils or localities do not necessarily indicate a higher class; instead, the relative abundance of significant localities is intended to be the major determinant for the class assignment.

The PFYC system is meant to provide baseline guidance for predicting, assessing, and mitigating paleontological resources. The classification should be considered at an intermediate point in the analysis, and should be used to assist in determining the need for further mitigation assessment or actions.

The descriptions for the classes below are written to serve as guidelines rather than as strict definitions. Knowledge of the geology and the paleontological potential for individual units or preservational conditions should be considered when determining the appropriate class assignment. Assignments are best made by collaboration between land managers and knowledgeable researchers.

Class 1 – **Very Low.** Geologic units that are not likely to contain recognizable fossil remains.

- Units that are igneous or metamorphic, excluding reworked volcanic ash units.

- Units that are Precambrian in age or older.

(1) Management concern for paleontological resources in Class 1 units is usually negligible or not applicable.

(2) Assessment or mitigation is usually unnecessary except in very rare or isolated circumstances.

The probability for impacting any fossils is negligible. Assessment or mitigation of paleontological resources is usually unnecessary. The occurrence of significant fossils is non-existent or extremely rare.

Class 2 – **Low.** Sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically significant nonvertebrate fossils.

- Vertebrate or significant invertebrate or plant fossils not present or very rare.
- Units that are generally younger than 10,000 years before present.
- Recent aeolian deposits.
- Sediments that exhibit significant physical and chemical changes (i.e., diagenetic alteration).

(1) Management concern for paleontological resources is generally low.

(2) Assessment or mitigation is usually unnecessary except in rare or isolated circumstances.

The probability for impacting vertebrate fossils or scientifically significant invertebrate or plant fossils is low. Assessment or mitigation of paleontological resources is not likely to be necessary. Localities containing important resources may exist, but would be rare and would not influence the classification. These important localities would be managed on a case-by-case basis.

Class 3 – **Moderate** or **Unknown.** Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence; or sedimentary units of unknown fossil potential.

- Often marine in origin with sporadic known occurrences of vertebrate fossils.
- Vertebrate fossils and scientifically significant invertebrate or plant fossils known to occur intermittently; predictability known to be low.

(or)

- Poorly studied and/or poorly documented. Potential yield cannot be assigned without ground reconnaissance.

Class 3a – **Moderate Potential.** Units are known to contain vertebrate fossils or scientifically significant nonvertebrate fossils, but these occurrences are widely scattered. Common invertebrate or plant fossils may be found in the area, and opportunities may exist for hobby collecting. The potential for a project to be sited on or impact a significant fossil locality is low, but is somewhat higher for common fossils.

Class 3b – **Unknown Potential.** Units exhibit geologic features and preservational conditions that suggest significant fossils could be present, but little information about the paleontological resources of the unit or the area is known. This may indicate the unit or area is poorly studied, and field surveys may uncover significant finds. The units in this Class may eventually be placed in another Class when sufficient survey and research is performed. The unknown potential of the units in this Class should be carefully considered when developing any mitigation or management actions.

(1) Management concern for paleontological resources is moderate; or cannot be determined from existing data.

(2) Surface-disturbing activities may require field assessment to determine appropriate course of action.

This classification includes a broad range of paleontological potential. It includes geologic units of unknown potential, as well as units of moderate or infrequent occurrence of significant fossils. Management considerations cover a broad range of options as well, and could include pre-disturbance surveys, monitoring, or avoidance. Surface-disturbing activities will require sufficient assessment to determine whether significant paleontological resources occur in the area of a proposed action, and whether the action could affect the paleontological resources. These units may contain areas that would be appropriate to designate as hobby collection areas due to the higher occurrence of common fossils and a lower concern about affecting significant paleontological resources.

Class 4 – **High.** Geologic units containing a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but may vary in occurrence and predictability. Surface disturbing activities may adversely affect paleontological resources in many cases.

> *Class 4a* – Unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two acres. Paleontological resources may be susceptible to adverse impacts from surface disturbing actions. Illegal collecting activities may impact some areas.
>
> *Class 4b* – These are areas underlain by geologic units with high potential but have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity.
>
> - Extensive soil or vegetative cover; bedrock exposures are limited or not expected to be impacted.
> - Areas of exposed outcrop are smaller than two contiguous acres.
> - Outcrops form cliffs of sufficient height and slope so that impacts are minimized by topographic conditions.
> - Other characteristics are present that lower the vulnerability of both known and unidentified paleontological resources.

(1) Management concern for paleontological resources in Class 4 is moderate to high, depending on the proposed action.

(2) A field survey by a qualified paleontologist is often needed to assess local conditions.

(3) Management prescriptions for resource preservation and conservation through controlled access or special management designation should be considered.

(4) Class 4 and Class 5 units may be combined as Class 5 for broad applications, such as planning efforts or preliminary assessments, when geologic mapping at an appropriate scale is not available. Resource assessment, mitigation, and other management considerations are similar at this level of analysis, and impacts and alternatives can be addressed at a level appropriate to the application.

The probability for impacting significant paleontological resources is moderate to high, and is dependent on the proposed action. Mitigation considerations must include assessment of the disturbance, such as removal or penetration of protective surface alluvium or soils, potential for future accelerated erosion, or increased ease of access resulting in greater looting potential. If impacts to significant fossils can be anticipated, on-the-ground surveys prior to authorizing the surface disturbing action will usually be necessary. On-site monitoring or spot-checking may be necessary during construction activities.

Class 5 – **Very High.** Highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils, and that are at risk of human-caused adverse impacts or natural degradation.

> *Class 5a* – Unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two contiguous acres. Paleontological resources are highly susceptible to adverse impacts from surface disturbing actions. Unit is frequently the focus of illegal collecting activities.
>
> *Class 5b* – These are areas underlain by geologic units with very high potential but have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has very high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity.
>
> - Extensive soil or vegetative cover; bedrock exposures are limited or not expected to be impacted.
> - Areas of exposed outcrop are smaller than two contiguous acres.
> - Outcrops form cliffs of sufficient height and slope so that impacts are minimized by topographic conditions.

- Other characteristics are present that lower the vulnerability of both known and unidentified paleontological resources.

(1) Management concern for paleontological resources in Class 5 areas is high to very high.

(2) A field survey by a qualified paleontologist is usually necessary prior to surface disturbing activities or land tenure adjustments. Mitigation will often be necessary before and/or during these actions.

(3) Official designation of areas of avoidance, special interest, and concern may be appropriate.

The probability for impacting significant fossils is high. Vertebrate fossils or scientifically significant invertebrate fossils are known or can reasonably be expected to occur in the impacted area. On-the-ground surveys prior to authorizing any surface disturbing activities will usually be necessary. On-site monitoring may be necessary during construction activities.

4. Conduct Pre-work Field Survey. Field surveys are almost always needed for Class 4 and 5 units, especially exposed bedrock areas (Class 4a and 5a). Class 3 units may or may not require a survey. Local conditions, such as vegetated areas or pockets of bedrock exposure, may affect the need and intensity of field surveys.

The consultant is required to submit a report of findings after completion of the field survey. In addition to standard reporting information, the report should contain the consultants' recommendations for further mitigation, and this recommendation should be considered when determining the need for and type of on-site monitoring or locality avoidance.

5. Monitor during disturbance activities. Those areas that have been determined to have a Very High potential (Class 5) for adverse impacts should typically be monitored at all times when surface-disturbing activities are occurring. If the area has a High potential (Class 4), it may be appropriate to examine the exposed unit, including the spoil or storage piles, only at key times. These times are dependent on the activity, but typically are: when bedrock is initially exposed, occasionally during active excavation, and when the maximum exposure is reached and before backfilling has begun. This monitoring and spot-checking must be performed by a permitted paleontologist or their BLM-approved representative. The monitor has the authority to briefly pause any activity to inspect a possible find. These pauses are intended to allow for identification of possible fossil resources and should only last a few minutes to a couple hours.

6. Evaluate significant finds. If significant paleontological resources are discovered during surface disturbing actions or at any other time, the proponent or any of his agents must: (a) stop work immediately at that site; (b) contact the appropriate BLM representative, typically the project inspector or Authorized Officer, as soon as possible; and (c) make every effort to protect the site from further impacts, including looting, erosion, or other human or natural damage. The BLM or designated paleontologist will evaluate the discovery and take action to protect or remove the resource within 10 working days. Work may not resume at that location until approved by the official BLM representative. In some cases, such as recovery of a dinosaur, further activity at that site may be delayed until the discovered fossils are recovered, or until the project is modified to avoid impacting the find. Because of the potential for lengthy delays, the BLM should assure that the project proponent understands this possibility prior to approval to begin work.

These steps are included here to provide general guidance, and it may be appropriate to modify or skip them for various situations. However, a brief discussion of the background and reason for modification should be placed in the project file.

For all surface-disturbing activities occurring within Class 3 or higher units, a stipulation should be included in the permitting document.

Further Information

Detailed information on the geologic units and paleontological resources within a State can often be obtained from State geological surveys, geological or paleontological museums, geology departments at universities or colleges, paleontological permittees or other researchers or within the BLM from Regional Paleontologists or knowledgeable Geologists.

Scientific publications, such as professional journals or State geological survey reports, often contain general and detailed information about paleontological and geological resources relevant to fossil potential and occurrences for specific areas. Current and past paleontological permittee reports usually include precise locality data and maps, and often contain discussions of findings and their significance.

Appendix B-2

Significance Criteria for Paleontological Resources: Vertebrate, Invertebrate, Plant and Trace Fossils

The Forest Service paleontological resources program focuses its management activities on scientifically significant fossil resources. Scientific significance may be attributed to the fossil specimen or trace fossil itself, and to its context, i.e., its location in time and space, or association with other relevant evidence. As a general rule, fossil specimens that are scientifically significant are management-relevant resources. The scientific significance of a paleontological specimen or trace, and its context, is determined by meeting any one of the following criteria:

Specimen-based criteria:

- Represents an unknown or undescribed/unnamed taxon.
- Represents a rare taxon, or rare morphological/anatomical element or feature. The "rareness" criterion comprises either absolute rareness in the fossil record, or relative or contextual rareness as described below.
- Represents a vertebrate taxon (trace, Plant, and Invertebrate fossils may also be significant).
- Exhibits an exceptional type and/or quality of preservation.
- Exhibits remarkable or anomalous morphological/anatomical character(s) or taphonomic alteration.
- Represents "soft tissue" preservation or presence.
- Exhibits cultural affiliation, e.g., alteration or use by ancient humans. (Resources matching this criterion are protected under the Archaeological Resources Protection Act of 1979 and are not considered in the PFYC.)

Context-based criteria:

- Is associated in a relevant way with other evidence of scientific interest, providing taphonomic, ecologic, environmental, behavioral, or evolutionary information.
- Is evidence that extends and/or constrains the stratigraphic, chronologic and/or geographic range of a species or higher-level taxonomic group.

APPENDIX D

SOCIETY OF VERTEBRATE PALEONTOLOGY
STANDARD PROCEDURES FOR THE ASSESSMENT AND MITIGATION OF ADVERSE IMPACTS TO PALEONTOLOGICAL RESOURCES

(2010)

Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources

Society of Vertebrate Paleontology
Impact Mitigation Guidelines Revision Committee

Abstract

Fossils are nonrenewable paleontological resources that are subject to impacts from land development. Procedures are presented for evaluating the potential for impacts of a proposed action on paleontological resources and for mitigating those impacts. Impact mitigation includes pre-project survey and salvage, monitoring and screen washing during excavation to salvage fossils, conservation and inventory, and final reports and specimen curation. The objective of these procedures is to offer standard methods for assessing potential impacts to fossils and mitigating these impacts.

Introduction

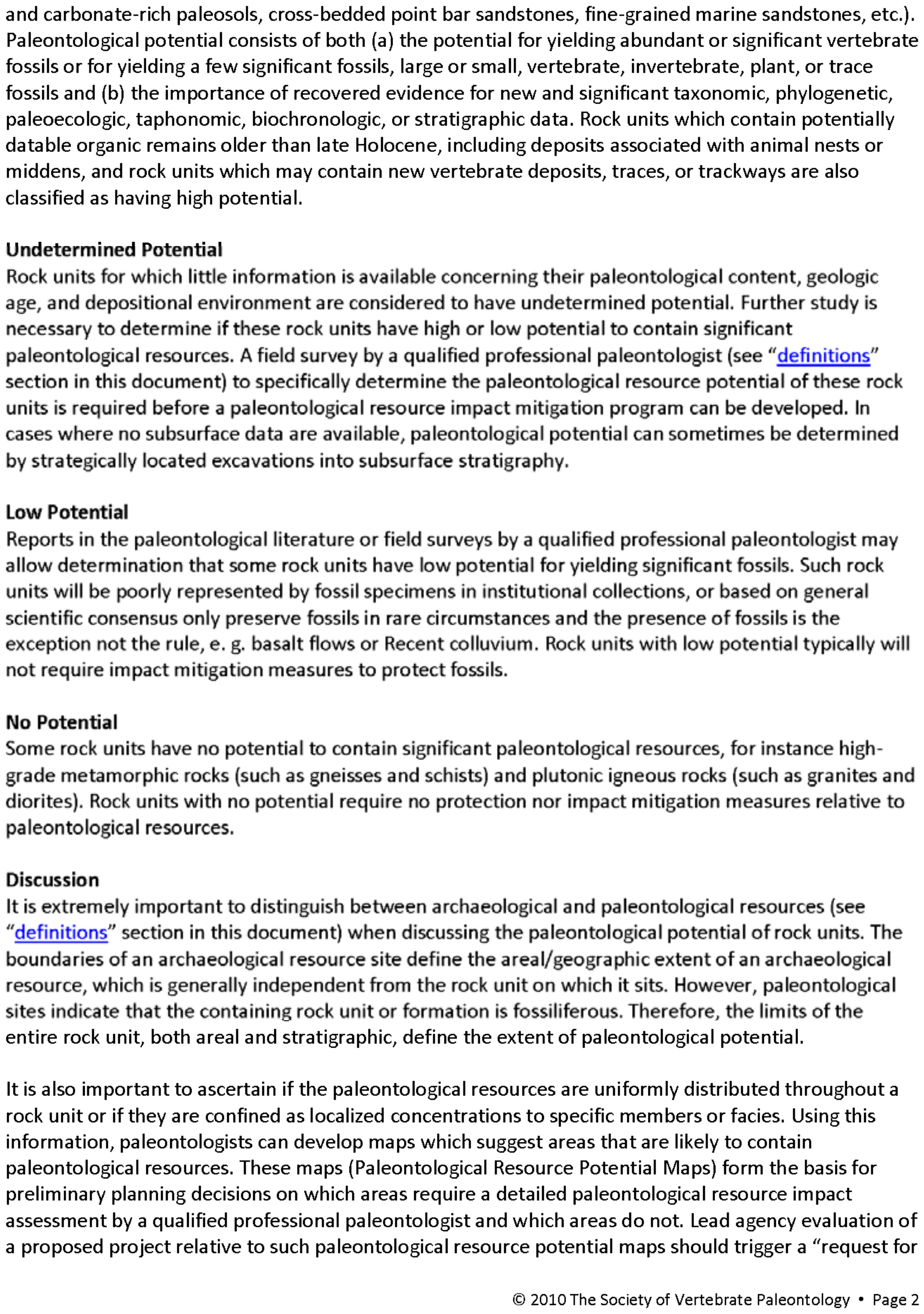
Fossils are nonrenewable paleontological resources that are afforded protection by federal, state, and local environmental laws and regulations. The Paleontological Resources Preservation Act (PRPA) of 2009 calls for uniform policies and standards that apply to fossils on all federal public lands. All federal land management agencies are required to develop regulations that satisfy the stipulations of the PRPA. Section 6302 of the PRPA mandates that federal agencies "*shall manage and protect paleontological resources on Federal land using scientific principles and expertise.*" Thus, federal agencies need the help of the professional paleontological community in the formulation and implementation of these PRPA-mandated policies and regulations. The potential for destruction or degradation of paleontological resources on both public and private lands selected for development under the jurisdiction of various governmental planning agencies is recognized. The standard procedures below are intended to be applicable to both private and public lands under the jurisdiction of local, city, county, regional, state, and federal agencies. Protection of paleontological resources includes: (a) assessment of the potential for land to contain significant paleontological resources which could be directly or indirectly impacted, damaged, or destroyed by proposed development and (b) formulation and implementation of measures to mitigate these adverse impacts, including permanent preservation of the site and/or permanent preservation of salvaged fossils along with all contextual data in established institutions.

Assessment of the Paleontological Potential of Rock Units

Rock units are described as having (a) high, (b) undetermined, (c) low, or (d) no potential for containing significant paleontological resources.

High Potential

Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Rocks units classified as having high potential for producing paleontological resources include, but are not limited to, sedimentary formations and some volcaniclastic formations (e. g., ashes or tephras), and some low-grade metamorphic rocks which contain significant paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils (e. g., middle Holocene and older, fine-grained fluvial sandstones, argillaceous



and carbonate-rich paleosols, cross-bedded point bar sandstones, fine-grained marine sandstones, etc.). Paleontological potential consists of both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, plant, or trace fossils and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data. Rock units which contain potentially datable organic remains older than late Holocene, including deposits associated with animal nests or middens, and rock units which may contain new vertebrate deposits, traces, or trackways are also classified as having high potential.

Undetermined Potential

Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources. A field survey by a qualified professional paleontologist (see "definitions" section in this document) to specifically determine the paleontological resource potential of these rock units is required before a paleontological resource impact mitigation program can be developed. In cases where no subsurface data are available, paleontological potential can sometimes be determined by strategically located excavations into subsurface stratigraphy.

Low Potential

Reports in the paleontological literature or field surveys by a qualified professional paleontologist may allow determination that some rock units have low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections, or based on general scientific consensus only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule, e. g. basalt flows or Recent colluvium. Rock units with low potential typically will not require impact mitigation measures to protect fossils.

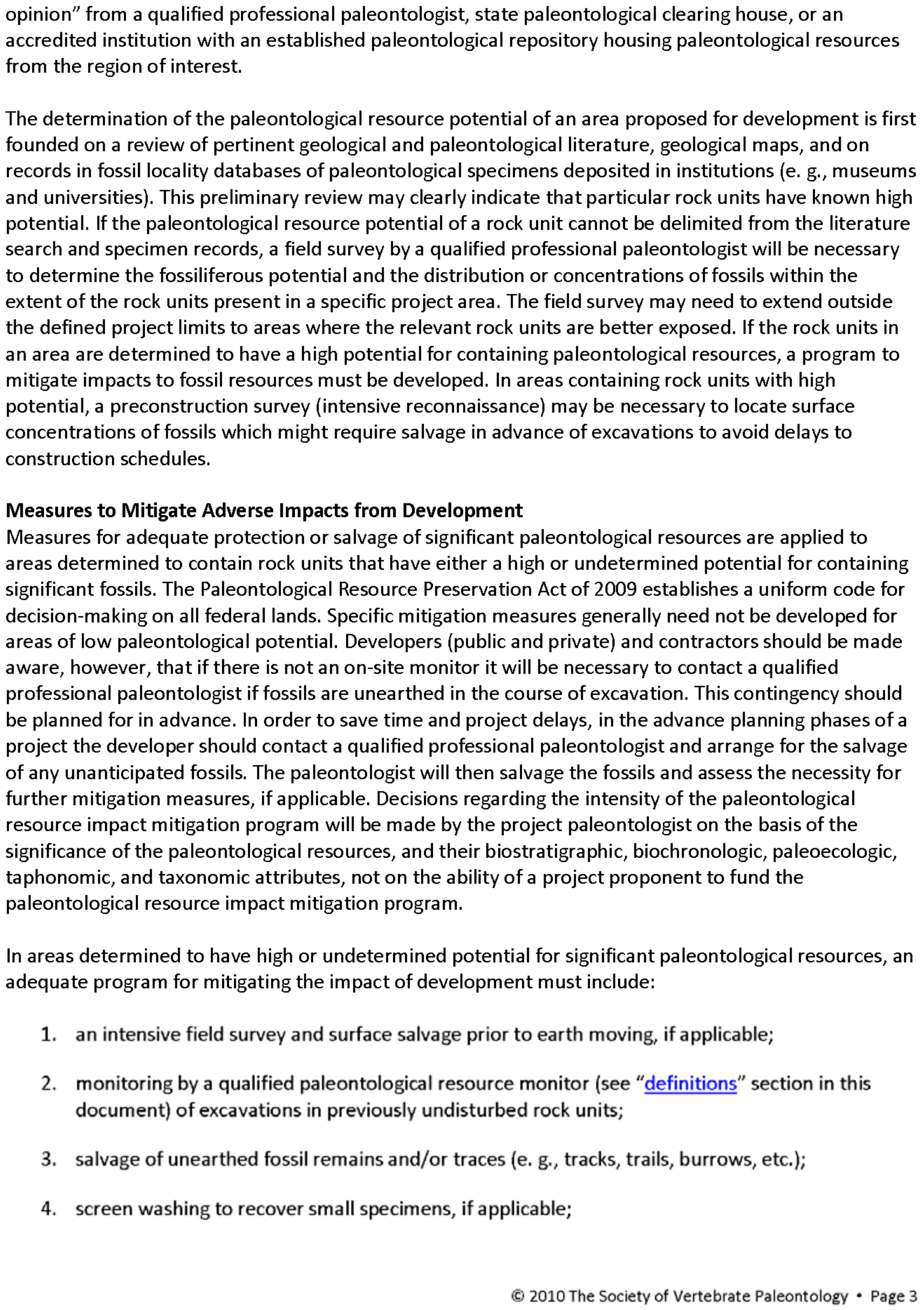
No Potential

Some rock units have no potential to contain significant paleontological resources, for instance high-grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites). Rock units with no potential require no protection nor impact mitigation measures relative to paleontological resources.

Discussion

It is extremely important to distinguish between archaeological and paleontological resources (see "definitions" section in this document) when discussing the paleontological potential of rock units. The boundaries of an archaeological resource site define the areal/geographic extent of an archaeological resource, which is generally independent from the rock unit on which it sits. However, paleontological sites indicate that the containing rock unit or formation is fossiliferous. Therefore, the limits of the entire rock unit, both areal and stratigraphic, define the extent of paleontological potential.

It is also important to ascertain if the paleontological resources are uniformly distributed throughout a rock unit or if they are confined as localized concentrations to specific members or facies. Using this information, paleontologists can develop maps which suggest areas that are likely to contain paleontological resources. These maps (Paleontological Resource Potential Maps) form the basis for preliminary planning decisions on which areas require a detailed paleontological resource impact assessment by a qualified professional paleontologist and which areas do not. Lead agency evaluation of a proposed project relative to such paleontological resource potential maps should trigger a "request for



opinion" from a qualified professional paleontologist, state paleontological clearing house, or an accredited institution with an established paleontological repository housing paleontological resources from the region of interest.

The determination of the paleontological resource potential of an area proposed for development is first founded on a review of pertinent geological and paleontological literature, geological maps, and on records in fossil locality databases of paleontological specimens deposited in institutions (e. g., museums and universities). This preliminary review may clearly indicate that particular rock units have known high potential. If the paleontological resource potential of a rock unit cannot be delimited from the literature search and specimen records, a field survey by a qualified professional paleontologist will be necessary to determine the fossiliferous potential and the distribution or concentrations of fossils within the extent of the rock units present in a specific project area. The field survey may need to extend outside the defined project limits to areas where the relevant rock units are better exposed. If the rock units in an area are determined to have a high potential for containing paleontological resources, a program to mitigate impacts to fossil resources must be developed. In areas containing rock units with high potential, a preconstruction survey (intensive reconnaissance) may be necessary to locate surface concentrations of fossils which might require salvage in advance of excavations to avoid delays to construction schedules.

Measures to Mitigate Adverse Impacts from Development

Measures for adequate protection or salvage of significant paleontological resources are applied to areas determined to contain rock units that have either a high or undetermined potential for containing significant fossils. The Paleontological Resource Preservation Act of 2009 establishes a uniform code for decision-making on all federal lands. Specific mitigation measures generally need not be developed for areas of low paleontological potential. Developers (public and private) and contractors should be made aware, however, that if there is not an on-site monitor it will be necessary to contact a qualified professional paleontologist if fossils are unearthed in the course of excavation. This contingency should be planned for in advance. In order to save time and project delays, in the advance planning phases of a project the developer should contact a qualified professional paleontologist and arrange for the salvage of any unanticipated fossils. The paleontologist will then salvage the fossils and assess the necessity for further mitigation measures, if applicable. Decisions regarding the intensity of the paleontological resource impact mitigation program will be made by the project paleontologist on the basis of the significance of the paleontological resources, and their biostratigraphic, biochronologic, paleoecologic, taphonomic, and taxonomic attributes, not on the ability of a project proponent to fund the paleontological resource impact mitigation program.

In areas determined to have high or undetermined potential for significant paleontological resources, an adequate program for mitigating the impact of development must include:

1. an intensive field survey and surface salvage prior to earth moving, if applicable;
2. monitoring by a qualified paleontological resource monitor (see "definitions" section in this document) of excavations in previously undisturbed rock units;
3. salvage of unearthed fossil remains and/or traces (e. g., tracks, trails, burrows, etc.);
4. screen washing to recover small specimens, if applicable;

5. preparation of salvaged fossils to a point of being ready for curation (i. e., removal of enclosing matrix, stabilization and repair of specimens, and construction of reinforced support cradles where appropriate);

6. identification, cataloging, curation, and provision for repository storage of prepared fossil specimens; and

7. a final report of the finds and their significance.

All phases of mitigation must be supervised by a qualified professional paleontologist who maintains the necessary paleontological collecting permits and repository agreements. All field teams will be supervised by a paleontologist qualified to deal with the significant resources that might be encountered. The lead agency must assure compliance with the measures developed to mitigate impacts of excavation. To assure compliance at the start of the project, a statement that confirms the site's paleontological potential, confirms the repository agreement with an established public institution, and describes the program for impact mitigation, must be deposited with the lead agency and contractor(s) before any ground disturbance begins. In many cases, it will be necessary to conduct a salvage program prior to grading to prevent damage to known paleontological resources and to avoid delays to construction schedules. The impact mitigation program must include preparation, identification, cataloging, and curation of any salvaged specimens. All field notes, photographs, stratigraphic sections, and other data associated with the recovery of the specimens must be deposited with the institution receiving the specimens. Since it is not professionally acceptable to salvage specimens without preparation and curation of specimens and associated data, costs for this phase of the program must be included in the project budget. The mitigation program must be reviewed and accepted by the lead agency. If a mitigation program is initiated early during the course of project planning, construction delays due to paleontological salvage activities can be minimized or even completely avoided.

Standard Procedures

These standard procedures for paleontological resource impact assessment and mitigation are designed to apply to areas containing rock units with high, low, and undetermined paleontological resource potential.

Assessment before Construction Starts

An adequate preconstruction paleontological resource impact assessment is the key to developing an adequate paleontological resource impact mitigation program. Only a professional paleontologist is qualified to prepare a paleontological resource impact assessment. An adequate assessment of potential impacts typically includes all the following elements:

1. Literature Search—A review of the pertinent paleontological, geological, geotechnical, and environmental literature provides an information baseline for evaluating the extent of previous paleontological work in an area. Such a review also provides a fundamental basis for formulating mitigation plans and for understanding the significance of paleontological resources. The preconstruction assessment should also include examination of geotechnical reports, borehole logs, and geologic cross sections to address whether project excavations will impact rock units with high potential.

2. Records Search—A review of institutional localities and specimen records provides a means for determining the extent of previous fieldwork and fossil recovery in, and adjacent to, an area of interest. This task can be accomplished either by sending a written request for information to the relevant institution(s) or visiting the institution to review the records directly. A simple, on-line search of an institution's records is often incomplete and inadequate for determining the number and extent of known fossil localities in an area.

3. Consultation with Others—The preconstruction assessment should include consultation with geologists and paleontologists knowledgeable about the paleontological resource potential of rock units present in the vicinity of the proposed project.

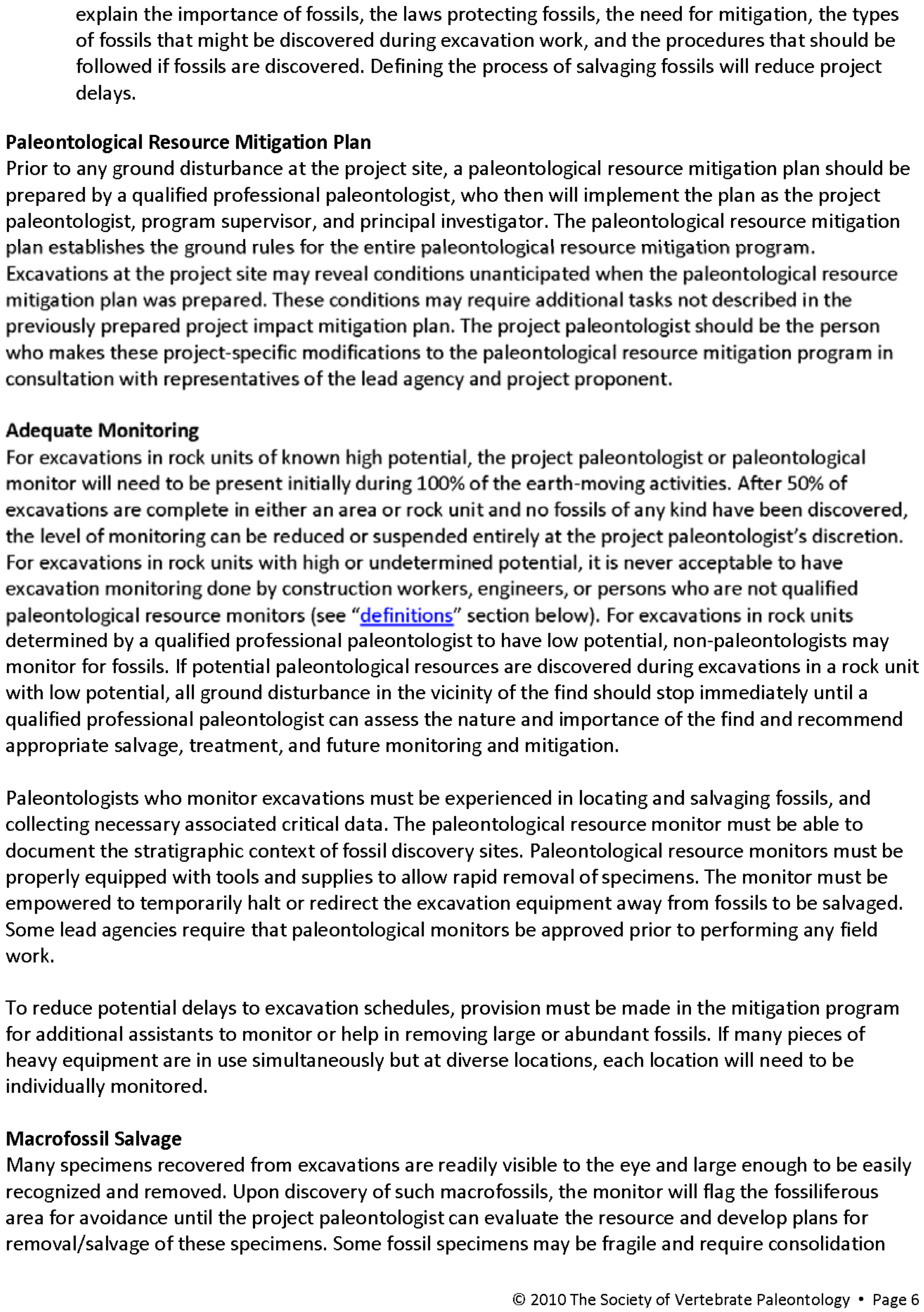
4. Field Survey—The assessment should include a field survey by a qualified professional paleontologist and approved staff, as needed, to determine the paleontological potential of each rock unit, to re-examine any known fossil localities on or near the project, to search for unknown fossil localities, and to delimit the specific boundaries of rock units within the project area.

5. Reports—A paleontological resource impact assessment report and a project-specific paleontological resource impact mitigation program should be prepared based upon data gathered during the assessment.

6. Agency Confirmation—Prior to ground disturbance, the lead agency should review the paleontological resource impact assessment and proposed mitigation program to determine the adequacy of the proposed program.

7. Repository Agreement—The project paleontologist should have a repository agreement arranged prior to the start of earth-moving for the project.

8. Pre-excavation meetings—The project paleontologist should hold pre-excavation meetings with representatives of the lead agency, the developer or project proponent, and contractors to



explain the importance of fossils, the laws protecting fossils, the need for mitigation, the types of fossils that might be discovered during excavation work, and the procedures that should be followed if fossils are discovered. Defining the process of salvaging fossils will reduce project delays.

Paleontological Resource Mitigation Plan

Prior to any ground disturbance at the project site, a paleontological resource mitigation plan should be prepared by a qualified professional paleontologist, who then will implement the plan as the project paleontologist, program supervisor, and principal investigator. The paleontological resource mitigation plan establishes the ground rules for the entire paleontological resource mitigation program. Excavations at the project site may reveal conditions unanticipated when the paleontological resource mitigation plan was prepared. These conditions may require additional tasks not described in the previously prepared project impact mitigation plan. The project paleontologist should be the person who makes these project-specific modifications to the paleontological resource mitigation program in consultation with representatives of the lead agency and project proponent.

Adequate Monitoring

For excavations in rock units of known high potential, the project paleontologist or paleontological monitor will need to be present initially during 100% of the earth-moving activities. After 50% of excavations are complete in either an area or rock unit and no fossils of any kind have been discovered, the level of monitoring can be reduced or suspended entirely at the project paleontologist's discretion. For excavations in rock units with high or undetermined potential, it is never acceptable to have excavation monitoring done by construction workers, engineers, or persons who are not qualified paleontological resource monitors (see "definitions" section below). For excavations in rock units determined by a qualified professional paleontologist to have low potential, non-paleontologists may monitor for fossils. If potential paleontological resources are discovered during excavations in a rock unit with low potential, all ground disturbance in the vicinity of the find should stop immediately until a qualified professional paleontologist can assess the nature and importance of the find and recommend appropriate salvage, treatment, and future monitoring and mitigation.

Paleontologists who monitor excavations must be experienced in locating and salvaging fossils, and collecting necessary associated critical data. The paleontological resource monitor must be able to document the stratigraphic context of fossil discovery sites. Paleontological resource monitors must be properly equipped with tools and supplies to allow rapid removal of specimens. The monitor must be empowered to temporarily halt or redirect the excavation equipment away from fossils to be salvaged. Some lead agencies require that paleontological monitors be approved prior to performing any field work.

To reduce potential delays to excavation schedules, provision must be made in the mitigation program for additional assistants to monitor or help in removing large or abundant fossils. If many pieces of heavy equipment are in use simultaneously but at diverse locations, each location will need to be individually monitored.

Macrofossil Salvage

Many specimens recovered from excavations are readily visible to the eye and large enough to be easily recognized and removed. Upon discovery of such macrofossils, the monitor will flag the fossiliferous area for avoidance until the project paleontologist can evaluate the resource and develop plans for removal/salvage of these specimens. Some fossil specimens may be fragile and require consolidation with archival quality media (e. g., Acryloid, Butvar, or Vinac) before moving. Others may require protection by encasing them within a plaster jacket before removal to a laboratory for later preparation and conservation. Occasionally specimens encompass all or much of a skeleton and will require moving either as a whole or in multiple blocks for later preparation. Such specimens require time to excavate and strengthen with a hardening solution before removal and the patience and understanding of the contractor to recover the specimens properly. It is thus important that contractors and developers are fully aware of the importance and fragility of fossils for their recovery to be undertaken with the optimum chances of successful extraction.

Avoidance and Site Protection

In exceptional instances the process of preconstruction assessment or construction monitoring itself may reveal a fossil occurrence of such importance that salvage or removal is unacceptable to all concerned parties. In such cases, the project design may need to be modified to avoid, protect and/or exhibit the fossil occurrence, e. g., in the floor or wall of a museum or as a basement exhibit in a mall. Under such circumstances, the site may be declared and dedicated as a protected resource of public value. Associated fossil fragments salvaged from such a site should be placed in an approved institutional repository. Federal land managers have the ability to set aside such exceptional areas providing documentation supports special management considerations.

Microfossil Salvage

Many significant vertebrate fossils (e. g., small mammal, bird, reptile, amphibian, or fish remains) are too small to be readily visible within the sedimentary matrix and are referred to as "microvertebrates". Small fossils also include non-vertebrate paleoenvironmental indicators (e. g., foraminifers, small gastropods, and plant seeds). Fine-grained sedimentary horizons (e. g., mudstones and paleosols) most often contain such fossils, which are typically recovered through a process of bulk matrix sampling followed by screen washing through 20 and/or 30 mesh screens. If indicators of potential microvertebrate fossils are found (e. g., plant debris, abundant mollusks, clay clasts, carbonate-rich paleosols, or mudstones) screening of a "test sample" (0.4 cubic yard/meter, ~600 lbs) may produce significant returns and indicate whether or not a larger sample needs to be screen washed. An adequate sample (standard sample) consists of approximately 4.0 cubic yards/meters (6,000 lbs or 2,500 kg) of matrix from each site, horizon, or paleosol. However, the uniqueness of the microvertebrate fossils recovered may justify screen washing even larger amounts. With this possibility in mind, two standard samples (~8.0 cubic yards/meters) or more as determined by the project paleontologist should be collected when the discovery is first made and set aside in case processing of a larger sample is later determined to be necessary. The developer must recognize that funding must be available to process these bulk matrix samples, thereby reducing volume to facilitate cost-effective storage of fossil specimens.

To avoid construction delays, samples of matrix may need to be removed from the project site and processed elsewhere. Chemicals (e. g., detergents, weak acids, orange oil, etc.) may be necessary to facilitate the breakdown of matrix. In some cases the concentrate will need to be further processed using heavy liquids (e. g., zinc bromide, polytungstate, or tetrabromide) to remove mineral grains and create a concentrate enriched with microvertebrate bones and teeth. The concentrate should be directly examined under a microscope to locate and remove individual microfossils.

Samples

To place fossils within a temporal context, dating of rock units may be necessary. If available, samples of volcanic ash and organic carbon should be collected for radiometric and/or thermoluminescence dating.

When appropriate, oriented samples should also be collected for paleomagnetic analysis. In addition, samples of fine-grained matrices should be collected from measured stratigraphic sections for microfossil (e. g., pollen, spores, dinoflagellates, ostracodes, diatoms, foraminifers, etc.) analyses. Other matrix samples may need to be collected and retained with the samples submitted to the repository institution for future analysis, for clast source analysis, or as witness to the source rock unit and possibly for procedures not yet envisioned. The project paleontologist should determine which of these samples should be immediately processed and which samples can be stored for later processing. Many museums will not accept such rock or sediment samples for curation and storage.

Preparation

Salvaged specimens must be prepared for identification and curation (not exhibition). This means removal of all or most of the enclosing sediment to reduce the specimen volume, increase surface area for the application of consolidants/preservatives, provide repairs and stabilization of fragile/damaged areas on a specimen, and allow identification of the fossils. Large specimens may require construction of reinforced plaster or fiberglass cradles. Removal of excess matrix from macrofossils during the preparation process will facilitate identification, reduce storage space, and reduce the cost of storage. Project paleontologists need to be aware that many museums will not accept specimens that are not fully prepared for permanent curation.

Identification and Cataloging

Specimens must be identified by competent qualified paleontological specialists to the lowest taxonomic level possible. Ideally, identification of individual specimens will be to genus and species and to skeletal element. Specimens must be cataloged and a complete list of specimens to be accessioned into the collections must be prepared for the curator of the repository institution. Batch identification and batch numbering (e. g., “mammals, 75 specimens”) is unacceptable.

Analysis

Although academic research questions should dictate the field methods and types of data recorded, the overall goal of a paleontological resource mitigation program is not to conduct research but rather to discover and salvage significant fossil remains, record relevant stratigraphic and taphonomic data, and curate and permanently house the salvaged fossil remains for future study. However, before salvaged specimens are curated, either the project paleontologist or a competent qualified paleontological specialist should determine the significance and importance of the salvaged specimens and this information should be included in the final report.

Storage

Adequate curation and storage of salvaged specimens in an approved repository institution is an essential goal of the paleontological mitigation program. Adequate storage must include curation of individual specimens into the collections of a recognized, not-for-profit repository with a permanent curator, such as a museum or a university (institution). A complete set of GPS data, field notes, photographs, locality forms, and stratigraphic sections must accompany the fossil collections. Specimens must be stored in a fashion that allows retrieval of specific, individual specimens by future researchers.

Specific requirements of the designated repository must be established prior to the start of the project, field salvage work, and laboratory analysis. Adequate advance notice of funds required by the repository for curation is needed for the benefit of project funding. Costs of the project should cover the necessary curatorial supplies such as, but not limited to, trays, vials, foam, and storage cabinets or shelves to provide for the appropriate curation of the specimens.

Reporting

1) Interim report
At the close of the excavation phase of a project, an interim report should be prepared. This interim report should summarize exceptional fossil discoveries, note areas where monitoring occurred and fossils were collected, and list tasks remaining for preparation, identification, and curation of the salvaged specimens. In the interim report, the preconstruction repository agreement should be appended and any additional repository considerations and costs should be described.

2) Final report
After preparation, identification, analysis of significance, and curatorial inventory of the salvaged specimens is complete, a final report must be prepared by the project paleontologist including a summary of the field and laboratory methods, site geology and stratigraphy, faunal/floral list(s), and a brief statement of the significance and relationship of the fossils discovered to similar fossils found elsewhere The final report should emphasize the discovery of any new or rare taxa, or paleoecological or taphonomic significance. A complete set of field notes, geologic maps, stratigraphic sections, and a list of identified specimens must be included in or accompany the final report. This report should be finalized only after all aspects of the mitigation program are completed, including preparation, identification, cataloging, and curatorial inventory.

The final report (with any accompanying documents) and repository curation of specimens and samples constitute the goals of a successful paleontological resource mitigation program. Full copies of the final report should be deposited with both the lead agency and the repository institution with the request that all locality data remain confidential and not made available to the general public.

Compliance
From the beginning of the project, the lead agency should assure compliance with measures to protect fossil resources by:

1. requesting during initial planning phases an assessment and program for impact mitigation that is consistent with these SVP Standard Procedures;
2. ensuring the adequacy of the proposed mitigation measures;
3. acknowledging arrangements for salvaged specimens to be permanently housed in an institutional paleontological repository;
4. ensuring that the paleontological resource mitigation program is supervised by a qualified professional paleontologist;
5. ensuring that all monitoring for paleontological resources is performed by qualified paleontological resource monitors;
6. inspecting the monitoring program in the field periodically during project construction;
7. ensuring that specimens are prepared, identified, cataloged, and properly curated;
8. requiring an interim and final report before issuing final occupancy permits or equivalent documents; and

9. ensuring that the final report is complete and adequately describes the methods and results of the mitigation program.

The project paleontologist should be responsible for:

1. assessing potential impacts to paleontological resources and developing a program for impact mitigation during initial planning phases;

2. obtaining a repository agreement, and ensuring repository acceptance of specimens;

3. ensuring implementation of the mitigation measures; and

4. preparing the interim and final reports.

Acceptance of the final report by the lead agency signifies completion of the program of mitigation for the project. Review and approval of the final report by a qualified professional paleontologist designated by the lead agency will determine the effectiveness of the program and adequacy of the report. Inadequate performances in either area comprise noncompliance, and may result in the lead agency removing the project paleontologist from its list of qualified professional paleontological consultants.

Definitions

A QUALIFIED PROFESSIONAL PALEONTOLOGIST (Principal Investigator, Project Paleontologist) is a practicing scientist who is recognized in the paleontological community as a professional and can demonstrate familiarity and proficiency with paleontology in a stratigraphic context. A paleontological Principal Investigator shall have the equivalent of the following qualifications:
1. A graduate degree in paleontology or geology, and/or a publication record in peer reviewed journals; and demonstrated competence in field techniques, preparation, identification, curation, and reporting in the state or geologic province in which the project occurs. An advanced degree is less important than demonstrated competence and regional experience.
2. At least two full years professional experience as assistant to a Project Paleontologist with administration and project management experience; supported by a list of projects and referral contacts.
3. Proficiency in recognizing fossils in the field and determining their significance.
4. Expertise in local geology, stratigraphy, and biostratigraphy.
5. Experience collecting vertebrate fossils in the field.

PALEONTOLOGICAL RESOURCE MONITORS shall have the equivalent of the following qualifications:
1. BS or BA degree in geology or paleontology and one year experience monitoring in the state or geologic province of the specific project. An associate degree and/or demonstrated experience showing ability to recognize fossils in a biostratigraphic context and recover vertebrate fossils in the field may be substituted for a degree. An undergraduate degree in geology or paleontology is preferable, but is less important than documented experience performing paleontological monitoring, or
2. AS or AA in geology, paleontology, or biology and demonstrated two years experience collecting and salvaging fossil materials in the state or geologic province of the specific project, or
3. Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in the state or geologic province of the specific project.

4. Monitors must demonstrate proficiency in recognizing various types of fossils, in collection methods, and in other paleontological field techniques.

ASSOCIATED CRITICAL DATA includes adequate field notes, sketches of stratigraphic sections, geologic maps, and site and specimen photos. Associated critical data may also include samples of organic carbon and volcanic ash for radiometric dating, oriented samples for paleomagnetic analysis, samples for microfossil analysis, and samples for determining the sediment source.

A **PALEONTOLOGICAL REPOSITORY** is a not-for-profit museum or university approved by the lead agency and employing a permanent curator responsible for paleontological records and specimens. Such an institution assigns accession, locality, and/or catalog numbers to individual specimens that are stored and conserved to ensure their preservation under adequate security against theft, loss, damage, fire, pests, and adverse climate conditions. Specimens will be stored in a stable environment away from flammable liquids, corrosive chemicals, organic materials subject to mildew, and sources of potential water damage. Specimens must have all modifications, preparation techniques, etc. documented and linked with the specimen. The repository will also archive lists of collected specimens, and any associated field notes, maps, photographs, diagrams, or other data. The repository must have procedures for tracking specimens removed from storage for study, preparation, exhibit, or loan. The repository must make its collections of cataloged specimens available for study by qualified researchers.

ARCHAEOLOGICAL RESOURCES are human remains and items or artifacts associated with human cultures. If paleontological resources are determined to be in close stratigraphic association with human remains or human manufactured items, or if fossils can be demonstrated to be intentionally modified by humans, they are also considered archaeological resources.

SIGNIFICANT PALEONTOLOGICAL RESOURCES are fossils and fossiliferous deposits, here defined as consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i. e., older than about 5,000 radiocarbon years).

A **LEAD AGENCY** is the agency responsible for addressing impacts to resources that a specific project might cause, and for ensuring compliance with approved mitigation measures.

PALEONTOLOGICAL POTENTIAL is the potential for the presence of significant paleontological resources. All sedimentary rocks, some volcanic rocks, and some low-grade metamorphic rocks have potential to yield significant paleontological resources. Paleontological potential is determined only after a field survey of a rock unit in conjunction with a review of available literature and relevant paleontological locality records.

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APPENDIX E

RESUMES OF KEY PERSONNEL

Resume of

ROBERT E. REYNOLDS

Senior Vertebrate Paleontologist

Mr. Reynolds was Curator of Earth Science at the San Bernardino County Museum for 32 years. During that time he amassed collections of more than two million paleontological specimens from inland California stratigraphic sections, primarily in the Mojave Desert. Mr. Reynolds developed the Paleontologic Resource Guidelines for San Bernardino County, and sat on the Environmental Review Committee. He developed the initial (1985) Paleontological Resources Sensitivity Map for the County of San Bernardino. He also started and managed the Museum's Paleontological Resource Assessment Program for 18 years. Mr. Reynolds was chair of the Society of Vertebrate Paleontology's committee for Conformable Paleontological Resource Impact Mitigation between 1993 – 1996, which developed the guidelines that San Bernardino County has adopted and modified for local use.

Selected paleontological resource assessment and salvage projects in the Mojave Desert include the Intermountain Power Project (1978), All American Pipeline, Blythe to Ventura, (1985), Kern River Pipeline, Mesquite, Nevada via Barstow to Santa Barbara, (1990, 2003), Solar I (1981) and Luz Solar at Daggett (1984), Luz Solar at Kramer III-VII (1986) and Harper Lake VIII (1989), 37 commercial and residential assessments and salvages in the Helendale – Victorville - Hesperia area (1986-2008), and seven projects in Cajon Pass including the BNSF Triple Track Project (2007-2008). Mr. Reynolds worked for LSA Associates, Inc. in Riverside as Senior Paleontologist/Associate for 10 years bringing his professional work in the field of paleontology to 42 years. He has been involved with paleontological resources assessment reports for a number of specific plans in Riverside County, including the Riverside County Integrated Plan (RCIP – 1999-2003).

Selected Project Experience

Paleontological Resources Salvage for the SCE El Casco Substation
San Timoteo Canyon, west of Banning
Riverside County, California
Southern California Edison (SCE) new El Casco Substation required paleontological resource monitoring during construction excavation that lasted 13 months, from 2009-2010. Approximately 168 localities recovered produced 16,000 vertebrate, invertebrate and plant fossils consisting of more than 50 diagnostic taxa. The high number of taxa make this one of the most important early Pleistocene - Early Irvingtonian North American Land mammal Age faunas in California. The abundance of field localities and size of the collection involved extensive amounts of data management.

Needles Highway Improvement Project, San Bernardino County, CA., Caltrans District 8, FPN: STPL 5954 (085)
The Needles Highway Improvement Project (NHIP) consists of improvements to roadways that run northward from Needles, California, to Laughlin, Nevada, providing access to recreational areas between the two cities. The study focused only on Bureau of Land Management (BLM) land and private lands in California. The proposed alignments will cross sediments with potential to contain significant nonrenewable paleontological resources as defined by the California Environmental Quality Act (CEQA), the National Environmental Policy Act (NEPA), and guidelines of the BLM and County of San Bernardino which conform to recommendations of the Society of Vertebrate Paleontology (SVP). Published literature and records searches indicate that improvements will encounter sediments dating from the late Miocene (5 Ma) to the late Pleistocene (10 Ka) with potential to contain significant nonrenewable paleontological resources. Recommendations to reduce construction impacts to nonrenewable paleontological resources were proposed.

Alta East Wind Project, Horned Toad Hills, Mojave, Kern County, CA., BLM Permit No. CA-08-00-008P (Exp. 8/2011)
CH2M HILL, Inc., requested a paleontological resources assessment for the Alta East Wind Project northwest of the City of Mojave in southeastern Kern County, California. The project includes developing pads for wind generation turbines, turbine access and service roads, management facilities, and a transmission line running from the center of the project south to connect with an existing distribution grid.

The study area includes five sections of land that contain sediments that have potential for paleontological resources. The early Pliocene Horned Toad Formation contains the late Hemphillian Warren Local Fauna, with 24 fossil mammalian taxa. The literature review identified 34 fossil localities in the Horned Toad Formation, 12 of which were verified within project boundaries. The field survey located an additional 69 localities within project boundaries. Because of the potential for direct impacts to all paleontological resource localities, mitigation procedures are summarized. A project-specific paleontological resources impact mitigation program (PRIMP), including fossil salvage by qualified paleontologists, was recommended to accompany development of this project

Paleontological Resources Monitoring Program, Equilon Pipeline, McKittrick to Fellows
Kern County, California
RAM Environmental Engineering Services retained LSA to provide paleontological resource monitoring during excavation of the 33-mile pipeline between McKittrick and Fellows in Kern County. This paleontological resource excavation monitoring program recovered 61 fossil specimens from six localities along the right-of-way. Depending on locality, the fossils ranged from Pliocene to Pleistocene in age.

Paleontological Resources Assessment and Evaluation for the Barren Hills Geothermal Project
Lyon County, Nevada
Sierra Geothermal Power, Inc. proposed construction of the Barren Hills Geothermal Project in the Pine Grove Hills south of Yerington in Lyon County, west central Nevada. The paleontological resources study included proposed geotechnical studies along a series of proposed access roads from southern Mason Valley into the Pine Grove Hills. These roads provide access to proposed drill pads and well site reflection seismic lines. Also proposed are four magnetotelluric (geophysical) lines running east-west and north-south across the study area.

The study area included 18 sections of land and 40 miles of project routes. Project disturbances included vehicular travel within the road corridors, clearing of drill pads, cross-country vehicular placement, and coil burial of the geophysical lines. The U.S. Forest Service (USFS), Bridgeport District, recognized nonrenewable paleontological resources on the project situated on BLM holdings or on the Humboldt–Toiyabe National Forest. The report was prepared under BLM permit number N-82319 (Exp. 9/10). Fieldwork and report writing for the project was accomplished in fall and winter months of 2008. An impact mitigation program was prepared for all phases of the project.

Paleontological Resources Assessment for the Ely Energy Center Project in Eastern Nevada
Eastern Nevada Counties
Nevada Power Company and Sierra Pacific Power Company proposed construction of the Ely Energy Center in northeastern Nevada. The project included power plants, substations, utilities, and rail lines proposed for Elko, White Pine, Lincoln, and Clark Counties. Power plant sites north of Ely are 6,000 acres in size. The report (BLM Report No. 8270 (NV040) 2007-1) was prepared under BLM Permit No. N-82319 (Exp. 9/07). Fieldwork and report writing for the project was accomplished in fall, winter, and spring months of 2006–2007. An excavation impact mitigation program was prepared for all phases of the project.

Paleontological Monitoring, Kern River Pipeline Expansion
Wyoming, Utah, Nevada, and California
LSA contracted with Ecology and Environment, Inc. (E&E) to provide field assistance with paleontological monitoring and excavation needs on the Kern River Pipeline Expansion 2003 project in Wyoming, Utah, Nevada, and California. Mr. Reynolds managed and coordinated all the paleontological needs for project. LSA assisted E&E with the preparation and implementation of paleontological guidelines based on BLM of Wyoming, Nevada, and California rules and regulations. LSA provided paleontological awareness training for all Nevada and California construction crews. Agency requirements indicated excavation monitoring on Federal Lands was required in Wyoming, Nevada, and California, states where LSA provided experienced paleontological monitors. Monitors (as many as 10 concurrently) worked six, and sometimes seven days a week, often in dusty, inclement, and freezing weather. LSA paleontological staff was required to be in compliance with safety and environmental laws and agency conditions that were in effect. The five-month field project required managing paleontological resources at and recovered from 42 localities, some of which produced hundreds of fossil specimens.

Paleontological Resources Literature Review for the Oak Valley Reconductor Line
San Timoteo Canyon to Banning
Riverside County, California
Southern California Edison (SCE) proposed transmission line upgrades and the new El Casco Substation for the 22-

mile Oak Valley Reconductor line. The proposed reconductor right-of-way runs from central San Timoteo Canyon east to the center of the town of Banning. A literature review and records search in 2005 determined that the project area contained two fossiliferous sedimentary formations, the Plio-Pleistocene San Timoteo Formation and late Pleistocene alluvial terrace deposits that overlie the San Timoteo Formation. Twenty-three vertebrate fossil localities near the proposed line contain significant and diverse assemblages of small and large fossil mammals including mastodon, horse, and camel. Mr. Reynolds conducted excavation monitoring during construction in 2009.

Paleontological Records Search and Field Survey for the Chuckwalla Solar Energy Project
Desert Center, Riverside County, California
LSA conducted a paleontological resource records search and field survey for the proposed 3,800-acre Chuckwalla Solar Energy project, located east of Desert Center in north-central Riverside County, California. This project is north of the Chuckwalla Mountains and south of the Palen Mountains. LSA located Pleistocene sediments with the potential to contain paleontological resources.

Paleontological Resource Monitoring for Infrastructure Improvements, PRA-BADL 10(2), Badlands Loop Road
Pennington and Jackson Counties, South Dakota
LSA provided paleontological resources monitoring during landslide stabilization and construction of roads, sewer ponds, and visitor facilities for eight months that spanned summer and winter conditions in South Dakota. This project involved a minimum of four field monitors working 12-hour days. The program salvaged 424 fossil specimens of large mammals and rodents from 65 localities that were recovered from Oligocene and Pleistocene sediments. This is one of the more successful paleontological recovery programs in a National Park.

Paleontological Literature Review and Field Survey for the Badlands Landfill Expansion
Riverside County, California
Riverside County Waste Management Department proposed Badlands Landfill Expansion, and a paleontological literature review and field survey to consider impacts to paleontological resources. LSA conducted a field survey of the proposed 80-acre project and recommended project-specific measures to mitigate impacts to significant, nonrenewable paleontological resources.

Paleontological Resources Assessment, Mid County Parkway, Corona to San Jacinto
Riverside County Transportation and Land Management Services
Western Riverside County, California
LSA provided the paleontological resources assessment PIR/PER for the master-planned 32 miles of alternate routes. This paleontological resources assessment program literature search located 176 fossil localities in the 15 sedimentary formations crossed by the project. The environmental documents were prepared to meet Caltrans format for a PIR, PER, and PMP, and took 3.5 years to prepare. Applicable legislation was analyzed and programs for mitigation of impacts to significant, nonrenewable paleontological resources were prepared.

Paleontological Resources Assessment PIR/PER for the SR-91 Corridor Improvements Project
California Department of Transportation Districts 8 and 12
Cities of Anaheim, Yorba Linda, Corona, Norco, and Riverside
Counties of Orange and Riverside, California
LSA provided the paleontological resources assessment PIR/PER for 12 miles of improvements under consideration for the SR-91 Corridor Improvements Project in eastern Orange and western Riverside Counties. This paleontological resources assessment program literature search located 38 fossil localities in the 12 sedimentary formations crossed by the project. The environmental documents were prepared to meet Caltrans format for a PIR, PER, and PMP, and took nine months to prepare. Applicable legislation was analyzed and programs for mitigation of impacts to significant, nonrenewable paleontological resources were prepared.

Burlington Northern Santa Fe Main Third Track Project
Keenbrook to Summit, Cajon Pass
San Bernardino County, California
The BNSF Main Third Track (3MT) Project added a third rail through Cajon Pass. Widening existing rail cuts lasted from June 2007 to June 2008. Excavation for the project contacted Miocene sediments of the Cajon Valley Beds and the Crowder Formation, and Cretaceous Cosy Dell Formation, which have potential to contain significant, nonrenewable paleontological resources. There were no delays to project construction caused by identification and recovery of paleontological resources. LSA was retained by Tom Dodson Associates, Inc. to develop a

Paleontological Resources Monitoring and Mitigation Program (PRMMP) consistent with previous studies in fossiliferous sedimentary formations in Cajon Pass. Excavation monitoring and screen washing recovered small to microscopic fossils from 70 localities. 870 fossils were analyzed through the laboratory identification process. The BNSF 3MT project produced additional significant new “first” fossil records and fossils from sediments not previously known to contain fossils.

Centex Homes Paleontological Resources Monitoring Program
City of Bakersfield, Kern County, California
Centex Homes retained LSA to provide a paleontological resources monitoring and salvage program for the 215-acre Eagle Crest housing development on the south side of the Kern River in the eastern portion of the City of Bakersfield. This excavation and salvage program continued intermittently from 2005 to 2008, and recovered cultural resources and 3,675 paleontological resources. Two of the fossils will be described and named as new species. Many of the fossils were first time records for the early Miocene and also geographic range extensions. The project also recovered 24 taxa of Pleistocene fossils with approximately five range extensions, including bat and mole that are rare in any fossil fauna. Fossils were prepared and inventoried by LSA and curated into the Buena Vista Museum of Natural History.

SELECTED MAJOR PROJECTS IN SOUTHERN CALIFORNIA AND ARIZONA

California

Imperial County

1987	Imperial Irrigation District

Riverside County, Eastern

1985	All American Pipeline
1986	Mecca Hills, Indio
1989	Eagle Mountain Land Fill

Riverside County, North Central

1989	Denizen Heights, Hemet
1989	Portrero Ranch, Beaumont
1989	Landmark/ Oak Valley, Beaumont
1991	Shutt Ranch, Calimesa
1991	Olive Dell Ranch, El Casco
1991	De Anza Cycle Park
1990	Badlands Landfill Expansion
1995	Jackrabbit Trail Paleo Salvage

Riverside County, South Central

1987	Richmond American, Los Alamos, Murrieta
1987	Nutmeg, Temecula
1987	California Oaks, Murrieta
1988	Vail Lake Development
1988	Ynez Road, Temecula
1988	Country Walk, Temecula
1988	Woodview, Temecula
1988	Ynez Town Center, Murrieta
1988	Quail Springs, Murrieta
1988	Dane Development, Murrieta
1988	Dix Development, Murrieta
1988	Crowell-David, Murrieta
1988	BCI, Temecula
1988	Antelope Road, Murrieta
1988	Gibbs I, Murrieta
1988	Gibbs II, Murrieta
1989	Olsen, Murrieta

1989	Murrieta Horse Ranch
1989	Pulte Homes, Murrieta
1989	Gibbs III, Murrieta
1989	Murrieta Village Center
1989	S & G Homes, Murrieta
1989	Kraus Project, Murrieta
1989	Dix Development, II, Murrieta
1989	Pulte-Silverhawk, Murrieta
!990	Crowell-David, Murrieta
1990	Paragon Park
!990	Whitten Project, Temecula
1990	Toyota of Temecula
1990	Relco Homes, Temecula
1991	Rolling Ridge Plaza
1991	Bedford, Ynez Road, Murrieta
1991	Ynez Auto Plaza
1991	RanPac, Murrieta
1991	Murrieta Valley High School
1991	Dix Development III, Murrieta
1991	Murrieta Hospital
1991	J W Redwood, Murrieta
1991	Margarita Meadows, Murrieta
1991	Winchester Meadows Business Park
1991	Murrieta Gateway
1991	California Oaks Development, Murrieta
1991	Lakeview Hot Springs
1991	Morrison Homes, Murrieta
1992	Aguanga, Temecula Arkose

San Bernardino County, Eastern

1979	Lugo-Mira Loma T/L, SCE
1979	Solar One, SCE, Daggett
1981	Salvage, Barstow Fossil Beds
1981	Tower M7-T3, SCE, Cajon Pass
1981	Coolwater Coal Gasification Plant, SCE, Daggett
1982	Hackberry Mtn Salvage, Goffs
1983	Klein Camel Salvage, Barstow
1983	Solar Ponds, Daggett
1982	Hwy. 138 Alignment, Cajon Pass
1983	Santa Fe Widening, Cajon Pass
1983	Antelope Cave Salvage, Mescal Range
1984	Robbins Quarry, Barstow
1984	LUZ-Wismer & Becker Solar Trough Site, Daggett
1984	Calico Lakes, Yermo
1984	United Energy, Yermo
1984	Coolwater SCE Solid Waste Site, Daggett
1984	Intermountain Power Project, Stateline to Adelanto
1985	All American Pipeline, Blythe to Ventura
1985	IPP South Electrode, Coyote Lake
1985	Luz SEGS II, Daggett
1986	Luz SEGS I, Daggett
1986	Newberry Ballast, SPRR,
1986	MCI Fiber Optics, Cajon Pass
1986	Bitter Spring Playa Salvage, Ft. Irwin
1986	Luz Evaporation Ponds, Daggett
1986	WilTel Fiber Optics, Stateline to Cajon

1988	Ward Valley Low Level Repository
1988	Silurian Valley Low Level Repository
1989	Broadwell Lake Repository
1990	Mojave Pipeline, Blythe to Bakersfield
1990	Kern River Pipeline, Mesquite, Nev. to Santa Barbara
1990	Coolwater Texaco Syngas, Daggett
1990	Pacific Agriculture, Cadiz Land
1991	Hidden Valley Repository, Cady Mts.
1991	Railcycle, Amboy
1991	Las Vegas Truck Stop, Yermo
1991	Indian Trails, Oro Grande
1991	Campbell Hill, Twentynine Palms Gravel Pit
1992	Little Piute Mts Bonebed Quarry
1994	Old Woman Sandstone, Lucerne Valley
1995	Hackberry Wash Salvage
1997	Piute Valley Hazen Quarry, Needles
1998	Robbins Quarry, Barstow
2001	KRGT, Daggett Compressor Station
2006	Needles Highway Improvement Project

Arizona

1990	Mojave Pipeline, Bermuda City
1985	Wolf Ranch Salvage, Bisbee,
1985	Wikiup Salvage

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Resume of

E. BRUCE LANDER, Ph.D.

Principal Investigator

Experience Summary

Extensive paleontologic resource management experience conducting and managing paleontologic resource/impact assessments and impact mitigation programs for large construction projects in California, Nevada, Utah, Wyoming, Arizona, New Mexico, Texas, and Maryland. Projects include municipal solid waste landfills; aggregate quarries; dams and reservoirs; aqueducts; flood control and groundwater recharge facilities; irrigation systems; cogeneration plants; solar energy and electrical generating plants; oil refineries; water pipelines/tunnels; oil and natural gas pipelines; electrical transmission lines; freeways, tunnels, and other roadways; subways; tramways; waste water treatment facilities; housing developments; planned communities; hotels; office buildings/complexes; business and industrial parks; shopping centers; hospitals and medical centers; convention centers; movie studios; parking lots/structures; marinas and marine supply facilities; space vehicle launch facilities; landslide stabilization and lagoon enhancement projects; geotechnical drilling programs; land exchanges; regional overviews; and conditional use permit, specific plan, and general plan revisions. Clients include private industry, public utilities, and federal, state, county, city, and regional agencies. Paleontologic resource assessments entailed data searches (literature reviews, archival searches, field surveys, consultation with other paleontologists) to develop baseline inventories, evaluation of scientific importance of resources and potential for disturbance by adverse project-related impacts, and formulation of mitigation measures to reduce these impacts to an acceptable level. Paleontologic resource impact mitigation programs required monitoring of earth-moving activities, recovery of fossil remains and fossiliferous rock samples, supervision of field personnel, and preparation of progress and final reports. Projects involved extensive coordination and consultation with project proponents, other consulting firms, and permitting agencies; adherence to strict delivery schedules; and completion within specified budget limits. Over 35 years of professional experience as a paleontologist and 25 years as a paleontologic consultant involved in paleontologic resource management and NEPA/CEQA compliance. Extensive paleontologic research background in land mammal faunas and vertebrate biostratigraphy of Tertiary continental formations of the southeastern, central, and western United States. Research entailed literature reviews, archival searches, field surveys, and consultation with other paleontologists.

Experience Record

1988-Date Paleo Environmental Associates, Inc., Altadena, California. Principal Investigator. Developed and manages paleontologic resource management consulting program; prepared paleontologic resource assessments and corresponding EIR/EIS sections for numerous major earth-moving projects in California, including Puente Hills, Weldon Canyon, Marsh Canyon, Elsmere Canyon, and Altamont Landfill EIRs; Eastern Transportation Corridor EIR/EIS; Luz Solar Energy Generating System III to XII AFCs; Playa Vista EIR; Metropolitan Water District of Southern California Eastside Reservoir and Inland Feeder EIRs; Santa Monica Mountains National Recreation Area Land Exchange EIS; and City Ranch, West End Area, and Santa Fe Ranch Specific Plan EIRs; managed Simi Valley Landfill expansion, Santiago Canyon Landfill, Puente Hills Landfill expansion, Foothill Ranch, Shell Oil Company Wilmington Manufacturing Complex SCOT unit, Los Angeles Metro Red Line, Sutter Power Plant Project, Eastern Transportation Corridor, and Metropolitan Water District of Southern California Inland Feeder and Cajalco Creek Dam and Detention Basin Project paleontologic resource impact mitigation programs. Caltrans projects include assessments and/or mitigation programs for SR-14, SR-41, and SR-178, and assessment for SR-47/Terminal Island, I-10/McNaughton Parkway, and I-15/French Valley Parkway. City of Los Angeles projects include assessments and/or mitigation programs for Rampart Area Police Station replacement, Harbor Community Police Station and Jail Replacement, Police Headquarters Facility, Los Angeles Harbor West Basin China Shipping and Yang Ming, Venice Pumping Plant Dual Force Main, Silver Lake Improvement, South Region Middle School No. 6, and Emergency Operations Center.

1985-1990 Engineering-Science, Inc., Pasadena, California. Project Manager, Paleontologist/Geologist.

Developed and managed paleontologic resource management consulting program; prepared numerous paleontologic resource assessments for projects in California, Arizona, Utah, Wyoming, New Mexico, Texas, Nevada, and Maryland, including Simi Valley Landfill Expansion EIR, Pacific Texas Pipeline Project EIR/EIS, Mojave-Kern River-El Dorado Natural Gas Pipeline Projects EIR/EIS, Los Angeles Metro Rail MOS-2 EIR/EIS, and Orange County Foothill Transportation Corridor EIR; prepared paleontologic resource assessment overviews of southern Ventura County for Ventura County Resource Management Agency and City of Simi Valley sphere of influence for City of Simi Valley Department of Community Development; supervised Los Angeles Metro Rail MOS-1 and interim Simi Valley Landfill paleontologic resource impact mitigation programs; assisted in preparing public relations program for Waste Management of California; prepared geology/seismicity sections of environmental documents for numerous construction projects.

1984-1985 Wirth Environmental Services/Dames and Moore, San Diego and Santa Barbara, California. Paleontologic Consultant. Prepared paleontologic resource assessments for Mead/McCullough-Victorville/Adelanto Transmission Project ER, Argus Cogeneration Expansion Project AFC, and Midway-Sunset Cogeneration Project AFC.

1984-1985 San Bernardino County Museum, Redlands, California. Paleontologist. Identified vertebrate fossil remains; prepared educational fossil exhibits; assisted in docent training, preparation of technical reports regarding results of paleontologic resource impact mitigation program for Los Angeles Department of Water and Power Intermountain Power Project transmission line corridor and Western Association of Vertebrate Paleontologists 1985 Field Trip Guidebook and Volume.

1982-1985 Marine and Environmental Science Associates, Inc. (MESA^2, Inc.), La Crescenta, California. Project Manager, Paleontologist/Geologist. Developed and managed paleontologic resource management consulting program; prepared paleontologic resource assessments for projects throughout California, including Sacramento Municipal Utility District's Geothermal Public Power Line Project (NOI and AFC) and ARCO's Coal Oil Point Project EIS/EIR; assisted in preparing geologic reports and maps on southern California continental borderland; assisted in preparing expert testimony for presentation before California Energy Commission.

1980-1981 Woodward-Clyde Consultants, San Francisco, California. Paleontologic Consultant. Supervised paleontologic resource impact mitigation program for MAPCO pipeline in Wyoming; assisted in preparation of paleontologic resource assessment. Projects included MAPCO's Rocky Mountain high-pressure liquid hydrocarbon pipeline project and Public Service Company of New Mexico's New Mexico Generating Station project.

1980 Research Reports Center (division of William Kauffman, Inc.), Los Altos, California. Copy Editor. Edited and abstracted technical reports for EPRI (Electric Power Research Institute) Guide and Journal.

1977-1979 U.S. Geological Survey Paleontology/Stratigraphy Branch, Menlo Park, California. Physical Science Technician. Conducted paleontologic resource impact mitigation program at Stanford Linear Accelerator Positron Electron Project ring.

1970-1976 University of California Museum of Paleontology, Berkeley, California. Research Assistant. Supervised vertebrate fossil collections and curatorial assistants during summer, 1976. Other positions included Teaching Assistant and Senior Museum Preparator.

1965-1970 University of California Department of Geology, Los Angeles. Laboratory Assistant. Prepared, identified, and curated fossils.

Education

B.S., Geology, 1969, University of California, Los Angeles

M.A., Paleontology, 1972, University of California, Berkeley

Ph.D., Paleontology, 1977, University of California, Berkeley

Professional Registrations

Certified Paleontologic Consultant, County of Orange, California

Registered Paleontologic Consultant, County of Riverside, California

Registered Paleontologic Consultant, County of Ventura, California

Professional Societies

Paleontological Society

Society for Sedimentary Geology

Society of Vertebrate Paleontology

Western Association of Vertebrate Paleontologists

Geological Society of America

American Association for the Advancement of Science

Association of Environmental Professionals

Institutional Affiliations

Research Associate, Natural History Museum of Los Angeles County

Publications

Lander, E.B. 1972. A review of the John Day oreodonts. University of California, Berkeley, unpublished M.A. thesis.

Munthe, J., and Lander, E.B. 1973. A reevaluation of the age of the Split rock vertebrate fauna, Wyoming. Geological Society of America Abstracts with Programs 5(6):497.

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Lander, E.B. 1980. Marine-nonmarine tie-ins in the southern California coast ranges and recalibration of the earlier part of the Arikareean Land Mammal Age. Geological Society of America Abstracts with Programs 12(7):468.

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Lander, E.B, and Butcher, J.J. 1984. Late Paleogene regression, plate tectonics, and the terminal Eocene event, California continental margin. Society of Economic Paleontologists and Mineralogists Abstracts, First Annual Midyear Meeting 1:47.

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Lander, E.B, and Reynolds, R.E. 1985. Fossil vertebrates from the Calico Mountains area, central Mojave Desert, San Bernardino County, California. Pages 156-153. *In* Reynolds, R.E., compiler. Geological Investigations Along

Interstate 15, Cajon Pass to Manix Lake. San Bernardino County Museum.

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Lander, E.B. 1988. Faunal events in the North American continental Tertiary mammalian herbivore record and their implications regarding the causes of extinction and diminishing average adult body size in late Quaternary mammalian herbivores. *In* Reynolds, J., compiler. Quaternary history of the Mojave Desert, Proceedings and Abstracts of the Mojave Desert Quaternary Research Center Second Annual Symposium, San Bernardino County Museum, Redlands, California, June 25-26, 1988. San Bernardino County Museum Association Quarterly 35(3&4):36-38.

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Kelly, T.S., and Lander, E.B. 1988. Biostratigraphy and correlation of Hemingfordian and Barstovian land mammal assemblages, Caliente Formation, Cuyama Valley area, California. *In* Bazeley, W.J.M., editor. Tertiary Tectonics and Sedimentation in the Cuyama Basin, San Luis Obispo, Santa Barbara, and Ventura Counties, California. Society of Economic Paleontologists and Mineralogists Pacific Section 59:1-19.

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APPENDIX F

RESULTS OF PALEONTOLOGICAL RESOURCE ARCHIVAL SEARCHES

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org

Vertebrate Paleontology Section
Telephone: (213) 763-3325
FAX: (213) 746-7431
e-mail: smcleod@nhm.org

NATURAL
HISTORY
MUSEUM
LOS ANGELES COUNTY

5 September 2013

Paleo Environmental Associates
2248 Winrock Ave.
Altadena, CA 91001

Attn: Dr. E. Bruce Lander

re: Paleontological Resources Records Check for the proposed Desert Quartzite solar mirror Project, near the City of Blythe, Riverside County, project area

Dear Bruce:

I have thoroughly searched our paleontology collection records for the locality and specimen data for the proposed Desert Quartzite solar mirror Project, near the City of Blythe, Riverside County, project area as outlined on the portions of the Roosevelt Mine and Ripley USGS topographic quadrangle maps that you sent to me via e-mail on 26 August 2013. We do not have any vertebrate fossil localities that lie directly within the proposed project area, but we do have vertebrate fossil localities from sedimentary deposits similar to those that occur in the proposed project area, albeit at some distance.

In the far northwestern portion of the proposed project area there are some surface deposits of younger Quaternary aeolian sands. Otherwise the western portion of the proposed project area has surface deposits composed of younger Quaternary Alluvium, derived predominately as alluvial fan deposits from the McCoy Mountains to the north and northwest. These younger Quaternary deposits typically do not contain significant vertebrate fossils, at least in the uppermost layers and especially in the coarser fractions closer to the source material in the mountains. We do have a vertebrate fossil locality somewhat nearby from younger Quaternary deposits though, LACM 5977, to the west-northwest of the proposed project area between Interstate Highway 10 and Ford Dry Lake, so probably from fine-grained lacustrine deposits, that produced specimens of kangaroo rat, *Dipodomys*, and pocket mouse, *Perognathus*. Most of the proposed project area, the eastern nearly flat portion, has surface deposits of older Quaternary Alluvium, derived as alluvial deposits on the Palo Verde Mesa. Our closest vertebrate fossil localities from older Quaternary deposits, the Pinto Formation in this case, are LACM (CIT) 208 and LACM 3414, some distance to the northwest of the proposed project area between the Eagle Mountains and the Coxcomb Mountains, that produced fossil specimens of tortoise, *Gopherus*, horse, *Equus*, and camel, *Camelops* and *Tanupolama stevensi*.

Shallow excavations in the younger Quaternary aeolian and alluvial fan deposits exposed in the western portion of the proposed project area are unlikely to encounter significant vertebrate fossil remains. Deeper excavations in those areas that extend down into older Quaternary deposits, as well as any excavations in the older Quaternary deposits exposed in most of the proposed project area, however, may well uncover significant vertebrate fossils. Any substantial excavations in the sedimentary deposits in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Any fossils recovered during mitigation should be deposited in an accredited and permanent scientific institution for the benefit of current and future generations.

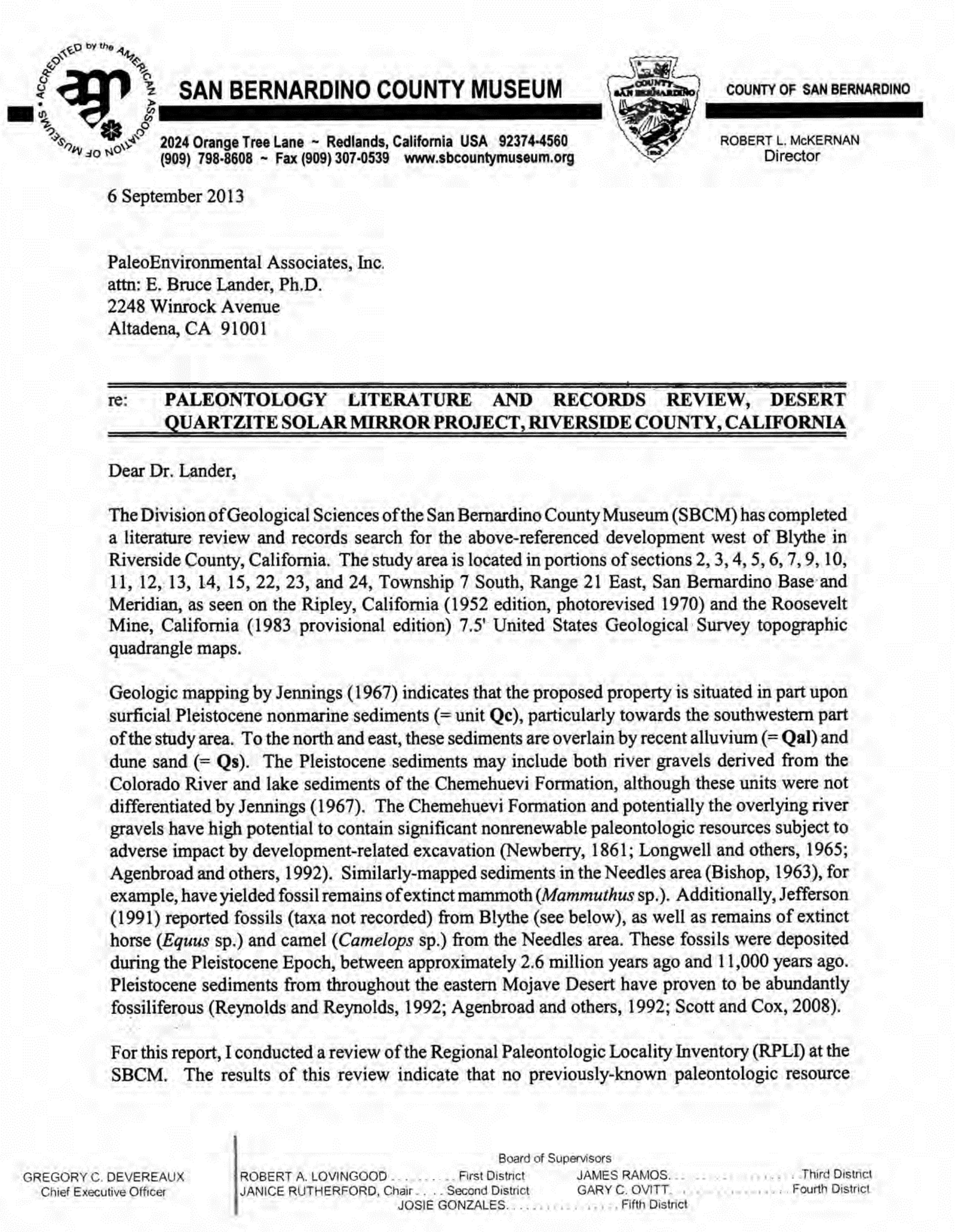
This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,

Samuel A. McLeod

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice



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COUNTY OF SAN BERNARDINO

ROBERT L. McKERNAN
Director

6 September 2013

PaleoEnvironmental Associates, Inc.
attn: E. Bruce Lander, Ph.D.
2248 Winrock Avenue
Altadena, CA 91001

re: **PALEONTOLOGY LITERATURE AND RECORDS REVIEW, DESERT QUARTZITE SOLAR MIRROR PROJECT, RIVERSIDE COUNTY, CALIFORNIA**

Dear Dr. Lander,

The Division of Geological Sciences of the San Bernardino County Museum (SBCM) has completed a literature review and records search for the above-referenced development west of Blythe in Riverside County, California. The study area is located in portions of sections 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 15, 22, 23, and 24, Township 7 South, Range 21 East, San Bernardino Base and Meridian, as seen on the Ripley, California (1952 edition, photorevised 1970) and the Roosevelt Mine, California (1983 provisional edition) 7.5' United States Geological Survey topographic quadrangle maps.

Geologic mapping by Jennings (1967) indicates that the proposed property is situated in part upon surficial Pleistocene nonmarine sediments (= unit **Qc**), particularly towards the southwestern part of the study area. To the north and east, these sediments are overlain by recent alluvium (= **Qal**) and dune sand (= **Qs**). The Pleistocene sediments may include both river gravels derived from the Colorado River and lake sediments of the Chemehuevi Formation, although these units were not differentiated by Jennings (1967). The Chemehuevi Formation and potentially the overlying river gravels have high potential to contain significant nonrenewable paleontologic resources subject to adverse impact by development-related excavation (Newberry, 1861; Longwell and others, 1965; Agenbroad and others, 1992). Similarly-mapped sediments in the Needles area (Bishop, 1963), for example, have yielded fossil remains of extinct mammoth (*Mammuthus* sp.). Additionally, Jefferson (1991) reported fossils (taxa not recorded) from Blythe (see below), as well as remains of extinct horse (*Equus* sp.) and camel (*Camelops* sp.) from the Needles area. These fossils were deposited during the Pleistocene Epoch, between approximately 2.6 million years ago and 11,000 years ago. Pleistocene sediments from throughout the eastern Mojave Desert have proven to be abundantly fossiliferous (Reynolds and Reynolds, 1992; Agenbroad and others, 1992; Scott and Cox, 2008).

For this report, I conducted a review of the Regional Paleontologic Locality Inventory (RPLI) at the SBCM. The results of this review indicate that no previously-known paleontologic resource

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localities are recorded by the SBCM from the site of the proposed solar mirror array, nor are any resource localities recorded from within several miles of the site. However, Jefferson (1991) listed one locality, UCMP V60004, from the Blythe area; unfortunately the precise location of this site and the nature of the fossils recovered were not discussed in that review.

Recommendations

The results of the literature review and the check of the RPLI at the SBCM demonstrate that excavation in conjunction with development is determined to have high potential to adversely impact significant nonrenewable paleontologic resources present within the boundaries of the proposed project property. A qualified vertebrate paleontologist must be retained to develop a program to mitigate impacts to such resources. This mitigation program should be consistent with the provisions of the California Environmental Quality Act (Scott and Springer, 2003), as well as with regulations currently implemented by the County of Riverside. This program should include, but not be limited to:

1. Monitoring of excavation in areas identified as likely to contain paleontologic resources by a qualified paleontologic monitor. Based upon the results of this review, areas of concern include any undisturbed surface or subsurface sediments of Pleistocene older alluvium. Paleontologic monitors should be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors must be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens.

2. Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates. Preparation and stabilization of all recovered fossils are essential in order to fully mitigate adverse impacts to the resources (Scott and others, 2004).

3. Identification and curation of specimens into an established, accredited museum repository with permanent retrievable paleontologic storage. These procedures are also essential steps in effective paleontologic mitigation (Scott and others, 2004) and CEQA compliance (Scott and Springer, 2003). The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities. Mitigation of adverse impacts to significant paleontologic resources is not complete until such curation into an established museum repository has been fully completed and documented.

4. Preparation of a report of findings with an appended itemized inventory of specimens. It is recommended that this report incorporate the full results of this literature review. The report and inventory, when submitted to the appropriate Lead Agency along with confirmation of the curation of recovered specimens into an established, accredited museum repository, would signify completion of the program to mitigate impacts to paleontologic resources.

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Please do not hesitate to contact us with any further questions you may have.

Sincerely,

Eric Scott, Curator of Paleontology
Division of Geological Sciences
San Bernardino County Museum

X

APPENDIX U

VISUAL RESOURCES TECHNICAL REPORT

VISUAL RESOURCES TECHNICAL REPORT

FOR THE
DESERT QUARTZITE SOLAR PROJECT
RIVERSIDE COUNTY, CALIFORNIA

Prepared for:

Desert Quartzite, LLC
135 Main Street, 6th Floor
San Francisco, California 94105

Prepared by:

URS
111 SW Columbia, Suite 1500
Portland, OR 97201
(503) 222-7200 ◆ Fax: (503) 250-4212

Project Number 60419825.28907534.30004

January 2016

TABLE OF CONTENTS

Section **Page**

1.0 PROPOSED ACTION AND ALTERNATIVES 1-1

1.1 INTRODUCTION 1-1
1.2 PROJECT BACKGROUND 1-3
1.3 SUMMARY OF PROJECT CONSTRUCTION ACTIVITIES AND SCHEDULE 1-3
1.4 APPLICANT-COMMITTED ENVIRONMENTAL PROTECTION MEASURES 1-3

1.4.1 Introduction 1-3
1.4.2 Lighting 1-4
1.4.3 Color and Reflection 1-4
1.4.4 Profile of Facilities 1-5

2.0 REGULATORY SETTING 2-1

2.1 FEDERAL 2-1

2.1.1 National Environmental Policy Act (42 USC 4371) 2-1
2.1.2 Federal Land Policy and Management Act 2-1
2.1.3 Bureau of Land Management 2-1
2.1.4 Federal Aviation Administration 2-3

2.2 STATE OF CALIFORNIA 2-4

2.2.1 California Environmental Quality Act 2-4

2.3 RIVERSIDE COUNTY 2-4

2.3.1 Riverside County General Plan and Palo Verde Valley Area Plan 2-4
2.3.2 Riverside County Airport Land Use Compatibility Plan 2-5

3.0 METHODS 3-1

3.1 ANALYSIS AREA 3-1
3.2 BASELINE CONDITIONS ASSESSMENT 3-1

Section **Page**

3.2.1 Visual Resource Inventory 3-2
3.2.2 Key Observation Points 3-4
3.3 IMPACT ASSESSMENT 3-5
3.3.1 Contrast Rating 3-6
3.3.2 Visual Resource Inventory Analysis 3-6

4.0 EXISTING BASELINE CONDITIONS 4-1

4.1 EXISTING BASELINE VISUAL RESOURCES 4-1
4.2 VISUAL RESOURCE INVENTORY VALUES: BLM PALM SPRINGS FIELD OFFICE 4-2

4.2.1 Scenic Quality 4-2
4.2.2 Visual Sensitivity 4-6
4.2.3 Distance Zones 4-8

4.3 KEY OBSERVATION POINTS 4-9

4.3.1 Key Observation Point 1: Interstate 10 4-10
4.3.2 Key Observation Point 2: Chuckwalla DWMA ACEC 4-10
4.3.3 Key Observation Point 3: McCoy Mountains 4-11
4.3.4 Key Observation Point 4: Mule Mountains 4-11
4.3.5 Key Observation Point 5: Bradshaw Trail 4-12
4.3.6 Key Observation Point 6: Town of Nicholls Warm Springs/Mesa Verde 4-12
4.3.7 Key Observation Point 7: Town of Ripley 4-12
4.3.8 Key Observation Point 8: Colorado River 4-13

5.0 IMPACT ASSESSMENT 5-1

5.1 VISUAL CONTRAST RATING 5-1

5.1.1 Key Observation Point 1: Interstate 10 5-1
5.1.2 Key Observation Point 2: Chuckwalla DWMA ACEC 5-3
5.1.3 Key Observation Point 3: McCoy Mountains 5-3
5.1.4 Key Observation Point 4: Mule Mountains 5-4
5.1.5 Key Observation Point 5: Bradshaw Trail 5-4
5.1.6 Key Observation Point 6: Town of Nicholls Warm Springs/Mesa Verde 5-5

Section **Page**

5.1.7 Key Observation Point 7: Town of Ripley 5-5
5.1.8 Key Observation Point 8: Colorado River... 5-5

5.2 VISUAL RESOURCE INVENTORY ANALYSIS... 5-5

5.2.1 Scenic Quality.. 5-6
5.2.2 Visual Sensitivity 5-9

5.3 IMPACT ASSESSMENT SUMMARY AND FINDINGS................................ 5-9
5.4 PLAN CONFORMANCE DETERMINATION 5-11

5.4.1 Federal... 5-11
5.4.2 State of California 5-13
5.4.3 Riverside County 5-13

6.0 REFERENCES.. 6-1
7.0 LIST OF PREPARERS.. 7-1

Tables

Table 1-1 Construction Overview for Assumed 25-month Schedule 1-4
Table 4-1 Scenic Quality Rating Summary.. 4-2
Table 4-2 Scenic Quality Rating: SQRU 021 Chuckwalla Valley.................................. 4-3
Table 4-3 Scenic Quality Rating: SQRU 026 McCoy Mountains 4-4
Table 4-4 Scenic Quality Rating: SQRU 036 Blythe Valley 4-4
Table 4-5 Scenic Quality Rating: SQRU 037 Palo Verde... 4-5
Table 4-6 Scenic Quality Rating: SQRU 038 Mule Mountains....................................... 4-5
Table 4-7 Scenic Quality Rating: SQRU 039 Little Chuckwalla Mountains................... 4-6
Table 4-8 Visual Sensitivity Ratings – Desert Quartzite Project Area 4-7
Table 4-9 Visual Sensitivity: SLRU 49 Bradshaw Trail.. 4-7
Table 4-10 Visual Sensitivity: SLRU 26 McCoy Mountains 4-8
Table 4-11 Visual Sensitivity: SLRU 46 Mule Mountains... 4-8
Table 4-12 Visual Sensitivity: SLRU 39 Little Chuckwalla Mountains............................ 4-9
Table 4-13 Key Observation Points 4-9
Table 5-1 Landscape Change and Viewer Exposure.. 5-2
Table 5-2 Scenic Quality Rating Unit Impact Summary 5-7
Table 5-3 Impact Criteria for Visual Resources... 5-10

Figures **Follows Page**

Figure 1-1 Regional Vicinity Map 1-5
Figure 1-2 Preliminary Site Plan 1-5
Figure 3-1 KOP Locations – Viewshed Analysis: Poles, Gen-Tie, Anemometer 3-7
Figure 3-2 KOP Locations – Viewshed Analysis: Solar Arrays 3-7
Figure 4-1 Visual Resource Inventory (VRI) Class 4-13
Figure 4-2 Scenic Quality 4-13
Figure 4-3 Sensitivity Level Rating Units 4-13
Figure 4-4 Visual Distance Zones 4-13
Figure 4-5 KOP Locations – Land Ownership 4-13

Appendices

Appendix A Record of Selected and Eliminated Key Observation Points
Appendix B Key Observation Points – Baseline Photographs
Appendix C Key Observation Points – Visual Simulations

LIST OF ACRONYMS

AF	Acre feet
AFY	Acre feet per year
ALUC	Airport Land Use Commission
BLM	Bureau of Land Management
CDCA	California Desert Conservation Area (CDCA) Plan area
CO	Carbon Dioxide
CRSS	Colorado River Substation
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
FLPMA	Federal Land Policy and Management Act
FO	Field Office
GHG	Greenhouse Gas
LTVA	Midland Long-Term Visitor Center
MW	Megawatt
NEPA	National Environmental Policy Act
PEIS	Programmatic EIS
POD	Plan of Development
ROD	Record of Decision (ROD)
ROW	Right-of-Way
RPS	Renewable Portfolio Standard
SB	Senate Bill
SCE	Southern California Edison
SEZ	Riverside East Solar Energy Zone
Solar PEIS	Solar Energy Development in Six Southwestern States PEIS
SLRU	Sensitivity Level Rating Units
SQRU	Scenic Quality Rating Units
VRI	Visual Resource Inventory
VRM	Visual Resource Management

SECTION 1.0
PROPOSED ACTION AND ALTERNATIVES

1.1 INTRODUCTION

Desert Quartzite, LLC (Applicant) proposes to develop and construct a 300-megawatt (MW) alternating current photovoltaic solar facility known as the Desert Quartzite Solar Project (Project). The overall Project includes the solar generation facility, an on-site substation, and the generation-tie (gen-tie) line. The proposed Project is located in eastern Riverside County near Blythe, California. The proposed solar facility and the approximately 3-mile-long, 230-kilovolt (kV) gen-tie line interconnection to the existing Southern California Edison (SCE) Colorado River Substation (CRSS) are located primarily on lands administered by the U.S. Department of the Interior, Bureau of Land Management (BLM) (BLM CACA# 04937; 5,115 acres). The Project site also includes 160 acres of private land (APN 879-110-001). The overall Project site encompasses approximately 5,275 acres. The proposed solar facility would be constructed within an approximately 3,714-acre fenced portion of the overall Project site. The gen-tie line study corridor encompasses approximately 445 acres of BLM lands within the overall Project site. A vicinity map of the proposed Project (i.e., including BLM and privately-owned lands) is presented on Figure 1-1 and the proposed preliminary site layout is presented on Figure 1-2.

Site access will be via Interstate 10 (I-10) at the State Route (SR)-78 exit to SR-78 (south)/ Neighbours Boulevard to 16th Avenue/Seeley Avenue (west). Project construction is anticipated to require from approximately 25 to 48 months to complete and is expected to start in late 2016. This analysis is based on an assumed approximately 25-month construction timeframe, which is considered to be worst case for impact assessment purposes. The construction workforce is estimated to result in an average 450 (round trip) vehicle trips per day (21 working days per month), with a maximum of 810 (round trip) vehicle trips per day during peak construction. The workforce is expected to commute to the site from within an average distance of 35 miles from the Project site and is expected to arrive at the Project site by 7 a.m. and to depart at 5 p.m. each day (i.e., avoid 7–9 a.m. peak traffic period but not the 4–6 p.m. peak period); it is common that a fairly large portion of the workforce voluntarily carpools regularly. In addition to commute trips by construction workers, approximately 14,400 truck deliveries of equipment, materials, and fuel for on-site construction equipment are estimated to be required over the course of the construction period. Construction of the proposed Project is expected to require a total of up to 10 to 15 oversize loads for transformers and motor graders. Equipment, material, and fuel deliveries are planned to occur during non-peak traffic hours. Construction phase-related truck deliveries are estimated to require one-way distances (within the boundaries of the Mojave Desert Air Quality Management District) as follows: equipment and material deliveries at 30.5 miles; aggregate and concrete at 13 miles; and fuel at 10 miles.

Construction activities will include site preparation and grading, solar array foundation installation (which may include post driving), equipment installation, on-site substation and operations and maintenance building construction, gen-tie poles and conductor installation along the gen-tie route, equipment testing, and site cleanup and restoration. Construction of the proposed Project will require removal of vegetation and disturbance during site preparation within the 3,714-acre fenced portion of the site as well as along the gen-tie corridor. The operational workforce is anticipated to be 5 employees.

It is currently estimated that the maximum water usage for an approximate 25-month construction timeframe is 1,400 acre feet (AF) or approximately 700 AF per year on average. During construction, water will be needed primarily for dust control and soil compaction, with small amounts used for sanitary and other purposes. During operations, the Project will use no water directly for electricity generation. The operational phase of the Project is expected to require up to 38 AF per year (AFY) of water. The Project plans to utilize groundwater from either existing local well(s) or via installation of on-site groundwater wells. The Applicant is also considering trucking water to the Project site for at least the initial months of construction if an on-site water supply well(s) is not yet installed and functional. It is possible that trucking water to the Project site could be required for the entire length of construction which would potentially require up to approximately 57,000 water deliveries (assuming 8,000-gallon capacity water trucks). All water deliveries to the Project site would be required by the Applicant to occur during non-peak traffic hours. It is assumed that water deliveries would originate from a water supply source within 10 miles of the Project site.

The purpose of this study is to provide scientific and technical data regarding the existing visual resources within the study area and the proposed Project’s potential to change the area’s visual resources. The Project information supporting this analysis is based primarily on the Applicant’s revised Desert Quartzite Solar Project Plan of Development (POD) submitted to the BLM in May 2014, as amended. The POD will continue to be updated by the Applicant to provide current and accurate Project information. If warranted, Applicant measures are proposed or recommended in this study to address adverse changes to visual resources as a result of the Project. This study is submitted to the BLM and Riverside County to support their independent review and evaluation of the environmental impacts of the Project pursuant to applicable Federal, State, and local laws. The POD is part of the BLM Right-of-Way (ROW) grant application process which for this Project includes preparation of an Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act (NEPA). The proposed Project is also expected to require a Conditional Use Permit from Riverside County, which will require compliance with the California Environmental Quality Act (e.g., Environmental Impact Report [EIR]). Therefore, it is currently planned that a joint EIS/EIR will be prepared by the BLM and Riverside County.

1.2 PROJECT BACKGROUND

The fundamental purpose of the Project is to construct, operate, and eventually decommission a clean, renewable source of solar electricity that helps meet California’s growing demand for power and helps fulfill national and State renewable energy and greenhouse gas (GHG) goals. Solar energy provides a sustainable, renewable source of power that helps reduce fossil fuel dependence and GHG emissions. The proposed Project will help California meet its Renewable Portfolio Standard (RPS) goal, which is currently 50 percent of electrical power retail sales by 2030 under Senate Bill (SB) 350. The Project supports Secretary of the Interior Salazar’s Orders 3283 and 3285, which make developing renewable energy a top national priority. The Project will also help the State achieve the 2006 Global Warming Solutions Act (Assembly Bill [AB] 32) GHG reduction targets, which require California’s GHG emissions to be reduced to 1990 levels by 2020. The Project would furthermore support the County’s energy policy goal to contribute to California’s long-term renewable energy development and GHG reduction goals.

When fully operational, the 300 MW Project would deliver over 1.5 billion kilowatt-hours of clean, renewable energy annually. This is equivalent to the amount of energy needed to serve over 90,000 California homes each year. When compared to the carbon dioxide (CO_2) emissions that would be emitted if the same amount of electricity was generated from fossil fuels, implementing the Project will avoid emissions of over 165,000 metric tons of CO_2 annually – the equivalent of taking almost 32,000 automobiles off the road. The electricity generated by the Project will be sold to one or more utilities or other retail customers.

1.3 SUMMARY OF PROJECT CONSTRUCTION ACTIVITIES AND SCHEDULE

Construction of the proposed Project is planned to consist of nine primary activities. The currently estimated timeframes and maximum workforce numbers for an assumed 25-month construction schedule are as shown in Table 1-1.

1.4 APPLICANT-COMMITTED ENVIRONMENTAL PROTECTION MEASURES

1.4.1 Introduction

In order to minimize potential Project-related effects to visual resources, including those associated with lighting, color, and the profile of the proposed facilities, the Applicant has committed to implement environmental protection measures specific to visual resources. The following environmental protection measures are based on the visual resource measures presented in Appendix A of the POD submitted to the BLM in May of 2014. As applicable, the measures presented herein have been updated to meet the current Project design.

TABLE 1-1
CONSTRUCTION OVERVIEW FOR ASSUMED 25-MONTH SCHEDULE

Activity #	Timeframe	Duration (Months)	Working Days	Max No. Workers[1]	Activity Description
1	Dec. 2016 – Jan. 2017	2	42	60	Move On (grading of laydown, construction trailers, and parking areas)
2	Jan. 2017 – June 2018	18	378	80	Grading – site preparation/clearing/ grading and balance of retention basins
3	Mar. 2017 – Aug. 2018	18	378	160	Construction – solar array structural components (posts, tilts, rails, trackers)
4	Apr. 2017 – Sept. 2018	18	378	80	Trenching – PCS excavation, PCS placement, underground cable trenching
5	May 2017 – Oct. 2018	18	378	310	Construction – solar module installation
6	Apr. 2018 – Sept. 2018	6	126	60	Construction – substation
7	Apr. 2018 – Sept. 2018	6	126	60	Construction – Gen-Tie
8	Apr. 2018 – Sept. 2018	6	126	60	Construction – Operations and Maintenance Building
9	July 2018 – Dec. 2018	6	126	60	Construction – testing, cleanup, and restoration

[1] Peak workforce estimated at 810 workers due to overlapping of construction activities. Workforce numbers may vary.

1.4.2 Lighting

Lights may periodically be used at nighttime in occupied portions of the Project site for security purposes. In order to limit the potential effects associated with night lighting, lighting on the Project site will be limited to areas required for operations or safety, will be directed on-site to avoid backscatter, and will be shielded from public view to the extent practical. Lighting that is not required to be on during nighttime hours will be controlled with sensors or switches operated such that lighting will be on only when needed.

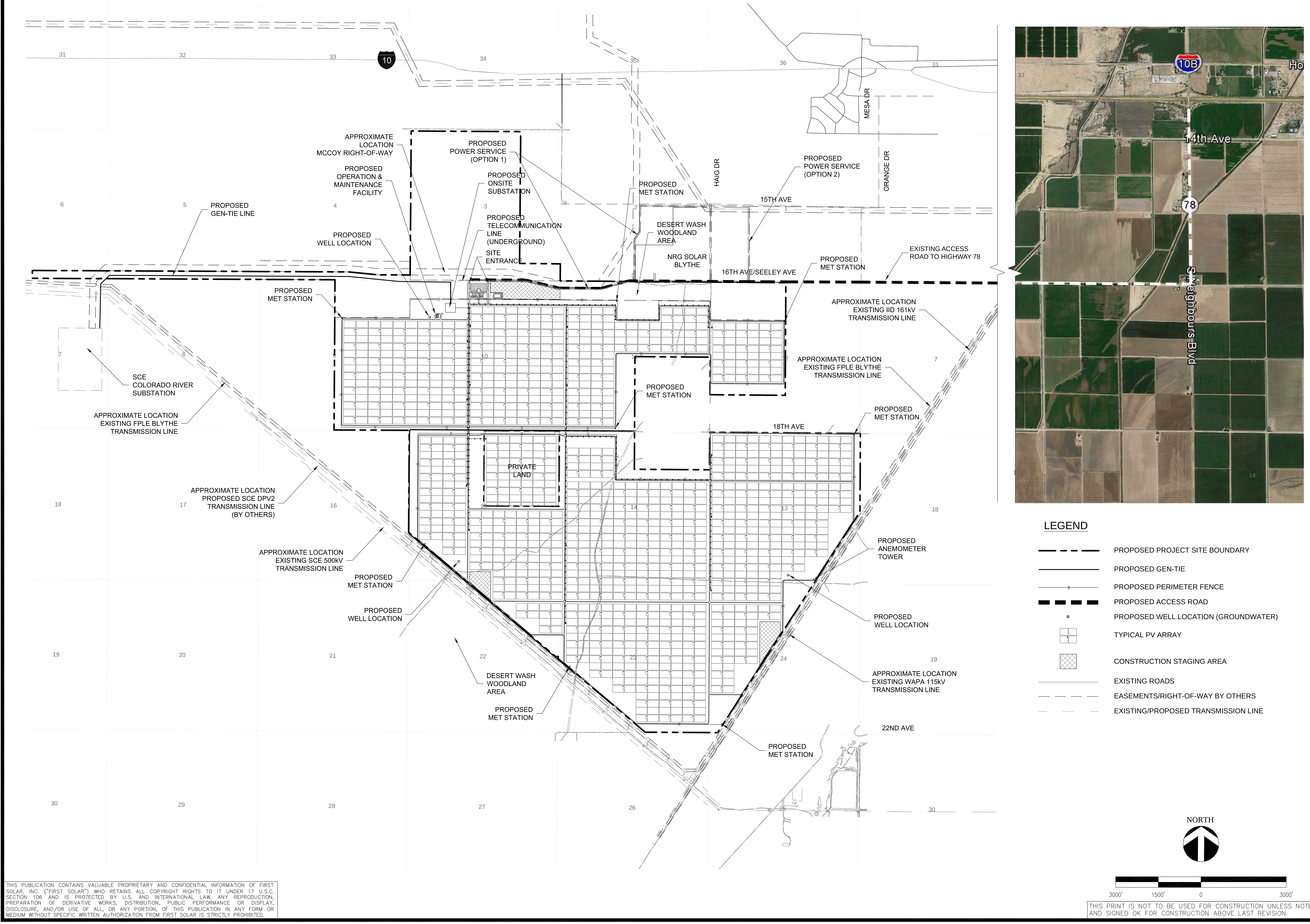
1.4.3 Color and Reflection

The Project will introduce new man-made facilities to the viewshed. In order to limit the potential visual effects associated with the introduction of facilities, the Project design will include the following: 1) an exterior color acceptable to the BLM will be used on Project buildings, as appropriate, to blend more naturally with the existing setting; and 2) fencing will be constructed of non-reflective materials to reduce visual effects.

1.4.4 Profile of Facilities

The Project’s PV blocks will cover a substantial ground area with dark PV panels and ancillary facilities. In order to limit the potential visual effects associated with the introduction of the proposed facilities, the Project design will include the following: 1) the Project will use low profile PV panel structures that should not extend higher than approximately 13 feet above the ground surface; and 2) Project facilities will be set back more than 1 mile from I-10 and at least 4 miles from SR-78.

V/Projects/GIS_Proj/Ladd/FirstSolar/DesertQuartrzite/1015-075A


10
31
32
33
34
35
36
31
APPROXIMATE LOCATION MCCOY RIGHT-OF-WAY
PROPOSED POWER SERVICE (OPTION 1)
PROPOSED OPERATION & MAINTENANCE FACILITY
PROPOSED ONSITE SUBSTATION
PROPOSED TELECOMMUNICATION LINE (UNDERGROUND)
PROPOSED MET STATION
HAIG DR
MESA DR
ORANGE DR
PROPOSED POWER SERVICE (OPTION 2)
15TH AVE
6
5
4
3
2
1
PROPOSED GEN-TIE LINE
PROPOSED WELL LOCATION
SITE ENTRANCE
DESERT WASH WOODLAND AREA
NRG SOLAR BLYTHE
PROPOSED MET STATION
16TH AVE/SEELEY AVE
EXISTING ACCESS ROAD TO HIGHWAY 78
PROPOSED MET STATION
APPROXIMATE LOCATION EXISTING IID 161kV TRANSMISSION LINE
7
8
10
SCE COLORADO RIVER SUBSTATION
APPROXIMATE LOCATION EXISTING FPLE BLYTHE TRANSMISSION LINE
PROPOSED MET STATION
APPROXIMATE LOCATION EXISTING FPLE BLYTHE TRANSMISSION LINE
7
PROPOSED MET STATION
18TH AVE
PRIVATE LAND
APPROXIMATE LOCATION PROPOSED SCE DPV2 TRANSMISSION LINE (BY OTHERS)
18
17
16
14
13
18
APPROXIMATE LOCATION EXISTING SCE 500kV TRANSMISSION LINE
PROPOSED MET STATION
PROPOSED ANEMOMETER TOWER
PROPOSED WELL LOCATION
PROPOSED WELL LOCATION
19
20
21
22
23
24
19
DESERT WASH WOODLAND AREA
APPROXIMATE LOCATION EXISTING WAPA 115kV TRANSMISSION LINE
PROPOSED MET STATION
22ND AVE
PROPOSED MET STATION
30
29
28
27
26
25
30
10B
Ho
33
14th Ave
78
S Neighbours Blvd
14
LEGEND
PROPOSED PROJECT SITE BOUNDARY
PROPOSED GEN-TIE
PROPOSED PERIMETER FENCE
PROPOSED ACCESS ROAD
PROPOSED WELL LOCATION (GROUNDWATER)
TYPICAL PV ARRAY
CONSTRUCTION STAGING AREA
EXISTING ROADS
EASEMENTS/RIGHT-OF-WAY BY OTHERS
EXISTING/PROPOSED TRANSMISSION LINE
NORTH
3000'
1500'
0
3000'

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DESERT QUARTZITE, LLC
135 MAIN STREET, 6TH FLOOR
SAN FRANCISCO, CALIFORNIA 94105
PHONE: (415) 935-2500

DESERT QUARTZITE
SOLAR PROJECT
RIVERSIDE COUNTY
CALIFORNIA

REV	DATE	REVISION DESCRIPTION	BY	CHK	APP

FS JOB #:
PROJ. DEVT. ENGR: RH
PROJ. MGR. ENV.:
SCALE: 1"=1500' @ 24"x36" SHEET
COPYRIGHT BY: DESERT QUARTZITE, LLC

SHEET TITLE

FIGURE 1-2

PRELIMINARY
SITE PLAN

SHEET 2 OF 14

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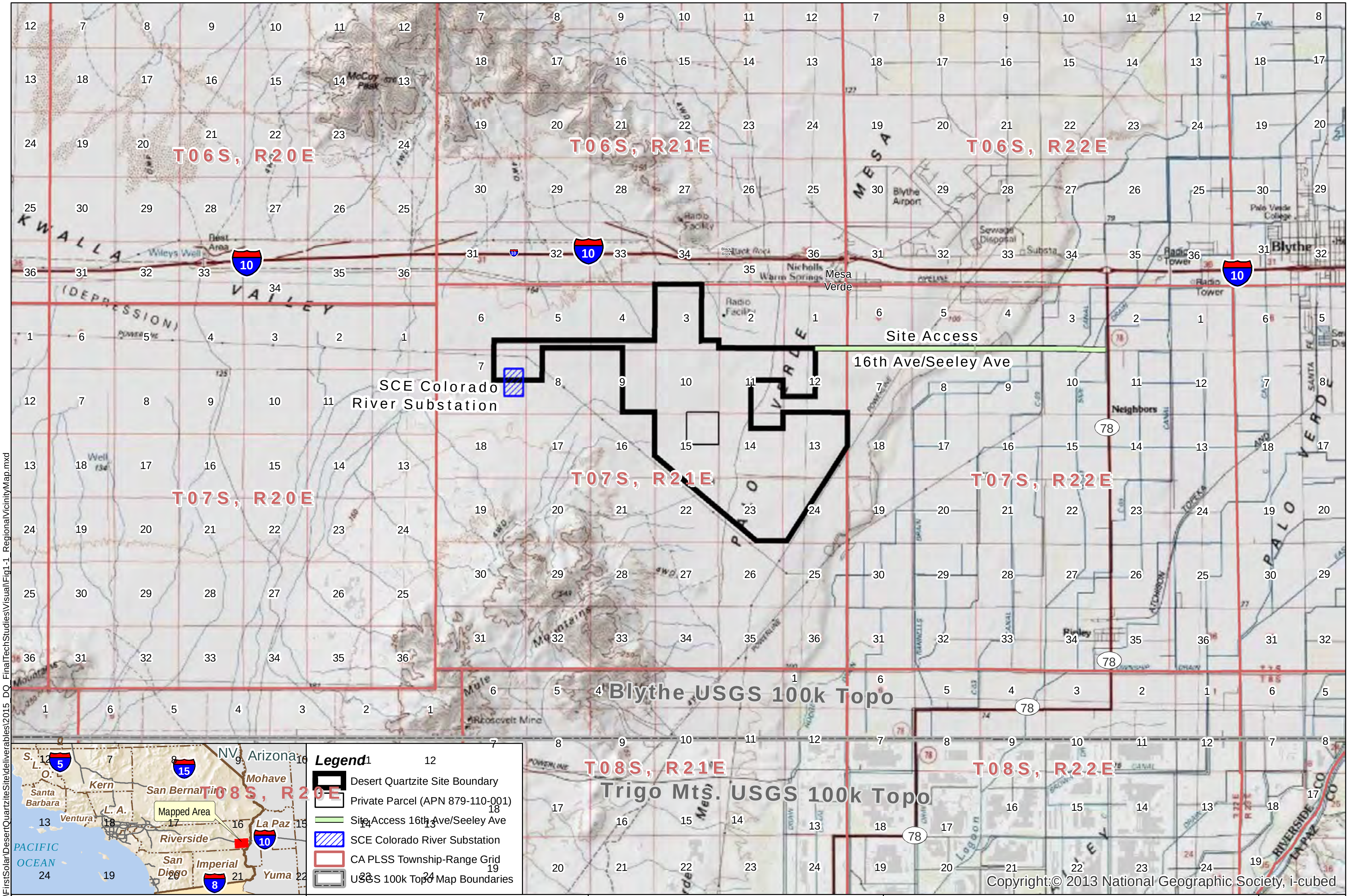
T06S, R20E
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T07S, R20E
T07S, R21E
T07S, R22E
T08S, R20E
T08S, R21E
T08S, R22E
Site Access
16th Ave/Seeley Ave
SCE Colorado River Substation
Blythe USGS 100k Topo
Trigo Mts. USGS 100k Topo
Blythe
Mesa Verde
Nicholls Warm Springs
Neighbors
Ripley
10
78
Mapped Area
Arizona
NV
PACIFIC OCEAN
Legend
Desert Quartzite Site Boundary
Private Parcel (APN 879-110-001)
Site Access 16th Ave/Seeley Ave
SCE Colorado River Substation
CA PLSS Township-Range Grid
USGS 100k Topo Map Boundaries
Copyright:© 2013 National Geographic Society, i-cubed

Visual Technical Study
Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

0 0.5 1 1.5 2 Miles

0 5,000 10,000 Feet

Source: [1] Bing Maps Aerial Imagery Web Mapping Service - (c) 2010 Microsoft Corporation and its datas upplier (Image Date: 3/13/2011), [2] California Geospatial Information Library PLS, [3] ESRI StreetMap USA (2007).

Figure 1-1. Regional Vicinity Map

2015

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SECTION 2.0
REGULATORY SETTING

2.1 FEDERAL

2.1.1 National Environmental Policy Act (42 USC 4371)

NEPA Section 101(b)(2) states that it is the “continuous responsibility” of the Federal government to “use all practicable means” to “assure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings.” Section 1502.6 states that analyses should be prepared using “an interdisciplinary approach which will ensure the integrated use of natural and social science and environmental design arts” (Section 102(2)(A)).

2.1.2 Federal Land Policy and Management Act

Section 102 (a)(8) of Federal Land Policy and Management Act (FLPMA) states that “the public lands be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values…”

2.1.3 Bureau of Land Management

2.1.3.1 Land Use Planning Handbook

The handbook (BLM 2005) states that visual resource management classes shall be designated for all BLM land based on consideration of Visual Resource Inventory (VRI) data and management considerations for other land uses. Resource use and management activities shall be managed according to the visual resource management objectives established in the land use plan.

2.1.3.2 Visual Resource Management System

Visual resources on BLM-administered lands are managed under the Visual Resource Management (VRM) System (BLM 1986). The system provides the framework by which to manage visual values by classifying all BLM-administered lands into one of four VRM classes. Visual values are established through the VRI process, which classifies scenery based on the assessment of three components: scenic quality, visual sensitivity, and distance zones. Each VRM class is defined by a specific management objective that describes the acceptable level of change to visual resources. Change in the resource is measured though implementation of the contrast rating procedure and by assessing change in visual resource inventory values. The BLM has completed the VRI for the Project site and surrounding areas located within the Palm Springs Field Office (FO) (BLM 2010). The BLM Palm Springs FO has assigned a Class III Interim VRM Objective to the Desert Quartzite Solar Project footprint (Dalton 2015). The VRM Class III objective is defined as follows:

> *Partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate (BLM 1986).*

2.1.3.3 California Desert Conservation Area Plan

The Riverside East Solar Energy Zone (SEZ) is located within the California Desert Conservation Area (CDCA) Plan area. The CDCA Plan of 1980 (as amended) designates all BLM-administered public lands in the CDCA, except for a few small and scattered parcels, geographically into four multiple-use classes: Class C (Controlled Use), Class L (Limited Use), Class M (Moderate Use), and Class I (Intensive Use). The classifications were based on the sensitivity of resources and type of uses for each geographic area. Each multiple-use class describes a different type and level or degree of use that is permitted within that geographic area. Land use actions and resource management activities on public lands within a multiple-use class delineation must meet the guidelines for each class. Lands within the Moderate Use Class are managed in a controlled balance between higher intensity use and protection. A wide variety of uses, such as mining, livestock grazing, recreation, and energy and utility development are allowed. Any damage caused by permitted uses must be mitigated. The proposed Project is located on lands designated as Moderate Multiple Use.

The CDCA outlines the following actions to manage for the alteration of the natural character of the landscape that could occur as part of the multiple-use activities described in the plan:

> *(1) The appropriate levels of management, protection, and rehabilitation on all public lands in the CDCA will be identified, commensurate with visual resource management objectives in the multiple-use class guidelines.*
>
> *(2) Proposed activities will be evaluated to determine the extent of change created in any given landscape and to specify appropriate design or mitigation measures using the Bureau's contrast rating process.*

The CDCA Plan stipulates that solar energy development and new electric transmission facilities are allowed on Class L, M, or I lands provided that NEPA requirements are met.

The Imperial Sand Dunes Recreation Area Management Plan (RAMP)/CDCA Plan Amendment established VRM classes for the Imperial Sand Dunes RAMP area within the CDCA. However, formal VRM classes were never established for most of the CDCA, including those that overlap the Project site.

A Section 368 federally designated, 2-mile (3-kilometer) wide energy corridor on BLM-administered lands overlaps the SEZ along I-10. There are also two north-south corridors within the SEZ that were designated as part of the CDCA Plan. One corridor is located in the western portion of the SEZ and one in the eastern portion.

2.1.3.4 Approved Resource Management Plan/Record of Decision for the Solar PEIS

The Record of Decision (ROD) for the Programmatic EIS (PEIS) for Solar Energy Development in Six Southwestern States (Solar PEIS) provides for ongoing implementation of the BLM's Solar Energy Program. As part of the Solar Energy Program, the BLM identified locations, referred to as SEZs, within this planning area considered suitable for utility production of solar energy (BLM 2012). The ROD contains information on anticipated land management plan revisions, including those that would be required for the Palm Springs- South Coast planning area. Appendix C of the ROD contains Design Features that would be required for projects constructed within the SEZ.

The Project is considered a "First in-line pending" application. The BLM defines "pending" applications as any applications filed within proposed variance and/or exclusion areas before the publication of the Supplement to the Draft Solar Programmatic Environmental Impact Statement (PEIS) (October 28, 2011), and any applications filed within proposed solar energy zones (SEZs) before June 30, 2009. Pending applications will not be subject to any new program elements adopted by the Solar PEIS ROD (BLM 2012).

2.1.4 Federal Aviation Administration

The Federal Aviation Administration (FAA) has established an interim policy for proposals by sponsors of federally obligated airports to construct solar energy systems on airport property (78 FR 63276). The interim policy also requires use of the Solar Glare Hazard Analysis Tool (SGHAT) for assessing glare-induced ocular impact. Solar energy systems that are located on a non-federally obligated airport or located off airport property are not subject to this policy; however, they are strongly encouraged to consider the requirements established in the interim policy when siting the project. The Project is not located on a federally obligated airport. However, Riverside County has requested that a glare analysis be performed for the Project. The interim policy provides the following standards for measuring ocular impact of a proposed solar energy system:

1. *No potential for glint or glare in the existing or planned Airport Traffic Control Tower (ATCT) cab, and*
2. *No potential for glare or ''low potential for after-image'' along the final approach path for any existing landing threshold or future landing thresholds (including any planned interim phases of the landing thresholds) as shown on the current FAA-approved Airport Layout Plan (ALP). The final approach path is defined as two (2) miles from fifty (50) feet above the landing threshold using a standard three (3) degree glidepath. Ocular impact must be analyzed over the*

entire calendar year in one (1) minute intervals from when the sun rises above the horizon until the sun sets below the horizon.

2.2 STATE OF CALIFORNIA

2.2.1 California Environmental Quality Act

In accordance with Appendix G of the California Environmental Quality Act Guidelines, a project would result in a significant impact on aesthetics and visual quality if the project would meet at least one of the following criteria:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings; and/or
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area or create substantial shadow on a sensitive use.

In addition, a project would have a significant impact if the project would introduce elements that would conflict with the visual character of a historic district, State- or federally-listed or eligible historic property, and/or substantially affect a feature or area identified as an important visual resource. By contrast, the project would be considered to result in a beneficial visual impact if the project would eliminate a dominant feature in the landscape that currently detracts from scenic qualities or blocks scenic vistas, or if the project would provide new scenic views that are not currently available.

2.3 RIVERSIDE COUNTY

2.3.1 Riverside County General Plan and Palo Verde Valley Area Plan

The Riverside County General Plan and Palo Verde Valley Area Plan contain policies to protect the scenic quality of views from designated and eligible scenic highways. Per the County of Riverside General Plan, I-10 is eligible for designation as a Riverside County Scenic Highway, and provides motorists with desert views across the mesa to the mountains. Policies applicable to the Project that pertain to the protection of visual resources are provided below (County of Riverside 2008). The County of Riverside considers scenic resources to include areas visible to the public that are generally considered visually attractive, including scenic corridors, natural landmarks, and prominent or unusual features. Scenic vistas are considered points that provide a view of the countryside and are accessible to the general public (County of Riverside 2008). Relevant policies include the following:

- **PVVAP 10.1:** “Protect the scenic highways in the Palo Verde Valley planning area from change that would diminish the aesthetic value of adjacent properties in accordance with the Scenic Corridors sections of the General Plan Land Use, Multipurpose Open Space, and Circulation Elements.”
- **C 19.1:** “Preserve scenic routes that have exceptional or unique visual features in accordance with Caltrans’ Scenic Highways Plan.”
- **OS 21.1:** “Identify and conserve the skylines, view corridors, and outstanding scenic vistas within Riverside County.”
- **OS 22.4:** “Impose conditions on development within scenic highway corridors requiring dedication of scenic easements consistent with the Scenic Highways Plan, when it is necessary to preserve unique or special visual features.”

2.3.2 Riverside County Airport Land Use Compatibility Plan

The Riverside County Airport Land Use Compatibility Plan (adopted 2004) identifies several countywide policies that apply to projects proposed within the Airport Land Use Compatibility Zones (Compatibility Zone E for portion of this Project) and relate to glare, which require review by the Airport Land Use Commission (ALUC). The Project has prepared a Glare Study analyzing Project effects which is included as part of an Application for Major Land Use Action Review submitted to the Riverside County ALUC.

SECTION 3.0
METHODS

3.1 ANALYSIS AREA

The study area for the visual resources assessment was defined by a 20-mile radius surrounding the Project site. This area was selected based on the assumption that: 1) visibility of the project would attenuate at this distance when observed from inferior or at-grade observer positions; and 2) visual contrast of the Project would be weak when viewed from higher elevations at this distance.

The study area was refined based on the results of viewshed analyses prepared for major Project components. Potential Project visibility is determined based on the relationship between topography, height of the proposed Project, and average eye height of the viewer. The results identify locations within the study area where the Project could potentially be seen, and locations where it is shielded by existing topography. The analysis is conservative, as it does not account for the potential screening of Project features by vegetation or structures. The resulting viewshed map illustrates the area where Project components could potentially be seen; however, it does not represent any measure of actual visibility.

Two viewshed models were prepared for the proposed Project, with each representing potential visibility of: 1) the anemometer, poles, and gen-tie (Figure 3-1); and 2) the solar arrays (Figure 3-2). The viewshed origin included the following worst-case assumptions:

- Solar Arrays: Panel height of 13 feet
- Anemometers: Maximum pole height of 30 feet
- 34.5 kV Collector Poles: Maximum pole height of 70 feet
- Gen-tie: Maximum pole height of 200 feet (note: conservative given maximum proposed gen-tie structure height is 135 feet)
- 10-meter digital elevation model

The viewshed models indicated potential visibility of the solar arrays across the Palo Verde Valley, with geographic extent limited by surrounding high elevation landforms of the McCoy, Palo Verde, and Chuckwalla Mountains. The viewshed of the anemometers, 34.5 kV collector poles, and gen-tie extended farther to the surrounding valleys due to the taller height of these components.

3.2 BASELINE CONDITIONS ASSESSMENT

Baseline (existing) conditions were described at multiple scales, including the regional landscape setting, the analysis area (using VRI data prepared for the Palm Springs FO [BLM

2010]), and at a localized scale using Key Observation Points (KOP). This approach evaluates baseline conditions at two spatial scales: Landscape-level scale, in which the regional landscape setting and scenic values are defined; and project-scale, in which the project site is assessed from KOPs (BLM 1986). The purpose of this framework is to understand potential impacts in a manner that is scalable, whereby KOPs are used to identify specific impact mechanisms that can be evaluated within in the larger scale context of the BLM Palm Springs Field Office (FO) planning area. The VRI data was obtained from the Visual Resource Inventory for the Palm Springs/South Coast FO (BLM 2010). Baseline conditions at KOPs were assessed in the field. Fieldwork was completed on February 25, 2015. The field team included representatives from BLM, First Solar, Truescape, and URS. Conditions during the site visit were clear and dry, with light wind.

3.2.1 Visual Resource Inventory

As part of its land use planning process, the BLM maintains an inventory of visual values within the planning area. Visual values are established through the VRI process, which classifies visual resources into one of four VRI classes based on the assessment of three components: scenic quality, visual sensitivity, and distance zones. These VRI classes and their components provide baseline measurements of existing conditions within the planning area.

Scenic quality is defined as the visual appeal of a tract of land and is determined using a systematic process to classify lands into one of three scenic quality categories: A, B, or C (BLM 1986). Class A represents the highest scenic quality, and C represents the lowest scenic quality. The first step in the scenic quality assessment process entails dividing the landscape into Scenic Quality Rating Units (SQRU) based on conspicuous changes in physiography or land use. Scenic quality within each SQRU is then ranked based on the assessment of seven key factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modification. Each key factor is scored, and the value of each is added to derive an overall score for the unit.

Visual sensitivity is defined as a measure of public concern for scenic quality (BLM 1986). Visual sensitivity within the planning area is determined by the Sensitivity Level Analysis (SLA), and is completed in two steps: 1) Delineation of Sensitivity Level Rating Units (SLRU), and 2) Rating visual sensitivity within each SLRU. SLRUs represent a geographic area where public sensitivity to change of the visual resources is shared amongst constituents. The unit boundaries may be defined by a single factor driving the sensitivity consideration, or factors driving sensitivity may extend across numerous SLRUs. Units are thus derived, in part, by the consideration of factors analyzed in the SLA. For example, constituents of a residential area are assumed to share a high sensitivity to change in visual resources of views from their homes. In such an example, an SLRU defining the general viewshed of this community would be established based on knowledge and assumptions of shared sensitivity of this area. Visual sensitivity ratings within each SLRU are estimated as high, medium, or low based on the categories and criteria described below:

- **Type of Users.** Visual sensitivity is expected to vary by type of user. For example, recreational sightseers may be highly sensitive to any changes in visual quality, whereas workers who pass through the area on a regular basis may not be as sensitive to change. This category is rated High where maintenance of visual quality is a major concern for most users, Moderate where maintenance of visual quality is a moderate concern for most users, and Low where maintenance of visual quality is a low concern for most users (BLM 1986).
- **Amount of Use.** Visual sensitivity is expected to vary by amount of use. For example, areas seen and used by large numbers of people are potentially more sensitive. Protection of visual values usually becomes more important as the number of viewers increase. This category is rated high for high levels of use, moderate for moderate levels of use, and low for low levels of use as defined below (BLM 1986):
    - **High.** Roads and highways (greater than 45,000 visits per year), rivers and trails (greater than 20,000 visits per year), and recreation sites (greater than 10,000 visitor days per year)
    - **Moderate.** Roads and highways (5,000–45,000 visits per year), rivers and trails (2,000–20,000 visits per year), and recreation sites (2,000–10,000 visitor days per year)
    - **Low.** Roads and highways (fewer than 5,000 visits per year), rivers and trails (less than 2,000 visits per year), and recreation sites (fewer than 2,000 visitor days per year)
- **Public Interest.** The visual quality of an area may be of concern to local, State, or National groups. Indicators of this concern are usually expressed in public meetings, letters, newspaper or magazine articles, newsletters, land-use plans, or public controversy created in response to proposed activities that is perceived to result in change to the landscape character. This category is rated High where maintenance of visual quality is a major public issue, Moderate where maintenance of visual quality is a moderate public issue, and Low where maintenance of visual quality is a minor public issue (BLM 1986).
- **Adjacent Land Uses.** The interrelationship with land uses in adjacent lands can affect the visual sensitivity of an area. For example, an area within the viewshed of a residential area may be very sensitive, whereas an area surrounded by commercially developed lands may not be visually sensitive. This category is rated High where maintenance of visual quality to sustain adjacent land use objectives is very important, Moderate where maintenance of visual quality to sustain adjacent land use objectives is moderately

important, and Low where maintenance of visual quality to sustain adjacent land use objectives is slightly important (BLM 1986).

- **Special Areas.** Management objectives for special areas such as Natural Areas, Wilderness Areas, or Wilderness Study Areas frequently require special consideration for the protection of the visual values. This designation does not necessarily indicate high scenic quality, but rather the potential for management objectives to be aimed at preservation of the natural landscape setting. This category is rated High where maintenance of visual quality to sustain Special Area management objectives is very important, Moderate where maintenance of visual quality to sustain Special Area management objectives is moderately important, and Low where maintenance of visual quality to sustain Special Area management objectives is slightly important (BLM 1986).
- **Other Factors.** Additional information, such as research or studies that includes indicators of visual sensitivity, should be included in the sensitivity level analysis when available.

Distance zones represent the distance from which the landscape is most commonly viewed and are established by buffering common travel routes and viewer locations at distances of 3 miles, 5 miles, and 15 miles. Because of the relationship between distance and viewer perception, distance zones can also be used to estimate visual thresholds, as a viewer’s ability to detect attributes of form, line, color, and texture is expected to decrease with distance. Distance zones are defined as follows (BLM 1986):

- **Foreground-Middleground.** This is the area that can be seen from a particular location to a distance up to 5 miles. The outer boundary of this distance zone is described as the point where the texture and form of individual plants are no longer apparent in the landscape. In some areas, atmospheric conditions can reduce visibility and shorten the distance normally covered by each zone.
- **Background.** The background includes locations that can be seen between a distance of 5 and 15 miles. The background zone does not include areas in the background that are so far distant that the only thing discernible is the form or outline. In order to be included within this distance zone, vegetation should be visible at least as patterns of light and dark.
- **Seldom-seen Zone.** These are areas that are generally not visible within the foreground-middleground and background, or portions which are visible but beyond the background distance of 15 miles.

3.2.2 Key Observation Points

Visual resources and viewer groups located within the analysis area were identified by desktop review of relevant planning documents and the VRI prepared for the BLM Palm

Springs FO (BLM 2010). Based on this review, a list of potential KOP locations was identified and provided to the BLM for feedback on their suitability for use in the visual impact assessment. A subset of 12 KOP locations as listed below was selected for field review:

- Bradshaw Trail
- California State Route 78
- Chuckwalla Desert Wildlife Management Area (DWMA)/Area of Critical Environmental Concern (ACEC)
- Colorado River
- Community of Ripley
- Interstate 10
- McCoy Mountains
- Mule Mountains ACEC
- Palen/McCoy Wilderness
- Town of Nicholls Warm Springs/Mesa Verde
- Midland Long Term Visitor Center (LTVA) (eliminated)
- Palo Verde College (eliminated)

Following field review, Midland Long-Term Visitor Center (LTVA) and Palo Verde College were eliminated due to lack of visibility of the Project site.

Through discussions with the BLM, the following additional 8 KOPs were not carried forward for analysis due to their low potential for Project visibility from their locations:

- Big Maria ACEC
- Blythe Airport
- Cibola National Wildlife Refuge
- City of Blythe
- County of Riverside Mayflower Park
- Ironwood State Prison (ISP)/Chuckwalla Valley State Prison
- Little Chuckwalla Mountains Wilderness
- Mule Mountains LTVA

Final KOPs were approved by the BLM. A description of KOPs (e.g., type of viewer, estimated amount of use, and distance zone, etc.) selected for the analysis, including those KOPs that were considered, but eliminated, are described in Appendix A. A map of the candidate KOP study area that was evaluated is also presented in Appendix A (Figure A-1). Final KOP locations are shown on Figure 3-1 through Figure 4-5.

3.3 IMPACT ASSESSMENT

Impacts to visual resources were assessed using a combination of: 1) the Visual Contrast Rating Procedure (BLM 1986), and 2) the VRI analysis. The results of these analyses were collectively used to inform a conformance determination to the Interim VRM Class III

Objective assigned to the Project footprint. The Project has prepared a separate Glare Study analyzing Project effects which is included as part of an Application for Major Land Use Action Review submitted to the Riverside County ALUC (submitted September 25, 2015).

3.3.1 Contrast Rating

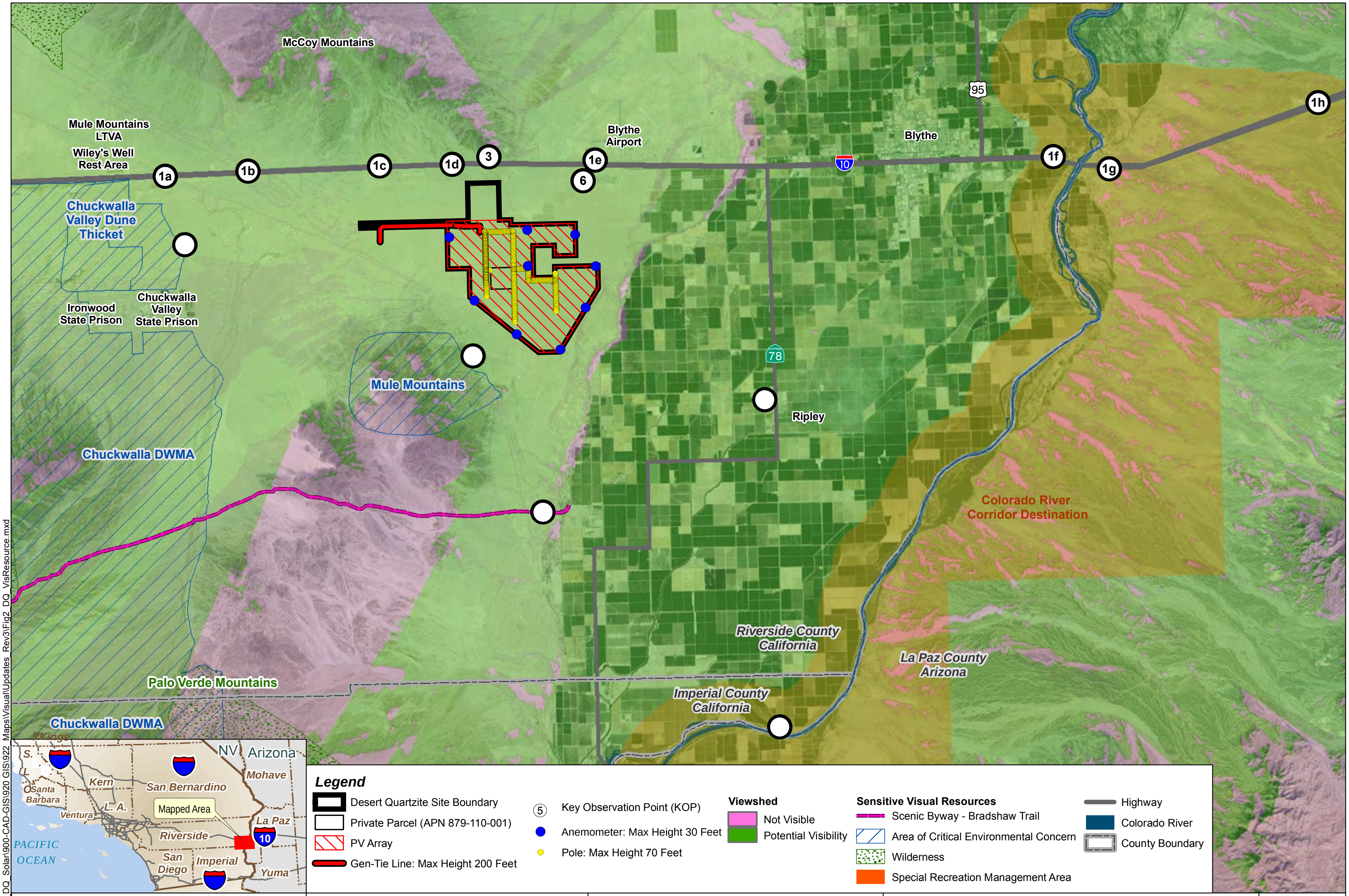
The Visual Contrast Rating Procedure assumes the extent to which a project results in adverse effects to visual resources is a function of the visual contrast between the project and the existing landscape (BLM 1986). This procedure was implemented at each KOP, and focused on identifying changes in form, line, color, and texture, considering the following environmental factors: distance, viewer geometry, duration of view, motion, atmospheric conditions, light conditions, scale, and spatial relationships (BLM 1986, 2013). Viewer exposure was assumed to be year-round; therefore, seasonality was not considered as a differentiating environmental factor in the analysis. Visual contrast was defined per BLM (1986), as follows:

- **None.** The element contrast is not visible or perceived.
- **Weak.** The element contrast can be seen but does not attract attention.
- **Moderate.** The element contrast begins to attract attention and begins to dominate the characteristic landscape.
- **Strong.** The element contrast demands attention, would not be overlooked, and is dominant in the landscape.

The contrast rating was completed using visual simulations of the proposed Project prepared by Truescape based on photographs taken at the KOPs. Photographs were taken using a digital SLR 1:1, 21 megapixel camera, ensuring a high level of resolution and clarity for generating visual simulations. A collection of photographs were taken at each KOP such that multiple images could be overlaid to create a panoramic representing the primary human vertical and horizontal field of view. Simulations were prepared using a true-to-scale digital 3D model of the Project and spatial data indicating locations of Project features. Project design-related specifications used in the model were provided by the Applicant. Locations of KOPs as well as target objects used for accurate alignment of the 3D model to the photography were surveyed using professional grade survey instruments. A 3D model of the Project site area was generated using land contour data and the proposed solar facilities modelled in 3D were then imported and positioned accurately into the individual photo simulation views. Simulations were produced using Autodesk 3D Studio Max Design and Adobe Photoshop. The resulting photo simulation represents the appearance of the Project within the primary human field of view when viewed from a position located 19.7 inches back from the photo.

3.3.2 Visual Resource Inventory Analysis

An analysis was conducted to identify potential change in VRI values of scenic quality and visual sensitivity for portions of BLM-administered lands within the Palm Springs FO planning area as a result of the Desert Quartzite Solar Project. This analysis identified the expected change in VRI values by comparing scenic quality and visual sensitivity classifications under the operational phase of the Project to original ratings provided in the BLM's VRI of the Palm Springs FO (BLM 2010). Because no additional major roads are required or proposed by the Project, it is assumed that there would be no change in visual distance zones, as primary viewer platforms would remain the same (I-10 and SR-78). The analysis was restricted to SQRUs and SLRUs that overlap with the Project site and/or its viewshed.


McCoy Mountains
Mule Mountains LTVA
Wiley's Well Rest Area
1a
1b
1c
1d
3
1e
6
Blythe Airport
Blythe
95
10
1f
1g
1h
Chuckwalla Valley Dune Thicket
Ironwood State Prison
Chuckwalla Valley State Prison
Mule Mountains
78
Ripley
Chuckwalla DWMA
Colorado River Corridor Destination
Riverside County California
La Paz County Arizona
Imperial County California
Palo Verde Mountains
Chuckwalla DWMA
Kings
S.
L
Santa Barbara
Kern
San Bernardino
NV
Arizona
Mohave
L. A.
Mapped Area
Ventura
Riverside
La Paz
10
PACIFIC OCEAN
San Diego
Imperial
Yuma
Legend
Desert Quartzite Site Boundary
Private Parcel (APN 879-110-001)
PV Array
Gen-Tie Line: Max Height 200 Feet
5
Key Observation Point (KOP)
Anemometer: Max Height 30 Feet
Pole: Max Height 70 Feet
Viewshed
Not Visible
Potential Visibility
Sensitive Visual Resources
Scenic Byway - Bradshaw Trail
Area of Critical Environmental Concern
Wilderness
Special Recreation Management Area
Highway
Colorado River
County Boundary

Visual Resources
Desert Quartzite Solar Project
Riverside County, CA

URS (an AECOM Company)

0 1 2 3 Miles
0 5,000 10,000 15,000 Feet

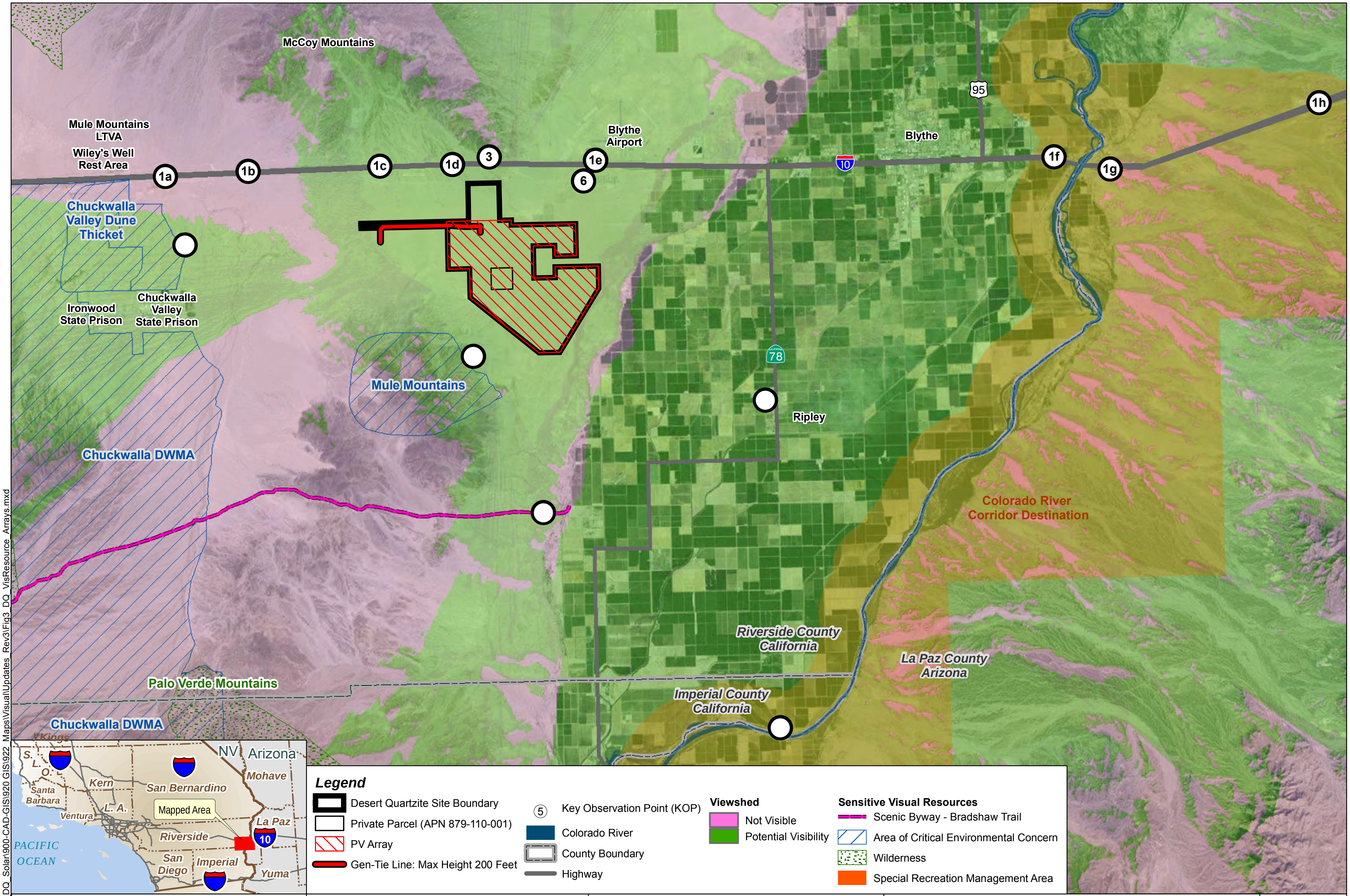
N

Source: [1] Aerial Imagery (Microsoft 2011), [2] Roads, Boundaries, Cities, River (Esri 2012). [3] Sensitive Visual Resources (Solar PEIS 2014). [4] Project Features (First Solar 2014).

Figure 3-1. KOP Locations - Viewshed Analysis: Poles, Gen-Tie, Anemometer

2015

P:\ 6041\60419825 DQ Solar\900-CAD-GIS\920 GIS\922 Maps\Visual\Updates Rev3\Fig2 DQ VisResource.mxd


McCoy Mountains
Mule Mountains LTVA
Wiley's Well Rest Area
1a
1b
1c
1d
3
1e
6
Blythe Airport
95
Blythe
10
1f
1g
1h
Chuckwalla Valley Dune Thicket
Chuckwalla Valley State Prison
Ironwood State Prison
Mule Mountains
78
Ripley
Chuckwalla DWMA
Colorado River Corridor Destination
Riverside County California
La Paz County Arizona
Imperial County California
Palo Verde Mountains
Chuckwalla DWMA
Kings
S. L. O.
Santa Barbara
Kern
San Bernardino
NV
Arizona
Mohave
Ventura
L. A.
Mapped Area
Riverside
La Paz
10
PACIFIC OCEAN
San Diego
Imperial
Yuma
Legend
Desert Quartzite Site Boundary
Private Parcel (APN 879-110-001)
PV Array
Gen-Tie Line: Max Height 200 Feet
5 Key Observation Point (KOP)
Colorado River
County Boundary
Highway
Viewshed
Not Visible
Potential Visibility
Sensitive Visual Resources
Scenic Byway - Bradshaw Trail
Area of Critical Environmental Concern
Wilderness
Special Recreation Management Area

Visual Resources
Desert Quartzite Solar Project
Riverside County, CA

URS (an AECOM Company)

N
0 1 2 3 Miles
0 5,000 10,000 15,000 Feet

Source: [1] Aerial Imagery (Microsoft 2011), [2] Roads, Boundaries, Cities, River (Esri 2012). [3] Sensitive Visual Resources (Solar PEIS 2014). [4] Project Features (First Solar 2014).

Figure 3-2. KOP Locations - Viewshed Analysis: Solar Arrays

2015

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SECTION 4.0
EXISTING BASELINE CONDITIONS

4.1 EXISTING BASELINE VISUAL RESOURCES

The landscape setting of the analysis area is generally characterized by large expanses of desert and agricultural croplands. The Project site includes the broad, flat Chuckwalla Valley, Palo Verde Mesa and the rugged ranges of the Big Maria Mountains to the northeast, Mule Mountains to the south, the McCoy Mountains to the north, and the Palo Verde Valley to the east. These mountains are recognized as unique features by Riverside County and form a backdrop that provides scale, variety, interest, and enclosure to this broad landscape (Riverside County 2014). Vegetation is primarily composed of creosote scrub, which sparsely covers the landscape but also includes wheat, alfalfa, and citrus orchards. To the east, contiguous agricultural land extends north to south, appearing as a lush, flat valley floor. This area is patterned and colored by a constantly changing array of cultivated crops and contains the majority of development in the area. There is a stark visual contrast between the fertile, highly irrigated agricultural lands and the arid desert to the west and north. The Colorado River meanders to the east of the Project site and is considered a remarkable natural resource and recreational attraction by the County of Riverside (County of Riverside 2008).

Though the analysis area is characterized by large areas of undeveloped land, industrial, commercial, and residential development is present in adjacent areas, including:

- The Blythe Energy Center, a 520 MW combined-cycle power plant
- The Blythe Solar Project, a 21 MW PV solar facility and gen-tie located immediately to the north of the proposed Project site
- The SCE Colorado River Substation, located west of the proposed Project
- Multiple existing high voltage transmission lines adjacent to the northern, eastern, western, and southern boundaries of the Project site
- I-10, running in an east/west direction and located to the north of the proposed Project site
- The Blythe Municipal Airport, located north of the proposed Project
- Chuckwalla and Ironwood Prisons, located to the west of the proposed Project site
- The communities of Blythe, Ripley, and Nicholls Warm Springs/Mesa Verde, located generally to the east of the proposed Project

Results of the baseline conditions assessment are described below, including planning-level VRI values (scenic quality, visual sensitivity, and distance zones), and KOPs.

4.2 VISUAL RESOURCE INVENTORY VALUES: BLM PALM SPRINGS FIELD OFFICE

The Project site is located in an area designated as VRI Class II, indicating high scenic value (Figure 4-1). Results of the BLM's VRI for the Palm Springs FO planning area (BLM 2010) that are within or partially within the Project site and its viewshed are summarized below.

4.2.1 Scenic Quality

The Project site overlaps the following SQRUs that were delineated in the Palm Springs FO planning area VRI: 021 (Chuckwalla Valley), 026 (McCoy Mountains), 036 (Blythe Valley), 037 (Palo Verde), 038 (Mule Mountains), and 039 (Little Chuckwalla Mountains) (Figure 4-2). Scenic quality for each unit is summarized in Table 4-1, below.

TABLE 4-1
SCENIC QUALITY RATING SUMMARY[1]

Scenic Quality Rating Unit	Rating[2]	Rationale
021	B	Dramatic mountains surrounding area; some cultural modification but overall natural-appearing.
026	C	Landscape lacks naturalness.
036	B	Adjacent scenery enhances flat landscape with some variation in vegetation and color.
037	C	Desert pavement adds color contrast to low, rolling landform with moderate views. Roads, power lines, and trash detract.
038	B	Interesting detail; landform features with subtle color variation and moderate views of adjacent units.
039	B	Some interesting landforms and color contrast with sparse vegetation and moderate views of adjacent scenery.

[1] Source: BLM 2010.

[2] Refer to Section 3.2.1 for description of ratings.

4.2.1.1 SQRU 021 – Chuckwalla Valley

SQRU 021 encompasses the Chuckwalla Valley, extending from the City of Blythe, California, northwest to Midland, and west to Desert Center. Scenic Quality was ranked as Class B (Table 4-2). This unit is characterized as a broad, enclosed landscape bordered by the rugged Mule, McCoy, Palen, Big Maria, and Chuckwalla Mountains. The valley bottom is characterized as vast, low, and gently rolling. Some variety in vegetation exists and is considered somewhat visually dominant. The area appears natural, despite some cultural modification (BLM 2010).

TABLE 4-2
SCENIC QUALITY RATING: SQRU 021 CHUCKWALLA VALLEY[1]

Criteria	Rating	Rationale
Landform	1	Vast, low, gently rolling valley bottom
Vegetation	3	Some variety in vegetation; one or two major types
Water	0	None present
Color	2	Subtle variation
Adjacent scenery	4	Dramatic mountains surrounding area
Scarcity	2	Fairly distinctive but not unusual
Cultural modification	0	Some cultural modification but overall natural- appearing
Total score	12	
Scenic quality rating[2]	B	12–18 points

[1] Source: BLM 2010.

[2] Refer to Section 3.2.1 for description of ratings.

4.2.1.2 SQRU 026 – McCoy Mountains

SQRU 026 is located in the McCoy Mountains, north of the Project site. The unit is characterized as a naturally appearing, rugged, and highly eroded mountain range. Vegetation is sparse, with little variety. Colors are generally monotone, with some contrast between the grey tones of the rock and brown tones of the soil. Adjacent scenery of neighboring Joshua Tree National Park, and the Palen, McCoy, and Big Maria Wilderness Areas, enhance scenic quality of this unit. Evidence of surface mining and milling exists and is considered discordant. Scenic quality was ranked as C (Table 4-3) (BLM 2010).

4.2.1.3 SQRU 036 – Blythe Valley

SQRU 036 is located east of the Project site, surrounding the City of Blythe, California. The unit contains primarily private lands characterized by agricultural, industrial, and residential uses. Topography is flat to rolling, with little variety. Though evidence of cultural modification exists, it does not detract from the overall scenic quality and is considered consistent with the prevailing landscape character. Overall scenic quality was ranked as Class B (Table 4-4) (BLM 2010).

4.2.1.4 SQRU 037 – Palo Verde

SQRU 037 is located south of the Project site, encompassing an area generally south of the Mule Mountains and west of Blythe Valley. The unit is characterized by a series of washes, separated by low, rolling, and rocky landforms. Roads, powerlines, and trash are considered discordant and detract from overall scenic quality. Overall scenic quality was ranked as Class C (Table 4-5) (BLM 2010).

TABLE 4-3
SCENIC QUALITY RATING: SQRU 026 McCOY MOUNTAINS[1]

Criteria	Rating	Rationale
Landform	3	Rugged Mountains, deep canyons
Vegetation	1	Little variety; not noticeable
Water	0	None present
Color	2	Some contrast between soil and rock
Adjacent scenery	4	Dramatic adjacent National Park and Wilderness
Scarcity	2	Somewhat distinctive but not unusual
Cultural modification	-2	Landscape significantly modified by surface mining/milling
Total score	10	
Scenic quality rating[2]	C	11 points or less

[1] Source: BLM 2010.

[2] Refer to Section 3.2.1 for description of ratings.

TABLE 4-4
SCENIC QUALITY RATING: SQRU 036 BLYTHE VALLEY[1]

Criteria	Rating	Rationale
Landform	1	Not much variety
Vegetation	3	Some variety
Water	1	Minor presence
Color	3	Some variation
Adjacent scenery	3.5	Enhances
Scarcity	1	Common in area
Cultural modification	0	Expected in this setting
Total score	12.5	
Scenic quality rating[2]	B	12–18 points

[1] Source: BLM 2010.

[2] Refer to Section 3.2.1 for description of ratings.

4.2.1.5 SQRU 038 – Mule Mountains

SQRU 038 is located south of the Project site in the Mule Mountains. This unit is characterized by interesting detail in landform created by a linear series of rough, serrated formations that appear prominent against the surrounding valley. Some evidence of mining exists; however, it is not dominant and does not detract from scenic quality. Overall scenic quality was ranked as Class B (Table 4-6) (BLM 2010).

TABLE 4-5
SCENIC QUALITY RATING: SQRU 037 PALO VERDE[1]

Criteria	Rating	Rationale
Landform	1.5	Low and rolling, washes
Vegetation	2	Not a lot of variety
Water	0.5	Washes
Color	3	Desert pavement contrast
Adjacent scenery	3.5	Moderate views of adjacent units
Scarcity	2	Similar
Cultural modification	-1.5	Roads, power lines, trash
Total score	11	
Scenic quality rating[2]	C	11 points or less

[1] Source: BLM 2010.

[2] Refer to Section 3.2.1 for description of ratings.

TABLE 4-6
SCENIC QUALITY RATING: SQRU 038 MULE MOUNTAINS[1]

Criteria	Rating	Rationale
Landform	3.5	Interesting detail feature
Vegetation	1	Sparse
Water	0	Not present or noticeable
Color	2.5	Subtle variation
Adjacent scenery	3	Moderate views of adjacent units
Scarcity	2.5	Common
Cultural modification	0	Not very noticeable
Total score	12.5	
Scenic quality rating[2]	B	12–18 points

[1] Source: BLM 2010.

[2] Refer to Section 3.2.1 for description of ratings.

4.2.1.6 SQRU 039 – Little Chuckwalla Mountains

SQRU 039 is located west of the Project site, adjacent to the Little Chuckwalla Mountains Wilderness Area. The unit transitions from the rough formations of the Little Chuckwalla Mountains toward the Chuckwalla Valley to the east. Overall, the area appears natural, with no evidence of cultural modification. Vegetation is sparse. Overall scenic quality was ranked as Class B (Table 4-7) (BLM 2010).

TABLE 4-7
SCENIC QUALITY RATING: SQRU 039 LITTLE CHUCKWALLA MOUNTAINS[1]

Criteria	Rating	Rationale
Landform	3.5	Some interest
Vegetation	1	Sparse
Water	0	Not present or noticeable
Color	3.5	Interesting contrast
Adjacent scenery	3	Moderate views
Scarcity	2.5	Not scarce
Cultural modification	0	None present
Total score	13.5	
Scenic quality rating[2]	B	12–18 points

[1] Source: BLM 2010.

[2] Refer to Section 3.2.1 for description of ratings.

4.2.2 Visual Sensitivity

The Project site is located in SLRU 49, Bradshaw Trail Backcountry Byway. Adjacent SLRUs that overlap the Project viewshed include the McCoy Mountains (SLRU 26), Mule Mountains (SLRU 46), and Little Chuckwalla Mountains (SLRU 39) (Table 4-8) (Figure 4-3).

4.2.2.1 SLRU 49 – Bradshaw Trail Backcountry Byway

The Project site is located in SLRU 49, Bradshaw Trail Backcountry Byway. This unit encompasses the eastern portion of the Chuckwalla Valley, extending from approximately the McCoy Mountains, south to the Palm Springs FO planning area boundary, and east to the Little Chuckwalla Mountains. Visual sensitivity was classified as high, primarily due to presence of the Byway, high OHV use, and importance of maintaining scenic quality to sustain land use objectives of neighboring Wilderness Areas, ACECs, and military ranges (Table 4-9) (BLM 2010).

4.2.2.2 SLRU 26 – McCoy Mountains

SLRU 26 is located north of the Project site in the McCoy Mountains. Visual sensitivity of this unit was ranked as medium, as it is not considered a primary recreation destination

(Table 4-10). Maintenance of scenic quality is of moderate importance as it is a visual backdrop for the I-10 corridor and is part of the CDCA (BLM 2010).

TABLE 4-8
VISUAL SENSITIVITY RATINGS – DESERT QUARTZITE PROJECT AREA[1]

Sensitivity Level Rating Unit	Overall Rating[2]	Rationale
Bradshaw Trail National Backcountry Byway	H	Backcountry Byway with high OHV use.
McCoy Mountains	M	Part of the California Desert Conservation Area (CDCA) and an important visual backdrop along the I-10 corridor.
Mule Mountain	H	Area of Critical Environmental Concern; part of CDCA.
Little Chuckwalla Mountains	M	Not a lot of use.

[1] Source: BLM 2010.

[2] Refer to Section 3.2.1 for description of ratings.

TABLE 4-9
VISUAL SENSITIVITY: SLRU 49 BRADSHAW TRAIL[1]

Criteria	Rating[2]	Rationale
Type of use	M	OHV, camping in the area, rural travelers
Amount of use	H	Indication of high OHV use, popular trail
Public interest	H	Backcountry Byway, historic trails
Adjacent land use	H	Military range, wilderness, various Areas of Critical Environmental Concern
Special areas	H	Part of California Desert Conservation Area
Other factors	NP	National designation
Overall rating	H	Backcountry Byway with high OHV use.

[1] Source: BLM 2010.

[2] Refer to Section 3.2.1 for description of ratings.

4.2.2.3 SLRU 46 – Mule Mountains

SLRU 46 is a small unit located south of the Project site in the Mule Mountains. Visual sensitivity was ranked as medium, largely due to low recreation use and limited access. The area is recognized for its proximity to the Mule Mountains Long Term Visitor Area, its designation as an ACEC, and its inclusion in the CDCA (Table 4-11) (BLM 2010).

4.2.2.4 SLRU 39 – Little Chuckwalla Mountains

SLRU 39 is a small unit located southwest of the Project site in the Little Chuckwalla Mountains. Visual sensitivity is classified as medium (Table 4-12), largely because it is located in the viewshed of I-10 and is part of the CDCA. Maintenance of scenic quality is also considered important to sustain neighboring Wilderness Areas and the Chuckwalla Valley. The area is characterized by limited access and low use (BLM 2010).

TABLE 4-10
VISUAL SENSITIVITY: SLRU 26 MCCOY MOUNTAINS[1]

Criteria	Rating[2]	Rationale
Type of use	L	Mining, some recreation
Amount of use	L	Not a significant recreational attraction
Public interest	M	Part of CDCA
Adjacent land use	M	Visual backdrop for Blythe and I-10 corridor
Special areas	H	Part of CDCA
Other factors	NP	Not present
Overall rating	M	Part of the CDCA and an important visual backdrop along the I-10 corridor

[1] Source: BLM 2010.

[2] Refer to Section 3.2.1 for description of ratings.

TABLE 4-11
VISUAL SENSITIVITY: SLRU 46 MULE MOUNTAINS[1]

Criteria	Rating[2]	Rationale
Type of use	L	Not very accessible
Amount of use	L	Low use
Public interest	M	Proximity to Long-term Visitor Area
Adjacent land use	M	Valley, Mule Mountains
Special areas	H	ACEC; part of CDCA
Other factors	NP	Not present
Overall rating	M	Some concern

[1] Source: BLM 2010.

[2] Refer to Section 3.2.1 for description of ratings.

4.2.3 Distance Zones

The proposed Project is located in the foreground-middleground distance zone, indicating visibility of this area from locations within 3-5 miles from viewing platforms (Figure 4-4). Primary viewing platforms include I-10 and SR-78 (BLM 2010).

TABLE 4-12
VISUAL SENSITIVITY: SLRU 39
LITTLE CHUCKWALLA MOUNTAINS[1]

Criteria	Rating[2]	Rationale
Type of use	L	Possible 4x4
Amount of use	L	Not much access
Public interest	M	Seen from highway
Adjacent land use	M	Wilderness, valley
Special areas	H	Part of CDCA
Other factors	NP	Not present
Overall rating	M	Not a lot of use

[1] Source: BLM 2010.

[2] Refer to Section 3.2.1 for description of ratings.

4.3 KEY OBSERVATION POINTS

Fifteen KOPs were established to evaluate baseline conditions and potential impacts to visual resources. Eight of the KOPs represent different locations along a linear corridor (I-10) and are collectively considered a “linear KOP” (Figure 4-5). Table 4-13 below summarizes environmental factors that could influence Project visibility and visual contrast level. The following subsections describe existing landscape character and scenic quality attributes as viewed from each KOP, including discussions of relevant human and environmental factors that could affect potential visibility toward the Chuckwalla Valley and Palo Verde Mesa.

TABLE 4-13
KEY OBSERVATION POINTS[1]

KOP	Location	Distance From Project (Approximate Miles)	Viewer Geometry	Duration of View
KOP 1a–1h	Interstate 10	0.5-15	At grade	Temporary/intermittent
KOP 2	Chuckwalla DWMA	5.0	At grade	Sustained/intermittent
KOP 3	McCoy Mountains	0.5	Superior	Sustained/intermittent
KOP 4	Mule Mountains	1.0	Superior	Sustained/intermittent
KOP 5	Bradshaw Trail	4.0	At grade	Intermittent
KOP 6	Nicholls Warm Springs/ Mesa Verde	1.0	At grade	Sustained
KOP 7	Community of Ripley	6.0	At grade	Sustained
KOP 8	Colorado River	12.0	At grade	Sustained

[1] KOP locations are shown on Figure 3-1 through Figure 4-5.

4.3.1 Key Observation Point 1: Interstate 10

I-10 is a major east-west four-lane interstate highway that runs from Arizona through California. It is located north of the Project site and traverses through the center of the Riverside East SEZ. Though the County has designated I-10 as an eligible County Scenic Highway, it is not designated as an eligible scenic highway by Caltrans' California Scenic Highways Program. Annual average daily traffic on I-10 north of the Project (Wiley's Well Road to Mesa Drive) is estimated at 20,200 (*see* http://www.interstate-guide.com/i-010_aadt.html).

Eight points along the I-10 corridor were used to establish a linear KOP (designated KOPs 1a–1h). This linear KOP is representative of roadway travelers traveling east- and westbound along I-10. Viewer geometry relative to the Project is generally at grade (KOPs 1a-1f); however, superior viewer positions do exist as westbound travelers descend from the Domee Rock Mountains toward the City of Blythe, the Palo Verde Mesa and the Chuckwalla Valley (KOPs 1h and 1g). From I-10, the landscape appears large in scale and enclosed. The flat valley creates a broad horizontal line, interrupted only by the discrete and rugged landforms of the surrounding mountains. When traveling eastbound, the landscape appears natural. A 500 kV transmission line parallels I-10 from Palm Springs; despite the modification to the landscape from this feature, the landscape appears largely intact. When traveling westbound, the City of Blythe is dominant in the foreground-middle ground.

4.3.2 Key Observation Point 2: Chuckwalla DWMA ACEC

The Chuckwalla DWMA is located in the eastern foothills of the Little Chuckwalla Mountains. The DWMA is bordered to the north by I-10 and the town of Desert Center and to the south by the Bradshaw Trail. The highest point is Black Butte, elevation 4,504 feet (1,373 meters). Much of the Little Chuckwalla Mountains are contained in the Chuckwalla Mountains Wilderness Area. Motorized travel is permitted on established roads.

The KOP was placed at the eastern edge of the DWMA, north of the Chuckwalla Valley State Prison. This KOP is representative of recreators using the lower elevation portions of the DWMA. Viewer geometry relative to the proposed Project site is at grade. From this KOP, the landscape appears broad and flat, characterized by a distinct horizontal line created by the valley floor. Views extend to the background distance zone, with some enclosure provided by the McCoy and Mule Mountains to the east.

The Mule Mountain Long Term Visitor Area (LTVA) is located south of KOP 2. Recreators may use this facility for seasonal long-term (September 15 to April 15) or short-term (14 days) visitation (*see* http://www.blm.gov/ca/st/en/fo/elcentro/recreation/ltvas.html).

4.3.3 Key Observation Point 3: McCoy Mountains

The McCoy Mountains are located east of the Palen Mountains and south of the Little Maria Mountains. The mountain range measures approximately 18 miles and is oriented primarily north-south. McCoy Peak, located at the southern terminus of the range, reaches an elevation of 2,054 feet above sea level. The southern terminus of the range is located on the north side of I-10, approximately 10 miles east of the City of Blythe.

The KOP was established on the foothills of the McCoy Mountains with views directed south across the Palo Verde Valley. The viewer position is superior relative to the valley and is representative of views experienced by individuals engaged in dispersed recreation. The landscape is characterized by the broad, flat Palo Verde valley, which appears enclosed by the bold form and jagged silhouette of the Mule Mountains and Chuckwalla Mountains to the south. Color in the valley is primarily muted tan to grey-green tones. Views from this location include I-10, which passes directly south of the KOP. The steady movement of vehicles and trucks are dominant features in the immediate foreground. An existing solar facility is visible to the southeast. The smooth, dark grey solar panels and flat, geometric shape of the facility contrast the form, line, color, and texture of the existing landscape; however, the facility is not a dominant feature in the view. Numerous narrow, vertical electrical transmission poles are visible in the foreground/middleground. The poles appear orderly and evenly distributed across the valley. Though they are relatively small in scale compared to the surrounding valley, they appear as dominant elements of the landscape.

Recreational use within the McCoy Mountains is reported low (Hill 2015).

4.3.4 Key Observation Point 4: Mule Mountains

The Mule Mountains are designated as an ACEC under the CDCA Plan, with the goal of managing prehistoric resources (BLM 1980). The ACEC measures 4,092 acres in size and is managed per dual Multiple Use Class designations: M (Moderate Use), and L (Limited Use).

The KOP was established on a narrow two-track located on BLM-administered lands and is representative of views experienced from the foothills of the Mule Mountains, including a BLM-administered interpretive area located nearby. The landscape is characterized by the broad, flat Palo Verde Valley. The valley appears large in scale, with enclosure provided by the bold forms and rugged silhouette of the McCoy Mountains to the north and the Big Maria Mountains to the northwest. The exposed gravelly loam soils of the valley are a dominant feature, appearing coarse due to the angular rocky substrate. Vegetation is composed of discrete oval-shaped shrubs that appear stippled across the landscape. An abandoned plantation exists to the east of this KOP, where remnant vegetation exists in distinct linear rows. Predominant color appears as muted grey to pink tones intermixed with the green tones of the vegetation. Large-stature lattice transmission towers cross the foreground-middleground of the view. The structures are apparent due to their distinctly vertical form and line that contrast against the predominantly horizontal line of the valley. Traffic on I-10 to the north is visible due to the consistent motion of vehicles against the still landscape.

4.3.5 Key Observation Point 5: Bradshaw Trail

Bradshaw Trail, also known as the “Gold Road to La Paz,” is a 65-mile backcountry byway extending from approximately 35 miles southeast of Indio, California, to approximately 15 miles southwest of Blythe. The route traverses mostly public land between the Chuckwalla Mountains and the Chocolate Mountain Aerial Gunnery Range. The trail is characterized as a dirt road that is periodically graded by the Riverside County Transportation Department. Four wheel drive vehicles are recommended because of stretches of soft sand and dry wash.

The Bradshaw Trail connects to SR-78 approximately 12 miles south of the intersection with I-10. Portions of the Bradshaw Trail intersect the Project viewshed in the foreground/ middleground and background distance zones. Multiple recreation-based viewing opportunities exist along the Bradshaw Trail.

4.3.6 Key Observation Point 6: Town of Nicholls Warm Springs/Mesa Verde

The Town of Nicholls Warm Springs/Mesa Verde is a small, medium-density residential community located south of I-10, north of the existing NRG Blythe 21 Solar Power Plant near Blythe. KOP 6 is located at the corner of Cottonwood Drive and Blythe Way, on the western edge of town. Nicholls Warm Springs/Mesa Verde is considered the closest residential grouping to the Project. Housing and community buildings are primarily single-story. Views from the perimeter of town extend across the flat horizon of the Palo Verde Mesa and the Chuckwalla Valley to the south and west and the Palo Verde Valley to the southeast and east. Surrounding mountain ranges appear dominant and provide enclosure to the setting.

4.3.7 Key Observation Point 7: Town of Ripley

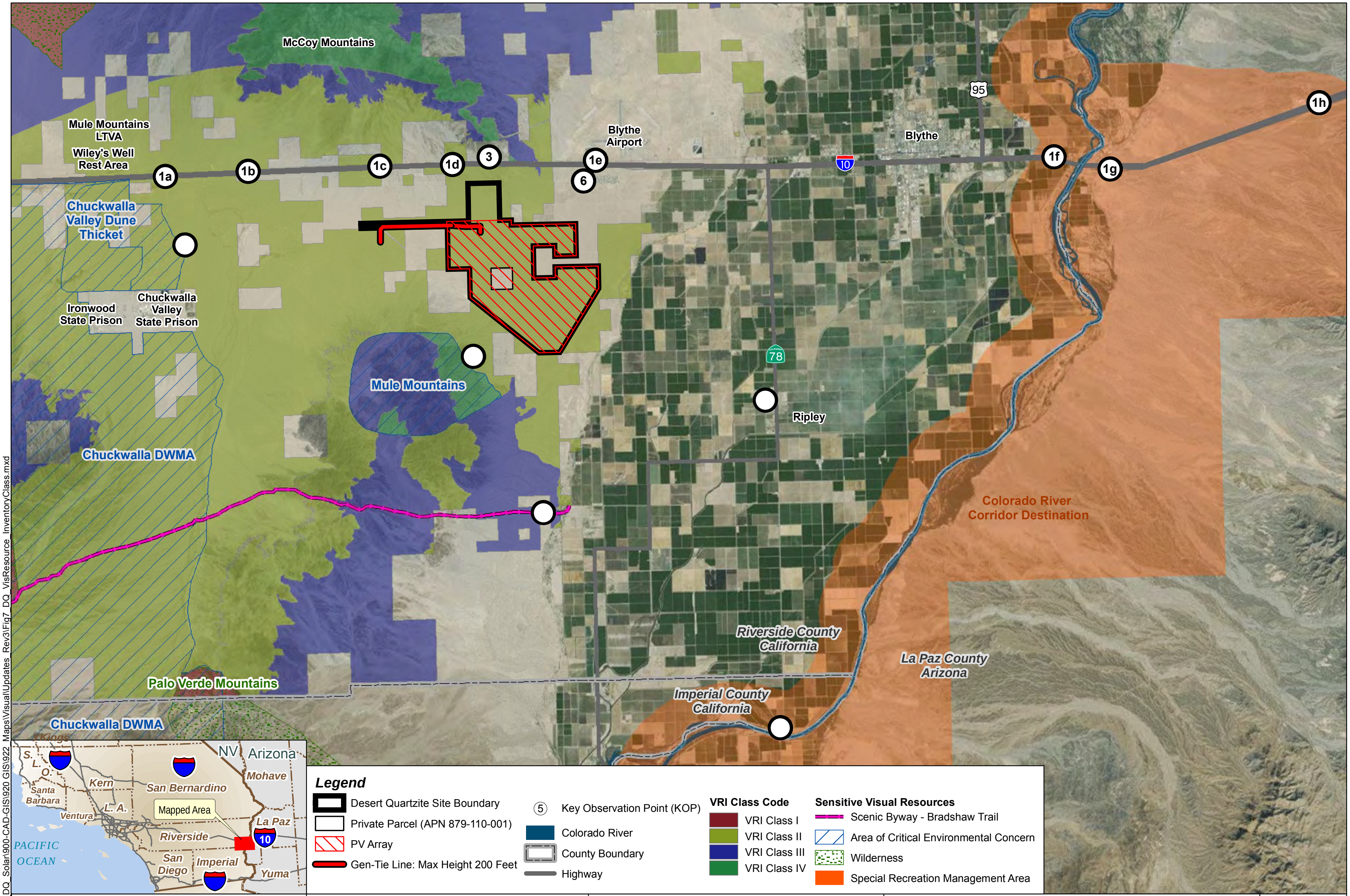
The Town of Ripley is located in eastern Riverside County, along SR-78 between Palo Verde and Blythe. The town exists as a discrete population center, surrounded by agricultural lands. Per the 2010 census, the population was approximately 692 (http://censusviewer.com/city/CA/Ripley). SR-78 is a two-lane highway that runs generally east-west from Oceanside, California to Blythe. In the vicinity of the proposed Project, the highway runs north-south, terminating at the intersection with eastbound I-10, east of the Project site. The portion of SR-78 in Riverside County is not designated as a scenic route by Caltrans.

The KOP was placed on the western edge of the Town of Ripley, adjacent to the Community Center. Views are representative of the residential area located the closest to the proposed Project. The landscape from the Town of Ripley appears broad and flat, with enclosure provided in the foreground by shallow, rolling topography and in the background by isolated forms of the Chuckwalla Mountains to the west. Views are dominated by the tan-pink color of exposed ground. Patches of vegetation exist, appearing discrete and irregular. Dried branches appear sharp. Large-stature 500 kV transmission towers are visible in the foreground, appearing as dominant elements in the landscape due to their vertical structure against the horizontal lines of the valley.

4.3.8 Key Observation Point 8: Colorado River

The Colorado River is a major water body in the southwestern U.S., the source of which is located in the Rocky Mountains of Colorado, and the mouth of which is located in the Gulf of California in Baja California, Mexico. The river crosses I-10 east of SR-78, which is east of the Project site, and is surrounded by agricultural land uses. It provides the border between California and Arizona.

The Project is adjacent to the City of Blythe Sphere of Influence (Colorado River Corridor Plan 2007). The river may be considered a “boating trail” under the 1974 Recreational Trails Act and may be used by recreational canoers from Blythe to the Imperial Dam (see http://www.dbw.ca.gov/Pubs/BlythetoImperial/BlythetoImperial.pdf). Boaters can start from Mayflower County Park north of the I-10 bridge over the river or at the privately owned Riviera Blythe Marina south of the bridge, and travel south toward the Imperial Dam. Portions of the Project may be visible from the Colorado River.


McCoy Mountains
Mule Mountains LTVA
Wiley's Well Rest Area
Blythe Airport
Blythe
95
10
1a
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3
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6
1f
1g
1h
Chuckwalla Valley Dune Thicket
Ironwood State Prison
Chuckwalla Valley State Prison
Mule Mountains
78
Ripley
Chuckwalla DWMA
Colorado River Corridor Destination
Riverside County California
La Paz County Arizona
Imperial County California
Palo Verde Mountains
Chuckwalla DWMA
NV
Arizona
Kings
S. L. O.
Kern
San Bernardino
Mohave
Santa Barbara
Ventura
L. A.
Mapped Area
La Paz
Riverside
10
PACIFIC OCEAN
San Diego
Imperial
Yuma
Legend
Desert Quartzite Site Boundary
Private Parcel (APN 879-110-001)
PV Array
Gen-Tie Line: Max Height 200 Feet
5 Key Observation Point (KOP)
Colorado River
County Boundary
Highway
VRI Class Code
VRI Class I
VRI Class II
VRI Class III
VRI Class IV
Sensitive Visual Resources
Scenic Byway - Bradshaw Trail
Area of Critical Environmental Concern
Wilderness
Special Recreation Management Area

Visual Resources
Desert Quartzite Solar Project
Riverside County, CA

URS (an AECOM Company)

N
0 1 2 3 Miles
0 5,000 10,000 15,000 Feet

Source: [1] Aerial Imagery (Microsoft 2011), [2] Roads, Boundaries, Cities, River (Esri 2012). [3] Sensitive Visual Resources (Solar PEIS 2014). [4] Project Features (First Solar 2014). [5] Visual Resource Inventory Class Data - Palm Springs (BLM 2010).

Figure 4-1. Visual Resource Inventory (VRI) Class

2015

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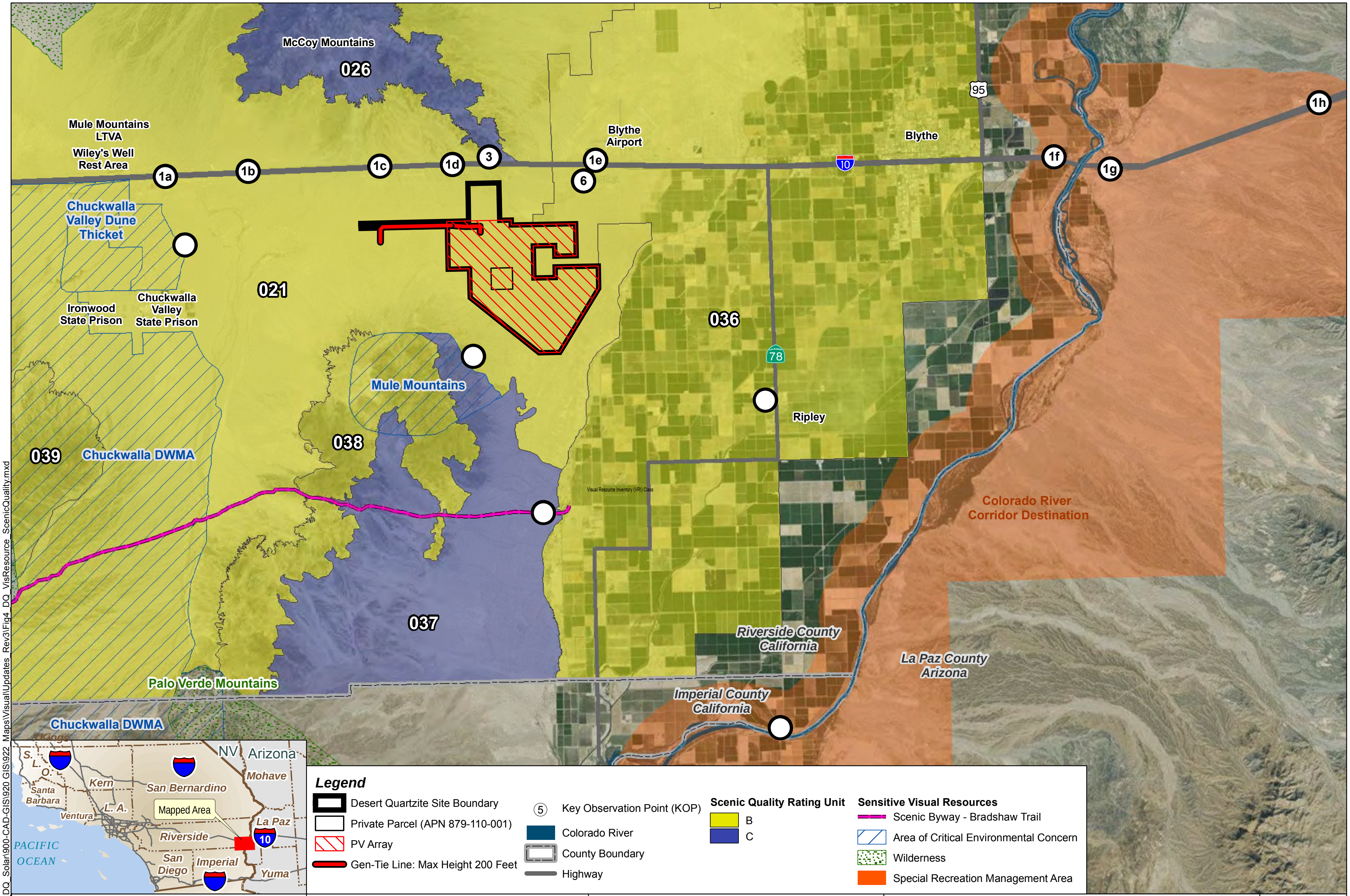
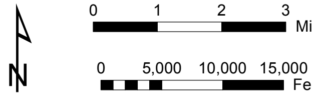

McCoy Mountains
026
Mule Mountains LTVA
Wiley's Well Rest Area
1a
1b
1c
1d
3
1e
6
1f
1g
1h
Blythe Airport
Blythe
95
10
Chuckwalla Valley Dune Thicket
021
Ironwood State Prison
Chuckwalla Valley State Prison
036
78
Mule Mountains
Ripley
038
039
Chuckwalla DWMA
Visual Resource Inventory (VRI) Class
Colorado River Corridor Destination
037
Riverside County California
La Paz County Arizona
Palo Verde Mountains
Imperial County California
Chuckwalla DWMA
NV
Arizona
Mohave
S. L. O.
Kern
San Bernardino
Santa Barbara
Ventura
L. A.
Mapped Area
La Paz
Riverside
10
PACIFIC OCEAN
San Diego
Imperial
Yuma
Legend
Desert Quartzite Site Boundary
Private Parcel (APN 879-110-001)
PV Array
Gen-Tie Line: Max Height 200 Feet
5 Key Observation Point (KOP)
Colorado River
County Boundary
Highway
Scenic Quality Rating Unit
B
C
Sensitive Visual Resources
Scenic Byway - Bradshaw Trail
Area of Critical Environmental Concern
Wilderness
Special Recreation Management Area

Visual Resources
Desert Quartzite Solar Project
Riverside County, CA

URS (an AECOM Company)


N
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1
2
3
Miles
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5,000
10,000
15,000
Feet

Source: [1] Aerial Imagery (Microsoft 2011), [2] Roads, Boundaries, Cities, River (Esri 2012). [3] Sensitive Visual Resources (Solar PEIS 2014). [4] Project Features (First Solar 2014). [5] Visual Resource Inventory Class Data - Palm Springs (BLM 2010).

Figure 4-2. Scenic Quality

2015

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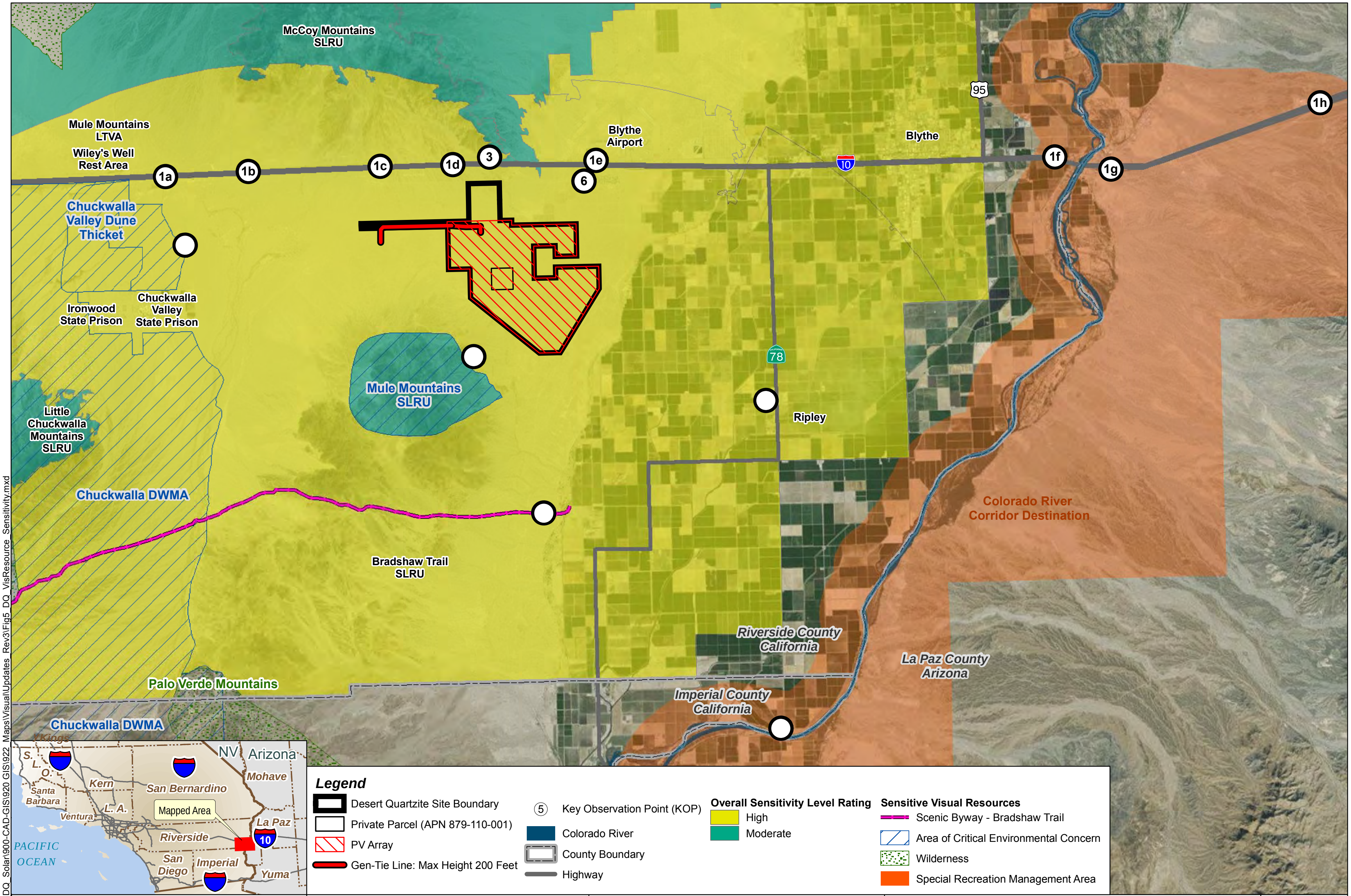
McCoy Mountains SLRU
Mule Mountains LTVA
Wiley's Well Rest Area
Blythe Airport
Blythe
95
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1a
1b
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1f
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1h
Chuckwalla Valley Dune Thicket
Ironwood State Prison
Chuckwalla Valley State Prison
Mule Mountains SLRU
78
Ripley
Little Chuckwalla Mountains SLRU
Chuckwalla DWMA
Colorado River Corridor Destination
Bradshaw Trail SLRU
Riverside County California
La Paz County Arizona
Imperial County California
Palo Verde Mountains
Chuckwalla DWMA
NV
Arizona
S. L. O.
Kern
Santa Barbara
Ventura
L. A.
San Bernardino
Mohave
Mapped Area
La Paz
Riverside
10
PACIFIC OCEAN
San Diego
Imperial
Yuma
Legend
Desert Quartzite Site Boundary
Private Parcel (APN 879-110-001)
PV Array
Gen-Tie Line: Max Height 200 Feet
5 Key Observation Point (KOP)
Colorado River
County Boundary
Highway
Overall Sensitivity Level Rating
High
Moderate
Sensitive Visual Resources
Scenic Byway - Bradshaw Trail
Area of Critical Environmental Concern
Wilderness
Special Recreation Management Area

Visual Resources
Desert Quartzite Solar Project
Riverside County, CA

URS (an AECOM Company)

N

0 1 2 3 Miles

0 5,000 10,000 15,000 Feet

Source: [1] Aerial Imagery (Microsoft 2011), [2] Roads, Boundaries, Cities, River (Esri 2012). [3] Sensitive Visual Resources (Solar PEIS 2014). [4] Project Features (First Solar 2014). [5] Visual Resource Inventory Class Data - Palm Springs (BLM 2010).

Figure 4-3. Sensitivity Level Rating Units

2015

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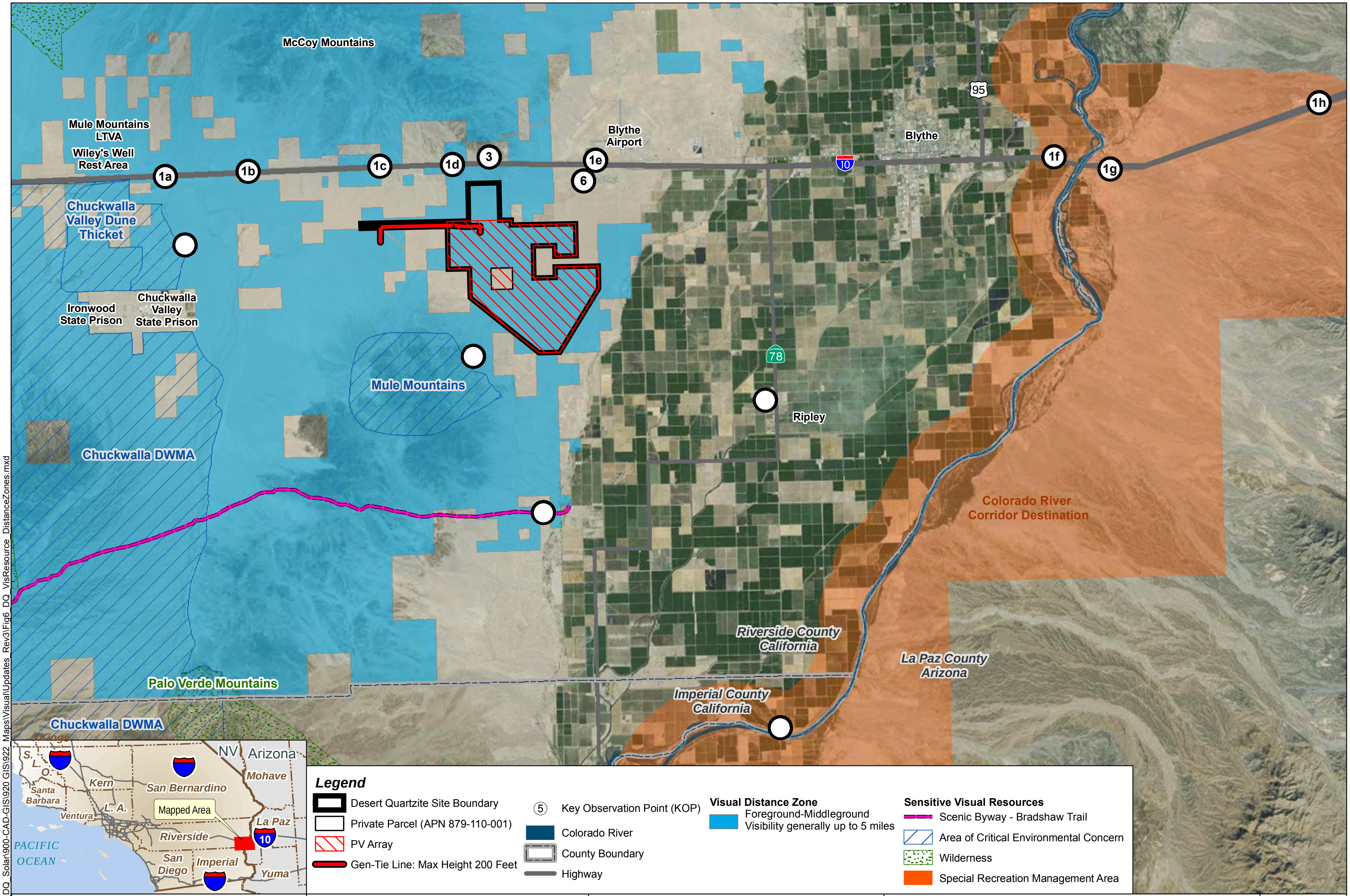
McCoy Mountains
Mule Mountains LTVA
Wiley's Well Rest Area
Blythe Airport
Blythe
95
10
1a
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1g
1h
Chuckwalla Valley Dune Thicket
Ironwood State Prison
Chuckwalla Valley State Prison
Mule Mountains
78
Ripley
Chuckwalla DWMA
Colorado River Corridor Destination
Riverside County California
La Paz County Arizona
Imperial County California
Palo Verde Mountains
Chuckwalla DWMA
NV
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S. L. O.
Santa Barbara
Kern
San Bernardino
Mohave
Ventura
L. A.
Mapped Area
La Paz
Riverside
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PACIFIC OCEAN
San Diego
Imperial
Yuma
Kings
Legend
Desert Quartzite Site Boundary
Private Parcel (APN 879-110-001)
PV Array
Gen-Tie Line: Max Height 200 Feet
5 Key Observation Point (KOP)
Colorado River
County Boundary
Highway
Visual Distance Zone
Foreground-Middleground Visibility generally up to 5 miles
Sensitive Visual Resources
Scenic Byway - Bradshaw Trail
Area of Critical Environmental Concern
Wilderness
Special Recreation Management Area

Visual Resources
Desert Quartzite Solar Project
Riverside County, CA

URS (an AECOM Company)

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0 1 2 3 Miles
0 5,000 10,000 15,000 Feet

Source: [1] Aerial Imagery (Microsoft 2011), [2] Roads, Boundaries, Cities, River (Esri 2012). [3] Sensitive Visual Resources (Solar PEIS 2014). [4] Project Features (First Solar 2014). [5] Visual Resource Inventory Class Data - Palm Springs (BLM 2010).

Figure 4-4. Visual Distance Zones

2015

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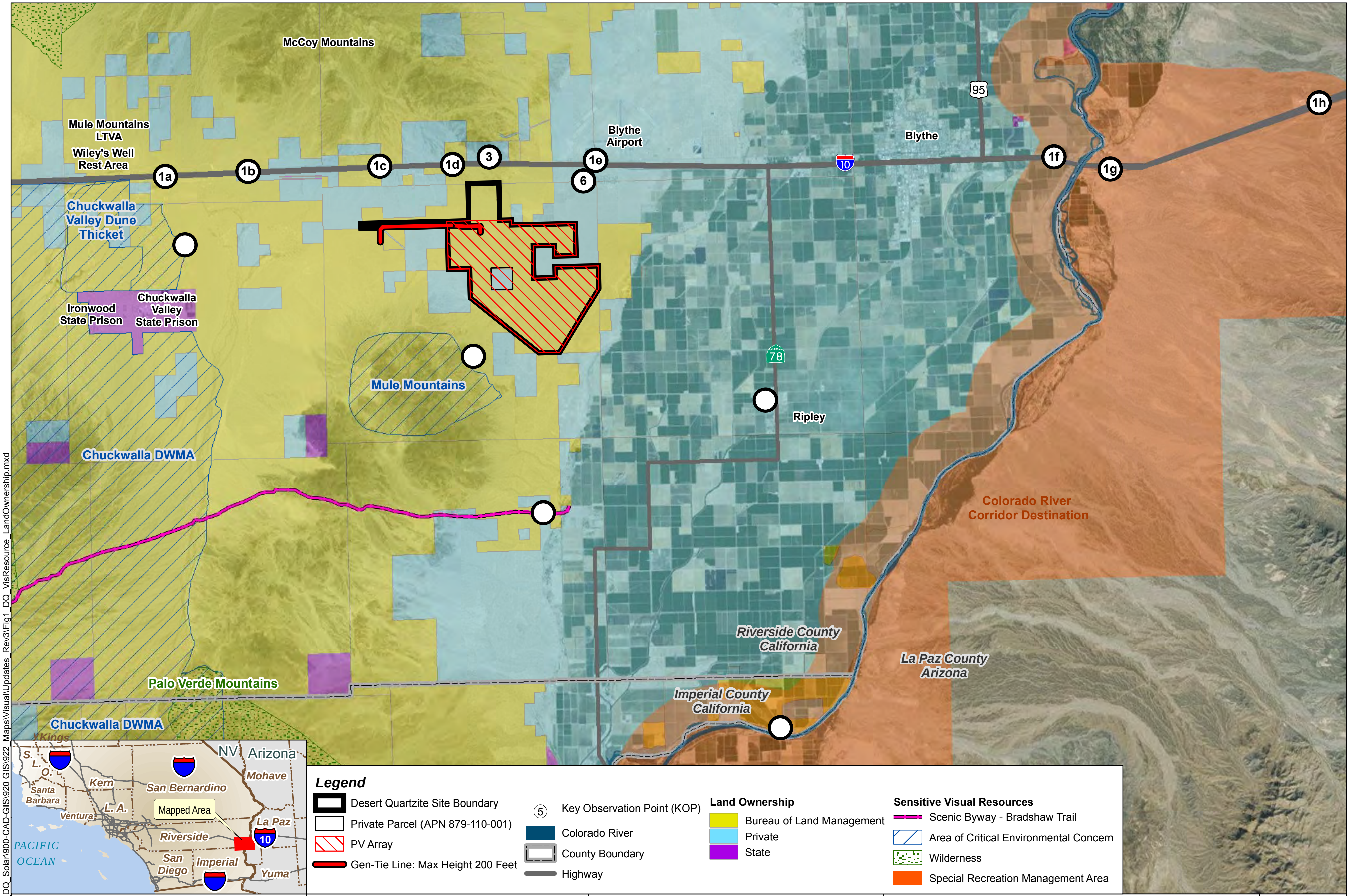
McCoy Mountains
Mule Mountains LTVA
Wiley's Well Rest Area
Blythe Airport
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Chuckwalla Valley Dune Thicket
Ironwood State Prison
Chuckwalla Valley State Prison
Mule Mountains
78
Ripley
Chuckwalla DWMA
Colorado River Corridor Destination
Riverside County California
La Paz County Arizona
Imperial County California
Palo Verde Mountains
Chuckwalla DWMA
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NV
Arizona
S. L. O.
Kern
San Bernardino
Mohave
Santa Barbara
Ventura
L. A.
Mapped Area
La Paz
10
Riverside
PACIFIC OCEAN
San Diego
Imperial
Yuma
Legend
Desert Quartzite Site Boundary
Private Parcel (APN 879-110-001)
PV Array
Gen-Tie Line: Max Height 200 Feet
5
Key Observation Point (KOP)
Colorado River
County Boundary
Highway
Land Ownership
Bureau of Land Management
Private
State
Sensitive Visual Resources
Scenic Byway - Bradshaw Trail
Area of Critical Environmental Concern
Wilderness
Special Recreation Management Area
N
0 1 2 3 Miles
0 5,000 10,000 15,000 Feet

Visual Resources
Desert Quartzite Solar Project
Riverside County, CA

URS (an AECOM Company)

Source: [1] Aerial Imagery (Microsoft 2011), [2] Roads, Boundaries, Cities, River (Esri 2012). [3] Sensitive Visual Resources (Solar PEIS 2014). [4] Project Features (First Solar 2014). [5] Land Ownership (BLM 2012).

Figure 4-5. KOP Locations - Land Ownership

2015

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SECTION 5.0
IMPACT ASSESSMENT

5.1 VISUAL CONTRAST RATING

Potential impacts to visual resources that may result from construction and/or operation of the proposed Project were assessed at 15 KOPs (8 of which are along I-10) established in the study area. The KOPs were established on public lands administered by the BLM, municipalities of Ripley and Nicholls Warm Springs/Mesa Verde, and within the Colorado River Corridor Destination Special Recreation Management Area (Figure 4-5). All KOPs were placed within the viewshed of Project components (Figures 3-1 and 3-2). The impact assessment was based on visual simulations prepared for a subset of the KOPs, including KOP 1c (I-10), KOP 2 (Chuckwalla DWMA), KOP 3 (McCoy Mountains), KOP 4 (Mule Mountains), and KOP 7 (Community of Nicholls Warm Springs/Mesa Verde) (see Appendix C). This subset was selected to represent various viewer positions and related visibility relative to the Project. No simulations were prepared for the construction phase. For KOPs where simulations were not prepared, assumptions were made regarding the level of visual contrast expected.

Visual contrast of the proposed Project was assessed from each KOP. Relevant environmental factors and results of the visual contrast rating and are described below and summarized in Table 5-1. Overall Project visibility was determined to be greatest at KOPs situated at close proximity and at an elevated vantage point relative to the Project. Because of the low stature of the solar panels, the gently sloping or rolling topography of the valley floor would block views of this feature from KOPs situated at grade. This impact assessment includes consideration of the Applicant-committed environmental protection measures for visual resources presented in Section 1.4.

5.1.1 Key Observation Point 1: Interstate 10

Construction of the proposed Project would result in moderate visual contrast when viewed from I-10. Primary sources of contrast would result from the density and movement of construction vehicles, workers, and activities such as site preparation and grading, solar array installation, equipment installation, on-site substation and operations and maintenance building construction, and gen-tie tower and conductor installation. Such activity would contrast at a moderate level against the primarily natural setting of the Chuckwalla Valley and the Palo Verde Mesa. Contrast of graded areas would increase incrementally as construction progressed and could contrast with the flat and uniform appearance, smooth texture, and distinct tan color where desert pavement was removed. Overall visual contrast of cleared areas would be weak as views of the ground-plane would be largely shielded by vegetation for viewers situated at-grade relative to the Project (i.e., KOPs 1a–1e). Likewise,

TABLE 5-1
LANDSCAPE CHANGE AND VIEWER EXPOSURE

			Landscape Change			Viewer Exposure	
KOP Number	KOP Name	Approximate Distance (Miles)	Overall Visual Contrast	Source of Contrast	Scale Dominance	Viewer Geometry	Duration of View
1	Interstate 10 (a-h)	0.5 to >15	Moderate	Form; color; texture	Apparent	Oblique/superior	Intermittent
2	Chuckwalla DWMA	≥5	None-weak[1]	N/A	Not apparent	Variable	Intermittent
3	McCoy Mountains	≥1	Strong	Form; color; texture	Dominant	Superior	Intermittent
4	Mule Mountains	≥0.5	Strong	Form; color; texture	Dominant	Superior	Intermittent
5	Bradshaw Trail	3	None	–	–	Variable	Intermittent
6	Nicholls Warm Springs/Mesa Verde	0.25	Moderate-strong	Form; line	Apparent	At grade	Sustained
7	Town of Ripley	3	Weak	Form; line	Not apparent	At grade	Sustained
8	Colorado River	8	None	N/A	Not apparent	At grade/inferior	Intermittent

[1] Visual contrast may increase to a moderate-to-strong level depending on the vantage point within this resource.

for viewers situated at a higher elevation relative to the Project (KOPs 1f–1h), visual contrast of cleared areas would be perceived as none to weak.

Visual contrast of Project components is expected to increase as construction of solar arrays, substation, gen-tie, and auxiliary facilities progresses. Construction-related dust is not expected to contribute to visual contrast, as dust control measures are included in the Plan of Development.

Operation of the proposed Project would result in moderate visual contrast against the existing landscape. Contrast is expected to be reduced from that expected during the construction phase as additional contrasting elements resulting from construction vehicles and personnel would be eliminated. The primary sources of visual contrast would result from the dark grey color, smooth and reflective surface of the solar panels, and the large scale of the facility relative to the surrounding landscape. The narrow, vertical lines of the collector poles and gen-tie result in weak visual contrast against the existing landscape, largely due to their distance from this observation corridor and the presence of multiple other larger stature electrical transmission poles. The facility would be apparent, though largely subdominant to surrounding landscape features. The low stature and dominant horizontal line of the structure would result in an overall weak visual contrast against the existing landscape.

Viewer exposure to weak visual contrast of the proposed Project during the operational phase would be intermittent. It is estimated that the Project would be most visible from within an approximately 4-mile segment located due north of the proposed Project, as the elevation of the highway is higher than that of the Project site. Views of the Project would be experienced temporarily while traveling east- or west-bound on I-10, at speeds of approximately 70 miles per hour. The Project would be situated at an oblique angle relative to the viewer.

5.1.2 Key Observation Point 2: Chuckwalla DWMA ACEC

Visual contrast of the proposed Project from the Chuckwalla DWMA during construction and operational phases would be none to weak. The low visibility of the Project from this location is primarily due to screening of construction-related actions and solar arrays by the low rolling topography of the Chuckwalla Valley. Visibility of taller structures, such as collector poles and the gen-tie, would also result in none to weak visual contrast, largely due to the location of these features relative to this observation point (approximately ≥4 miles) and the difficulty in discerning the narrow vertical line of these features at this distance. In addition, the presence of other existing transmission lines in and surrounding the Project site would reduce the contrast created by the proposed collector poles and gen-tie structures.

5.1.3 Key Observation Point 3: McCoy Mountains

Construction and operation of the Project when viewed from KOP 3 would be strong. Similar to KOP 1 (I-10) as described above, visual contrast during the construction phase would primarily result from the density and movement of construction vehicle, workers, and flat, uniform appearance, smooth texture, and distinct tan color of graded areas.

During operation of the Project, strong visual contrast would result from the broad, flat form and dark grey, reflective surface of the solar panels against the exiting muted tones of the landscape. From this elevated viewer platform, the scale of the solar panels would dominate the landscape. Other Project features, including collector poles and gen-tie, would be visible; however, these features would contrast at a weak level against the existing landscape, largely due to the presence of multiple other transmission structures with similar form, line, and axis within the study area.

Viewer exposure to visual contrast of the proposed Project during construction and operational phases would be intermittent to sustained, depending on the prevailing use of the area. The majority of use is expected within the southern-most portion of the mountain range along access roads leading to local utility stations.

5.1.4 Key Observation Point 4: Mule Mountains

Construction and operation of the Project when viewed from KOP 4 would be strong. As described for I-10 and the McCoy Mountains, the primary sources of visual contrast during the construction phase would result from the density and movement of construction vehicles, workers, and the flat, uniform appearance, smooth texture, and distinct tan color of graded areas. Construction-related actions would appear dominant due to the close proximity (<1 mile) of viewers to the Project site.

During the operational phase, the primary source of visual contrast would result from the solar panels; specifically, the broad, flat form, dark grey, reflective surface and smooth texture of this feature against the existing muted tones of the landscape. The configuration of linear arrays would be apparent, appearing ordered and directional. Collector poles would be apparent, appearing as rows of straight, tall vertical lines that result in weak-moderate visual contrast against the existing landscape. Collectively, these features would dominate the landscape from this vantage point. The gen-tie, though visible, would contrast at a weak level when viewed from this location. The tall, narrow, vertical lines of the gen-tie poles are consistent with the cluttered appearance of existing transmission and distribution lines.

5.1.5 Key Observation Point 5: Bradshaw Trail

Visibility of construction and operational phases of the Project from the Bradshaw Trail is expected to be minimal. Views of the Project site from the majority of the Bradshaw Trail would be screened by the Mule Mountains to the north. The low, rolling topography east of the Mule Mountains would preclude visibility of the solar arrays from the eastern-most terminus of the Bradshaw Trail. Collector poles and gen-tie may be detectable; however, visual contrast is expected to be weak, largely due to distance and the presence of existing transmission and distribution lines.

5.1.6 Key Observation Point 6: Town of Nicholls Warm Springs/Mesa Verde

Construction and operation of the Project when viewed from KOP 6 would be moderate. Visual contrast during the construction phase is primarily expected to result from the presence of construction vehicles and workers and the close proximity (<1 mile) of construction-related actions to viewers. Construction-related actions pertaining to installation of the collector poles and gen-tie could be apparent due to the vertical stature of these features. Because viewer geometry at this site is at-grade, cleared and graded areas are expected to be screened by low rolling topography and foreground vegetation, and therefore would not contribute to visual contrast.

Though characterized by a low profile consistent with the horizontal line of the landscape, solar panels would be apparent, largely due to the large scale of the facility and the smooth, flat silhouette against the surrounding coarser texture and muted colors of the landscape. Moderate-strong contrast could result from the scale of the Project and the large portion of the horizon occupied by the arrays. Collector poles would also be apparent; however, visual contrast is expected to be weak as a result of existing and planned transmission structures in the foreground. In addition, the existing NRG Blythe 21 solar facility is located between the proposed Project location and Nicholls Warm Springs/Mesa Verde.

5.1.7 Key Observation Point 7: Town of Ripley

Visual contrast of the proposed Project when viewed from the Town of Ripley would be weak. Though no high elevation or prominent topography or vegetation exists between the Project site and the Town of Ripley, the low-stature solar array would be screened by the gently rolling topography of the valley and the Project would not be apparent. Collector poles could be visible; however, the narrow, vertical line and form of these structures is consistent with existing electrical transmission and distribution poles and therefore is expected to result in low visual contrast.

5.1.8 Key Observation Point 8: Colorado River

No visual contrast is expected to result from viewpoints on the Colorado River, as the channel is situated below grade relative to the Palo Verde Mesa and Chuckwalla Valley bottom and the proposed solar array and gen-tie facilities.

5.2 VISUAL RESOURCE INVENTORY ANALYSIS

The VRI analysis was implemented for SQRUs 021, 026, 036, 037, and 038, and for SLRU 49 (Bradshaw Trail National Backcountry Byway) (Tables 4-2 through 4-7). This assessment summarizes impacts to scenic quality and visual sensitivity based on estimated changes to key factor rating scores documented in the BLM's VRI for the Palm Springs FO (BLM 2010). This assessment is to support the requirements of FLPMA and allow the BLM to document potential change in the distribution of scenic values across the planning area.

For scenic quality, the primary key factors that could reduce scenic quality ratings are "cultural modification" and "adjacent scenery." Potential visual contrast of the Project could appear discordant, thereby reducing the score for "cultural modification." Likewise, if the land use objectives associated with a particular SQRU were identified as being reliant on the scenic quality of SQRU 021 (where the Project site is located), the overall score for "Adjacent Scenery" could be reduced under operational conditions.

For visual sensitivity, the primary factor that is evaluated under the Projects operational scenario in the VRI analysis is "Adjacent Land Use," which measures the importance of maintaining visual quality to sustain adjacent land use objectives (Tables 4-8 through 4-12). The VRI analysis addresses long-term impacts to visual resources that may result from the Project under operational conditions.

5.2.1 Scenic Quality

Potential impacts to scenic quality are described below and summarized in Table 5-2.

5.2.1.1 Scenic Quality Rating Unit 021 – Chuckwalla Valley

The proposed Project is located in SQRU 021 (Chuckwalla Valley). The results of the contrast rating completed at the KOPs indicate that the proposed Project, under operational conditions, would dominate the landscape when viewed from superior viewer positions (i.e., Unit 026 [McCoy Mountains] and Unit 038 [Mule Mountains]). When viewed from these higher elevation vantage points, moderate-strong contrast of the Project could extend to background distance zones. Visibility of the Project is limited in areas situated at similar elevation due to the low profile of the solar arrays. The solar arrays, considered the dominant visual element of the proposed Project, would be discordant with existing naturally appearing character attributes of the Chuckwalla Valley, thereby potentially reducing the ranking of cultural modification in SQRU 21 from 0 (neutral) to -4. A reduction in value could reduce the overall scenic quality rating score from 12 to 8 and the overall scenic quality rating classification from B to C. The expected level of cultural modification within this portion of SQRU 021 is not expected to warrant splitting the SQRU in planning records, as transmission lines and other solar developments are present throughout the unit.

5.2.1.2 Scenic Quality Rating Unit 026 – McCoy Mountains

The proposed Project is located south of SQRU 021 (McCoy Mountains). Based on the viewshed models prepared for all Project components, the proposed Project would not be

TABLE 5-2
SCENIC QUALITY RATING UNIT IMPACT SUMMARY

Scenic Quality Rating Unit (SQRU)[1]	SQRU Name[1]	Existing Rating[2]	Expected Post-project Rating	Rationale[1]
021	Chuckwalla Valley	B	C	Reduction in Cultural Modification from 0 to -4.
026	McCoy Mountains	C	C	Operation of the proposed Project is not expected to detract from existing values for "Adjacent Scenery."
036	Blythe Valley	B	C	A reduction of one point in the value for "Adjacent Scenery" to account for modification to the Chuckwalla Valley.
037	Palo Verde	C	C	Despite the reduction of 1 point for value for "Adjacent Scenery," no change in overall classification would occur.
038	Mule Mountains	B	C	A reduction of 1 point the value for "Adjacent Scenery" would decrease the overall scenic quality score from 12.5 to 11.5.
039	Little Chuckwalla Valley	B	B	"Adjacent Scenery" is dominated by the rugged topography of the Mule, McCoy and Little Chuckwalla Mountains; consequently, no change in the inventoried value for "Adjacent Scenery" is expected.

[1] Source: BLM 2010.

[2] Refer to Section 3.2.1 for description of ratings.

visible from the majority of this SQRU. The dramatic landscape of adjacent National Park and Wilderness was recognized in the scenic quality assessment as a major contribution to overall visual quality, with a value of 4 assigned to "Adjacent Scenery." Operation of the proposed Project is not expected to detract from the quality of existing adjacent scenery in the adjacent National Park or Wilderness Area. Consequently, no change in scenic quality rating is expected to result in SQRU 026 as a result of the proposed Project.

5.2.1.3 Scenic Quality Rating Unit 036 – Blythe Valley

The proposed Project is located west of SQRU 036 (Blythe Valley). Based on field reconnaissance, the proposed Project would not be visible from the majority of this SQRU due to shielding by topography, vegetation, and/or structures. "Adjacent Scenery" was recognized to "enhance" the overall scenic quality of the unit. A value of 3.5 was assigned to "Adjacent Scenery." Though specific elements of adjacent scenery (e.g., valley, mountains) are not specified, it is assumed that the collective landscape character of the broad Chuckwalla Valley and Palo Verde Mesa and the enclosure provided by the surrounding McCoy, Chuckwalla, and Mule Mountains collectively support this positive score. A conservative reduction of one point in the value for “Adjacent Scenery” could result from modification to the Chuckwalla Valley visible from the western edge of this SQRU. Should this reduction be applied, a reduction in the overall scenic quality rating score from 12.5 to 11.5 could result, thereby reducing the overall scenic quality rating classification from B to C.

5.2.1.4 Scenic Quality Rating Unit 037 – Palo Verde

The proposed Project is located north of SQRU 037 (Palo Verde). “Adjacent Scenery” moderately enhances scenic quality of this unit, with a value of 3.5 assigned to this key factor. The proposed Project would be visible from the northern portion of this SQRU, where the Project could appear as a dominant element of “Adjacent Scenery.” The proposed Project could appear discordant, thereby reducing the overall contribution of the portion of the adjacent scenery to the overall score. A conservative reduction of 1 point the value for “Adjacent Scenery” due to visual contrast of the proposed Project would decrease the overall scenic quality score from 11 to 10. Despite this reduction in score, no change in the existing scenic quality classification of “C” would result.

5.2.1.5 Scenic Quality Rating Unit 038 – Mule Mountains

The proposed Project is located northeast of SQRU 038 (Mule Mountains). Similar to SQRU 037, “Adjacent Scenery” moderately enhances scenic quality of this unit, with a value of 3 assigned to this key factor. The proposed Project would be visible from the northern portion of this SQRU, where the Project could appear as a dominant element of “Adjacent Scenery.” The proposed Project could appear discordant, thereby reducing the overall contribution of the portion of the adjacent scenery to the overall score. A conservative reduction of 1 point the value for “Adjacent Scenery” due to visual contrast of the proposed Project would decrease the overall scenic quality score from 12.5 to 11.5. This reduction in the scenic quality score would change the existing scenic quality classification of B to C.

5.2.1.6 Scenic Quality Rating Unit 039 – Little Chuckwalla Mountains

The proposed Project is located east of SQRU 039 (Little Chuckwalla Mountains). “Adjacent Scenery” moderately enhances scenic quality of this unit, with a value of 3 assigned to this key factor. Based on the viewshed models, the proposed Project could be visible from the northeastern edge of this SQRU. However, “Adjacent Scenery” is expected to be dominated by the rugged topography of the Mule, McCoy and Little Chuckwalla Mountains. Consequently, no change in the inventoried value for “Adjacent Scenery” is expected and no change in the scenic quality classification of B is expected to result from operation of the proposed Project.

5.2.2 Visual Sensitivity

Operation of the proposed Project could alter visual sensitivity within SLRU 49 (Bradshaw Trail National Backcountry Byway SLRU). As shown on Figure 4-3, this SLRU extends from the Imperial County/Riverside County border to approximately 10 miles north of the Bradshaw Trail, including the Chuckwalla Valley, Palo Verde Mesa and Palo Verde Valley.

The sensitivity level analysis for this unit indicated a high score for "Adjacent Land Use," because of the importance of maintaining scenic quality for adjacent land use, including a military range, Wilderness Areas, and ACECs. Operation of the proposed Project could reduce this value to a "Medium" or "Low," as the areas overall contribution to scenic quality would be diminished. It is likely that, for planning purposes, the SLRU would be split such that portions of the unit located to the south retained a ranking of "High" for this key factor. Visual sensitivity for portions of this SLRU located in the Chuckwalla Valley south of I-10 could be reduced from "high" to "medium."

5.3 IMPACT ASSESSMENT SUMMARY AND FINDINGS

An overall impact determination is provided below. This determination summarizes the expected impact in terms of its magnitude/intensity, direction, geographic extent, and context. Criteria used in this assessment are described in Table 5-3.

The rating scales provided below provide a guideline to place the effects of the Project in an appropriate context and to reach summary conclusions about the level of impact, taking into account the impact factors of intensity, duration, extent, and context.

Impacts may be beneficial or adverse. Impacts are generally assumed to be adverse, unless specifically noted as beneficial:

- **Major.** Impacts would be high intensity, resulting from strong visual contrast, scale dominance, prolonged viewer duration, and within the foreground-middleground distance zone. Long-term or permanent impacts would be regional or extended in geographic extent. Impacts would affect areas defined as having outstanding or high visual values (important or unique).
- **Moderate.** Impacts would be medium-high intensity, resulting from moderate to strong visual contrast, prolonged or intermittent viewer duration, and within the foreground-middleground or background distance zone; however viewer exposure to high intensity impacts would be intermittent and experience from background distance zone. Project related visual contrast would be co-dominant with existing features. Temporary or long-term impacts would be local or regional in geographic extent. Impacts would affect areas defined as having high visual value (common or important).
- **Minor.** Impacts would be of low intensity, resulting from weak visual contrast, prolonged or intermittent viewer duration, and within the foreground-middleground or background distance zone. Project related visual contrast would be subordinate to existing features. Temporary or long-term impacts would be local geographic extent. Impacts would affect areas defined as having low to high visual value (common).

TABLE 5-3
IMPACT CRITERIA FOR VISUAL RESOURCES

Magnitude or Intensity	**Low.** Project components result in low to no visual contrast against the existing landscape, viewer duration is prolonged or transient, and experienced from foreground-middleground or background distance zones. Project-related impacts are subordinate.	**Medium.** Project components result in moderate to strong visual contrast against the existing landscape, viewer duration is prolonged or transient, and views are experienced from foreground-middleground or background distance zones. Project-related impacts are co-dominant.	**High.** Project components result in strong visual contrast against the existing landscape, viewer duration is prolonged, and views are experienced from foreground-middleground distance zones. Project-related impacts are dominant.
Duration	**Temporary.** Changes to landscape character would last less than 3 years or for the duration of Project construction.	**Long-term.** Changes to landscape character would extend for the life of the Project.	**Permanent.** Changes to landscape character would last longer than the estimated life of the Project.
Geographic Extent (Viewshed limiting factors)	**Local.** The geographic extent of the affected area would not extend beyond the foreground-middleground distance zone (3–5 miles); key factor used to rank scenic quality in affected SQRU(s) could be changed; however, no change to VRI values for affected SQRUs would result.	**Regional.** The geographic extent of the affected area would extend to the background distance zone (15 miles) and/or VRI scores for affected SQRU(s) would be altered.	**Extended.** The geographic extent of the affected area would extend beyond the background distance zone (15 miles) and VRI scores for affected SQRU(s) would be altered.
Context	**Common.** The affected area is ranked as VRI Class IV (low visual value). The affected area is not recognized for its scenic value.	**Important.** The affected area is ranked as VRI Class II (high visual value) or III (moderate visual value). The affected area may be recognized for its scenic quality, though scenic resources are not protected by existing legislation.	**Unique.** The affected area is ranked as VRI Class I. The affected area is managed by legislation aimed at the protection of visual resources.

- **No effect.** No effect would occur if the facilities would be isolated, screened by prevailing vegetation or topography, not noticed in the view, most often seen from background distance zones, or where no visually sensitive resources would be affected.

Detailed impact findings are provided in Sections 5.1 and 5.2. In summary, moderate to strong visual contrast was identified at four of the eight KOPs analyzed: Interstate 10, McCoy Mountains, Mule Mountains, and the Town of Nicholls Warm Springs/Mesa Verde. The visual contrast expected at these locations is due to their higher elevation relative to the Project site and/or close proximity. This conclusion is consistent with the expected visual contrast levels described in the Final Solar PEIS, which analyzed potential impacts of several solar facilities (BLM 2012). Based on this expected level of contrast and scale dominance, scenic quality of three of the affected SQRUs could be reduced. Likewise, it is expected that visual sensitivity of the Bradshaw Trail Backcountry Byway SLRU would be reduced from "medium" to "low." Collectively these changes could reduce the overall VRI score for the Project site and surrounding lands from a Class II to Class III or IV.

Based on these findings, impacts to visual resources from the proposed Project are expected to be of **medium-high intensity, long-term, regional, and affecting important resources**. Impacts would be experienced from locations in the foreground-middleground, where viewer duration is prolonged. However, because most locations analyzed represent viewer experience of recreators or roadway travelers, predominant viewer exposure is expected to be transient. The duration of impacts is considered long-term, extending for the life of the Project. The geographic extent of impacts is considered regional, as the distribution of VRI values would be altered within the BLM Palm Springs FO planning area (i.e., shift of Class II to Class III or IV). Affected resources are considered important, as lands occupied by the Project site were ranked as VRI Class II (high visual value). Overall, the Project is expected to result in **moderate impacts to visual resources**. Impacts to visual resources would not be perceived from several sensitive viewer locations within the Project's viewshed, including the Chuckwalla DWMA, Bradshaw Trail, Town of Ripley, and the Colorado River.

5.4 PLAN CONFORMANCE DETERMINATION

This section discusses conformance of the proposed Project with existing federal, state and local land management objectives based on the results of the visual resource impact analysis.

5.4.1 Federal

5.4.1.1 Visual Resource Management System

Potential impacts to visual resources that may result from construction and operation of the proposed Project would be consistent with that permitted under the Class III Interim VRM Objective assigned to the Project footprint. Projects sited in VRM Class III management areas should "*Partially retain the existing character of the landscape. The level of change to* *the characteristic landscape should be moderate* (BLM 1986)". The Project would begin to attract attention and begin to dominate the characteristic landscape; however the overall change to the existing character of the landscape would be moderate (see Section 5.1 for discussion of visual contrast and Section 5.3 for discussion of change to existing landscape character). Changes in landscape character would be perceived from locations situated at higher elevations relative to the Project, where moderate-strong element contrast in form and texture would be apparent. Overall visual contrast in line and color is expected to be weak.

5.4.1.2 California Desert Conservation Area Plan

As discussed in Section 2.0, the proposed Project is located in an area designated as Moderate Multiple Use (BLM 1980). The CDCA outlines the following actions to manage for the alteration of the natural character of the landscape that could occur as part of the multiple-use activities described in the plan:

> *(1) The appropriate levels of management, protection, and rehabilitation on all public lands in the CDCA will be identified, commensurate with visual resource management objectives in the multiple-use class guidelines.*
>
> *(2) Proposed activities will be evaluated to determine the extent of change created in any given landscape and to specify appropriate design or mitigation measures using the Bureau's contrast rating process.*

The CDCA Plan stipulates that solar energy development and new electric transmission facilities are allowed on Class L, M, or I lands provided that NEPA requirements are met. The proposed Project conforms to the land management objectives defined in the CDCA.

5.4.1.3 Federal Aviation Administration

The Federal Aviation Administration (FAA) has established an interim policy for proposals by sponsors of federally obligated airports to construct solar energy systems on airport property (78 FR 63276). The interim policy also requires use of the Solar Glare Hazard Analysis Tool (SGHAT) for assessing glare-induced ocular impact. Solar energy systems that are located on a non-federally obligated airport or located off airport property are not subject to this policy; however, they are strongly encouraged to consider the requirements established in the interim policy when siting the project.

The Project is in conformance with this land use objective and required findings. The Project has prepared a Glare Study analyzing project effects which is included as part of an Application for Major Land Use Action Review submitted to the Riverside County ALUC (URS 2015).

5.4.2 State of California

5.4.2.1 California Environmental Quality Act

In accordance with Appendix G of the California Environmental Quality Act Guidelines, a project would result in a significant impact on aesthetics and visual quality if the project would meet at least one of the following criteria:

- Have a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings; and/or
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area or create substantial shadow on a sensitive use.

The results of this study indicate that the proposed Project could result in potentially adverse effects to scenic vistas, scenic resources, and degradation of visual character or quality of the site.

5.4.3 Riverside County

5.4.3.1 Riverside County General Plan and Palo Verde Valley Area Plan

The Riverside County General Plan and Palo Verde Valley Area Plan contain the following policies:

- PVVAP 10.1: “Protect the scenic highways in the Palo Verde Valley planning area from change that would diminish the aesthetic value of adjacent properties in accordance with the Scenic Corridors sections of the General Plan Land Use, Multipurpose Open Space, and Circulation Elements.”
- C 19.1: “Preserve scenic routes that have exceptional or unique visual features in accordance with Caltrans’ Scenic Highways Plan.”
- OS 21.1: “Identify and conserve the skylines, view corridors, and outstanding scenic vistas within Riverside County.”
- OS 22.1: “Design developments within designated scenic highway corridors to balance the objectives of maintaining scenic resources with accommodating compatible land uses.”

- OS 22.4: "Impose conditions on development within scenic highway corridors requiring dedication of scenic easements consistent with the Scenic Highways Plan, when it is necessary to preserve unique or special visual features."

The proposed Project is in conformance with these policies/land use objectives. Operation of the Project would not result in adverse impacts to scenic resources as observed from I-10.

5.4.3.2 The Riverside County Airport Land Use Compatibility Plan

The Riverside County Airport Land Use Compatibility Plan (adopted 2004) identifies several countywide policies that apply to projects proposed within the Airport Land Use Compatibility Zones (Compatibility Zone E for portion of this Project) and relate to glare, potential electrical interference, and placement of structures in the vicinity of Blythe Airport, which require review by the Airport Land Use Commission (ALUC).

The Project has prepared a Glare Study analyzing project effects which is included as part of an Application for Major Land Use Action Review submitted to the Riverside County ALUC. The proposed Project is in conformance with this land use objective.

SECTION 6.0
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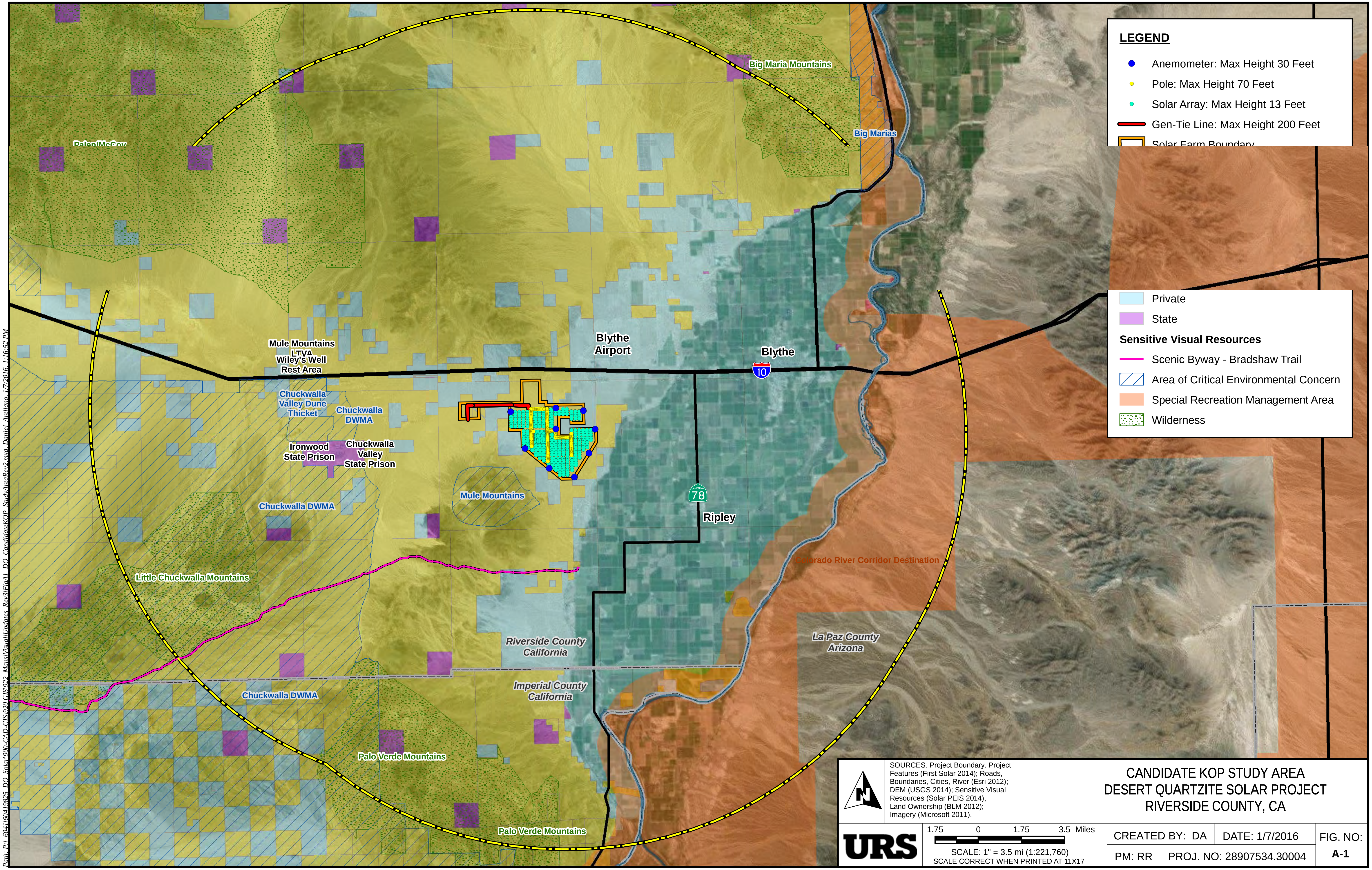
SECTION 7.0
LIST OF PREPARERS

Louise Kling, Senior Environmental Planner and Visual Resource Specialist, URS

Emily Whiteman, Environmental Planner, URS

APPENDIX A
RECORD OF SELECTED AND ELIMINATED KEY OBSERVATION POINTS

This appendix presents a tabular summary of the selected and eliminated key observation points as well as Figure A-1 (Candidate KOP Study Area).


LEGEND
● Anemometer: Max Height 30 Feet
● Pole: Max Height 70 Feet
● Solar Array: Max Height 13 Feet
Gen-Tie Line: Max Height 200 Feet
Solar Farm Boundary
Private
State
Sensitive Visual Resources
Scenic Byway - Bradshaw Trail
▨ Area of Critical Environmental Concern
Special Recreation Management Area
Wilderness
Big Maria Mountains
Big Marias
Palen/McCoy
Mule Mountains
LTVA
Wiley's Well
Rest Area
Blythe
Airport
Blythe
10
Chuckwalla
Valley Dune
Thicket
Chuckwalla
DWMA
Ironwood
State Prison
Chuckwalla
Valley
State Prison
Mule Mountains
Chuckwalla DWMA
78
Ripley
Colorado River Corridor Destination
Little Chuckwalla Mountains
Riverside County
California
La Paz County
Arizona
Imperial County
California
Chuckwalla DWMA
Palo Verde Mountains
Palo Verde Mountains
N
1.75 0 1.75 3.5 Miles

SOURCES: Project Boundary, Project Features (First Solar 2014); Roads, Boundaries, Cities, River (Esri 2012); DEM (USGS 2014); Sensitive Visual Resources (Solar PEIS 2014); Land Ownership (BLM 2012); Imagery (Microsoft 2011).

CANDIDATE KOP STUDY AREA
DESERT QUARTZITE SOLAR PROJECT
RIVERSIDE COUNTY, CA

URS

SCALE: 1" = 3.5 mi (1:221,760)
SCALE CORRECT WHEN PRINTED AT 11X17

CREATED BY: DA	DATE: 1/7/2016	FIG. NO:
PM: RR	PROJ. NO: 28907534.30004	A-1

Path: P:_6041\60419825_DQ_Solar\900-CAD-GIS\920 GIS\922_Maps\Visual\Updates_Rev3\FigA1_DQ_CandidateKOP_StudyAreaRev2.mxd, Daniel_Arellano, 1/7/2016, 1:16:52 PM

Table A-1. Record of Selected and Eliminated Key Observation Points (KOP)					
Candidate KOP	**Selected / Eliminated**	**Description**	**Uses**	**Visual Analysis Factors**	**Project Component / Analysis Goal**
Bradshaw Trail	Selected	Bradshaw Trail is a Back Country Byway. Bradshaw Trail, also known as the Gold Road to La Paz, is a 65-mile back country byway that begins 35 miles southeast of Indio, CA and ends 15 miles southwest of Blythe. The first road through Riverside County was blazed by William Bradshaw in 1862, as an overland stage route beginning in San Bernardino, California, and ending in La Paz (now Ehrenberg), Arizona. The trail was used extensively between 1862 and 1877 to transport miners and other passengers to the gold fields at La Paz. The trail is now a graded dirt road that traverses mostly public land between the Chuckwalla Mountains and the Chocolate Mountain Aerial Gunnery Range. The trail is periodically graded by the Riverside County Transportation Department, but 4WD vehicles are recommended before of stretches of soft sand and dry wash.	Recreation	Foreground / middleground / background views; temporary/transient; viewer position variable	Assess change in landscape character along Bradshaw trail, including potential foreground views of PV Arrays, background views of transmission towers, and areas where -- based on the viewshed model -- Project is not expected to be visible.
California State Route 78 (SR-78)	Selected	SR-78 is an east-west two lane California state highway that runs from Oceanside to Blythe, but generally runs north-south in the vicinity of the Project. SR-78 terminates at its intersection with eastbound I-10, east of the Project site within the viewshed of the Riverside SEZ. The portion of SR-78 in Riverside County is not designated as a scenic route by Caltrans.	Transportation; Residential	Middleground views; temporary /transient; viewer position at grade	Assess potential changes in landscape character at nearby residences and roadway travelers with potential views of arrays as and taller Project infrastructure (transmission towers, anemometer, and 34.5 kV poles).
Chuckwalla DWMA ACEC / Chuckwalla Valley Dune Thicket ACEC	Selected	The range spans approximately 40 miles (64 km), running in a generally northwest-to-southeast direction. It is bordered to the north by Interstate 10 and the town of Desert Center and to the south by the Bradshaw Trail and the Chocolate Mountains Aerial Gunnery Range. The highest point is Black Butte, elevation 4,504 feet (1,373 m). The Chuckwalla Range is divided from the Little Chuckwalla Range by Graham Pass. The Orocopia Mountains are to the west and Joshua Tree National Park to the northwest. Most of the mountains were designated by the Bureau of Land Management as the Chuckwalla Mountains Wilderness Area in 1994. Motorized travel is allowed only on “cherry-stemmed” established roads.	Public Lands Recreation	Background / middleground views; temporary/transient; viewer position at grade	Assess potential changes in landscape character with potential views of arrays as well as taller Project infrastructure (transmission towers, anemometer, and 34.5 kV poles).
Colorado River	Selected	The Colorado River is a major water body in the southwestern U.S., the source of which is located in the Rocky Mountains of Colorado, and the mouth of which is located in the Gulf of California in Baja California, Mexico. It is the primary source of water supply for all of southern California. It is not designated as a Wild & Scenic River by the National Wild and Scenic Rivers System, but is used for recreational activities. The river crosses I-10 east of SR-78, which is east of the Project site, and is surrounded by agricultural land uses. It provides the border between California and Arizona.	Recreational Water Supply	Background / middleground views; temporary/transient; viewer position at grade / inferior	Assess potential changes to landscape character of the river corridor.

Table A-1. Record of Selected and Eliminated Key Observation Points (KOP)					
Candidate KOP	**Selected / Eliminated**	**Description**	**Uses**	**Visual Analysis Factors**	**Project Component / Analysis Goal**
Community of Ripley	Selected	Ripley is a census-designated place community in east Riverside County. It is located along State Route 78 between Palo Verde and Blythe. The area is mostly agricultural lands irrigated by Colorado River water. The elevation is 249 feet (76 m). The population was 692 at the 2010 census.	Residential	Middleground views; long-term viewers; viewer position at grade	Assess potential changes in landscape and community character with potential views of arrays as well as taller Project infrastructure (transmission towers, anemometer, and 34.5 kV poles).
Interstate 10 (I-10) Corridor	Selected	I-10 is a major east-west four lane interstate highway that runs from Arizona through California. I-10 is eligible for the State Scenic Highway System, but is not designated as a scenic highway by Caltrans. It is located north of the Project site, and traverses through the center of the Riverside SEZ.	Transportation	Foreground / middleground / background views; temporary/transient; viewer position at grade	Assess potential change in character along I-10; including potential foreground views of PV Arrays, background views of transmission towers, and areas where Project is not expected to be visible.
McCoy Mountains	Selected	The range lies in a northwest-southeasterly direction east of the Palen Mountains and south of the Little Maria Mountains. The mountain range is approximately 18 miles long and is located just north of Interstate 10, and about seven miles northeast of Chuckwalla Valley State Prison. The mountains reach an elevation of 2,054 feet above sea level at McCoy Peak, at the southern end of the range. Downtown Blythe, California is about 10 miles to the east.	Public LandsRecreation	Foreground/Middleground views; temporary/transient; superior viewer position	Assess potential change in landscape character that may result from development of the proposed Project.
Mule Mountains ACEC	Selected	Under the California Desert Conservation Area (CDCA) Plan, the Mule Mountains are designated as an Area of Critical Environmental Concern (ACEC) by the BLM. The Mule Mountains ACEC is 4,092 acres in size and bears dual Multiple Use Class designations, M (Moderate Use) and L (Limited Use). The Mule Mountains ACEC was established to manage prehistoric resources (BLM, 1980).	Public Lands Recreation	Foreground / middleground; stationary; temporary/transient; viewer position at grade	Assess potential change in landscape character that may result from development of the proposed Project.

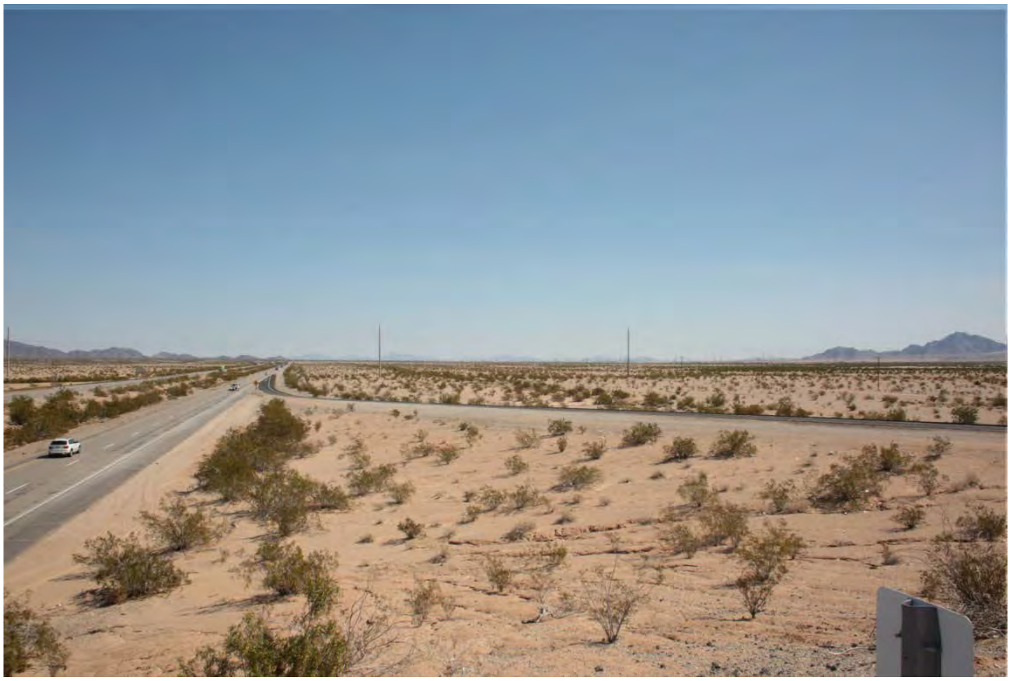
Table A-1. Record of Selected and Eliminated Key Observation Points (KOP)					
Candidate KOP	**Selected / Eliminated**	**Description**	**Uses**	**Visual Analysis Factors**	**Project Component / Analysis Goal**
Palen/McCoy Wilderness	Selected	Within the Palen-McCoy Wilderness are the Granite, McCoy, Palen, Little Maria and Arica Mountains, which are five distinct mountain ranges separated by broad sloping bajadas. Because this large area incorporates so many major geological features, the diversity of vegetation and landforms is exceptional. The desert wash woodland found here provides food and cover for burro deer, coyote, bobcat, gray fox and mountain lion. Desert pavement, bajadas, interior valleys, canyons, dense ironwood forests, canyons and rugged peaks form a constantly changing landscape pattern.	Public Lands Recreation	Background views; temporary/transient; superior viewer position	Assess potential change in landscape character from that may result from development of the proposed Project.
Midland Long Term Visitor Area (LTVA)	Selected/ Eliminated following field visit	The BLM's Long Term Visitor Area (LTVA) program was established in 1983 to meet the long-term camping needs of winter visitors and to provide special management and control measures for the protection of natural and cultural resources. Each year, thousands of visitors come to the deserts of Southern California to enjoy the natural opportunities found there. Many of these visitors choose to make the Midland LVTA their home from the months of September through April. The LTVA is conveniently located approximately 8 miles north of the town of Blythe and to the several different types of recreational opportunities within the area including hiking, rock hounding, hunting, camping, OHV driving, wildlife watching, etc.	Public Lands Recreation	Background views; transient and long-term viewers; superior viewer position	Assess potential change in landscape character that may result from development of the proposed Project.
Nicholls Warm Springs / Palo Verde	Selected	Nicholls Warm Springs is a small, medium density residential community located south of the I-10, north of the NRG Blythe Solar Power Plant near Blythe.	Residential	Middleground views; transient and long-term viewers; viewer position at grade	Assess potential change in landscape character that may result from development of the proposed Project.
Palo Verde College	Selected / Eliminated following field visit	Palo Verde College is located on a mesa overlooking the City of Blythe and the Palo Verde Valley.	Academic	Middleground View; prolonged; familiar; superior viewer position	Assess potential change in landscape character that may result from development of the proposed Project.

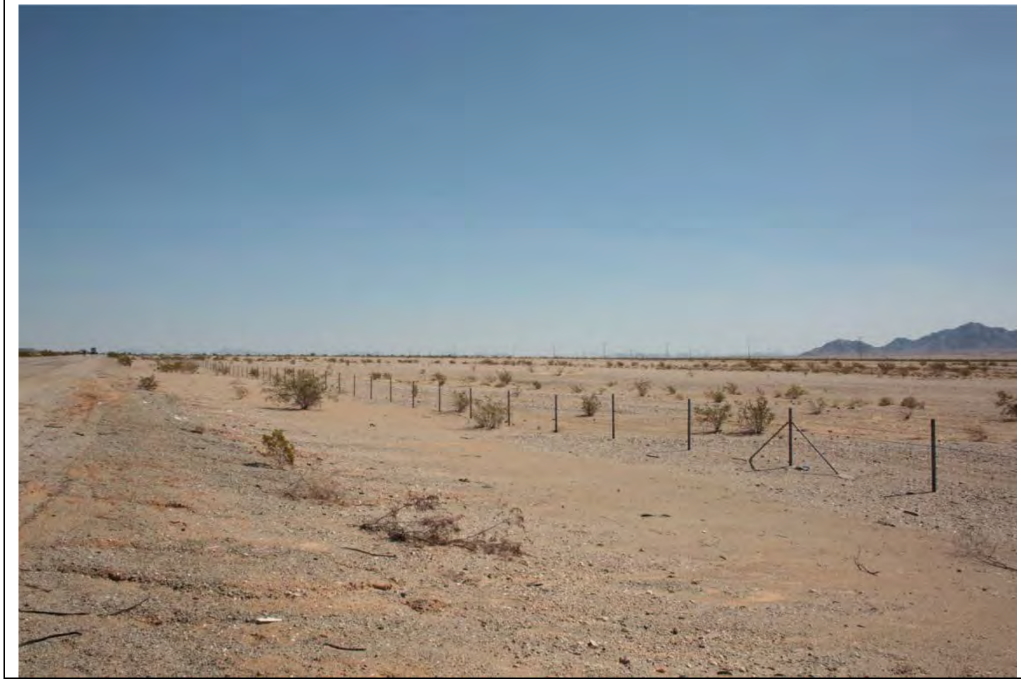
Table A-1. Record of Selected and Eliminated Key Observation Points (KOP)					
Candidate KOP	**Selected / Eliminated**	**Description**	**Uses**	**Visual Analysis Factors**	**Project Component / Analysis Goal**
Big Maria ACEC	Eliminated	The Big Marias ACEC contains the single greatest concentration of geoglyphs in North America. The density of intaglio features in this ACEC is extremely rare and presents unique management challenges for cultural resource protection and opportunities for scientific research. The ground figures within the ACEC are known to be of tremendous importance to several Native American tribes.	Public Lands Recreation	N/A	N/A
Blythe Airport	Eliminated	Blythe Airport is a County of Riverside publicly-owned general aviation facility located six miles west of Blythe. It has two asphalt runways and is situated at approximately 400 feet in elevation. The Blythe Airport accommodated 69 aircrafts per day on average for a 12-month period ending February 2014.	Commercial - Air Transportation	N/A	N/A
Cibola National Wildlife Refuge	Eliminated	Cibola NWR is located in the floodplain of the lower Colorado River and surrounded by a fringe of desert ridges and washes. The refuge encompasses both the historic Colorado River channel as well as a channelized portion constructed in the late 1960's. Along with these main water bodies, several important backwaters are home to many wildlife species that reside in this portion of the Sonoran Desert. Cibola National Wildlife Refuge is located south east of the Project site, in Arizona.		N/A	N/A
City of Blythe	Eliminated	The City of Blythe is a General Law city, which was incorporated in 1916. It is located in the Palo Verde Valley of Riverside County approximately 225 miles east of Los Angeles, CA and 150 miles west of Phoenix, Arizona. The City of Blythe encompasses an area of approximately 26 square miles and is situated 265 feet above mean sea level (City of Blythe 2006-2014). The I-10 corridor runs directly through the city.	Residential Agriculture	N/A	N/A
County of Riverside Mayflower Park	Eliminated	Mayflower Park is a 24-acre park situated alongside the Colorado River 6 miles north of Blythe, just north of 6th Avenue and Colorado River Road. It consists of grassy campsites for tents and RVs, covered picnic ramadas on the river, showers, a launch ramp and a small lagoon. Recreational activities at the park include boating/fishing, picnics, and swimming in the lagoon.	Public Facilities Recreation	N/A	N/A
Ironwood State Prison (ISP) / Chuckwalla Valley State Prison	Eliminated	ISP jointly occupies with CVSP 1,720 acres of State-owned property, of which ISP encompasses 640 acres. The prison complex occupies approximately 350 acres with the remaining acreage used for erosion control, drainage ditches, and catch basins.	Federal Facility	N/A	N/A

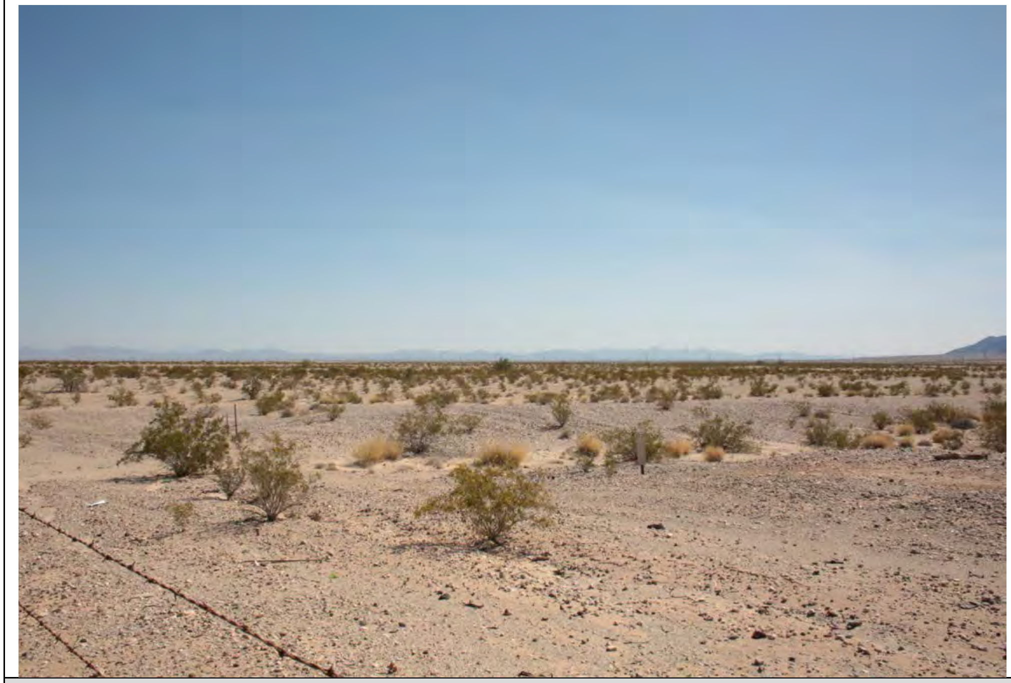
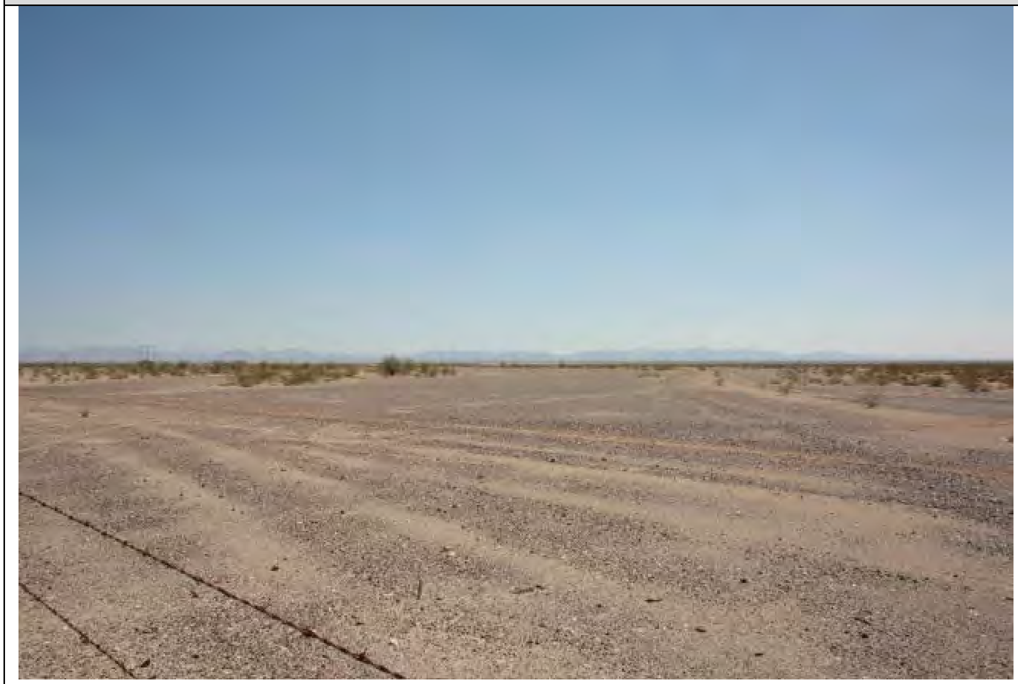
Table A-1. Record of Selected and Eliminated Key Observation Points (KOP)					
Candidate KOP	**Selected / Eliminated**	**Description**	**Uses**	**Visual Analysis Factors**	**Project Component / Analysis Goal**
Little Chuckwalla Mountains Wilderness	Eliminated	Rugged mountains surrounded by a large, gently sloping bajada laced with a network of washes describe the terrain and landforms found within the Little Chuckwalla Mountains Wilderness. To the north, a bajada gently rises to 400 feet, while the rugged mountains crest at 2,100 feet. Habitat for bighorn sheep and desert tortoise can be found in portions of this region, and the southern bajada has been identified as crucial desert tortoise habitat. Several sensitive plant species grow here, including the California snakeweed, Alverson's foxtail cactus and the barrel cactus.	Public LandsRecreation	N/A	N/A
Mule Mountains LTVA	Eliminated	The Mule Mountains Long Term Visitor Area consists of the Wiley's Well and Coon Hollow camp sites located approximately 17 miles west of Blythe, and the surrounding desert area where dispersed camping is allowed. The Long Term Visitor Area is managed by BLM. The area consists of 29 trailer sites with tables, BBQ stands and campsite rings, vault toilets, and ranger patrols. There is no electricity or water at the campgrounds. Long term camping trailers and motor homes are allowed. There is easy 4WD access to nearby rock-hounding sites such as the Hauser Geode Beds and Opal Hill Fire Agate Mine. The historic Bradshaw Trail National Scenic Byway passes between the two campgrounds and provides access to numerous trails, gem and mineral collection sites and historic stage route and mining areas.	Public Facilities Recreation	N/A	N/A
Palo Verde Mountains Wilderness	Eliminated	Distinguishing this wilderness are twin buttes known as the Flat Tops, which stand out as a landmark against a range of jagged peaks. Palo Verde Peak is the high point of the range rising to 1,800 feet. Dry washes cut across the mountain slopes, supporting such vegetation as palo verde, mesquite and ironwood. Clapp Spring and its palm oasis are unique to this area, offering the only permanent water source to such wildlife species as desert bighorn sheep, desert tortoise and wild burros. Rather than hide among canyon walls as most springs in the desert, Clapp Spring lies in an open landscape. Saguaro cactus dot the southeastern part of the wilderness, a rare plant species in California.	Public Lands Recreation	N/A	N/A
Riviera RV Resort	Eliminated	Riviera RV Resort is a privately-owned park and marina on the Colorado River near I-10 in Blythe. It consists of a convenience store and recreational room, laundry facility, public restroom sand showers, a pool and spa, and tent and RV camping sites. Recreational activities include hiking, boating, skiing, fishing and off-road adventures.	Recreation	N/A	N/A
Wiley Well District Geode Beds	Eliminated	The Wiley Well District is located in the Colorado Desert, south of I-10 between Desert Center and Blythe. Best known for its many geode beds and a variety of other rocks and minerals, the Wiley Well District has been popular with rock hounds since the 1940s. In January 2000, the California Federation of Mineralogical Societies and the BLM signed a MOU that designated the Wiley Well District as a Rockhound Educational and Recreational Area. The MOU establishes and preserves over 36 square miles of the area for rockhounding.	Recreation	N/A	N/A

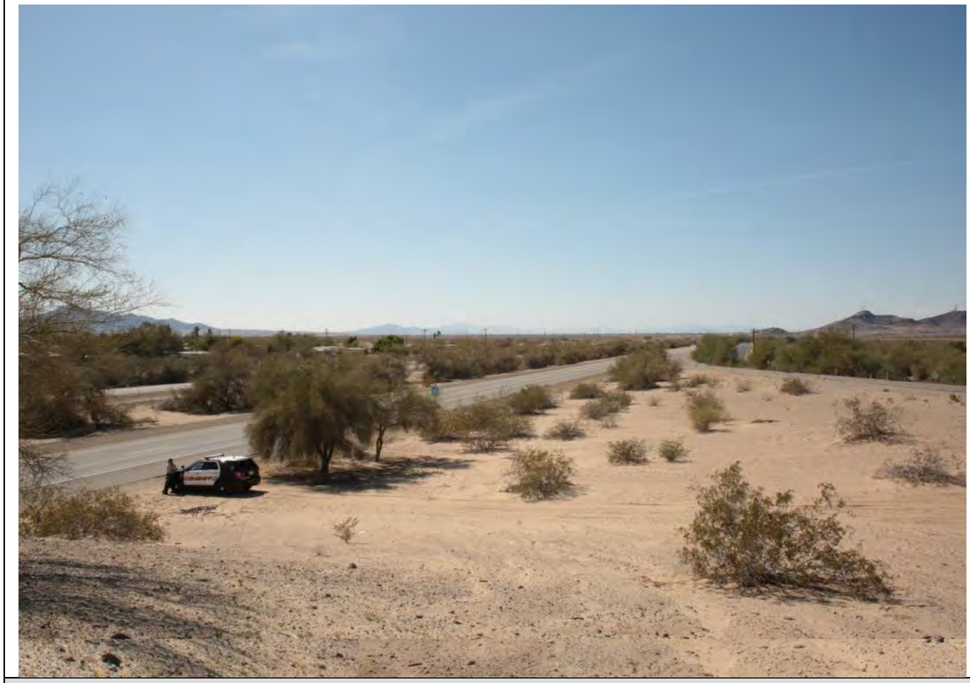
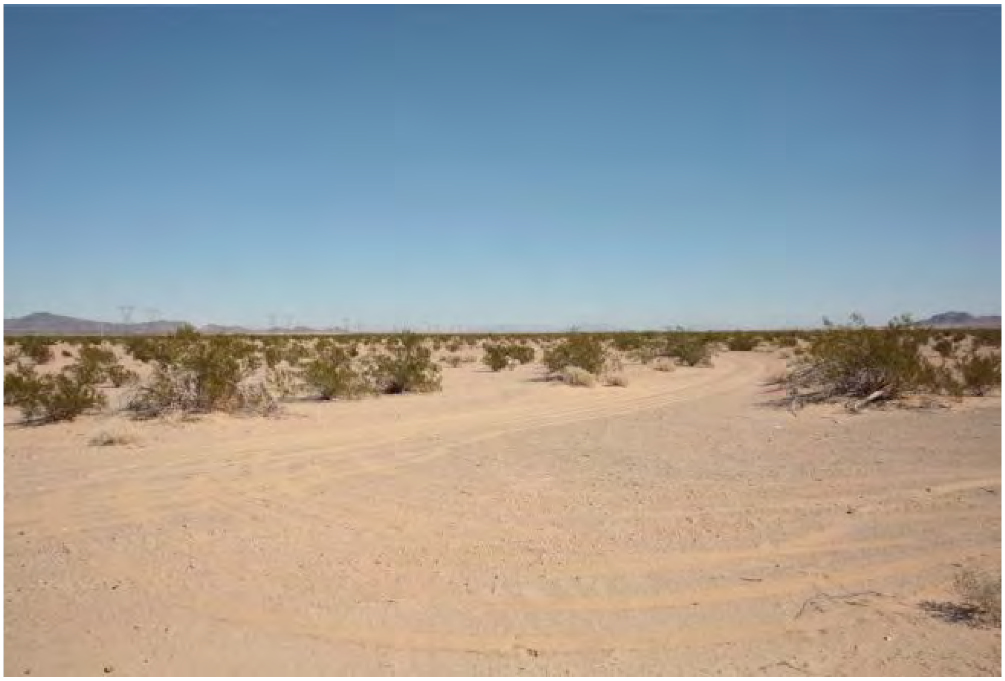
Table A-1. Record of Selected and Eliminated Key Observation Points (KOP)					
Candidate KOP	**Selected / Eliminated**	**Description**	**Uses**	**Visual Analysis Factors**	**Project Component / Analysis Goal**
Wiley's Well Rest Area	Eliminated	Wiley's Well is a public rest area along the I-10 corridor 15 miles west of Blythe. The facility is maintained by the California Department of Transportation.	Public Facilities	N/A	N/A

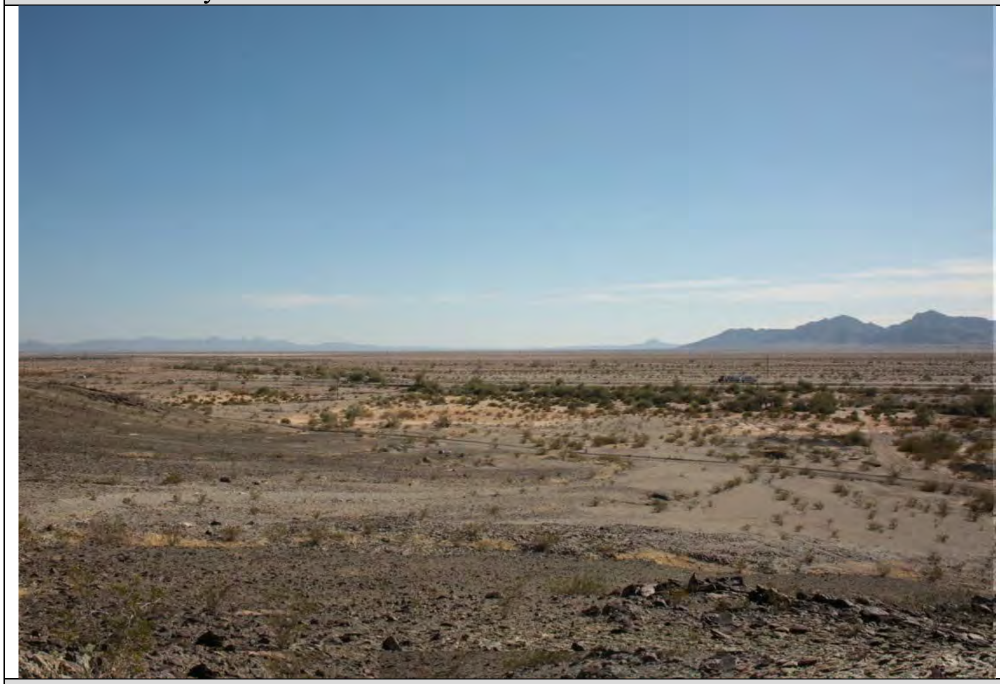
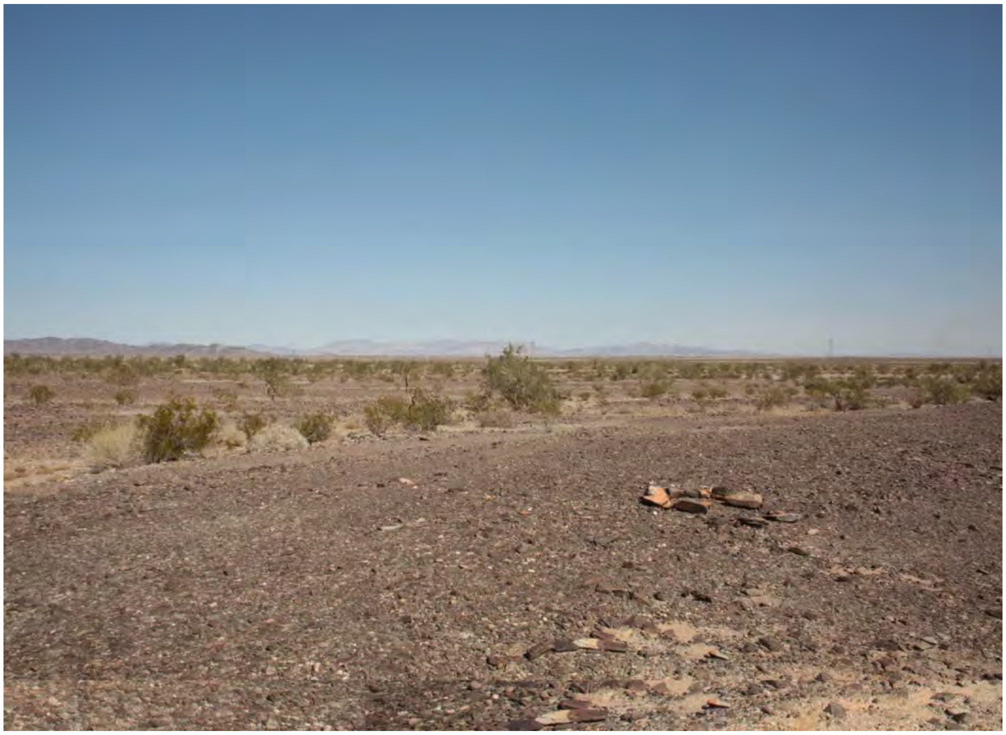
APPENDIX B
KEY OBSERVATIONS POINTS – BASELINE PHOTOGRAPHS

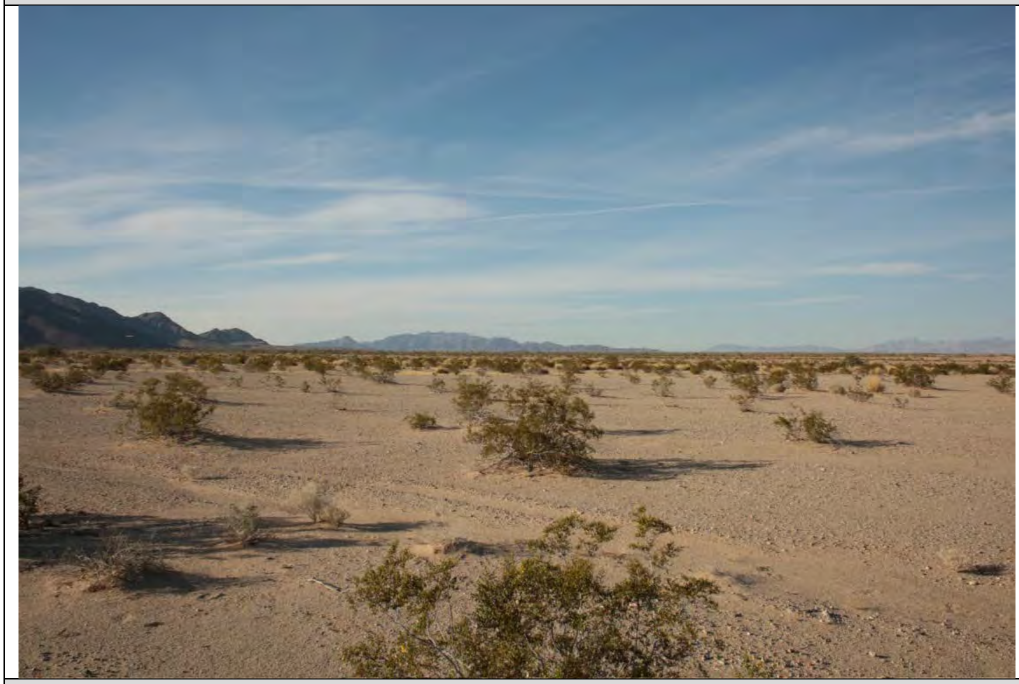
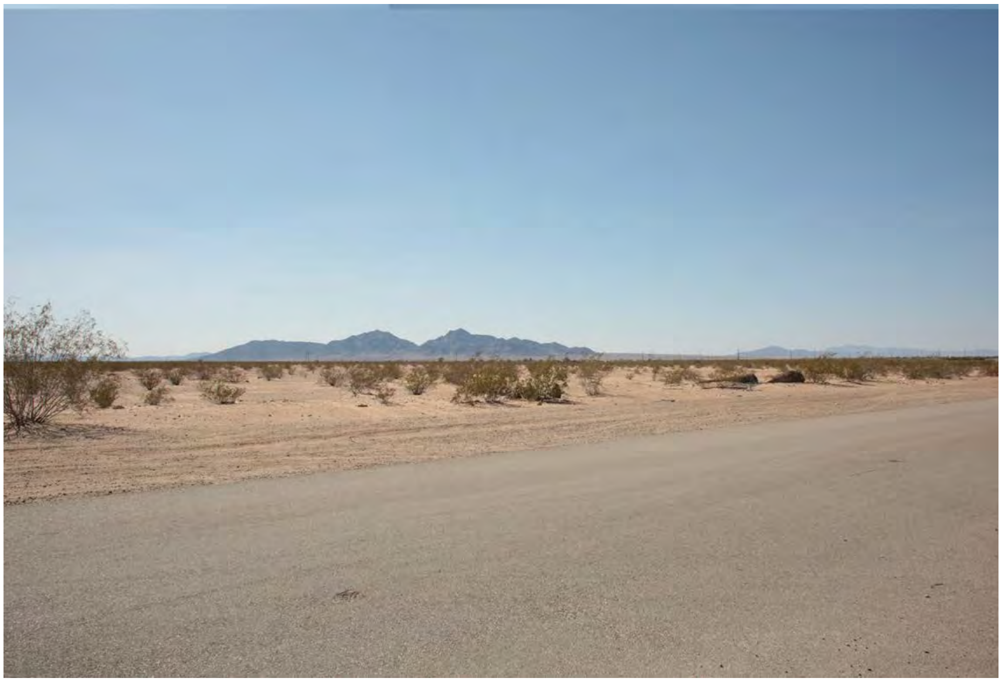
KOP #1a: Interstate 10	Description
	View directed east from Interstate 10 eastbound at KOP 1-a (Corner of Christopher Columbus Transcontinental Highway & Wiley's Well Road). Viewer location is approximately 6 miles west of the western edge of the proposed solar array.

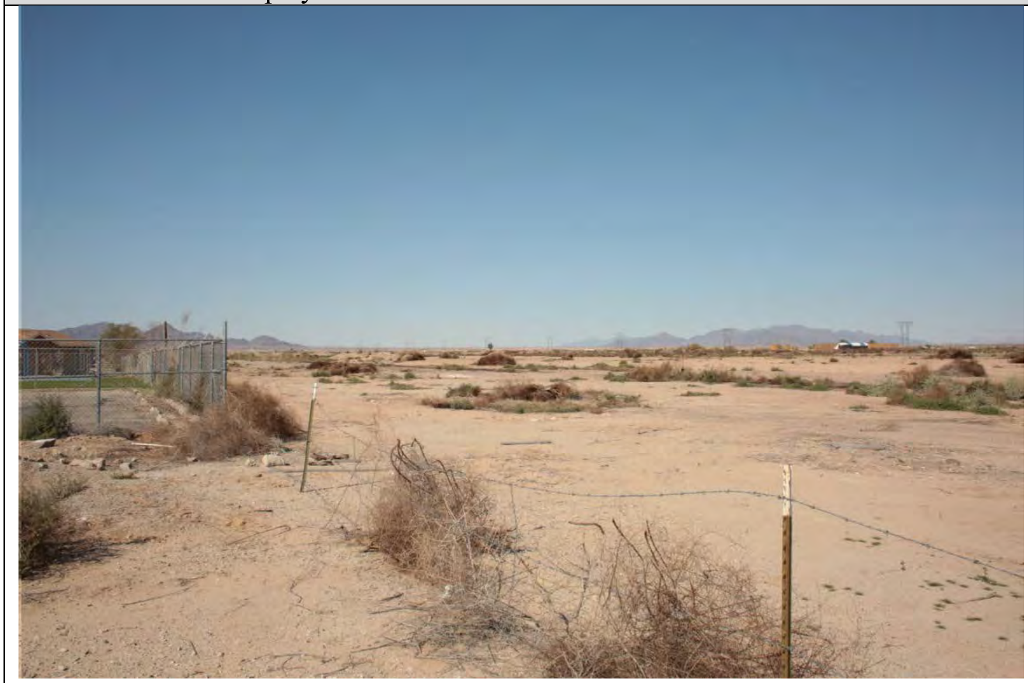
KOP #1b: Interstate 10	Description
	View directed east from Interstate 10 eastbound at KOP 1-b. Viewer location is approximately 3.5 miles west of the western edge of the proposed solar array.

<table>
<tr><th>KOP #1c: Interstate 10</th><th>Description</th></tr>
<tr><td></td><td>View directed southeast from Interstate 10 eastbound at KOP 10-c. Viewer location is due north of the western edge of the proposed solar array.</td></tr>
<tr><th>KOP #1d: Interstate 10</th><th>Description</th></tr>
<tr><td></td><td>View directed south-southeast from Interstate 10 eastbound at KOP 10-d. Viewer location is due north of the proposed solar array.</td></tr>
</table>

KOP #1e: Interstate 10	Description
	View directed west from Interstate 10 westbound at KOP 1-e. Viewer location is approximately due north of the eastern edge of the proposed solar array.
KOP # 2: Chuckwalla DWMA	Description
	View directed eastward from the Chuckwalla DWMA at KOP 2. Viewer location approximately 2 miles from the western edge of the proposed solar array.

KOP #3: McCoy Mountains	Description
	View directed south-southeast across the Palo Verde Mesa, Chuckwalla Valley and Palo Verde Valley from the McCoy Mountains at KOP 3.
KOP #4: Mule Mountains	Description
	View directed north across the Palo Verde Mesa and Chuckwalla Valley from the foothills of the Mule Mountains at KOP 4.

KOP #5: Bradshaw Trail	Description
	View directed north from the Bradshaw Trail at KOP 5.
KOP #6: Town of Nicholls Warm Springs / Mesa Verde	Description
	View directed south-southwest across the Palo Verde Mesa from the foothills from Nicholls Warm Springs/Mesa Verde at KOP 6.

KOP #7: Town of Ripley	Description
	View directed west-northwest across the Palo Verde Valley from the Town of Ripley at KOP 7.

APPENDIX C

KEY OBSERVATIONS POINTS – VISUAL SIMULATIONS

Single Frame Photosimulations - Existing & Proposed

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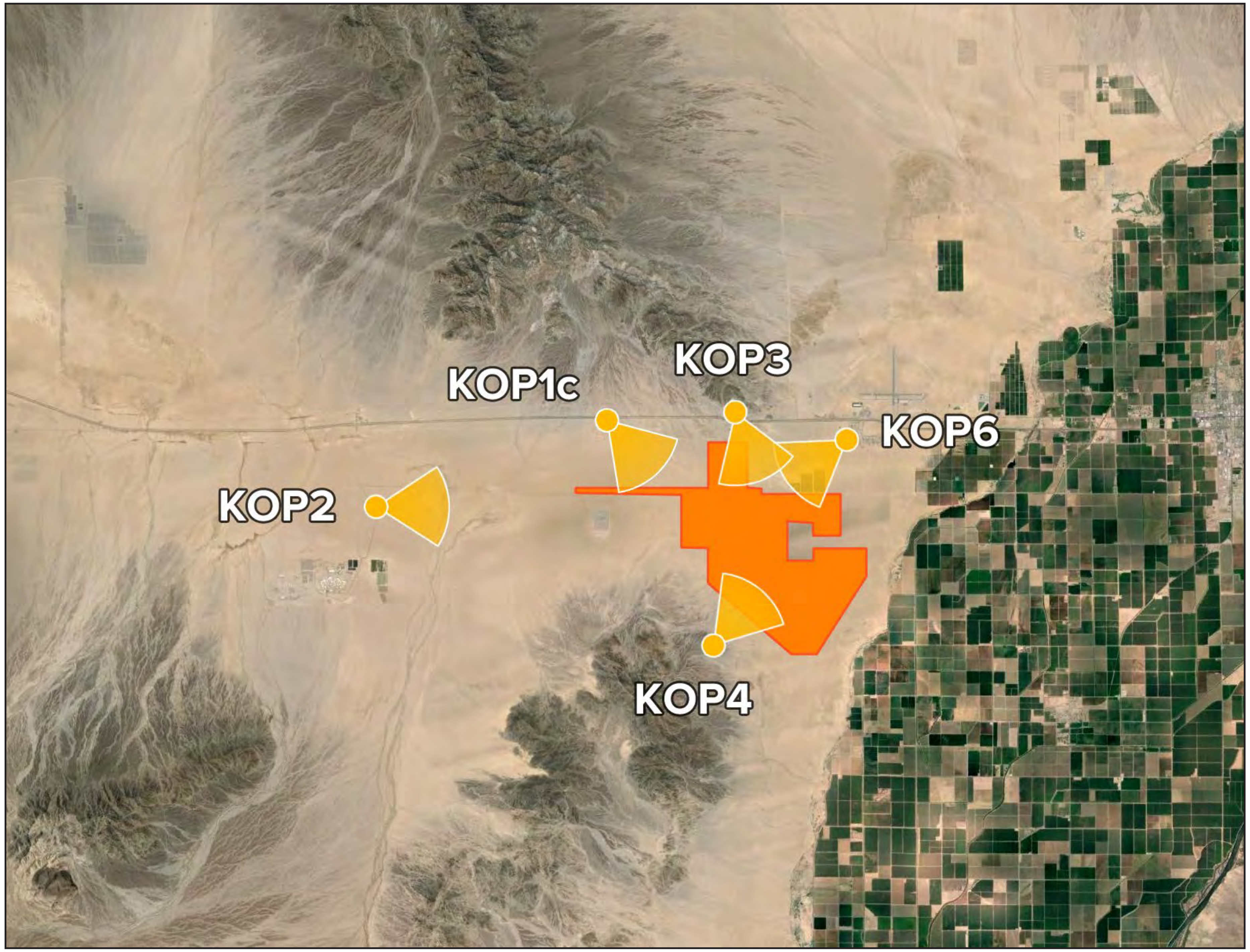
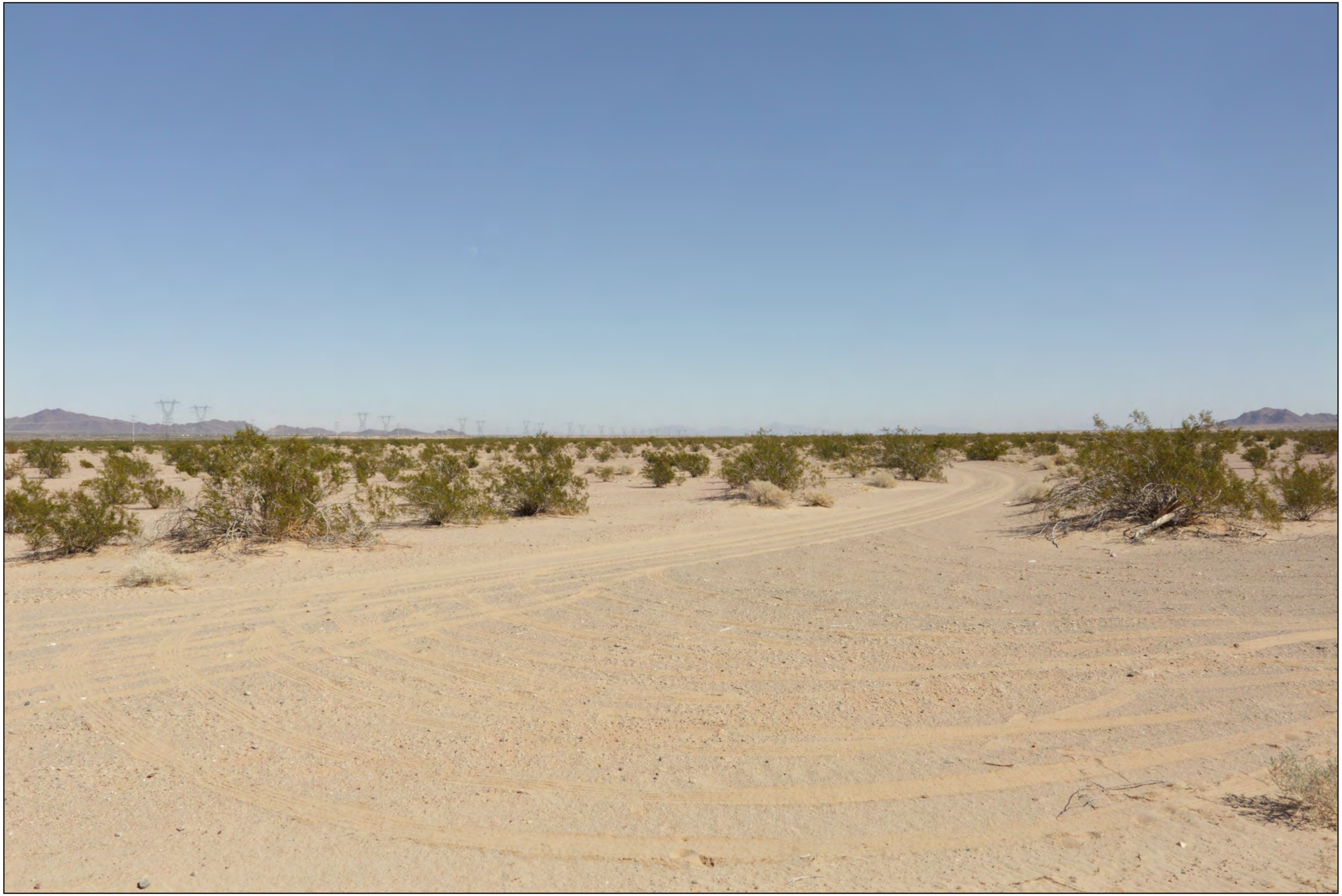
Viewpoint Locations

KOP2	*Chuckwalla DWMA*
KOP3	*McCoy Mountains*
KOP4	*Mule Mountains*
KOP1c	*Interstate 10*
KOP6	*Nicholls Warm Springs*


KOP3
KOP1c
KOP6
KOP2
KOP4



KOP2 - Chuckwalla DWMA, Looking East - *Existing View*

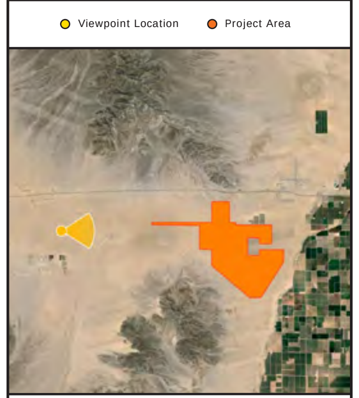
a. For on-screen display: scale bar to be 4 inches wide, viewing distance is 11.2 inches.
b. When printed on 11x17 paper, viewing distance is 11.2 inches.

First Solar.

Desert Quartzite Solar Project

KOP2

Chuckwalla DWMA



Easting Position (UTM Zone 11):	**695432.7**
Northing Position (UTM Zone 11):	**3718027.8**
Elevation of Photopoint Position (NAD83):	**424.5**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**26 February 2015 at 01:40 PM**
Orientation of View:	**E**
Horizontal Field of View:	**65°**
Vertical Field of View:	**46°**

NOTES:

Viewpoint locations have been precision surveyed by:

The Holt Group, Inc.
Blythe, California 92225

No part of this photo simulation shall be altered in any way.

Visual assessments should be made from the full size TrueView™ only.

Photo Simulation Created Using
TrueView™ Technology
(Patent No.: US 8,184,906 B2)

Provided by

Truescape®

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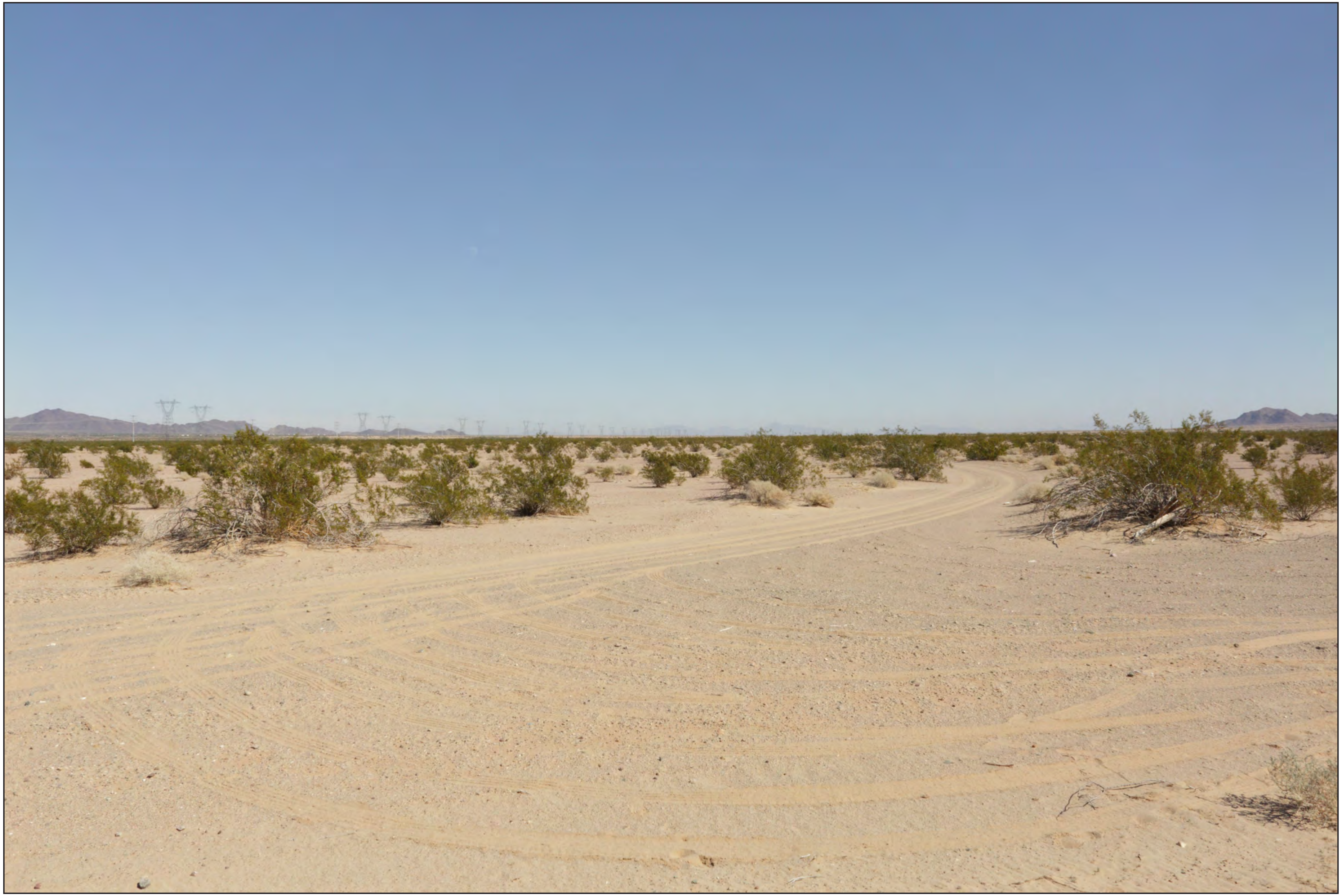
DATE

4 September 2015



KOP2 - Chuckwalla DWMA, Looking East - *Proposed View*

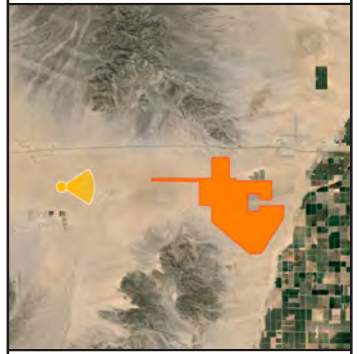
First Solar.

Desert Quartzite Solar Project

KOP2

Chuckwalla DWMA

● Viewpoint Location ● Project Area



Easting Position (UTM Zone 11):	**695432.7**
Northing Position (UTM Zone 11):	**3718027.8**
Elevation of Photopoint Position (NAD83):	**424.5**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**26 February 2015 at 01:40 PM**
Orientation of View:	**E**
Horizontal Field of View:	**65°**
Vertical Field of View:	**46°**

NOTES:

Viewpoint locations have been precision surveyed by:

The Holt Group, Inc.
Blythe, California 92225

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TrueView™ Technology
(Patent No.: US 8,184,906 B2)

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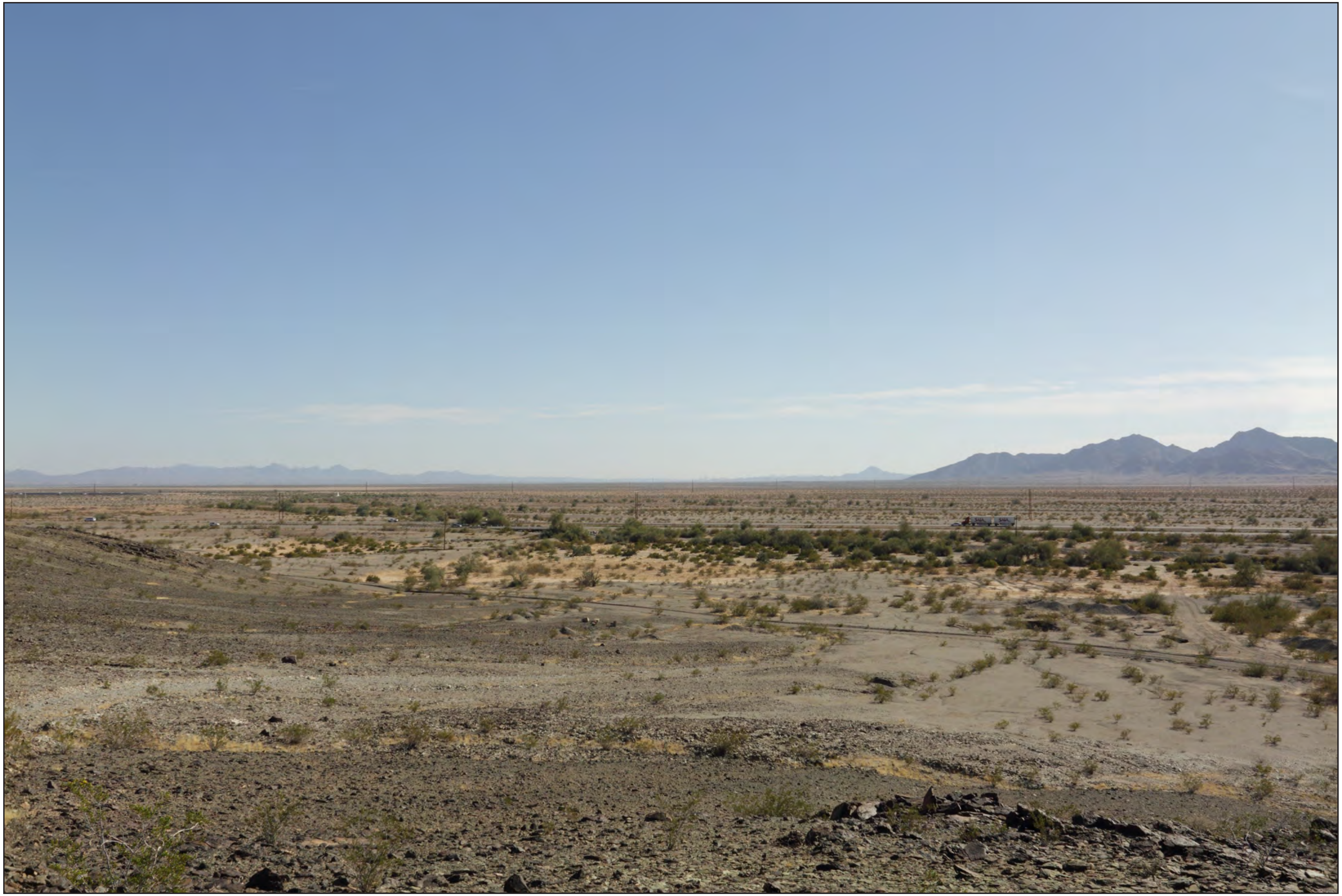


KOP3 - McCoy Mountains, Looking South - *Existing View*

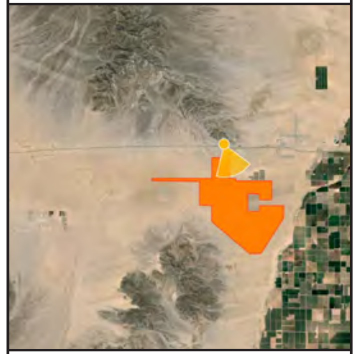
First Solar.

Desert Quartzite Solar Project

KOP3

McCoy Mountains

● Viewpoint Location ● Project Area



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Northing Position (UTM Zone 11):	**3721347.7**
Elevation of Photopoint Position (NAD83):	**544.6**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**26 February 2015 at 03:12 PM**
Orientation of View:	**S**
Horizontal Field of View:	**65°**
Vertical Field of View:	**46°**

NOTES:

Viewpoint locations have been precision surveyed by:

The Holt Group, Inc.
Blythe, California 92225

No part of this photo simulation shall be altered in any way.

Visual assessments should be made from the full size TrueView™ only.

Photo Simulation Created Using
TrueView™ Technology
(Patent No.: US 8,184,906 B2)

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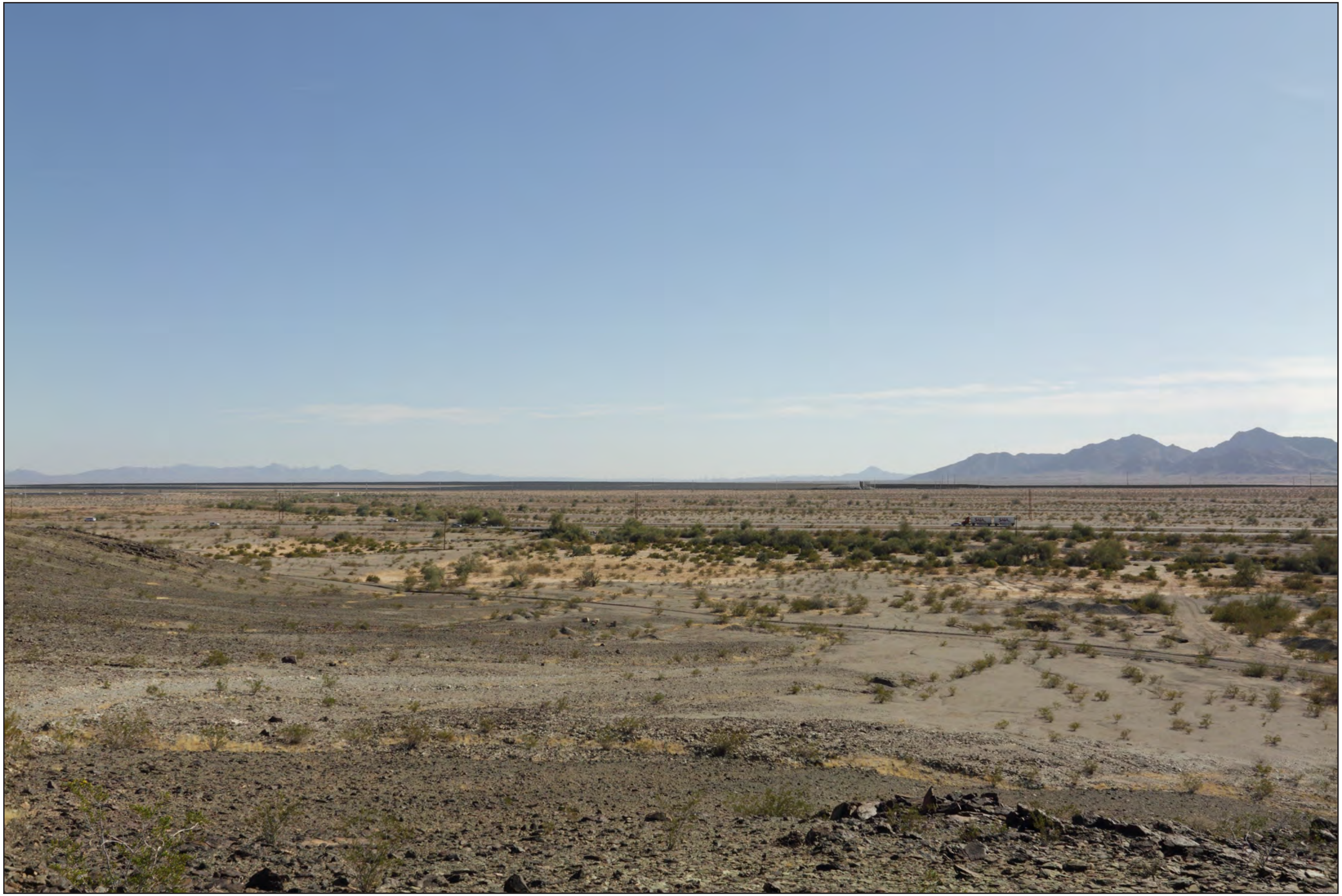
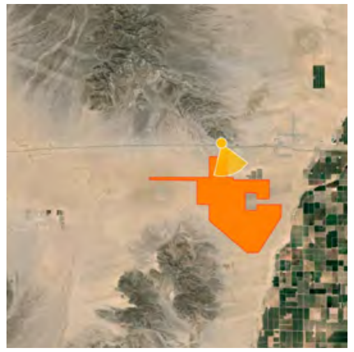


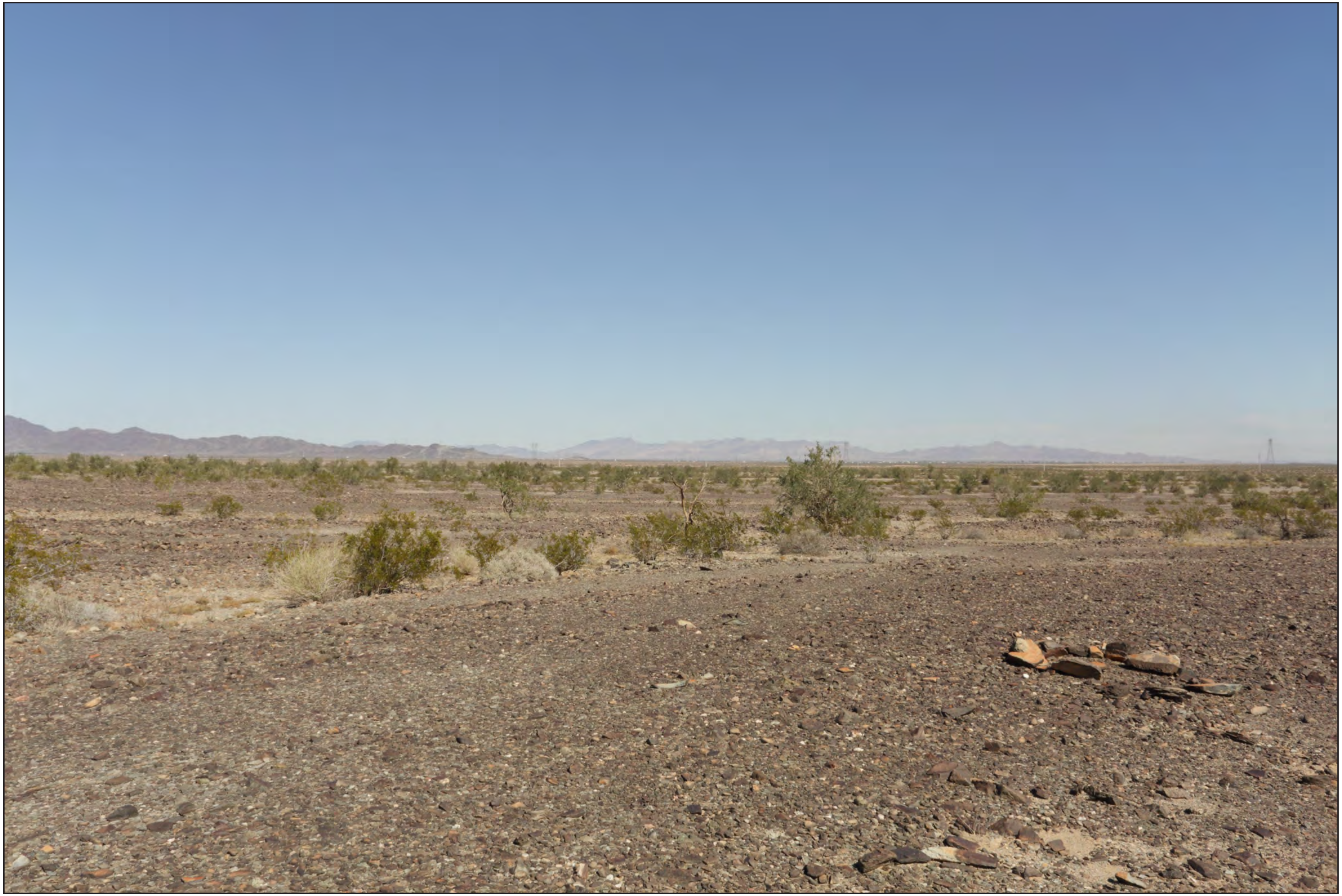
KOP3 - McCoy Mountains, Looking South - *Proposed View*

KOP3

McCoy Mountains



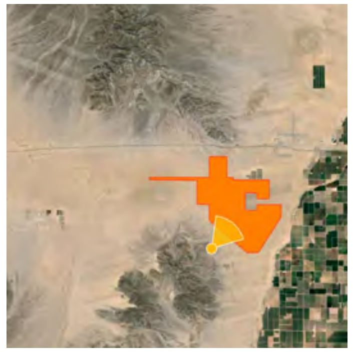
Easting Position (UTM Zone 11):	**706864.0**
Northing Position (UTM Zone 11):	**3721347.7**
Elevation of Photopoint Position (NAD83):	**544.6**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**26 February 2015 at 03:12 PM**
Orientation of View:	**S**
Horizontal Field of View:	**65°**
Vertical Field of View:	**46°**



KOP4 - Mule Mountains, Looking Northeast - *Existing View*

KOP4

Mule Mountains



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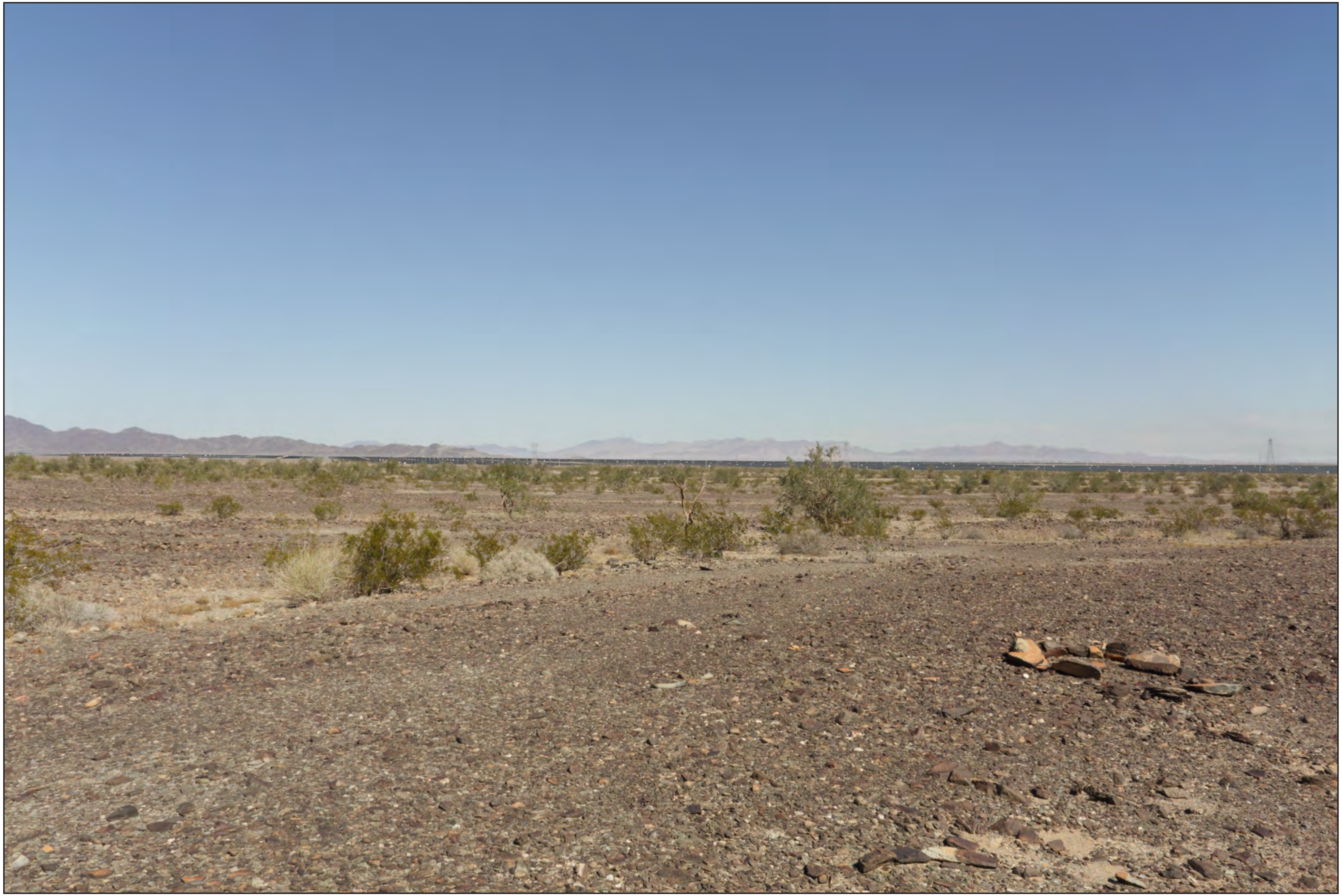
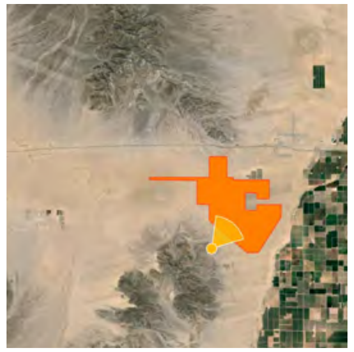
Northing Position (UTM Zone 11):	**3713836.2**
Elevation of Photopoint Position (NAD83):	**435.9**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**26 February 2015 at 12:00 PM**
Orientation of View:	**NE**
Horizontal Field of View:	**65°**
Vertical Field of View:	**46°**



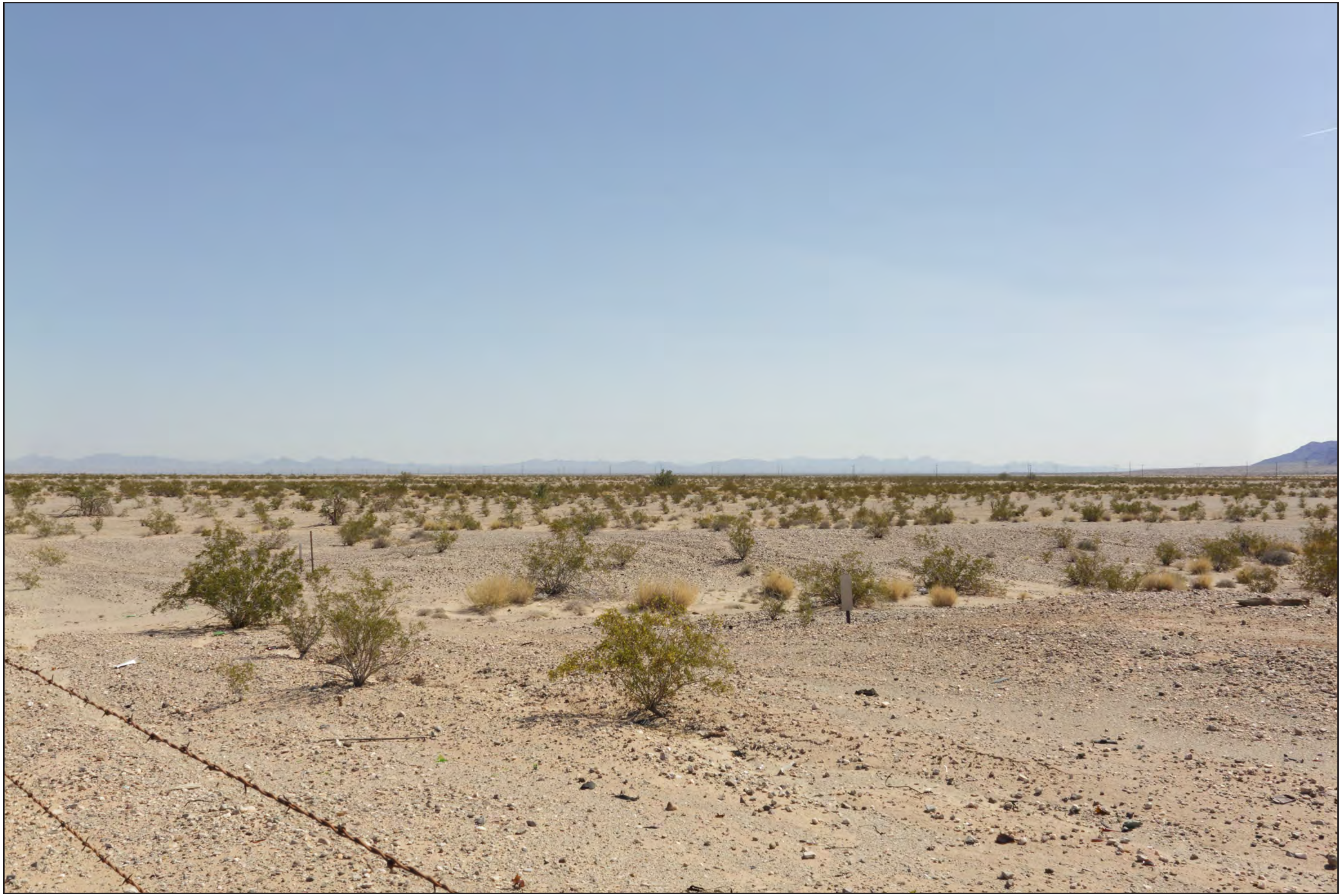
KOP4 - Mule Mountains, Looking Northeast - *Proposed View*

KOP4

Mule Mountains



Easting Position (UTM Zone 11):	**706270.0**
Northing Position (UTM Zone 11):	**3713836.2**
Elevation of Photopoint Position (NAD83):	**435.9**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**26 February 2015 at 12:00 PM**
Orientation of View:	**NE**
Horizontal Field of View:	**65°**
Vertical Field of View:	**46°**

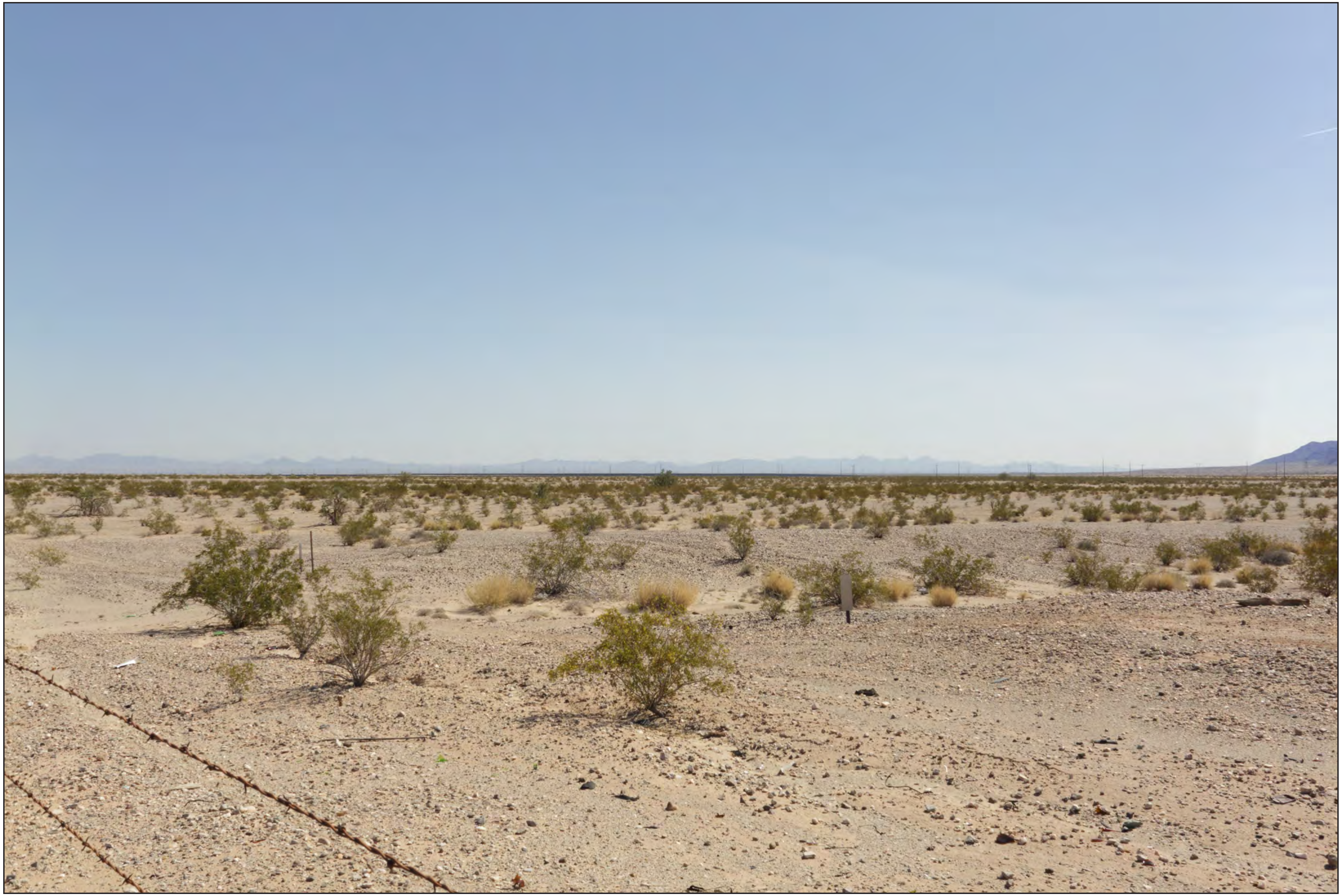


KOP1c

Interstate 10

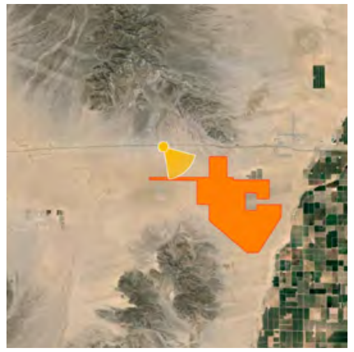
Easting Position (UTM Zone 11):	**702753.8**
Northing Position (UTM Zone 11):	**3721002.0**
Elevation of Photopoint Position (NAD83):	**539.5**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**27 February 2015 at 01:12 PM**
Orientation of View:	**SE**
Horizontal Field of View:	**65°**
Vertical Field of View:	**46°**

KOP1c - Interstate 10, Looking Southeast - *Existing View*



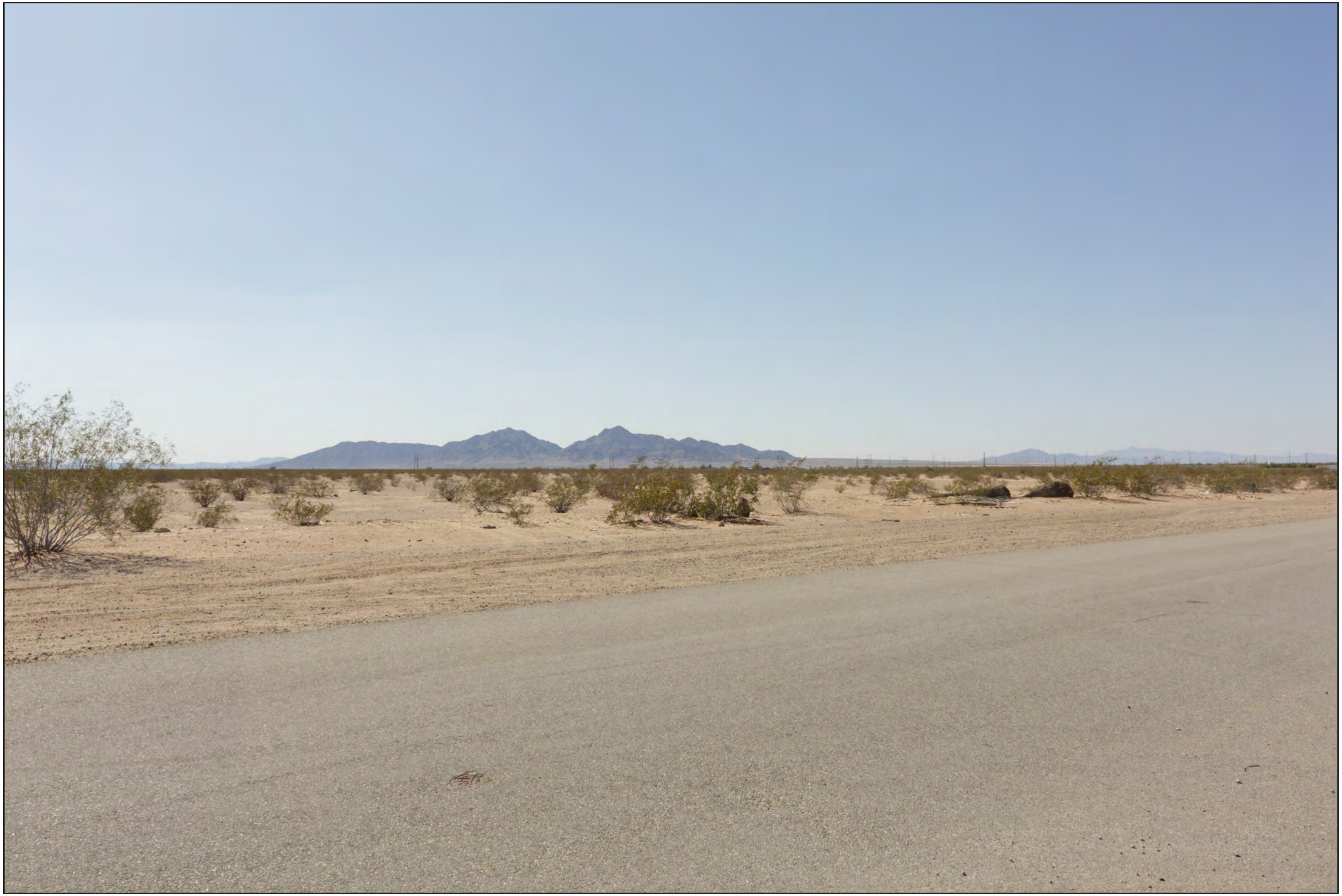
KOP1c

Interstate 10



Easting Position (UTM Zone 11):	**702753.8**
Northing Position (UTM Zone 11):	**3721002.0**
Elevation of Photopoint Position (NAD83):	**539.5**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**27 February 2015 at 01:12 PM**
Orientation of View:	**SE**
Horizontal Field of View:	**65°**
Vertical Field of View:	**46°**

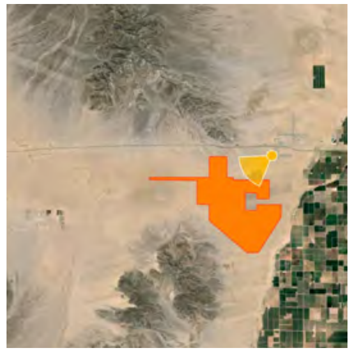
KOP1c - Interstate 10, Looking Southeast - *Proposed View*



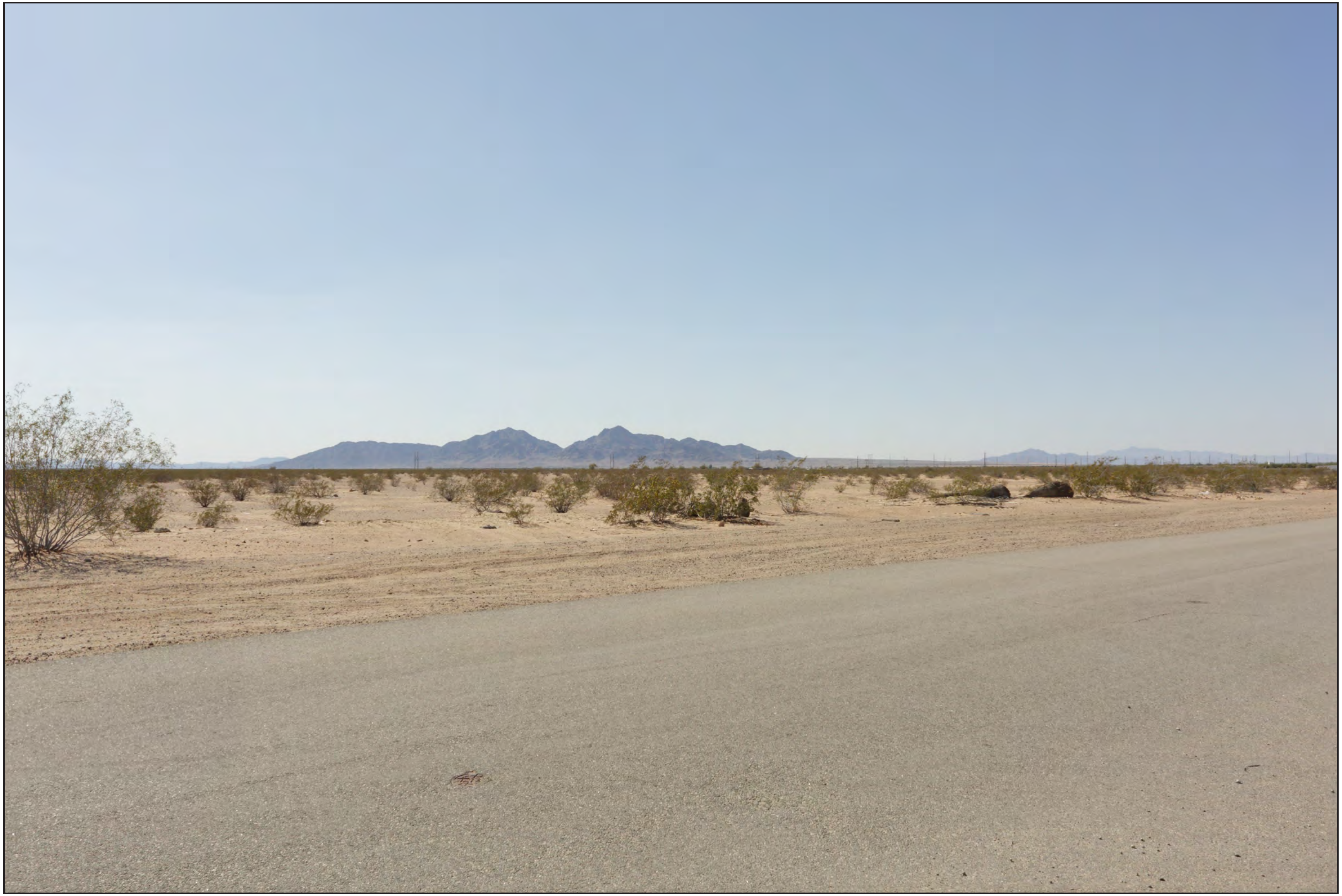
KOP6 - Nicholls Warm Springs, Looking Southwest - *Existing View*

KOP6

Nicholls Warm Springs

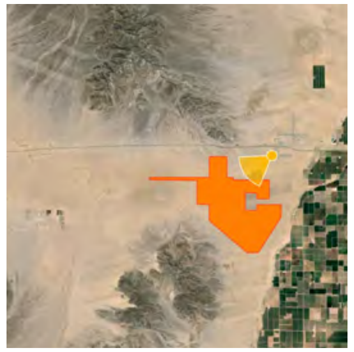


Easting Position (UTM Zone 11):	**710409.6**
Northing Position (UTM Zone 11):	**3720442.8**
Elevation of Photopoint Position (NAD83):	**397.2**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**27 February 2015 at 12:33 PM**
Orientation of View:	**SW**
Horizontal Field of View:	**65°**
Vertical Field of View:	**46°**



KOP6

Nicholls Warm Springs



Easting Position (UTM Zone 11):	**710409.6**
Northing Position (UTM Zone 11):	**3720442.8**
Elevation of Photopoint Position (NAD83):	**397.2**
Height of Camera Above Ground (ft):	**5.4**
Date of Photography:	**27 February 2015 at 12:33 PM**
Orientation of View:	**SW**
Horizontal Field of View:	**65°**
Vertical Field of View:	**46°**

KOP6 - Nicholls Warm Springs, Looking Southwest - *Proposed View*

APPENDIX V

DRAINAGE REPORT

DESERT QUARTZITE SOLAR PROJECT

DRAINAGE REPORT

Prepared For:

First Solar Development, Inc.
1111 Broadway, Suite 400
Oakland, CA 94607

Prepared by:

TLA Engineering and Planning, Inc.
1528 Eureka Road, Suite 100
Roseville, CA 95661
(916) 786-0685

August 10, 2011

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TABLE OF CONTENTS

1 EXECUTIVE SUMMARY 1

2 INTRODUCTION 2

3 PROJECT SITE DESCRIPTION 3
  3.1 Proposed Development 3
  3.2 Climate 3
  3.3 Geology 4
  3.4 Soil Type 4
  3.5 Drainage Area 4

4 HYDROLOGIC ANALYSIS 6
  4.1 Precipitation 6
  4.2 Infiltration 6

5 HYDRAULIC ANALYSIS 8
  5.1 Pre to Post Project Characteristics 8
  5.2 Results 9

6 SEDIMENT TRANSPORT ANALYSIS 11
  6.1 Methodology 11
  6.2 Results 11

7 PIER SCOUR ANALYSIS 12
  7.1 Methodology 12
  7.2 Results 12

8 CONCLUSIONS 13

9 REFERENCES 14

TABLES

TABLE 1 HYDRAULIC ANALYSIS SUMMARY 10

TABLE 2 SEDIMENT TRANSPORT ANALYSIS SUMMARY 11

TABLE 3 PIER SCOUR ANALYSIS SUMMARY 12

TABLE OF CONTENTS

FIGURES

FIGURE 1 VICINITY MAP 16

FIGURE 2 POST PROJECT SITE MAP 17

FIGURE 3 DRAINAGE SHED MAP 18

FIGURE 4 EXISTING PRE PROJECT DEPRESSION AREAS 19

FIGURE 5 MAXIMUM FLOW DEPTH
5a Pre Project 20
5b Post Project 20
5c Difference 21

FIGURE 6 MAXIMUM VELOCITY
6a Pre Project 22
6b Post Project 22
6c Difference 23

FIGURE 7 MAXIMUM SEDIMENT SCOUR
7a Pre Project 24
7b Post Project 24

FIGURE 8 POST PROJECT PIER SCOUR DEPTHS 25

1 EXECUTIVE SUMMARY

First Solar proposes to construct and operate a 300 Megawatt alternating current (MWac) solar photovoltaic energy generating facility known as Desert Quartzite Solar Project (Project). The Project is located on 5,000 acres in an unincorporated area of eastern Riverside County, south of Interstate 10 and west of Blythe, California. See Figure 1 for the Project vicinity map, Figure 2 for the Post Project site map and Figure 3 for the Project drainage shed map.

The purposes of this Report are to evaluate the Project's potential impact to drainage runoff depth, velocity, volume and sediment transport; determine the potential solar panel pedestal pier scour depths; and if necessary, propose mitigation measures for the identified Post Project drainage impacts.

The primary drainage criteria and methods follow the Riverside County Hydrology Manual. U.S Army Corps of Engineers HEC-1 modeling software was used to determine the mountain shed runoff hydrographs. FLO-2D modeling software was used to determine the alluvial fan area rainfall, flow depths, velocities, and sediment transport. HEC-18 method was used to determine the solar pedestal pier scour depths.

Based on the results of this Report, the proposed Desert Quartzite Solar Project will cause minor impacts to the existing drainage shed area. The impacts have been minimized due to the relatively flat terrain and presence of large natural depressions that range from one to five feet deep. These large depressions store significant volumes of water which attenuate the increased outflow. See Figure 4 for existing depression areas.

The unmitigated Post Project impacts during the 100-year storm event are as follows:

- Average Flow Depth increase of 0.03-feet
- Average Flow Velocity increase of 0.04 feet/second
- Total Outflow increase of 20 acre-feet (2.6%)

See Figures 5 and 6 for the maximum flow depth and velocity. The nominal Post Project increases in flow depth, velocity and outflow can be mitigated with onsite retention basins sized with at least 20 acre-feet of combined storm water storage capacity.

The unmitigated Post Project sediment transport will be less than the pre project conditions due to soil compaction. The Project site experiences relatively shallow and slow flows, so the nominal increases in Post Project flow depths and velocities do not overcome the decreased erosion potential due to compaction. See Figure 7 for maximum sediment scour depths.

The maximum potential pier scouring at the solar array pedestal supports is 1.22-feet. The structural design and embedment depth of the solar panel pedestal piers should account for the maximum potential scour plus a factor of safety. Monitoring after large storm events should be implemented to detect piers with significant scouring. See Figure 8 for pier scour depths.

2 INTRODUCTION

First Solar proposes to construct and operate a 300 Megawatt alternating current (MWac) solar photovoltaic energy generating facility known as Desert Quartzite Solar Project (Project). The Project is located in an unincorporated area of eastern Riverside County, south of Interstate 10 and west of Blythe, California. The Project will be located on federal lands managed by the U.S. Department of Interior, Bureau of Land Management (BLM), Palm Springs Field Office. See Figure 1 for the Project vicinity map and Figure 2 for the Post Project site map.

The Project boundary encompasses 5,310 acres and will ultimately develop approximately 2,500 acres of solar panels. The Project facilities will consist of: fixed tilted solar panels mounted above ground on supports consisting of wide flange pedestals; access roads; underground electrical wires from solar panels, transformer pads; maintenance and control buildings and facilities; water well for potable water supply and onsite sewage disposal system for the maintenance building; electrical interconnect equipment; overhead phone line; and a transmission line and facilities.

The Project is located in an existing drainage alluvial fan area which receives drainage from offsite mountains and offsite alluvial fan areas. The offsite downstream areas consist of alluvial fan areas with drainage flows that ultimately drain over bluffs east of the Project site.

The drainage areas, including the Project, are located in ungauged watershed runoff areas.

FIRM maps for all of the drainage studied area, including the Project area, are designated in The FIRM Riverside County panel index sheet 06065CIND2A, dated August 28, 2008 as “Zone D”, “Areas in which flood hazards are undetermined”.

The purposes of this Report are:

1. Evaluate the Project’s potential impact to drainage runoff depth, velocity, volume and sediment transport;
2. Determine the potential solar panel pedestal pier scour depths; and
3. If necessary, propose mitigation measures for the identified Post Project drainage impacts.

3 PROJECT SITE DESCRIPTION

The Project is located on largely undeveloped and relatively flat land on the Palo Verde Mesa in eastern Riverside County, approximately nine miles west of the City of Blythe and one mile south of the Interstate-10 freeway. See Figure 1 for the Project vicinity map.

The Project area is undeveloped except for the First Solar Electric Blythe 1 200-acre solar project abutting the northeast side of the Project; a portion of a developed subdivision located south of I-10 at the northeast side of the drainage shed studied; and overhead power line facilities that cross the drainage sheds studied. There are some areas in the alluvial fan area south of I-10 that were cultivated in the past. There also are some bermed areas in the alluvial fan that have evidently been constructed to divert drainage flows away from the internal areas protected by the berms. One of these bermed areas consists of a 160-acre parcel near the middle of and completely surrounded by the proposed Project.

3.1 Proposed Development

The Project will be a 300 Megawatt alternating current (MWac) solar photovoltaic energy generating facility. The Project will construct solar arrays, access roads, an on-site electrical substation, and maintenance facilities.

The photovoltaic (PV) modules are mounted on framing assemblies made of steel, each holding 16 modules and measuring approximately eight feet wide by sixteen feet long. The PV module assemblies are attached at an angle to vertical steel piers that are spaced eight feet center-to-center and are driven into the ground to a depth of four to seven feet below grade. Each steel pier is a single W6x7.2 “I” beam. Once mounted, the front of each PV module assembly will be approximately 1.5 feet above grade, while the rear will be approximately five to six feet above grade.

The PV modules are electrically connected by wiring harnesses running along the bottom of each assembly to combiner boxes that collect power from several rows of modules. The combiner boxes feed DC power from the modules to the Power Conversion Station (PCS) via underground cables. The inverters in the PCS convert the DC electric input into AC electric output and the isolation transformer steps the current up for on-site transmission of the AC power to the PV combining switchgear (PVCS). The PVCS collects the power for transmission to the substation.

3.2 Climate

The Riverside County Hydrology Manual describes the desert areas as extremely hot and dry during the summer months, with moderate temperatures occurring during the winter. The mean seasonal precipitation in the eastern desert region is three inches.

The region experiences three types of storms: general winter storms, general summer storms and high intensity thunderstorms. General winter storms generate most of the precipitation. As these storms move toward the eastern end of the County, beyond the Santa Ana Mountains, little moisture remains and precipitation decreases rapidly over the desert areas.

3.3 Geology

The Project is located in an alluvial fan area with the Mule Mountains located immediately to the southwest and the McCoy Mountains located north of I-10. As discussed in the Riverside County Hydrology Manual, mountain areas have extremely shallow soil depths and on many of the steepest slopes soil cover is virtually non-existent with bedrock exposed. These areas without soil cover have extremely low infiltration capacity.

The alluvial cones and fans near the mountains have coarse soils and are extremely porous. The soils further downstream tend to become finer and less porous.

3.4 Soil Type

A geotechnical investigation by Earth Systems Southwest was performed on the First Solar Electric Blythe 1 200-acre solar project abutting the northeast side of the Project. This report indicates the soil conditions consist generally of medium dense to dense, dry to damp, fine to course grained Silty Sands and Sands with Some Silt (Unified Soils Classification System symbols SM and SP-SM).

Additionally, soil maps from the U.S. Department of Agriculture Natural Resources Conservation Service were obtained and evaluated to determine the various soil types within the alluvial fan area. These soils maps were used to calculate a composite runoff index number from the Riverside County Hydrology Manual Plate E-6.1.

3.5 Drainage Area

The existing drainage areas surrounding the Project were determined from a combination of USGS topographic maps and a project specific topographic survey performed by Hillwig-Goodrow, Inc. in 2009. Hillwig-Goodrow’s survey utilized aerial Lidar scanning, ground survey control and conventional photogrammetry to generate one-foot elevation contours within the Project boundary. The drainage basins are shown on Figure 3.

There are two mountain areas that drain into and through portions of the Project that created the alluvial fan area.

One area is north of Interstate 10, and is designated as drainage shed M1 on Figure 3. This shed consists of a portion of the McCoy Mountains and a portion of alluvial fan that has been blocked and diverted to the southeast side of shed M1 by channelization and I-10. This shed consists of 3,343-acres and ranges in elevation from 1670-feet at the northwest corner to 470-feet at the southeast and the I-10 bridge crossing. The area drains under an I-10 bridge into an area south of the I-10 bridge and into the alluvial shed area north of the Project.

The other mountain area is towards the southwest side of the Project and consists of 27 sheds designated as sheds M2 through M28 on Figure 3. These sheds consist of a portion of the Mule Mountains that drain into the alluvial fan area west of the Project site. These 27 sheds have a cumulative acreage of 2,043-acres and range in elevations from 1750-feet to 395-feet where they enter into the alluvial fan.

The alluvial fan drainage area studied consists of the offsite and onsite areas and is located in the Palo Verde Mesa. The area consists of 14,847 offsite acres and 5,310 Project onsite acres for a total of 20,157-alluvial fan acres. The total alluvial fan area ranges in elevation from the highest elevation near the northwest of 525-feet to a lowest elevation of 320-feet near the southeast. The straight line length between these elevations is approximately 6.92-miles and yields a slope of 0.0056 feet/foot.

The northern portion of the alluvial fan can be considered inactive because of the construction of I-10 and the diversion of mountain shed's M1 and alluvial fan drainage to the I-10 bridge as a concentrated flow under the bridge. This concentrated flow eventually becomes braided south of I-10 and reenters the alluvial fan drainage area near the north side of the Project.

4 HYDROLOGIC ANALYSIS

The primary drainage criteria and methods follow the Riverside County Hydrology Manual for precipitation, soil infiltration, and runoff index numbers. The drainage shed areas that affect the Project upstream and that the Project may affect downstream are shown on Figure 3.

The total drainage shed area studied is approximately 25,543 acres (39.91 square miles) and consists of:

1. Mountain shed M1, north of the Project and I-10:	3,343 acres
2. Mountain sheds M2-M28 southwest of the Project:	2,043 acres
3. Alluvial fan area south of I-10:	
a. Outside of Project	14,847 acres
b. Project area	5,310 acres

4.1 Precipitation

The Riverside County Hydrology Manual relies on the National Oceanic and Atmospheric Administration (NOAA) for precipitation. NOAA Atlas 14 was utilized for determining point precipitation frequency estimates for the 100-year event.

Point precipitation for four representative locations throughout the total drainage shed areas studied were obtained. The unadjusted point frequencies for the four locations were tabulated and found to have very little difference by location. Thus, the average of the four locations was calculated for each time period within the 24-hour rainfall event.

A rainfall distribution is not specified in the Riverside County Hydrology Manual; therefore, the point precipitation was adjusted per the San Bernardino County Hydrology Manual by the respective drainage shed areas. Lag times were calculated using the curve number method (i.e. runoff index number).

The resultant 100-year, 24-hour rainfalls for the drainage sheds are:

- mountain shed M1 = 3.47” (adjusted for area)
- mountain sheds M2-M28 = 3.50” (unadjusted because shed areas are less than 1 sq. mile)
- alluvial fan = 3.40” (adjusted for area).

4.2 Infiltration

The Riverside County Hydrology Manual estimates infiltration rates based on the watershed’s soil-cover complex. This estimation is expressed as an index of runoff potential or “runoff index” number ranging from zero to 100. High runoff index numbers indicate a high runoff potential with low infiltration.

Riverside County specifies an antecedent moisture condition II for 100-year design storm events. Accordingly, Riverside County Plate E-6.1 provides the associated runoff index numbers.

The mountain shed areas have the following drainage shed characteristics:

1. Are undeveloped with Barren ground cover conditions;
2. For AMC II condition have a composite runoff index number:
    a. For mountain shed M1: RI = 88.5
    b. For mountain sheds M2-M28: RI = 93.0
3. Have a basin surface roughness coefficient “n” = 0.04;

The existing alluvial fan shed area has the following drainage characteristics:

1. Is mostly undeveloped with Barren ground cover conditions;
2. For AMC II condition has a composite runoff index number of 83.0;
3. Has a basin surface roughness coefficient “n” = 0.05;
4. Soil grading curve (using FSE Blythe1 geotechnical report) provides the following:
    a. D10 = 0.070 mm
    b. D50 = 0.270 mm
    c. D60 = 0.297 mm
    d. D95 = 2.700 mm
    e. Uniformity coefficient = D60/D10 = 4.24
    f. Specific gravity = 2.65
    g. Dry weight = 104 pounds/cubic feet

5 HYDRAULIC ANALYSIS

Because the proposed Project is located in ungauged watersheds with a large alluvial fan area, ephemeral drainages, and for most of the site not well defined drainage outlet channels, it is necessary to utilize several types of drainage technologies and methods in order to provide the information, results, and develop mitigation measures if needed.

U.S Army Corps of Engineers HEC-1 modeling software was used to determine the mountain shed runoff hydrographs. FLO-2D modeling software was used to determine the alluvial fan area rainfall, flow depths, velocities and sediment transport.

The hydrographs from the HEC-1 calculations were entered into the FLO-2D model and used along with the other parameters developed above for the alluvial fan area to calculate: maximum flow depths, maximum velocities and sediment aggregation/degradation depths. The FLO-2D model grid cells were set to dimensions of 300-feet by 300-feet.

FLO-2D output for maximum depths, velocities, and pier scour calculations are those that occurred at any time during the 36-hour runoff calculation period in each grid and they do not necessarily occur at the same time. Sediment aggregation/degradation amounts are those final amounts that result from the 100-year, 24-hour storm at the end of the 36-hour calculation period.

5.1 Pre to Post Project Characteristics

The Project will alter the soil's hydraulic characteristics within the solar arrays due to vegetation removal and grading as follows:

> Vegetation would not be removed from the Proposed Project site until the onset of construction of a given phase. Vegetation would be Disked under, mulched or composted and retained on site to assist in erosion control and limit waste disposal. In some areas to be graded outside of the solar field, native vegetation would possibly be harvested for replanting to augment soil stabilization.
>
> Area's comprising the solar array field will be prepared using conventional farming equipment including tractors with Disking equipment and vibratory rollers with limited use of scrapers to perform micrograding within sections of the solar array field. This method improves construction worker safety by eliminating trip hazards. The site will be contour graded level; the macro level topography will remain unchanged, but within each solar array, the vegetation will be disked into the top soil and then flattened with a drum roller.
>
> Under this approach, rubber-tired farming tractors towing Disking equipment will disc the top 5-7 inches of soil. A water truck will follow along the tractor to moisten the land and keep dust below acceptable levels. The tractor may make several passes to fully disc the vegetation into the top soil, preserving the underground root structure, top soil

nutrients and seed base. A drum roller will then be used to flatten the surface and return the soil compaction to a compaction level similar to the preconstruction compaction. The intent of the roller is to compact the soil under the solar field area, simply to even out the surface after the Disking is complete.

Lastly, limited use of scrapers for micrograding will be employed to even out areas of the ground to maintain a consistent grade in each solar field area. Hydrology analysis will evaluate these areas that are susceptible to scour from storm water runoff. The ground will be graded to a level topography using micrograding only where necessary.

Vegetation would be cleared from roadways, access ways, and where concrete foundations would be used for inverter equipment, substations, and the O&M facilities. Vegetation would be cleared for construction of the drainage controls, including berms. Organic matter would be mulched and redistributed within the construction area (except in trenches and under equipment foundations). Plant root systems would be left in place, except where grading and trenching would be required for placement of solar module foundations, underground electric lines, inverter and transformer pads, road and access ways, and other facilities to provide soil stability.

To account for the above described grading approach and the other facilities and impervious surfaces discussed in the Project Site Description, the Post Project soil characteristics were adjusted as follows:

	Pre Project	Post Project	Change
1. Composite runoff index number	83.0	88.0	+5.0
2. Surface roughness coefficient “n”	0.05	0.04	-0.01

Theoretically these soil characteristic changes will result in higher runoff potential with less infiltration.

The Project terrain is relatively flat with large natural depressions scattered across the southeast portion. The natural depressions range in depth from one to five feet, and are shown on Figure 4. These depressed areas trap and hold large volumes of runoff which will help attenuate increases in peak flow and volume associated with the Project.

5.2 Results

The Pre and unmitigated Post Project hydraulic analysis results are summarized in Table 1 below. Total rainfall volume from the mountain sheds and alluvial fan shed remained constant at a total of 6,679 acre-feet.

The total rainfall volume simulated over the alluvial fan shed area resulted in infiltration, storage in the natural depressions and outflow. The unmitigated Post Project infiltration decreased by 91 acre-feet or 3.4%; storage increased by 71 acre-feet or 2.2%; and outflow increased by 20 acre-feet or 2.6%.

The Pre and unmitigated Post Project flows have relatively shallow depths and low velocities due to the flat terrain. The maximum depth results are somewhat miss leading due to the natural depressions that are approximately five-feet deep. On average the majority of the Project site will experience flow depths less than half a foot (see Figure 5a & 5b). The unmitigated Post Project onsite flow depths increased by an average of 0.03-feet or 7.5% (see Figure 5c).

The maximum velocities occur on the fringe of the Project boundary where the mountain sheds enter the alluvial fan area. On average the majority of the Project site will experience flow velocities less than half a foot per second (see Figure 6a and 6b). The unmitigated Post Project onsite flow velocities increased by an average of 0.04 feet per second or 17.4% (see Figure 6c).

The unmitigated Post Project increases to depth, velocity and outflow are minimal as an order of magnitude to the drainage area studied. The flat terrain with natural depressions helped to attenuate the Post Project effects of decreasing the infiltration capability of the soil.

Mitigation for the Project's nominal increases can be achieved by constructing retention basins at the upstream and/or downstream edges of the Project. The retention basins should be sized with at least 20 acre-feet of combined storm water storage capacity.

TABLE 1: Hydraulic Analysis Summary

Item Description		Pre Project	Unmitigated Post Project	Post - Pre	Percent Change
Rainfall Volume					
Mountain Sheds	acre-feet	1,097	1,097	0	0.0%
Alluvial Fan Shed	acre-feet	5,582	5,582	0	0.0%
Total	acre-feet	6,679	6,679	0	0.0%
Alluvial Fan Flow Volume					
Infiltration	acre-feet	2,671	2,580	-91	-3.4%
Storage	acre-feet	3,245	3,316	71	2.2%
Outflow	acre-feet	763	783	20	2.6%
Total	acre-feet	6,679	6,679	0	0.0%
Onsite Flow Depth					
Maximum Depth	feet	5.23	5.63	0.40	7.6%
Average Depth	feet	0.40	0.43	0.03	7.5%
Onsite Flow Velocity					
Maximum Velocity	feet/sec	1.85	2.12	0.27	14.6%
Average Velocity	feet/sec	0.23	0.27	0.04	17.4%

6 SEDIMENT TRANSPORT ANALYSIS

Sediment transport occurs through the scour or deposition of soil based on storm event flow rates and soil characteristics. Hydrologic, hydraulic and soil data discussed earlier in this report were utilized for the sediment transport analysis.

6.1 Methodology

FLO-2D has a sediment transport component that can compute sediment scour or deposition for nine different methodologies. The FLO-2D user's manual identifies the Zeller and Fullerton methodology as appropriate for alluvial floodplain conditions.

Within each FLO-2D grid element, the sediment transport capacity is computed for overland flow based on the flow hydraulics. The sediment transport capacity is then compared with the sediment supply and the resulting sediment excess or deficit is uniformly distributed over the grid element.

6.2 Results

The Pre and unmitigated Post Project sediment transport analysis results are summarized in Table 2 below. On average the majority of the Pre and unmitigated Post Project site will experience sediment scour and deposition depths of plus or minus half a foot.

The unmitigated Post Project average onsite sediment scour depth (degradation) decreased by 0.07-feet or 15.9% and the deposition depth (aggradation) decreased by 0.03-feet or 5.0%. These decreases are attributable to the increase in the soil compaction which reduces the erosion potential.

The Project site experiences relatively shallow and slow flows, so the nominal increases in Post Project flow depths and velocities do not overcome the decreased erosion potential due to compaction.

TABLE 2: Sediment Transport Analysis Summary

Item Description			Project	Unmitigated Project	Pre	Change
Onsite Sediment Transport						
Average Degradation Depth (-)		feet	-0.44	-0.37	0.07	-15.9%
Average Aggradation Depth (+)		feet	0.60	0.57	-0.03	-5.0%
Average Site Depth (+ or -)		feet	0.12	0.11	-0.01	-8.3%

7 PIER SCOUR ANALYSIS

As discussed earlier in this report, the solar panel pedestals will be supported by vertical steel piers. Each pier is a single W6x7.2 "I" beam. As storm water flow encounters the piers, turbulent flow will occur. The turbulent flow will cause increased local scour around the piers.

7.1 Methodology

The pier scour analysis followed the Federal Highway Administration's Hydraulic Engineering Circular No. 18 (HEC-18), "Evaluating Scour at Bridges" (4th Edition). Flow depth and velocity outputs from the FLO-2D model were used to calculate the pier scour depths at each grid element. The local scour equation and the various parameters and assumed values are as follows:

$$\frac{y_s}{a} = 2.0K_1K_2K_3K_4\left(\frac{y}{a}\right)^{0.35} Fr^{0.43}$$

Where:
y_s = Local scour depth (ft)
K_1 = 1.1 (correction factor for pier nose shape)
K_2 = 1.29 (correction factor for angle of attack of flow)
K_3 = 1.1 (correction factor for bed condition)
K_4 = 1.0 (correction factor for armoring)
a = 0.33 (pier width in feet)
y = FLO-2D average flow depth (ft);
Fr = Froude number:

$$Fr = \frac{V}{\sqrt{gy}}$$

Where:
V = FLO-2D average velocity (ft/s)
g = Acceleration due to gravity (32.2 ft/s^2)

7.2 Results

The pier scour analysis results are summarized in Table 3 below. The maximum pier scour depth is 1.22-feet and the average depth is 0.39-feet (see Figure 8). The structural design and embedment depth of the solar panel pedestal piers should account for the maximum potential scour plus a factor of safety. Monitoring after large storm events should be implemented to detect piers with significant scouring.

TABLE 3: Local Pier Scour Analysis Summary

Item Description			Unmitigated Post Project
Local Pier Scour			
	Maximum Depth	feet	1.22
	Average Depth	feet	0.39

8 CONCLUSIONS

The proposed Desert Quartzite Solar Project will cause minor impacts to the existing drainage shed area. The impacts have been minimized due to the relatively flat terrain and presence of large natural depressions that range from one to five feet deep. These large depressions store significant volumes of water which attenuate the increased runoff.

The unmitigated Post Project impacts during the 100-year storm event are as follows:

- Average Flow Depth increase of 0.03-feet
- Average Flow Velocity increase of 0.04 feet/second
- Total Outflow increase of 20 acre-feet (2.6%)

The nominal Post Project increases in flow depth, velocity and outflow can be mitigated with onsite retention basins sized with at least 20 acre-feet of combined storm water storage capacity.

The unmitigated Post Project sediment transport will be less than the pre project conditions due to soil compaction. The Project site experiences relatively shallow and slow flows, so the nominal increases in Post Project flow depths and velocities do not overcome the decreased erosion potential due to compaction.

The maximum potential pier scouring at the solar array pedestal supports is 1.22-feet. The structural design and embedment depth of the solar panel pedestal piers should account for the maximum potential scour plus a factor of safety. Monitoring after large storm events should be implemented to detect piers with significant scouring.

9 REFERENCES

1. “Hydrology Manual”, Riverside County (California) Flood Control and Water Conservation District, April 1978, John W. Bryant, Chief Engineer

2. Flood Insurance Rate Map (FIRM). FIRM maps for the all of the drainage area and Project area consist of four Panels as follows: Panel Numbers *06065C2550G, *06065C2575G, *06065C3200G, and *06065C3225G. These panels are not printed by NFIP and for the areas are designated in the FIRM Index Sheet 2 for Riverside County, California as “Zone D”, “Areas in which flood hazards are undetermined”.

   Thus, flood plains in the area have not been determined and no flood plain elevations or flows have been developed.

3. “Geotechnical Engineering Report, Proposed Solar Field Facility, North of 16th Avenue on both sides Haig Road, Blythe, Riverside county, CA”, March 27, 2008 by Earth Systems Southwest for First Solar Electric.

   This report is for an approximately 240 acre site abutting and near the northeast side of the Project.

4. “Web Soil Survey, National Cooperative Soil Survey”, by USDA, Natural Resources Conservation Service. (See Appendix I for applicable excerpts).

5. “Point Precipitation Frequency Estimates from the National Oceanic & Atmospheric Administration (NOAA) Atlas 14”. 2006, National Weather Service, Silver Spring, Maryland.

6. “San Bernardino County, Hydrology Manual”, August 1986 (SBCHM).

7. “HEC-1”, US Army Corps of Engineers, Hydraulic Engineering Center.

   This is a computer program that allows runoff and hydrographs to be computed utilizing various input data. This program is used for the Project offsite Mountain Shed areas.

8. FLO-2D, Version 2007.06.

   FLO-2D is a two-dimensional surface-water-flow and sediment-transport model computer drainage calculation program used for the Projects alluvial fan drainage areas.

9. “Evaluating Scour at Bridges, 4th Edition”, May/Sept 2001, Publication No. FHWA NHI 01-001, Hydraulic Engineering Center No. 18 (HEC-18).

   Chapter 6 of this document provides the background methods used to calculate scour depths at the solar support pedestals.

10. “Drainage Calculations for x1-Riv-64-D,E”, April 1964, by California Department of Public Works-Division of Highways.

The calculations include information relative to I10 and DOH station 927+50 and shown as the Palowalla Ditch. This is the ditch and area that drains to the southeast and under the I10 bridge which drainage is directed towards the northeast side of the Project site.

11. “Desert Quartzite Field Visit” 1 page email of August 14, 2009 from Crystal Eggers.

This email provides a general description of soil conditions in the Project site.

12. “Sedimentation Engineering”, ASCE Manuals and Reports on Engineering Practice No. 54, 2006 originally published 1975 and republished as Classic Edition, 2006

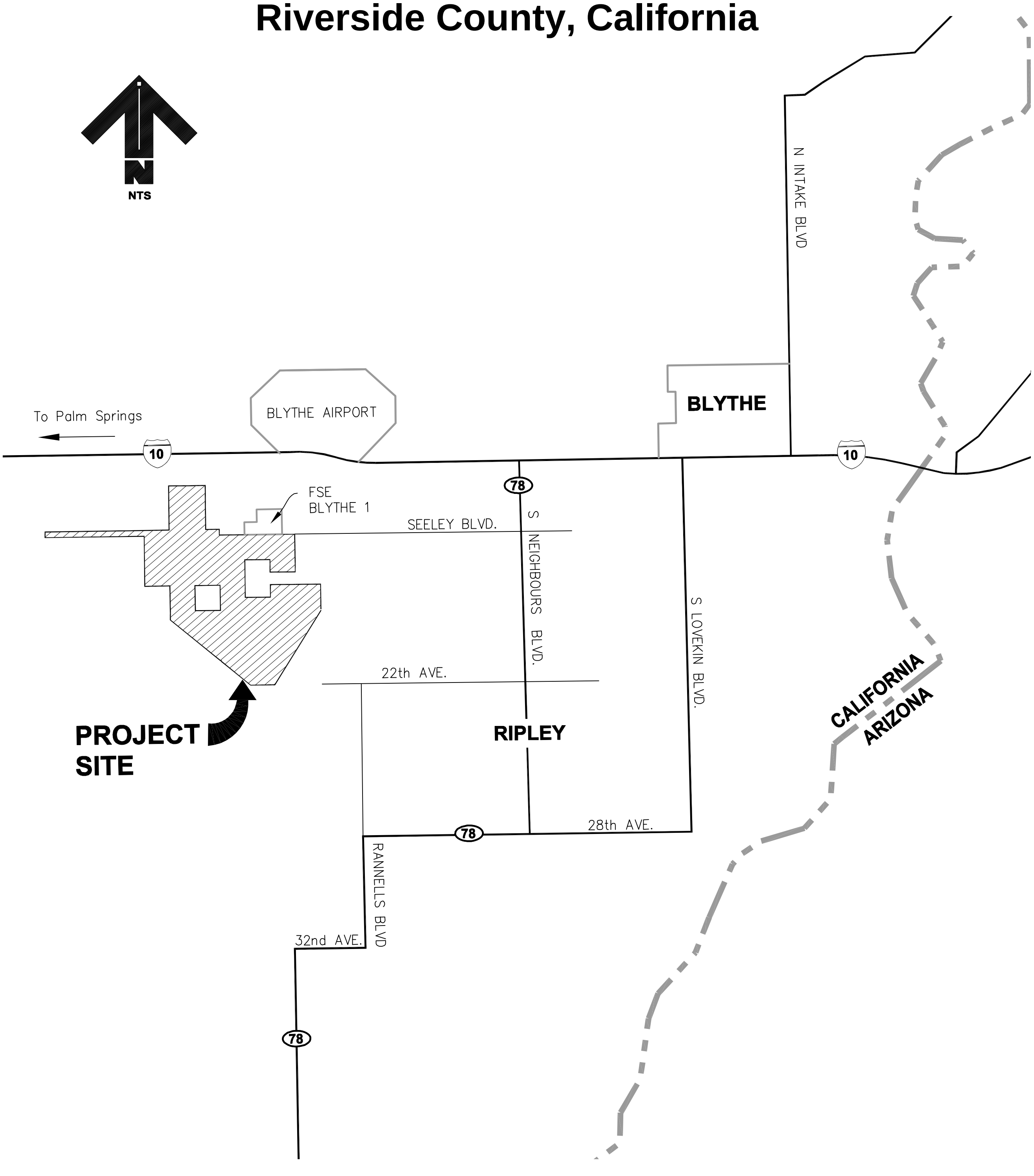
13. “Sedimentation Engineering, Processes, Measurements, Modeling, and Practice”, ASCE Manuals and Reports on Engineering Practice No. 110, 2007

14. “Sediment Yield Computed with Universal Equation”, December 1972, Journal of the Hydraulics Division, Proceedings of ASCE, by Jimmy R. Williams and Harold D. Berndt.

15. ‘Predicting Soil Erosion by Water: A Guide to Conservation Planning With the Revised Universal Soil Loss Equation (RUSLE)”, January 1997, USDA, Agricultural Research Service, Agriculture Handbook Number 703

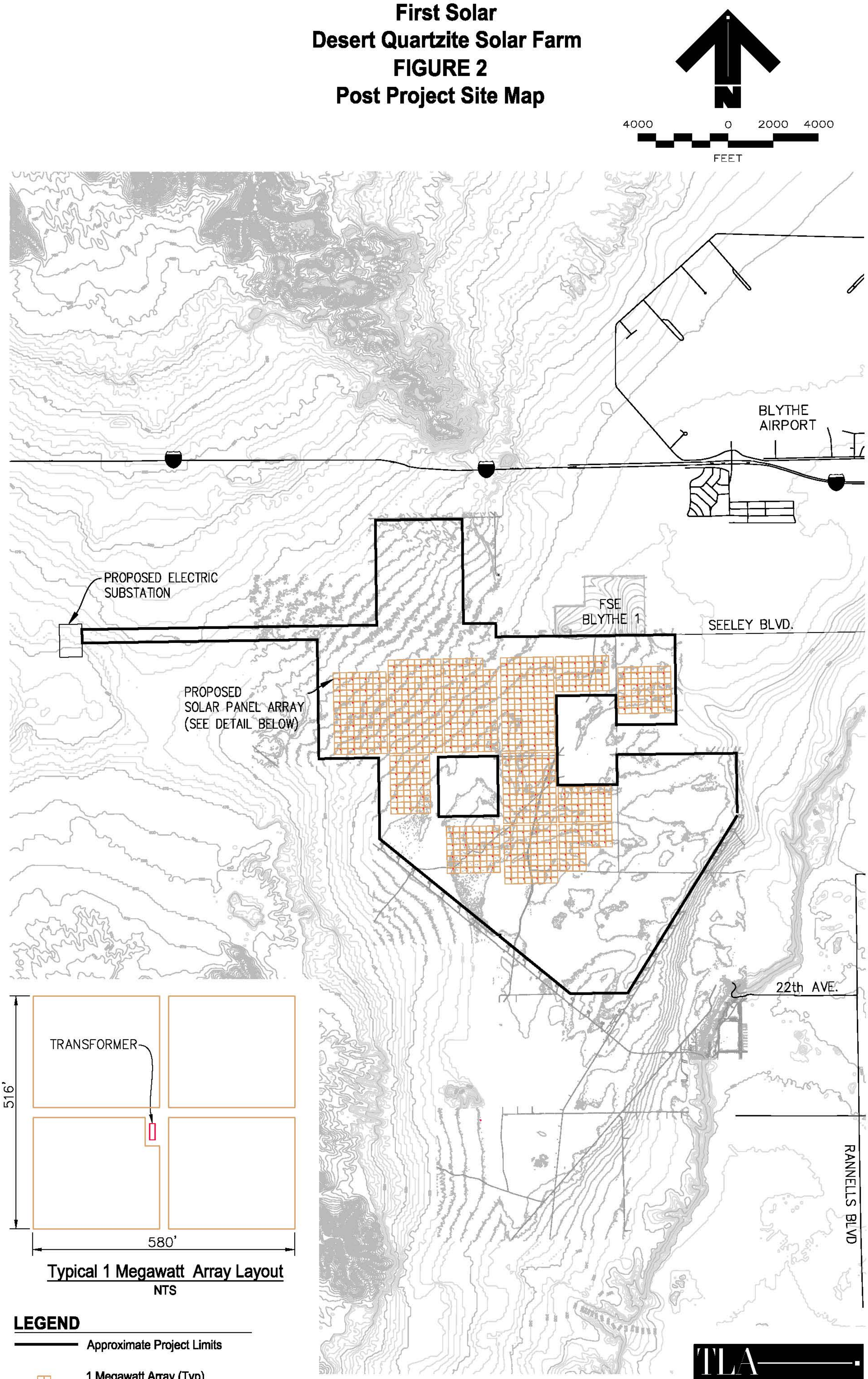
16. “Draft, User’s Reference Guide, Revised Universal Soil Loss Equation, Version 2 (RUSLE@), May 15, 2008, prepared for USDA-Agricultural Research Service, Washington, D.C.

First Solar
Desert Quartzite Solar Farm
Figure 1
General Project Vicinity Map
Riverside County, California


N
NTS
N INTAKE BLVD
BLYTHE AIRPORT
BLYTHE
To Palm Springs
10
10
78
FSE
BLYTHE 1
SEELEY BLVD.
S NEIGHBOURS BLVD.
S LOVEKIN BLVD.
22th AVE.
PROJECT SITE
RIPLEY
CALIFORNIA
ARIZONA
78
28th AVE.
RANNELLS BLVD
32nd AVE.
78

TLA
ENGINEERING & PLANNING

First Solar
Desert Quartzite Solar Farm
FIGURE 2
Post Project Site Map


N
4000
0
2000
4000
FEET
BLYTHE AIRPORT
PROPOSED ELECTRIC SUBSTATION
FSE BLYTHE 1
SEELEY BLVD.
PROPOSED SOLAR PANEL ARRAY (SEE DETAIL BELOW)
22th AVE.
RANNELLS BLVD
TRANSFORMER
516'
580'

Typical 1 Megawatt Array Layout
NTS

LEGEND

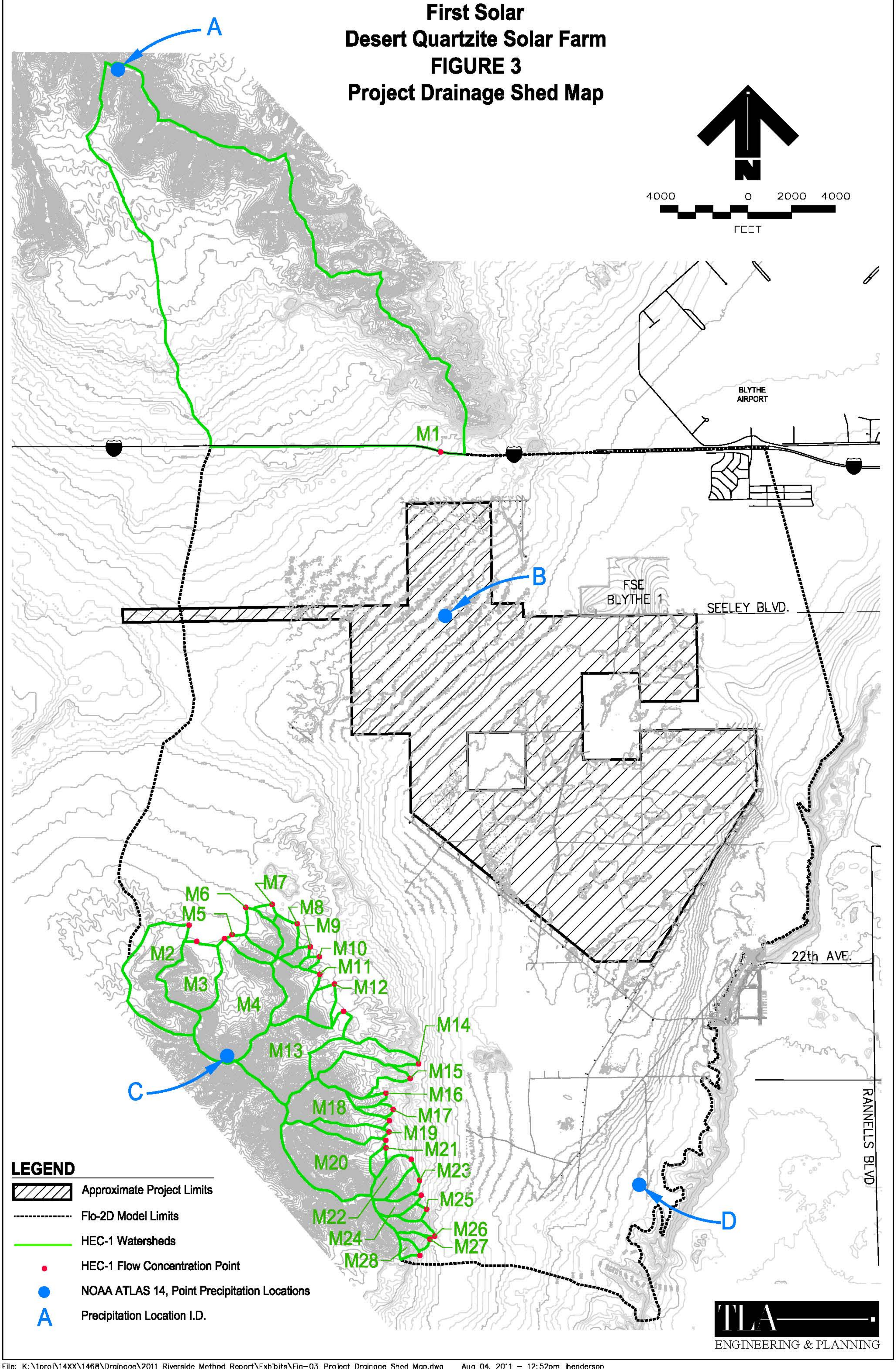
▬ Approximate Project Limits

⊞ 1 Megawatt Array (Typ)
(See Array Layout above)

TLA
ENGINEERING & PLANNING

File: K:\1proj\14XX\1468\Drainage\2011 Riverside Method Report\Exhibits\Fig-2_Post-Project Site Map.dwg Aug 04, 2011 – 9:59am jhenderson

First Solar
Desert Quartzite Solar Farm
FIGURE 3
Project Drainage Shed Map


A
B
C
D
N
4000
0
2000
4000
FEET
BLYTHE
AIRPORT
M1
FSE
BLYTHE 1
SEELEY BLVD.
22th AVE.
RANNELLS BLVD
M2
M3
M4
M5
M6
M7
M8
M9
M10
M11
M12
M13
M14
M15
M16
M17
M18
M19
M20
M21
M22
M23
M24
M25
M26
M27
M28
TLA
ENGINEERING & PLANNING

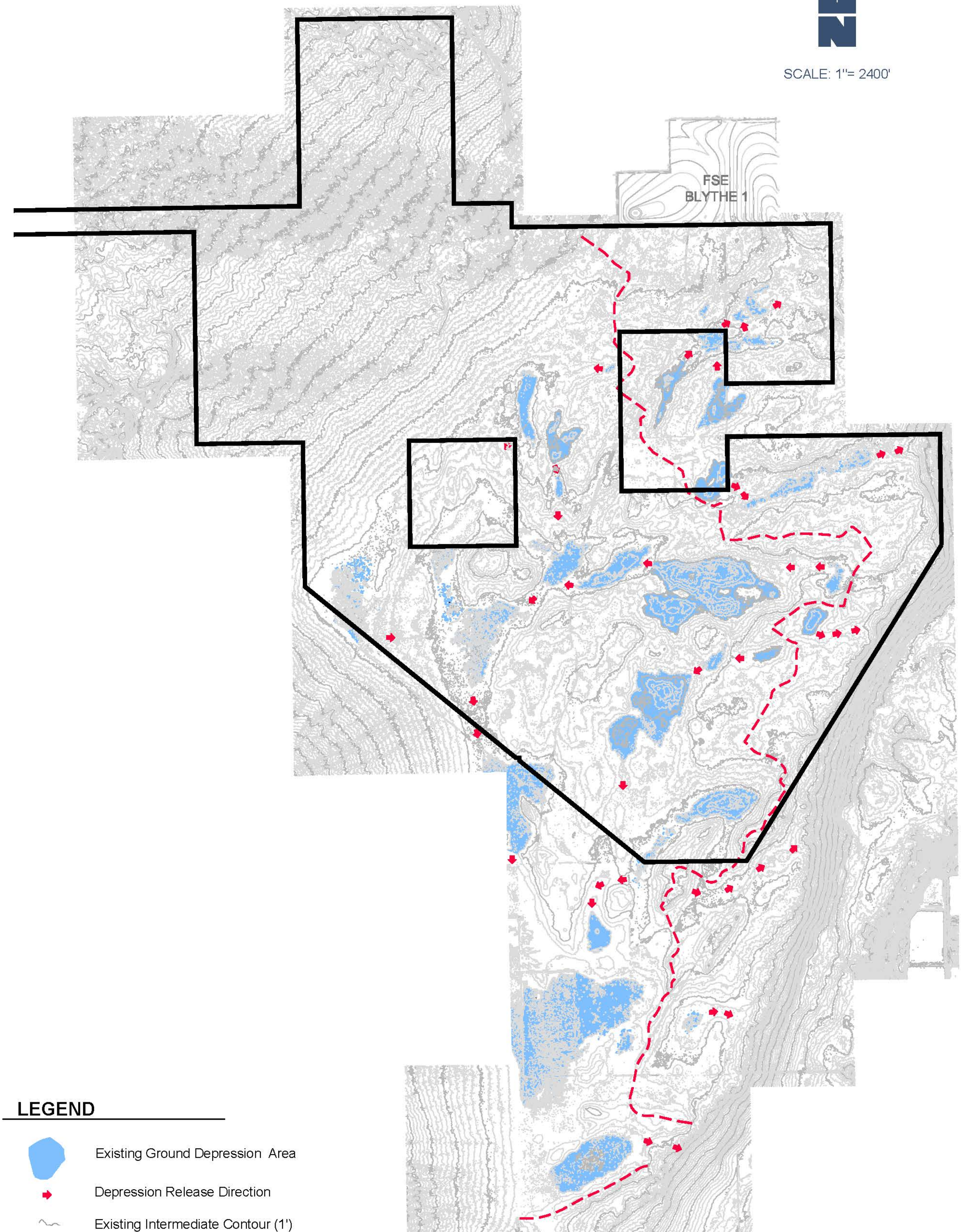
LEGEND

▨	Approximate Project Limits
------	Flo-2D Model Limits
—	HEC-1 Watersheds
•	HEC-1 Flow Concentration Point
●	NOAA ATLAS 14, Point Precipitation Locations
A	Precipitation Location I.D.

File: K:\1proj\14XX\1468\Drainage\2011 Riverside Method Report\Exhibits\Fig-03 Project Drainage Shed Map.dwg Aug 04, 2011 - 12:52pm jhenderson

First Solar
Desert Quartzite Solar Farm
FIGURE 4
Existing Ground Depression Areas

SCALE: 1"= 2400'



LEGEND

🟦 Existing Ground Depression Area

➡ Depression Release Direction

∿ Existing Intermediate Contour (1')

∿ Existing Index Contour (5')

- - - Existing Onsite Drainage Divide

TLA
ENGINEERING & PLANNING

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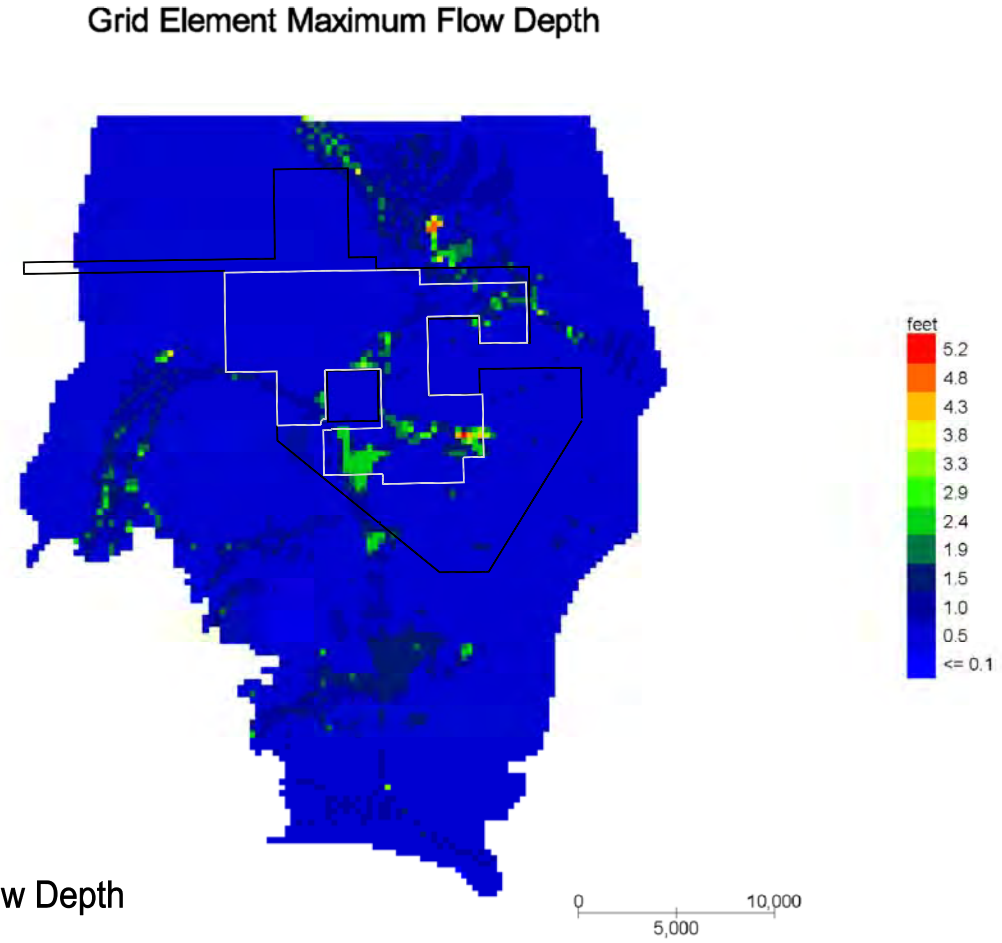

Grid Element Maximum Flow Depth
feet
5.2
4.8
4.3
3.8
3.3
2.9
2.4
1.9
1.5
1.0
0.5
<= 0.1
0
5,000
10,000

Figure 5a
Pre Project Flow Depth

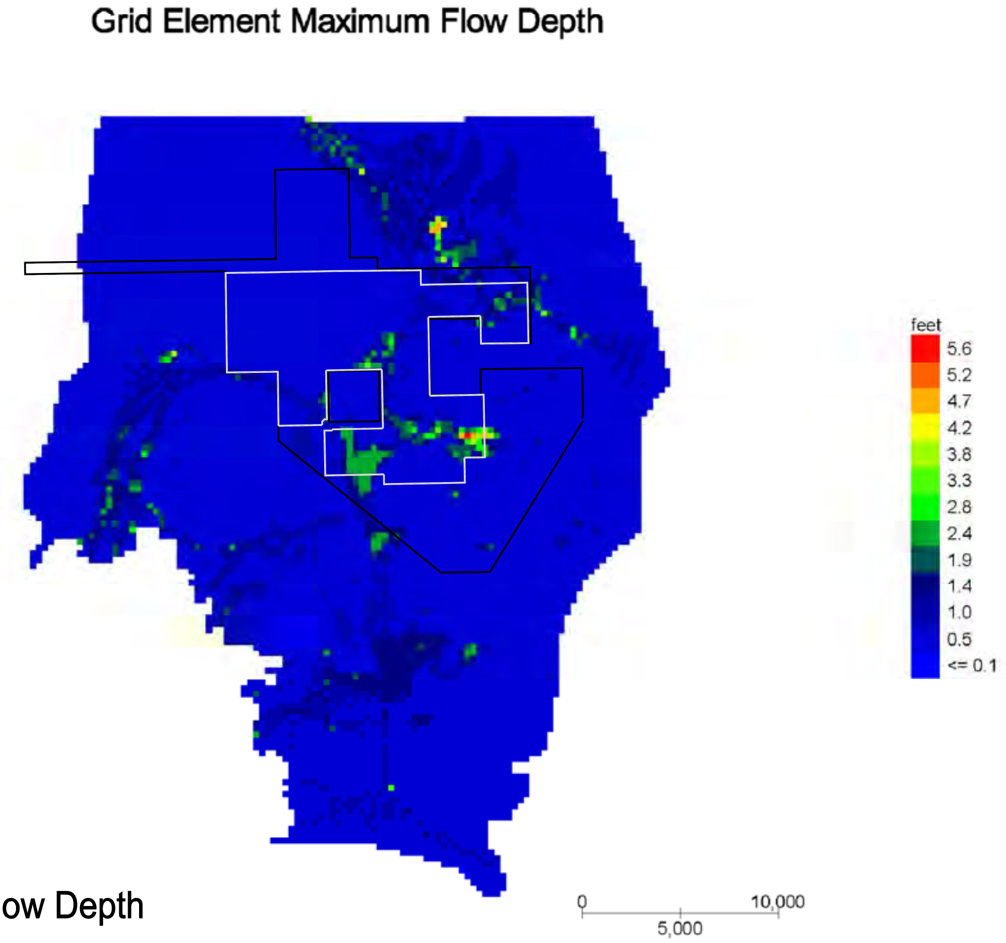
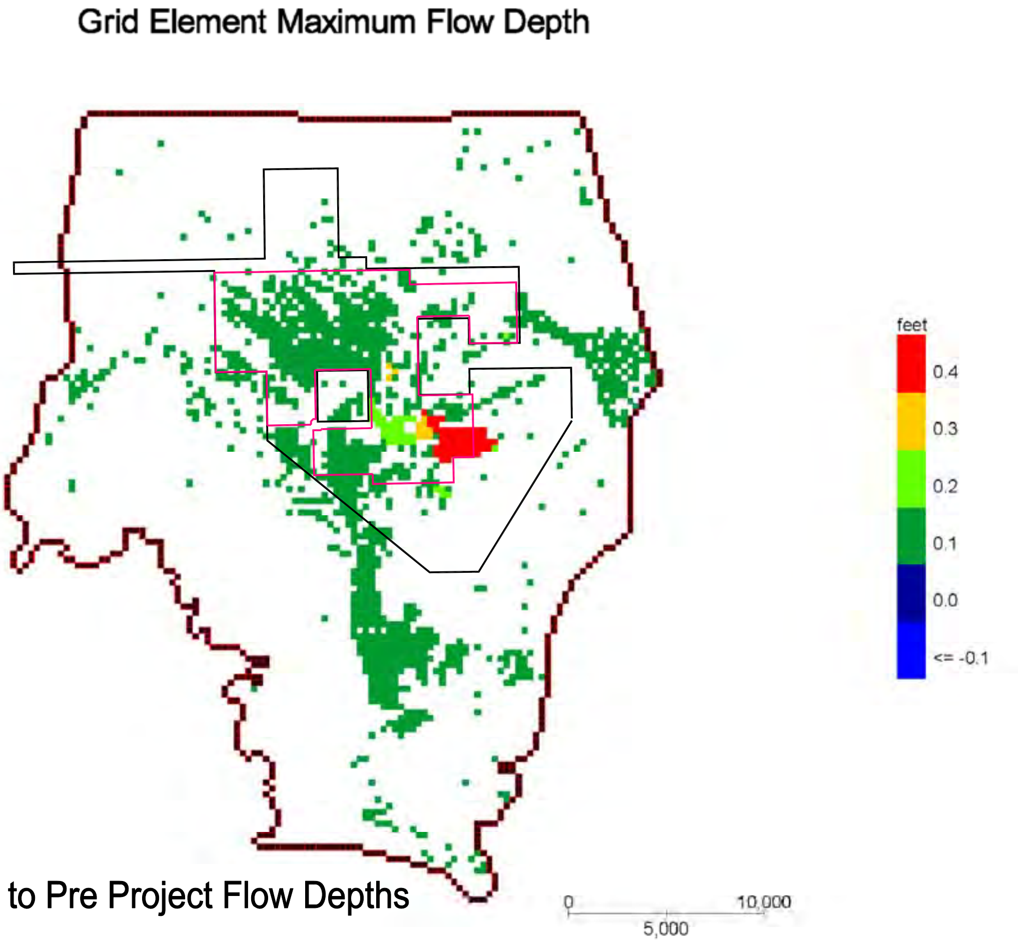

Grid Element Maximum Flow Depth
feet
5.6
5.2
4.7
4.2
3.8
3.3
2.8
2.4
1.9
1.4
1.0
0.5
<= 0.1
0
5,000
10,000

Figure 5b
Post Project Flow Depth



Grid Element Maximum Flow Depth

feet
0.4
0.3
0.2
0.1
0.0
<= -0.1
0
10,000
5,000

Figure 5c
Difference Post to Pre Project Flow Depths

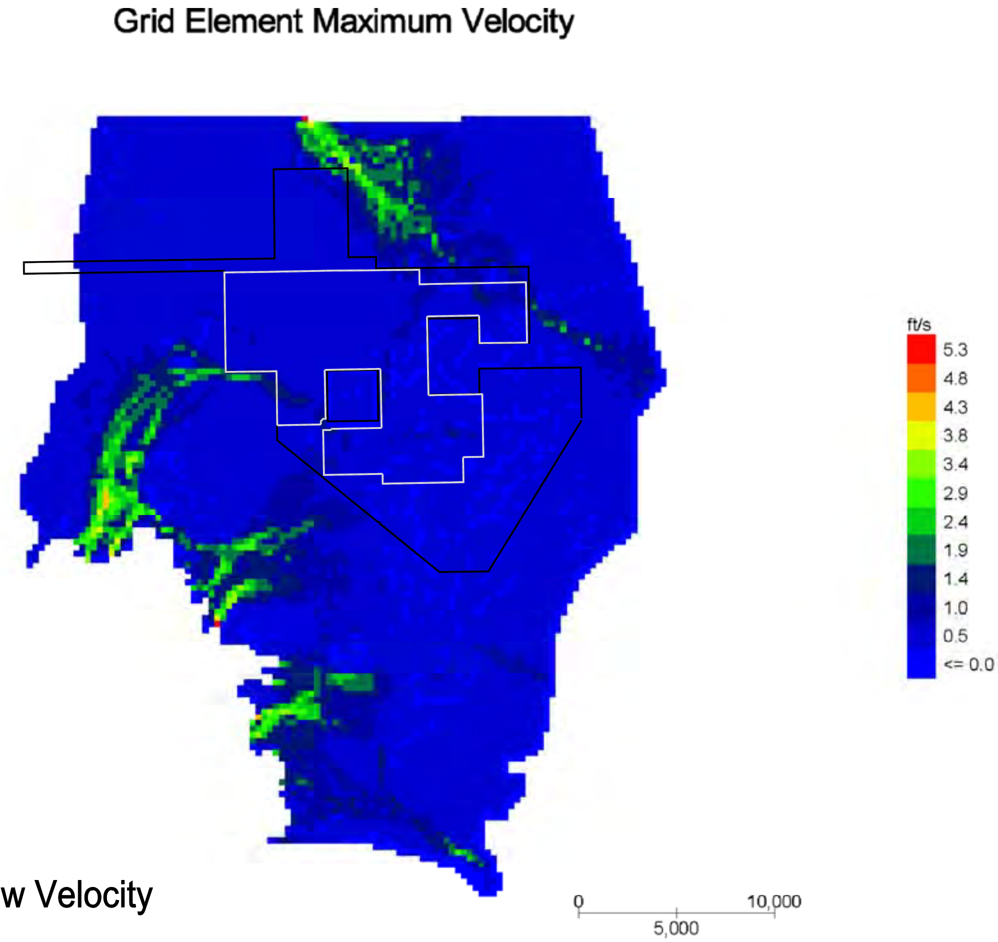

Grid Element Maximum Velocity
ft/s
5.3
4.8
4.3
3.8
3.4
2.9
2.4
1.9
1.4
1.0
0.5
<= 0.0
0
5,000
10,000

Figure 6a
Pre Project Flow Velocity

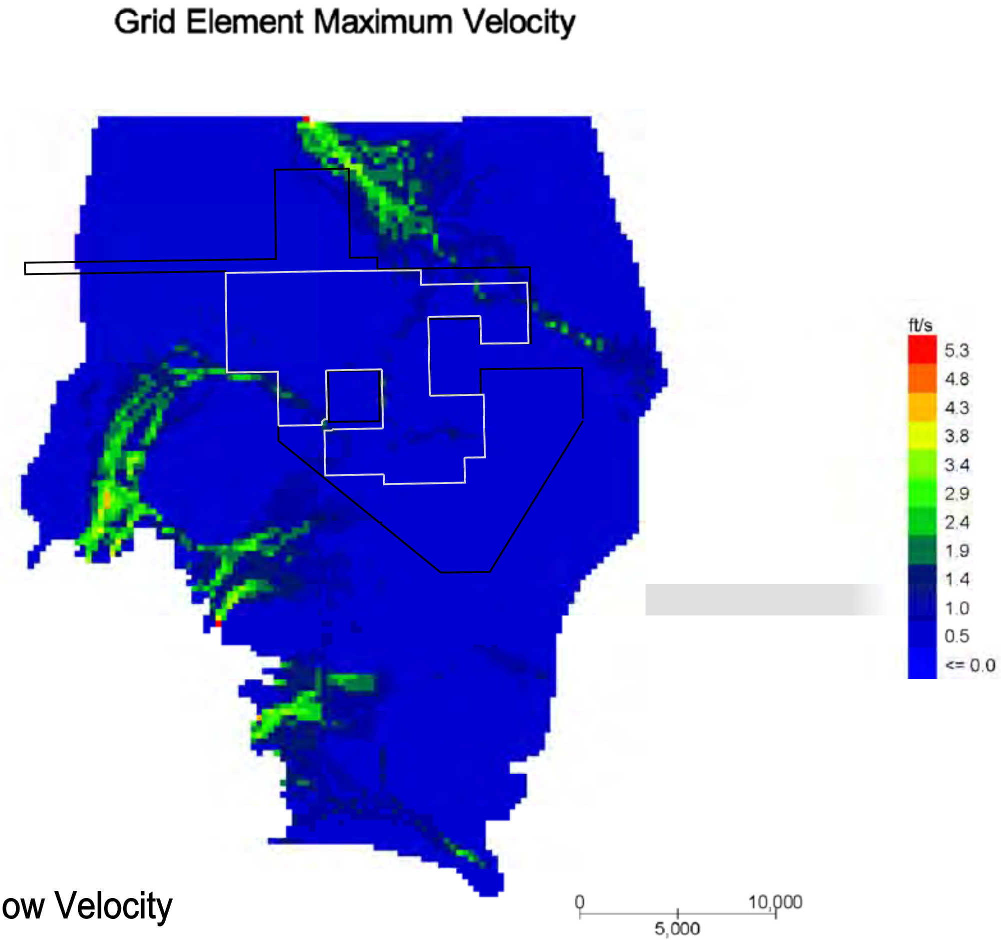
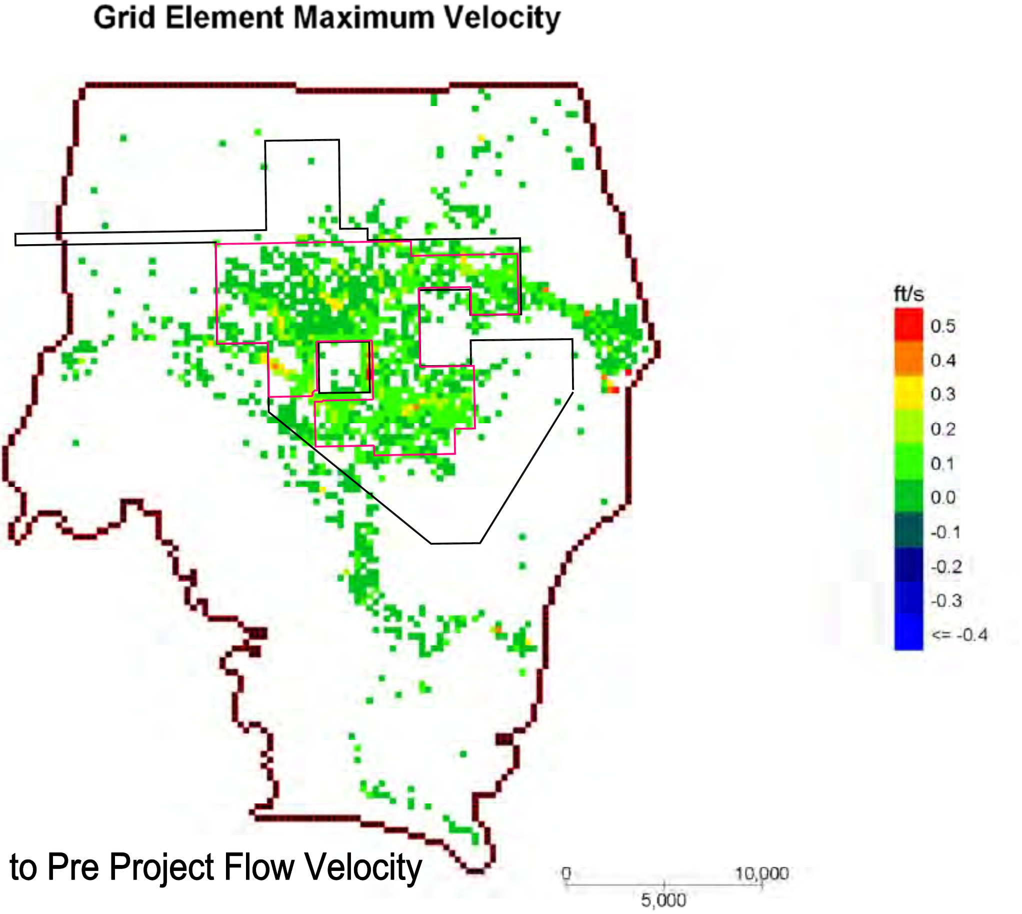

Grid Element Maximum Velocity
ft/s
5.3
4.8
4.3
3.8
3.4
2.9
2.4
1.9
1.4
1.0
0.5
<= 0.0
0
5,000
10,000

Figure 6b
Post Project Flow Velocity


Grid Element Maximum Velocity

ft/s
0.5
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-0.3
<= -0.4
0
10,000
5,000

Figure 6c
Difference Post to Pre Project Flow Velocity

Grid Element Maximum Scour

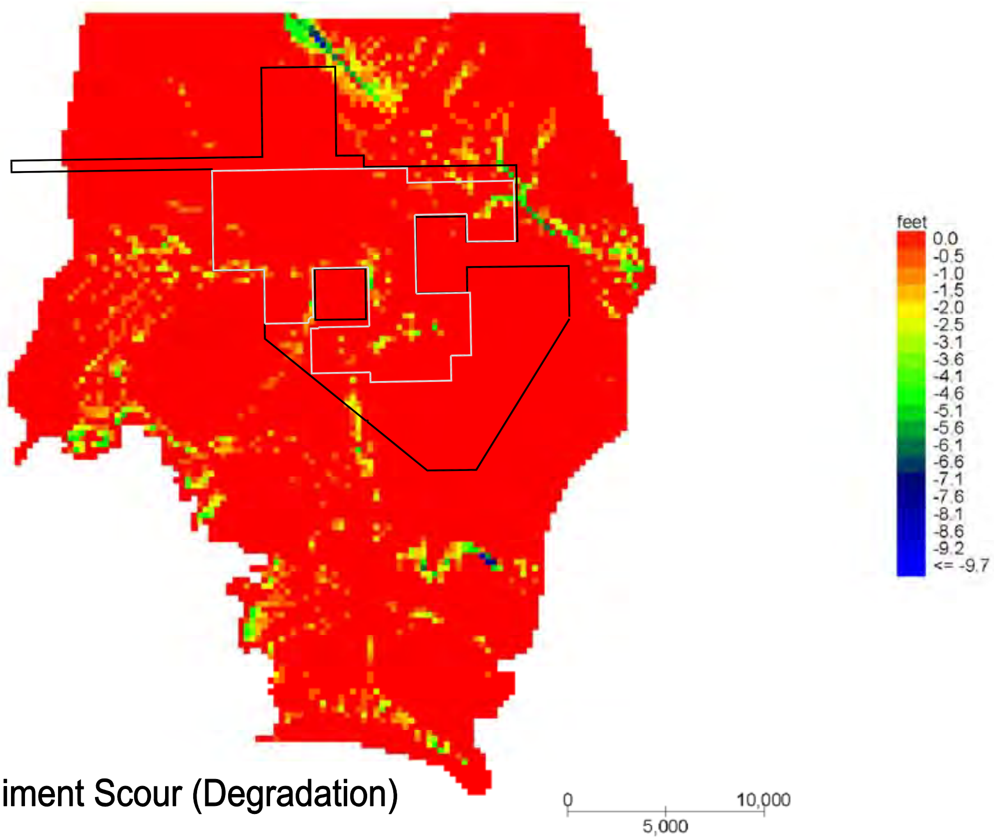

feet
0.0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.1
-3.6
-4.1
-4.6
-5.1
-5.6
-6.1
-6.6
-7.1
-7.6
-8.1
-8.6
-9.2
<= -9.7
0
5,000
10,000

Figure 7a
Pre Project Sediment Scour (Degradation)

Grid Element Maximum Scour

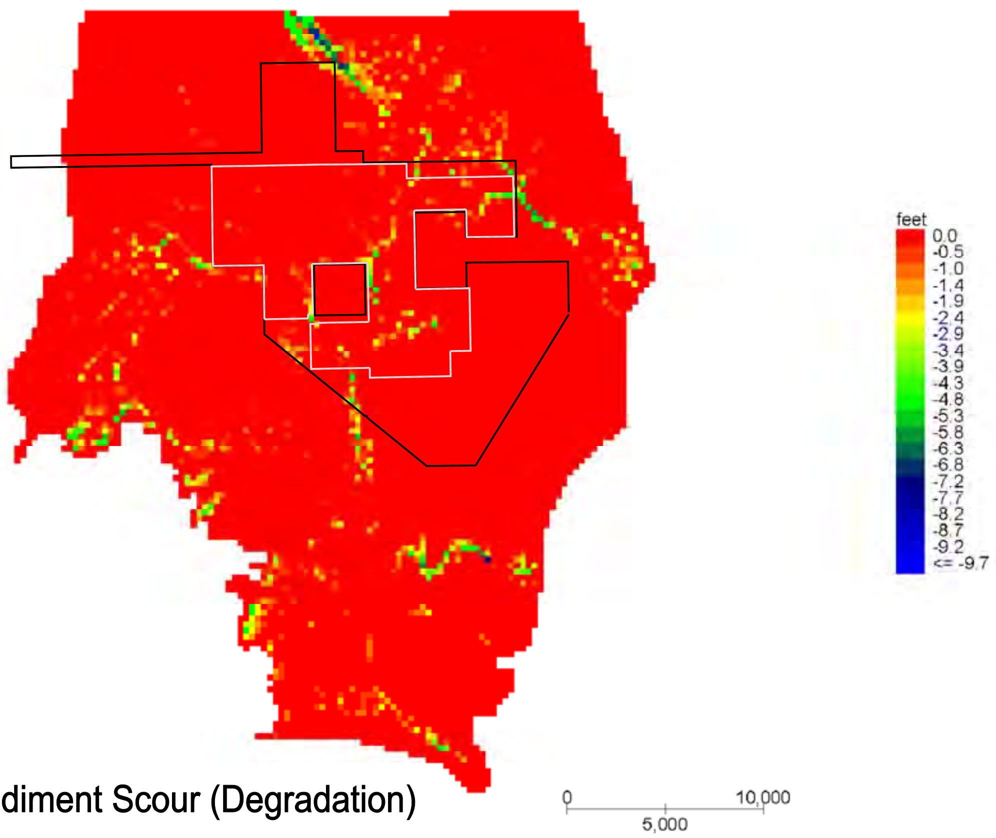

feet
0.0
-0.5
-1.0
-1.4
-1.9
-2.4
-2.9
-3.4
-3.9
-4.3
-4.8
-5.3
-5.8
-6.3
-6.8
-7.2
-7.7
-8.2
-8.7
-9.2
<= -9.7
0
5,000
10,000

Figure 7b
Post Project Sediment Scour (Degradation)

Grid Element Maximum Pier Scour

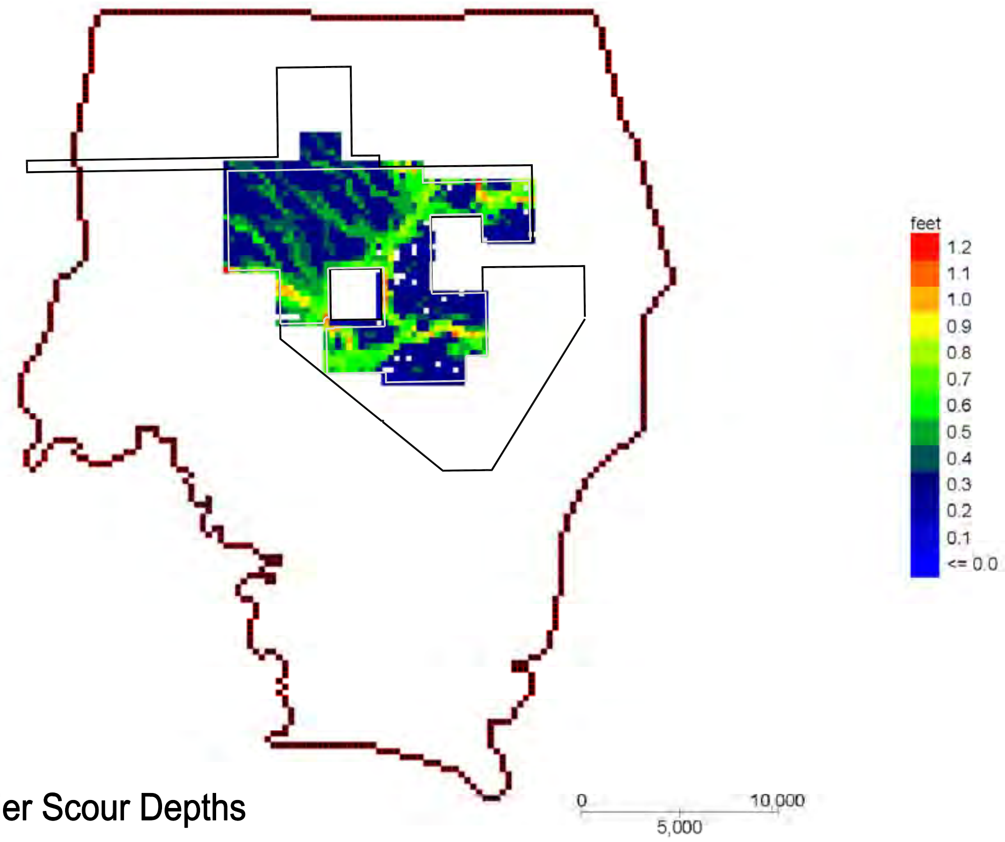

feet
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
<= 0.0
0
10,000
5,000

Figure 8
Post Project Pier Scour Depths

APPENDIX W

AIR QUALITY AND GREENHOUSE GAS TECHNICAL REPORT

AIR QUALITY AND GREENHOUSE GAS TECHNICAL STUDY

FOR THE
DESERT QUARTZITE SOLAR PROJECT

RIVERSIDE COUNTY, CALIFORNIA

Prepared for:

Desert Quartzite, LLC
135 Main Street, 6th Floor
San Francisco, California 94105

Prepared by:

URS
4225 Executive Square, Suite 1600
La Jolla, California 92037
(858) 812-8277 ⬍ Fax: (858) 812-9293

URS Project Number 60419825.28907534.30001

December 2015

TABLE OF CONTENTS

Section Page

1.0 PROJECT OVERVIEW 1-1

1.1 INTRODUCTION 1-1
1.2 PROJECT BACKGROUND 1-3

2.0 REGULATORY FRAMEWORK 2-1

2.1 INTRODUCTION 2-1
2.2 POLLUTANTS AND HEALTH EFFECT 2-1

2.2.1 Criteria Pollutants 2-1
2.2.2 Toxic Air Contaminants 2-4
2.2.3 Greenhouse Gases 2-5
2.2.4 Odors 2-5
2.2.5 Health Effects 2-6

2.3 FEDERAL REGULATIONS 2-10

2.3.1 National Environmental Policy Act 2-10
2.3.2 Clean Air Act 2-10

2.4 STATE REGULATIONS 2-16

2.4.1 California Environmental Quality Act 2-16
2.4.2 ARB Requirements 2-17
2.4.3 Health & Safety Code §39500 *et seq.* State Implementation Plan 2-18
2.4.4 HSC §40910 – 40930 – California Clean Air Act 2-18
2.4.5 HSC §39650 – 39675 – Toxic Air Contaminant Program 2-18
2.4.6 Title 17, California Code of Regulations, §93115 – Airborne Toxic Control Measure for Stationary Compression-ignition Engines 2-19
2.4.7 California Health & Safety Code §41700 – Nuisance Regulation 2-19
2.4.8 Stats. 2006, Ch. 488 and California Health & Safety Code § 38500–38590 – California Climate Change Regulatory Program 2-19
2.4.9 Pavley Regulations 2-21

2.5 LOCAL REGULATIONS 2-21

Section **Page**

2.5.1 HSC §40914 – Mojave Desert Air Quality Plans 2-22
2.5.2 MDAQMD's CEQA Significance Thresholds (MDAQMD 2011) 2-22
2.5.3 HSC §4000 *et seq*., HSC §40200 et seq., Indicated MDAQMD Rules – MDAQMD Rules and Regulations (MDAQMD 2015) 2-23

3.0 EXISTING BASELINE CONDITIONS 3-1

3.1 INTRODUCTION 3-1
3.2 REGIONAL CLIMATE 3-2
3.3 EXISTING AMBIENT AIR QUALITY 3-3

4.0 IMPACT ASSESSMENT 4-1

4.1 IMPACT THRESHOLDS AND ASSESSMENT CRITERIA 4-1
4.2 ASSUMPTIONS AND METHODOLOGY 4-1
4.3 PROJECT EMISSION CONTROL MEASURES 4-3
4.4 IMPACT ASSESSMENT RESULTS 4-4
4.5 FINDINGS 4-4

5.0 REFERENCES 5-1
6.0 LIST OF PREPARERS 6-1

Tables **Page**

Table 2-1 National and California Ambient Air Quality Standards 2-12
Table 2-2 Attainment Status for the Portion of Riverside County within MDAQMD with Respect to National and California Ambient Air Quality Standards 2-14
Table 2-3 Federal General Conformity *De Minimis* Levels 2-15
Table 2-4 MDAQMD's CEQA Significant Emissions Thresholds 2-22
Table 3-1 Average Temperature and Precipitation Data at Blythe (1949–2010) 3-2
Table 3-2 Air Quality Data for the Blythe Project Area (2011–2013) 3-4
Table 4-1 Project Construction Daily Emission Estimations (Lbs/Day) 4-5
Table 4-2 Project Construction Annual Emission Estimations (Tons/Year) 4-5
Table 4-3 Project Operational Annual Emission Estimations (Tons/Year) 4-6
Table 4-4 Project GHG Emission Estimations – Annual (Tons/Year and Metric Tons/Year) 4-6

Figures **Follows Page**

Figure 1 Regional Vicinity Map 1-3
Figure 2 Preliminary Site Plan 1-3
Figure 3 MDAQMD Boundary and Project Vehicle Miles 2-23
Figure 4 Annual Wind Rose (Blythe, CA 2006–2010) 3-4

Appendices

Appendix A Project Construction Emission Estimations
Appendix B Project Operational Emission Estimations

SECTION 1.0
PROJECT OVERVIEW

1.1 INTRODUCTION

Desert Quartzite, LLC (Applicant) proposes to develop and construct a 300-megawatt (MW) alternating current photovoltaic solar facility known as the Desert Quartzite Solar Project (Project). The overall Project includes the solar generation facility, an on-site substation, and the generation-tie (gen-tie) line. The proposed Project is located in eastern Riverside County near Blythe, California. The proposed solar facility and the approximately 3-mile-long, 230-kilovolt (kV) gen-tie line interconnection to the existing Southern California Edison (SCE) Colorado River Substation (CRSS) are located primarily on lands administered by the U.S. Department of the Interior, Bureau of Land Management (BLM) (BLM CACA# 04937; 5,115 acres). The Project site also includes 160 acres of private land (APN 879-110-001). The overall Project site encompasses approximately 5,275 acres. The proposed solar facility would be constructed within an approximately 3,714-acre fenced portion of the overall Project site. The gen-tie line study corridor encompasses approximately 445 acres of BLM lands within the overall Project site. A vicinity map of the proposed Project (i.e., including BLM and privately-owned lands) is presented on Figure 1 and the proposed preliminary site layout is presented on Figure 2. Figures 1 and 2 are presented at the end of Section 1.0.

Site access will be via Interstate 10 (I-10) at the State Route (SR)-78 to SR-78 (south)/ Neighbours Boulevard to 16th Avenue/Seeley Avenue (west). Project construction is anticipated to require from approximately 25 to 48 months to complete, and is expected to start in late 2016. This analysis is based on an assumed approximately 25-month construction timeframe which is considered to be worst case for impact assessment purposes. The construction workforce is estimated to result in an average of 450 (round trip) vehicle trips per day (21 working days per month), with a maximum of 810 (round trip) vehicle trips per day during peak construction. The workforce is expected to commute to the site from within an average distance of 35 miles from the Project site and is expected to arrive at the Project site by 7 a.m. and to depart at 5 p.m. each day (i.e., avoid 7–9 a.m. peak traffic period but not the 4–6 p.m. peak period); it is common that a fairly large portion of the workforce voluntarily carpools regularly. In addition to commute trips by construction workers, approximately 14,400 truck deliveries (i.e., 14,400 round trips or 28,800 one way trips) of equipment, materials, and fuel for on-site construction equipment are estimated to be required over the course of the construction period. Construction of the proposed Project is expected to require a total of up to 10-15 oversize loads for transformers and motor graders. Equipment, material, and fuel deliveries are planned to occur during non-peak traffic hours. Construction phase-related truck deliveries are estimated to require one-way distances (within the boundaries of the Mojave Desert Air Quality Management District) as follows: equipment and material deliveries at 30.5 miles; aggregate and concrete at 13 miles; and fuel at 10 miles.

Construction activities will include site preparation and grading, solar array foundation installation (which may include post driving), equipment installation, on-site substation and operations and maintenance building construction, gen-tie poles and conductor installation along the gen-tie route, equipment testing, and site cleanup and restoration. Typical construction equipment considered in this analysis includes graders, scrapers, dozers, loaders, tractors, tractor discs, skid steers, roller/vibrator/padders, trenchers, post drivers, forklifts, pumps, generators, and trucks. Construction of the proposed Project will include site preparation activities involving clearing of vegetation/surface disturbance and cut-and-fill activities as itemized by construction activity in Appendix A (Project Construction Emission Estimations). The operational workforce is anticipated to be five employees.

It is currently estimated that the maximum water usage for an approximate 25-month construction timeframe is 1,400 acre feet (AF) or approximately 700 AF per year on average. During construction, water will be needed primarily for dust control and soil compaction, with small amounts used for sanitary and other purposes. During operations, the Project will use no water directly for electricity generation. The operational phase of the Project is expected to require up to 38 AF per year (AFY) of water, including an estimated 18 AFY for two annual panel washings. The Project plans to utilize groundwater from either existing local well(s) or via installation of on-site groundwater wells. The applicant is also considering trucking water to the Project Site for at least the initial months of construction if an on-site water supply well(s) is not yet installed and functional. It is possible that trucking water to the Project Site could be required for the entire length of construction which would potentially require up to approximately 57,000 water deliveries (assuming 8,000-gallon capacity water trucks). All water deliveries to the Project site would be required by the applicant to occur during non-peak traffic hours. It is assumed that water deliveries would originate from a water supply source within 10 miles of the Project site. The worst-case water trucking scenario is included in the emission estimations.

The purpose of this study is to provide scientific information and technical data regarding the existing environmental baseline conditions within the study area and the potential air quality and greenhouse gas (GHG) impacts from the proposed Project. The Project information supporting these analyses is primarily based on the Applicant's revised Desert Quartzite Solar Project Plan of Development (POD) submitted to the BLM in May 2014, as amended. The POD will continue to be updated by the Applicant to provide current and accurate Project information. If warranted, Applicant measures are proposed in this study to address adverse changes to the air quality as a result of the Project. This study will be submitted to the BLM and Riverside County to support their independent review and evaluation of the environmental impacts of the Project pursuant to applicable Federal, State, and local laws. The POD is part of the BLM Right-of-Way (ROW) grant application process which for this Project includes preparation of an Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act (NEPA). Because part of the Project would be on private land, the proposed Project is also expected to require a Conditional Use Permit (CUP) from Riverside County. A CUP would necessitate compliance with the California Environmental Quality Act (CEQA), for which an Environmental Impact Report (EIR) is expected to be required. Therefore, it is currently assumed that a joint EIS/EIR will be prepared by the BLM and Riverside County.

1.2 PROJECT BACKGROUND

The fundamental purpose of the Project is to construct and operate a clean, renewable source of solar electricity that helps meet California's growing demand for power and helps fulfill national and State renewable energy and clean power goals. Solar energy provides a sustainable, renewable source of power that helps reduce fossil fuel dependence and GHG emissions. The proposed Project will help California meet its Renewable Portfolio Standard (RPS) goal, which is currently 50 percent[1] of electrical power retail sales by 2030 under Senate Bill (SB) 350. The Project supports Secretary of the Interior Salazar's Orders 3283 and 3285, which make developing renewable energy a top national priority. The Project will also help California achieve the 2006 Global Warming Solutions Act (Assembly Bill [AB] 32) GHG reduction targets, which require California's GHG emissions to be reduced to 1990 levels by 2020.

The electricity generated by the Project will be sold to one or more utilities or other retail customers. When fully operational, the 300 MW Project will deliver over 1.5 billion kilowatt-hours of clean, renewable energy annually. This generation is equivalent to the amount of energy needed to serve over 90,000 California homes each year. When compared to the carbon dioxide (CO_2) emissions that would be emitted if the same amount of electricity was generated from fossil fuels, implementing the Project will avoid emissions of over 165,000 metric tons of CO_2 annually – the equivalent of taking almost 32,000 automobiles off the road.

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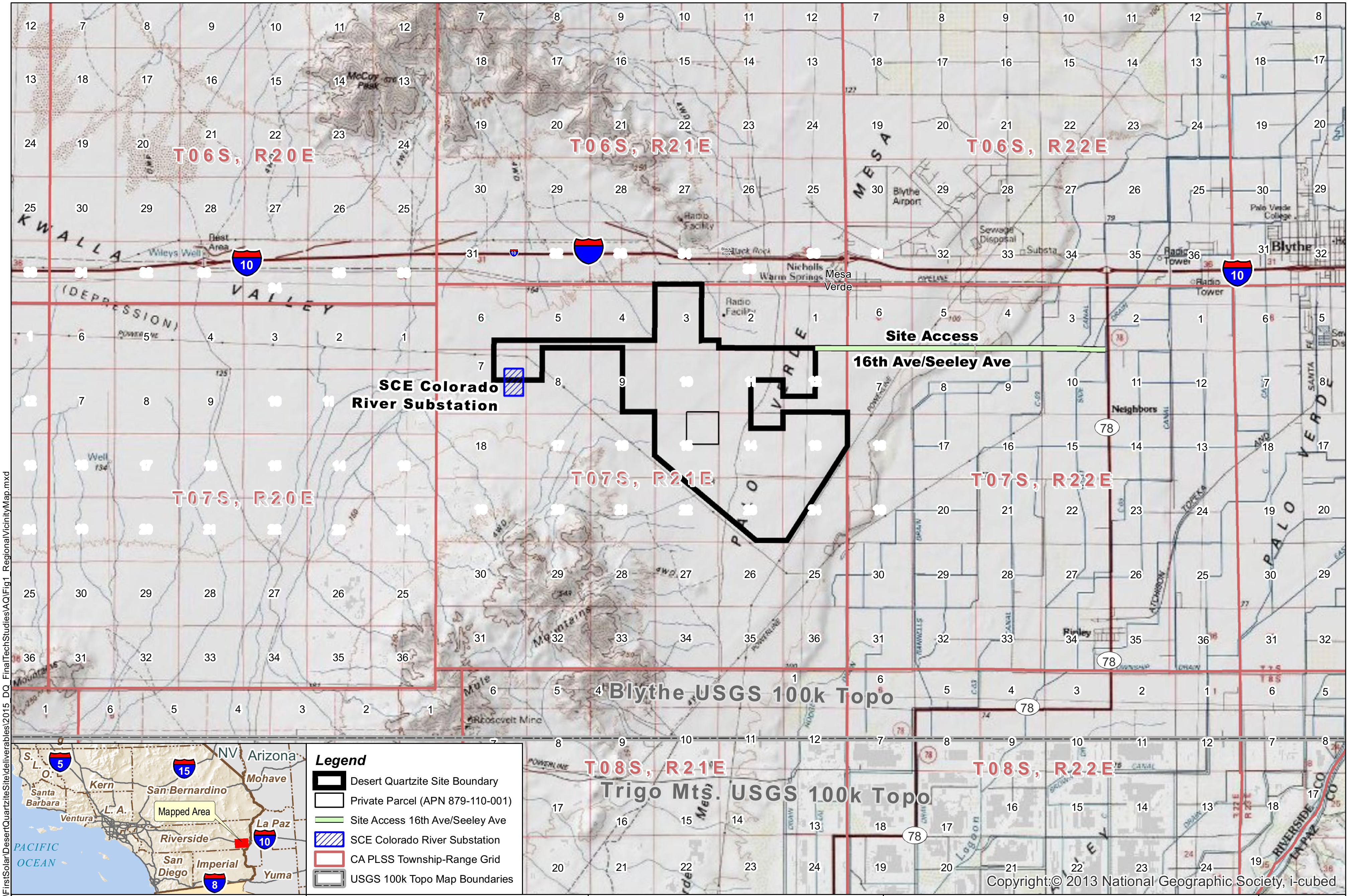
[1] SB 350 was signed into law by California Governor Brown on October 8, 2015. This legislation increases California's RPS to 50 percent by 2030.


T06S, R20E
T06S, R21E
T06S, R22E
T07S, R20E
T07S, R21E
T07S, R22E
T08S, R21E
T08S, R22E
Site Access
16th Ave/Seeley Ave
SCE Colorado River Substation
Blythe USGS 100k Topo
Trigo Mts. USGS 100k Topo
KWALLA VALLEY (DEPRESSION)
MESA
PALO VERDE
Blythe
Blythe Airport
Nicholls Warm Springs
Mesa Verde
Ripley
Neighbors
McCoy Peak
Roosevelt Mine
Wileys Well
Rest Area
Radio Facility
Sewage Disposal
Palo Verde College
10
78
Mapped Area
Arizona
NV
Mohave
Kern
San Bernardino
Santa Barbara
Ventura
L. A.
Riverside
La Paz
San Diego
Imperial
Yuma
PACIFIC OCEAN
Legend
Desert Quartzite Site Boundary
Private Parcel (APN 879-110-001)
Site Access 16th Ave/Seeley Ave
SCE Colorado River Substation
CA PLSS Township-Range Grid
USGS 100k Topo Map Boundaries
Copyright:© 2013 National Geographic Society, i-cubed

Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

N
0 0.5 1 1.5 2 Miles
0 5,000 10,000 Feet

Source: [1] Bing Maps Aerial Imagery Web Mapping Service - (c) 2010 Microsoft Corporation and its datas upplier (Image Date: 3/13/2011), [2] California Geospatial Information Library PLS, [3] ESRI StreetMap USA (2007).

Figure 1. Regional Vicinity Map

2015

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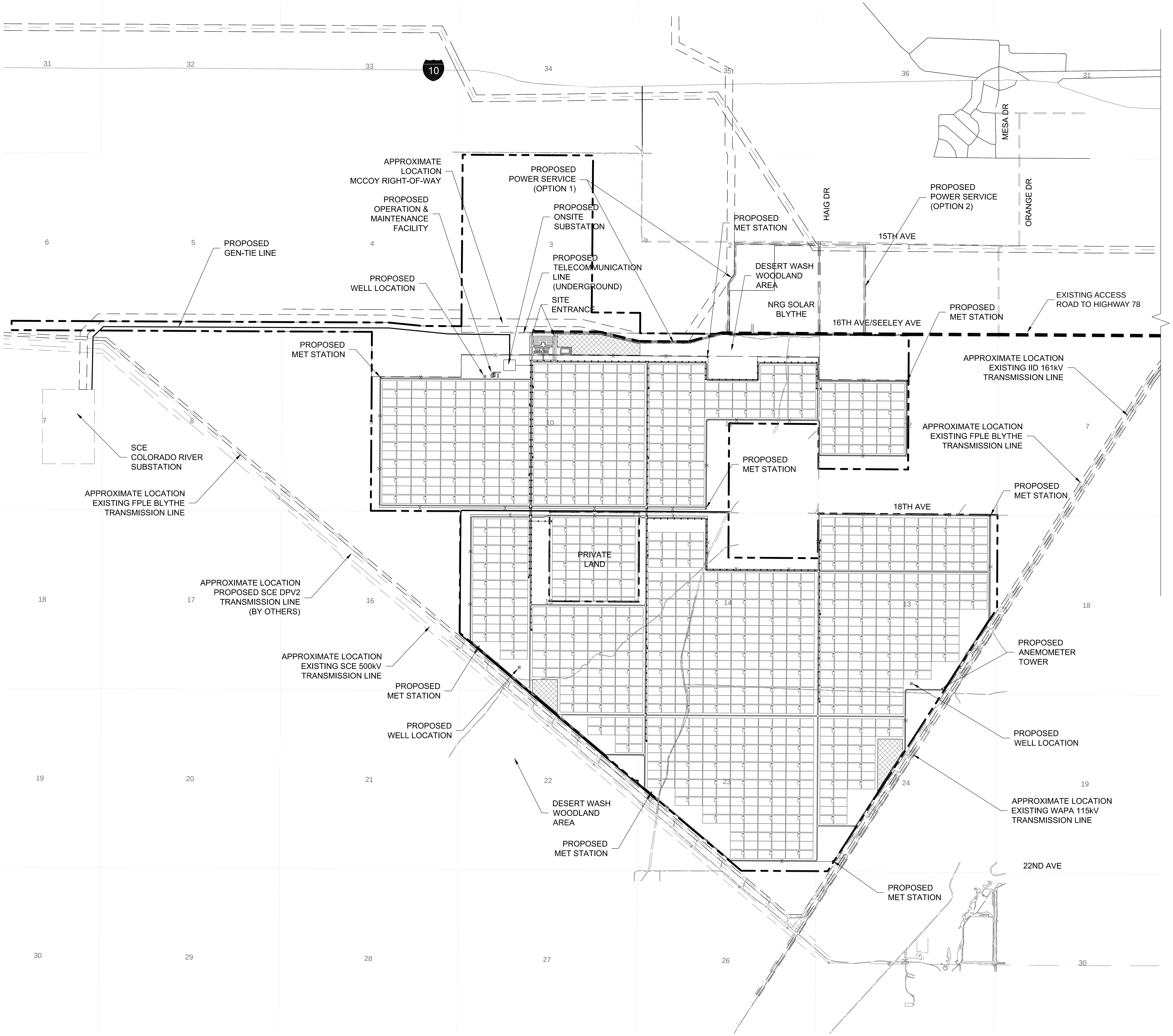
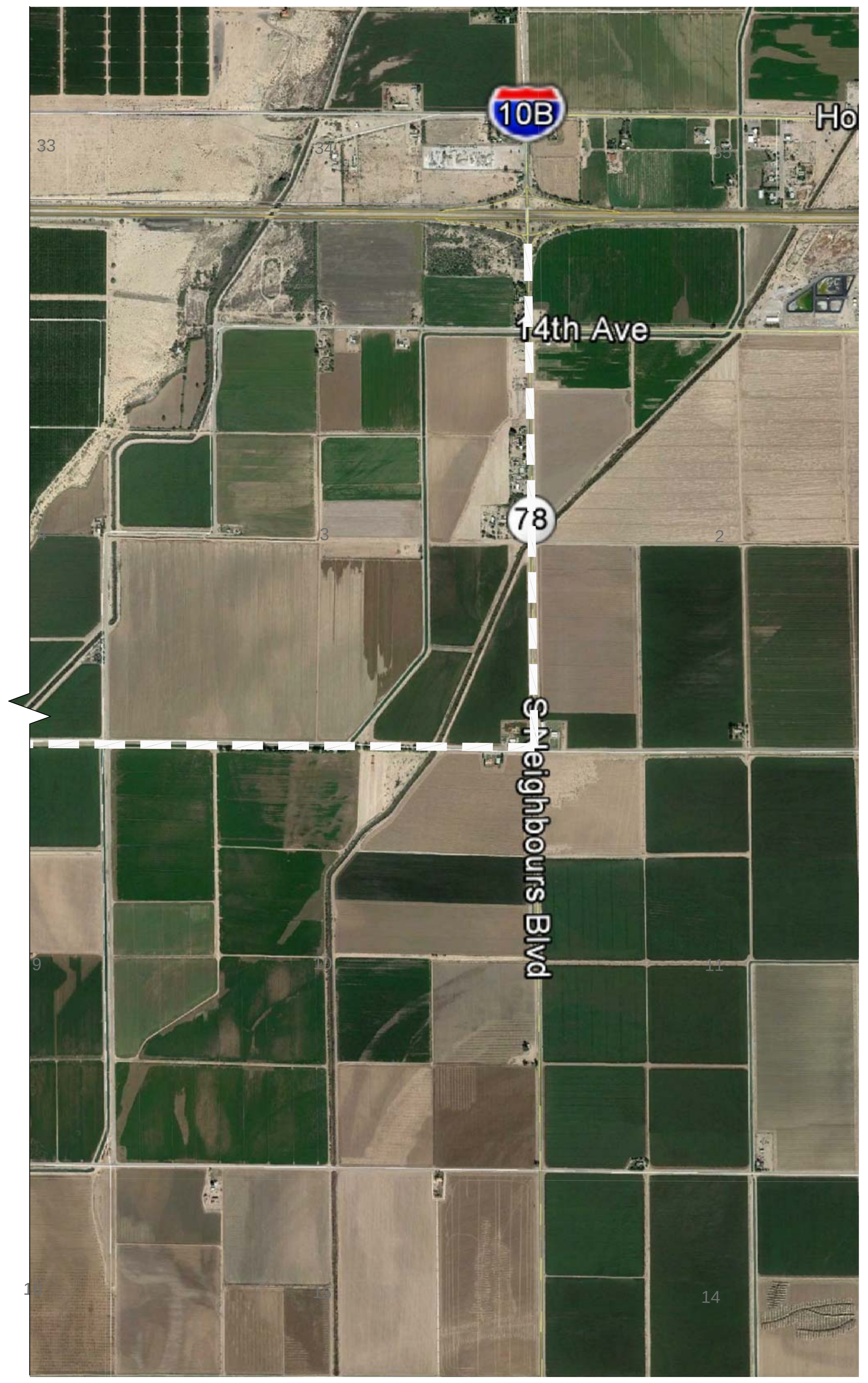

31
32
33
10
34
35
36
31
MESA DR
ORANGE DR
HAIG DR
APPROXIMATE LOCATION MCCOY RIGHT-OF-WAY
PROPOSED POWER SERVICE (OPTION 1)
PROPOSED OPERATION & MAINTENANCE FACILITY
PROPOSED ONSITE SUBSTATION
PROPOSED MET STATION
PROPOSED POWER SERVICE (OPTION 2)
6
5
4
3
2
1
PROPOSED GEN-TIE LINE
15TH AVE
PROPOSED TELECOMMUNICATION LINE (UNDERGROUND)
DESERT WASH WOODLAND AREA
PROPOSED WELL LOCATION
SITE ENTRANCE
NRG SOLAR BLYTHE
EXISTING ACCESS ROAD TO HIGHWAY 78
PROPOSED MET STATION
16TH AVE/SEELEY AVE
PROPOSED MET STATION
APPROXIMATE LOCATION EXISTING IID 161kV TRANSMISSION LINE
7
8
10
11
12
7
APPROXIMATE LOCATION EXISTING FPLE BLYTHE TRANSMISSION LINE
SCE COLORADO RIVER SUBSTATION
PROPOSED MET STATION
APPROXIMATE LOCATION EXISTING FPLE BLYTHE TRANSMISSION LINE
PROPOSED MET STATION
18TH AVE
PRIVATE LAND
APPROXIMATE LOCATION PROPOSED SCE DPV2 TRANSMISSION LINE (BY OTHERS)
18
17
16
14
13
18
PROPOSED ANEMOMETER TOWER
APPROXIMATE LOCATION EXISTING SCE 500kV TRANSMISSION LINE
PROPOSED MET STATION
PROPOSED WELL LOCATION
PROPOSED WELL LOCATION
19
20
21
22
23
24
19
DESERT WASH WOODLAND AREA
APPROXIMATE LOCATION EXISTING WAPA 115kV TRANSMISSION LINE
PROPOSED MET STATION
22ND AVE
PROPOSED MET STATION
30
29
28
27
26
25
30


10B
Ho
33
14th Ave
78
S Neighbours Blvd
14

LEGEND

- PROPOSED PROJECT SITE BOUNDARY
- PROPOSED GEN-TIE
- PROPOSED PERIMETER FENCE
- PROPOSED ACCESS ROAD
- PROPOSED WELL LOCATION (GROUNDWATER)
- TYPICAL PV ARRAY
- ▨ CONSTRUCTION STAGING AREA
- EXISTING ROADS
- EASEMENTS/RIGHT-OF-WAY BY OTHERS
- EXISTING/PROPOSED TRANSMISSION LINE

NORTH

3000' 1500' 0 3000'

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DESERT QUARTZITE, LLC
135 MAIN STREET, 6TH FLOOR
SAN FRANCISCO, CALIFORNIA 94105
PHONE: (415) 935-2500

DESERT QUARTZITE
SOLAR PROJECT
RIVERSIDE COUNTY
CALIFORNIA

REV	DATE	REVISION DESCRIPTION	BY	CHK	APP

FS JOB #:
PROJ. DEVT. ENGR: RH
PROJ. MGR. ENV.:
SCALE: 1"=1500' @ 24"x36" SHEET
COPYRIGHT BY: DESERT QUARTZITE, LLC

SHEET TITLE

FIGURE 2

PRELIMINARY SITE PLAN

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SECTION 2.0
REGULATORY FRAMEWORK

2.1 INTRODUCTION

Each level of government – federal, state, and local—has adopted specific laws, ordinances, regulations, and standards (LORS) that regulate emissions and protect the health and welfare of the general public from specific air pollutants. The applicable LORS related to the potential air quality effects from the Project are described below. These LORS are administered (either independently or cooperatively) by the U.S. Environmental Protection Agency (EPA) Region 9, California Air Resources Board (ARB), and Mojave Desert Air Quality Management District (MDAQMD).

2.2 POLLUTANTS AND HEALTH EFFECT

2.2.1 Criteria Pollutants

Individual air pollutants at certain concentrations may adversely affect human or animal health, reduce visibility, damage property, and reduce the productivity or vigor of crops and natural vegetation. Six air pollutants have been identified by the EPA and ARB as being of concern both on a nationwide and statewide level: ozone (O_3); carbon monoxide (CO); nitrogen dioxide (NO_2); sulfur dioxide (SO_2); lead; and particulate matter (PM), which is subdivided into two classes based on particle size: Respirable PM equal to or less than 10 micrometers in diameter (PM_{10}) and Fine PM equal to or less than 2.5 micrometers in diameter ($PM_{2.5}$). Because the air quality standards for these air pollutants are regulated using human health and environmentally based criteria, they are commonly referred to as “criteria air pollutants.”

2.2.1.1 Ozone

Ozone is the principal component of smog and is formed in the atmosphere through a series of reactions involving volatile organic compounds (VOC) and nitrogen oxides (NO_x) in the presence of sunlight. VOC and NO_x are called precursors of ozone. NO_x includes various combinations of nitrogen and oxygen, including nitric oxide (NO), NO_2, and others. Ozone is a principal cause of lung and eye irritation in the urban environment. Significant ozone concentrations are usually produced only in the summer, when atmospheric inversions are greatest and temperatures are high. VOC and NO_x emissions are both considered critical in ozone formation.

2.2.1.2 Carbon Monoxide

CO is a colorless and odorless gas that, in the urban environment, is associated primarily with the incomplete combustion of fossil fuels in motor vehicles. Relatively high concentrations are typically found near crowded intersections and along heavily used roadways carrying slow-moving traffic. Even under most severe meteorological and traffic conditions, high concentrations of CO are limited to locations within a relatively short distance (300 to 600 feet) of heavily traveled roadways. Vehicle traffic emissions can cause localized CO impacts, and severe vehicle congestion at major signalized intersections can generate elevated CO levels, called “hot spots,” which can be hazardous to human receptors adjacent to the intersections.

2.2.1.3 Nitrogen Dioxide

NO_2 is a product of combustion and is generated in vehicles and in stationary sources, such as power plants and boilers. It is also formed when ozone reacts with NO in the atmosphere. As noted above, NO_2 is part of the NO_x family and is a principal contributor to ozone and smog generation. It is also a major contributor to $PM_{2.5}$.

2.2.1.4 Sulfur Dioxide

SO_2 is a combustion product, with the primary source being power plants and heavy industries that use coal or oil as fuel. SO_2 is also a product of diesel engine combustion. SO_2 in the atmosphere contributes to the formation of $PM_{2.5}$ and acid rain.

2.2.1.5 Lead

Lead is a highly toxic metal that may cause a range of human health effects. Previously, the lead used in gasoline anti-knock additives represented a major source of lead emissions to the atmosphere. EPA began working to reduce lead emissions soon after its inception, issuing the first reduction standards in 1973. Lead emissions have significantly decreased due to the near elimination of leaded gasoline use.

2.2.1.6 Particulate Matter

Particulate matter (PM) is a complex mixture of extremely small particles and liquid droplets. Particulate matter is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. Natural sources of particulate matter include windblown dust and ocean spray. The size of particulate matter is directly linked to the potential for causing health problems. EPA is concerned about particles that are 10 micrometers in diameter or smaller, because these particles generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. Health studies have shown a significant association between exposure to particulate matter and premature death. Other important effects include aggravation of respiratory and cardiovascular disease, lung disease, decreased lung function, asthma attacks, and certain cardiovascular problems, such as heart attacks and irregular heartbeat. Individuals particularly sensitive to fine particle exposure include older adults, people with heart and lung disease, and children. As previously discussed, EPA groups particulate matter into two categories, which are described below.

2.2.1.7 $PM_{2.5}$

Fine particles, such as those found in smoke and haze, are $PM_{2.5}$. Sources of fine particles include all types of combustion activities (motor vehicles, power plants, wood burning, etc.) and certain industrial processes. $PM_{2.5}$ is also formed through reactions of gases, such as SO_2 and nitrogen oxides, in the atmosphere. $PM_{2.5}$ is the major cause of reduced visibility (haze) in California.

2.2.1.8 PM_{10}

PM_{10} includes both fine and coarse dust particles; the fine particles are $PM_{2.5}$. Coarse particles, such as those found near roadways and dusty industries, are larger than 2.5 micrometers and smaller than 10 micrometers in diameter. Sources of coarse particles include crushing or grinding operations and dust from paved or unpaved roads. Control of PM_{10} is primarily achieved through the control of dust at construction and industrial sites, the cleaning of paved roads, and the wetting or paving of frequently used unpaved roads.

2.2.1.9 Other Pollutants

Besides the six primary criteria pollutants discussed above for which there are both Federal and State health standards, California has also adopted standards for sulfates (SO_4^{2-}), hydrogen sulfide (H_2S), visibility reducing particles, and vinyl chloride. As described below, these pollutants would either not be emitted or would not be of concern related to construction and operation of the proposed Project. The typical sources and health effects of these pollutants are summarized below for informational purposes.

Sulfates. Sulfates (SO_4^{2-}) are a particulate product that comes from the combustion of sulfur-containing fossil fuels. Major sources include fossil fueled power plants. In the presence of oxygen and a metal ion, SO_2 can form sulfates. The health effects associated with sulfates include respiratory illnesses, decreased pulmonary disease resistance and aggravation of cardiovascular diseases. For the proposed Project, sulfate emissions from combustion of fossil fuels in construction and operations phase vehicles and equipment would be minimal due in part to the low sulfur content in fuels (maximum 15 ppm sulfur by weight), pollution controls, and the low sulfate formation rate from combustion of applicable fuels.

Hydrogen Sulfide. H_2S emissions often are associated with geothermal activity, oil and gas production, refining, sewage treatment plants, and confined animal feeding operations. At low concentrations H_2S, which has a characteristic “rotten egg” smell, may cause irritation to the eyes, mucous membranes and respiratory system, dizziness and headaches. In high concentrations (800 ppm can cause death) hydrogen sulfide is extremely hazardous, especially in enclosed spaces. H_2S would not be emitted during construction and operation of the proposed Project.

Visibility Reducing Particles. Visibility-reducing particles consist of suspended particulate matter, which is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. Except for Lake County (which is designated attainment), California's attainment status with respect to visibility reducing particles is currently designated as unclassified. CARB has not established a method for measuring visibility with the precision and accuracy needed to designate areas as attainment or nonattainment. The proposed Project would limit emissions of fugitive dust and would not be a major contributor of visibility reducing particles during the construction or operational phases of the Project.

Vinyl Chloride. Vinyl chloride monomer is a sweet-smelling, colorless gas at ambient temperature. Landfills, wastewater treatment plants, and polyvinyl chloride (PVC) production are the major identified sources of vinyl chloride emissions in California. In humans, epidemiological studies of occupationally exposed workers have linked vinyl chloride exposure to development of a rare cancer, liver angiosarcoma, and have suggested a relationship between exposure and lung and brain cancers. Vinyl chloride would not be produced by construction or operation of the proposed Project.

2.2.2 Toxic Air Contaminants

Toxic air contaminants (TAC) are substances that have the potential to be emitted into the ambient air that have been determined to present some level of chronic or acute health risk (cancer or non-cancer) to the general public. These pollutants may be emitted in trace amounts from various types of sources, including combustion sources.

Since no safe levels of TACs can be determined, there are no ambient air quality standards for TACs. Instead, TAC impacts are evaluated by calculating the health risks associated with a given exposure. The requirements of the Air Toxics "Hot Spots" Information and Assessment Act (AB 2588) apply to facilities that use, produce, or emit toxic chemicals. Facilities that are subject to the toxic emission inventory requirements of the act must prepare and submit toxic emission inventory plans and reports and periodically update those reports.

The main TACs that are emitted from mobile sources such as those that would be operating to construct and operate the Project include those substances that the EPA and the Federal Highway Administration (FHWA) have identified as Mobile Source Air Toxics. The EPA reviewed the list of TACs and identified a group of 21 TAC's as Mobile Source Air Toxics (MSAT), which are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline. EPA refined the list further, compiling a subset of six priority MSATs identified as having the greatest influence on health. These included: benzene, 1,3-butadiene, formaldehyde, acrolein, acetaldehyde, and diesel particulate matter (DPM). The most critical TAC in this MSATs group is DPM from the diesel exhaust.

2.2.3 Greenhouse Gases

Constituent gases of the Earth's atmosphere, called atmospheric GHGs, play a crucial role in the Earth's radiation amount by trapping infrared radiation emitted from the Earth's surface, which otherwise would have escaped to space. Prominent GHGs contributing to this process include CO_2, methane (CH_4), water vapor, nitrous oxide (N_2O), perfluorocarbons (PFC), hydrofluorocarbons (HFC), sulfur hexafluoride (SF6), and chlorofluorocarbons (CFC). This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate. Anthropogenic (caused or produced by humans) emissions of these GHGs in excess of natural ambient concentrations are responsible for the enhancement of the greenhouse effect and have led to a trend of unnatural warming of the Earth's natural climate, known as global warming or climate change. Emissions of gases that induce global warming are attributable to human activities associated with industrial/manufacturing, agriculture, utilities, transportation, and residential land uses.

GHGs have varying global warming potential (GWP). The GWP is the potential of a gas or aerosol to trap heat in the atmosphere; it is the "cumulative radiative forcing effect of a gas over a specified time horizon resulting from the emission of a unit mass of gas relative to a reference gas" (EPA 2015). The reference gas for GWP is CO_2; therefore, CO_2 has a GWP of 1. The other main greenhouse gases that have been attributed to human activity include CH_4, which has a GWP of 28, and N_2O, which has a GWP of 265. Transportation is responsible for 37 percent of California's greenhouse gas emissions, followed by electricity generation. Emissions of O_2 and N_2O are byproducts of fossil fuel combustion. SF6 is used in electrical transformers. Methane, a potent greenhouse gas, results from off-gassing associated with agricultural practices and landfills. Sinks of O_2, where O_2 is stored outside of the atmosphere, include uptake by vegetation and dissolution into the ocean. (ARB 2015a)

2.2.4 Odors

Odors are considered an air quality issue both at the local level (e.g., odor from wastewater treatment) and at the regional level (e.g., smoke from wildfires). Odors are generally regarded as an annoyance rather than a health hazard. However, manifestations of a person's reaction to foul odors can range from psychological (e.g., irritation, anger, or anxiety) to physiological (e.g., circulatory and respiratory effects, nausea, vomiting, and headache).

Several examples of common land use types that generate substantial odors include wastewater treatment plants, landfills, composting/green waste facilities, recycling facilities, petroleum refineries, chemical manufacturing plants, painting/coating operations, rendering plants, and food packaging plants.

2.2.5 Health Effects

2.2.5.1 Criteria Pollutants

Ozone. Individuals exercising outdoors, children, and people with preexisting lung disease, such as asthma and chronic pulmonary lung disease, are considered to be the most susceptible sub-groups for ozone effects. Short-term exposure (lasting for a few hours) to ozone can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. An increased risk for asthma has been found in children who participate in multiple sports and live in communities with high ozone levels.

Particulate Matter. A consistent correlation between elevated PM_{10} and $PM_{2.5}$ levels and an increase in mortality rates, respiratory infections, number and severity of asthma attacks and the number of hospital admissions has been observed in different parts of the United States and various areas around the world. Some studies have reported an association between long term exposure to air pollution dominated by fine particles and increased mortality, reduction in life-span, and an increased mortality from lung cancer.

Daily fluctuations in $PM_{2.5}$ concentration levels have also been related to hospital admissions for acute respiratory conditions in children, to school and kindergarten absences, to a decrease in respiratory lung volumes in normal children, and to increased medication use in children and adults with asthma. Studies show lung function growth in children is reduced with long-term exposure to particulate matter. The elderly, people with pre-existing respiratory or cardiovascular disease, and children appear to be more susceptible to the effects of high levels of PM_{10} and $PM_{2.5}$.

Carbon Monoxide. Individuals with a deficient blood supply to the heart are the most susceptible to the adverse effects of CO exposure. The effects observed include earlier onset of chest pain with exercise, and electrocardiograph changes indicative of decreased oxygen (O_2) supply to the heart. Inhaled CO has no direct toxic effect on the lungs, but exerts its effect on tissues by interfering with oxygen transport. Hence, conditions with an increased demand for oxygen supply can be adversely affected by exposure to CO. Individuals most at risk include fetuses, patients with diseases involving heart and blood vessels, and patients with chronic hypoxemia (oxygen deficiency) as seen at high altitudes.

Nitrogen Dioxide. Population-based studies suggest that an increase in acute respiratory illness, including infections and respiratory symptoms in children, is associated with long-term exposure to NO_2 at levels found in homes with gas stoves, which are higher than ambient levels found in southern California. Increase in resistance to air flow and airway contraction is observed after short-term exposure to NO_2 in healthy subjects. Larger decreases in lung functions are observed in individuals with asthma or chronic obstructive pulmonary disease (e.g., chronic bronchitis, emphysema) than in healthy individuals, indicating a greater susceptibility of these sub-groups.

Sulfur Dioxide. In asthmatics, increase in resistance to air flow, as well as reduction in breathing capacity leading to severe breathing difficulties, are observed after acute exposure to SO_2. In contrast, healthy individuals do not exhibit similar acute responses even after exposure to higher concentrations of SO_2. Some population-based studies indicate that the mortality and morbidity effects associated with fine particles show a similar association with ambient SO_2 levels. In these studies, efforts to separate the effects of SO_2 from those of fine particles have not been successful. It is not clear whether the two pollutants act synergistically or one pollutant alone is the predominant factor.

Lead. Fetuses, infants, and children are more sensitive than others to the adverse effects of lead exposure. Exposure to low levels of lead can adversely affect the development and function of the central nervous system, leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence quotient. In adults, increased lead levels are associated with increased blood pressure. Lead poisoning can cause anemia, lethargy, seizures, and death; although, it appears that there are no direct effects of lead on the respiratory system.

Other Pollutants. As discussed in Section 2.2.1.9, California has adopted standards for SO_4, H_2S, visibility reducing particles, and vinyl chloride. Project-related emission of these pollutants would be negligible or non-existent and, thus, the associated health effects of these pollutants related to the proposed Project are not addressed herein.

2.2.5.2 Toxic Air Contaminants

The following specific descriptions of health effects for each of the criteria air pollutants associated with project construction and operations are based on information on health effects of TACs from the California Office of Environmental Health Hazard Assessment (OEHHA 2012) and the EPA (USEPA 2012).

Diesel Particulate Matter. Diesel particulate matter (DPM) is emitted from both mobile and stationary sources. In California, on-road diesel-fueled engines contribute approximately 24 percent of the statewide total, with an additional 71 percent attributed to other mobile sources such as construction and mining equipment, agricultural equipment, and transport refrigeration units. Stationary sources contribute about five percent of total DPM. Diesel exhaust includes over 40 substances that are listed by the EPA as hazardous air pollutants and by the ARB as toxic air contaminants. Fifteen of these substances are listed by the

International Agency for Research on Cancer (IARC) as carcinogenic to humans, or as a probable or possible human carcinogen. Some of these substances are: acetaldehyde; antimony compounds; arsenic; benzene; beryllium compounds; bis (2-ethylhexyl)phthalate; dioxins and dibenzofurans; formaldehyde; inorganic lead; mercury compounds; nickel; polycyclic organic matter (POM, including polycyclic aromatic hydrocarbon compounds [PAHs]); and styrene. Almost all of the diesel particle mass is in the fine particle range of 10 microns or less in diameter (PM_{10}). Approximately 94 percent of the mass of these particles are less than 2.5 microns in diameter. Because of their small size, these particles can be inhaled and a portion will eventually become trapped within the small airways and alveolar regions of the lung.

A number of adverse short-term health effects have been associated with exposures to diesel exhaust. Occupational exposures to diesel exhaust particles have been associated with significant cross-shift decreases in lung function. Increased cough, labored breathing, chest tightness, and wheezing have been associated with exposure to diesel exhaust in bus garage workers. A significant increase in airway resistance and increases in eye and nasal irritation were observed in human volunteers following one-hour chamber exposure to diesel exhaust. In acute or subchronic animal studies, exposure to diesel exhaust particles induced inflammatory airway changes, lung function changes, and increased the animals' susceptibility to infection. A number of adverse long-term non-cancer effects have been associated with exposure to diesel exhaust. Occupational studies have shown that there may be a greater incidence of cough, phlegm and chronic bronchitis among those exposed to diesel exhaust than among those not exposed. Reductions in pulmonary function have also been reported following occupational exposures in chronic studies. Exposure to diesel exhaust has also shown cellular changes in laboratory animals.

Over 30 human epidemiological studies have investigated the potential carcinogenicity of diesel exhaust. These studies, on average, found that long-term occupational exposures to diesel exhaust were associated with a 40 percent increase in the relative risk of lung cancer. The lung cancer findings are consistent and the association is unlikely to be due to chance. These epidemiological studies strongly suggest a causal relationship between occupational diesel exhaust exposure and lung cancer.

Acrolein. Acrolein is usually formed from the burning of organic matter including tobacco or from the burning of fuels such as gasoline. Acrolein is a powerful irritant. Due to its highly reactive nature, the effects of acrolein are generally limited to the site of contact; skin, eyes and mucous membranes. Inhalation exposure to low levels (≤ 1 part per million [ppm]) causes irritation of the eyes, nose and throat. Acute exposures to levels above 1 ppm result in mucous hypersecretion and exacerbation of allergic airway response in animal models. Moderately higher exposures may result in severe lacrimation, and irritation of the mucous membranes of the respiratory tract. Death due to respiratory failure has been associated with high level exposures. Long term exposure to acrolein may result in structural and functional changes in the respiratory tract, including lesions in the nasal mucosa, and pulmonary inflammation.

1,3–Butadiene. Motor vehicle exhaust is a constant source of 1,3-butadiene. Although 1,3-butadiene breaks down quickly in the atmosphere, it is usually found in ambient air at low levels in urban and suburban areas. Acute (short-term) exposure to 1,3-butadiene by inhalation in humans results in irritation of the eyes, nasal passages, throat, and lungs. Epidemiological studies have reported a possible association between 1,3-butadiene exposure and cardiovascular diseases. Epidemiological studies of workers in rubber plants have shown an association between 1,3-butadiene exposure and increased incidence of leukemia. Animal studies have reported tumors at various sites from 1,3-butadiene exposure. The EPA has classified 1,3-butadiene as carcinogenic to humans by inhalation.

Benzene. Approximately 84 percent of the benzene emitted in California comes from motor vehicles, including evaporative leakage and unburned fuel exhaust. Currently, the benzene content of gasoline is less than one percent. Benzene is found in the air from emissions from burning coal and oil, gasoline service stations, and motor vehicle exhaust. Acute (short-term) inhalation exposure of humans to benzene may cause drowsiness, dizziness, headaches, as well as eye, skin, and respiratory tract irritation, and, at high levels, unconsciousness. Chronic (long-term) inhalation exposure has caused various disorders in the blood, including reduced numbers of red blood cells and aplastic anemia, in occupational settings. Reproductive effects have been reported for women exposed by inhalation to high levels, and adverse effects on the developing fetus have been observed in animal tests. Increased incidence of leukemia (cancer of the tissues that form white blood cells) have been observed in humans occupationally exposed to benzene. The EPA has classified benzene as a human carcinogen.

Formaldehyde. Exposure to formaldehyde may occur by breathing contaminated indoor air, tobacco smoke, or ambient urban air. Acute (short-term) and chronic (long-term) inhalation exposure to formaldehyde in humans can result in respiratory symptoms, and eye, nose, and throat irritation. Limited human studies have reported an association between formaldehyde exposure and lung and nasopharyngeal cancer. Animal inhalation studies have reported an increased incidence of nasal squamous cell cancer. The EPA considers formaldehyde a probable human carcinogen. The non-cancer adverse health effects of formaldehyde are largely a manifestation of its ability to irritate mucous membranes. As a result of its solubility in water and high reactivity, formaldehyde is efficiently absorbed into the mucus layers protecting the eyes and respiratory tract where it rapidly reacts, leading primarily to localized irritation. Acute high exposure may lead to eye, nose and throat irritation, and in the respiratory tract, nasal obstruction, pulmonary edema and dyspnea. Prolonged or repeated exposures have been associated with allergic sensitization, respiratory symptoms (coughing, wheezing, shortness of breath), histopathological changes in respiratory epithelium, and decrements in lung function. Children, especially those with diagnosed asthma, may be more likely to show impaired pulmonary function and symptoms than are adults following chronic exposure to formaldehyde.

2.2.5.3 Odors

Offensive odors can potentially affect human health in several ways. First, odorant compounds can irritate the eye, nose, and throat, which can reduce respiratory volume. Second, the VOCs that cause odors can stimulate sensory nerves to cause neurochemical changes that might influence health, for instance, by compromising the immune system. Finally, unpleasant odors can trigger memories or attitudes linked to unpleasant odors, causing cognitive and emotional effects such as stress.

2.3 FEDERAL REGULATIONS

2.3.1 National Environmental Policy Act

NEPA establishes a public, interdisciplinary framework for Federal agencies reviewing projects under their jurisdiction to consider environmental impacts. NEPA's basic policy is to assure that all branches of government give proper consideration to the environment prior to undertaking any major Federal action that significantly affects the environment.

The BLM, as lead Federal agency for the Project, is responsible for preparation of an EIS in compliance with NEPA to evaluate the environmental impacts of the portions of the Desert Quartzite Solar Project on Federal lands (BLM 2008). The Desert Quartzite Solar Project and the Project gen-tie line are located on lands administered and managed by the BLM. Therefore, NEPA compliance will be required for these portions of the Project through preparation of a Draft and Final EIS. BLM is also responsible for Native American consultation, including government-to-government consultation.

2.3.2 Clean Air Act

The EPA implements and enforces the requirements of many of the Federal environmental laws. EPA Region 9, which has its offices in San Francisco, administers Federal air programs in California. The Federal Clean Air Act (CAA) of 1970, 42 United States Code 7401 *et seq.*, as amended in 1977 and 1990, is the basic Federal statute governing air pollution and its control. The provisions of the CAA that are potentially relevant to this Project are listed below and their applicability is discussed in the following sections:

- Air Quality Control Regions
- National Ambient Air Quality Standards
- General Conformity Compliance
- Greenhouse Gas Endangerment

- Clean Vehicles

The Project is not expected to have any stationary sources of emissions during the operational phase and will not store or handle substantive quantities hazardous materials during its construction and operation. Therefore, the Project will not be subject to the Federal stationary source regulations and requirements, such as Prevention of Significant Deterioration (PSD), New Source Review (NSR), New Source Performance Standards (NSPS), Maximum Achievable Control Technology (MACT), Federally Mandated Operating Permits, and Risk Management Plan (RMP).

2.3.2.1 Air Quality Control Regions

Because air pollution is a regional problem and not limited to political or state boundaries, the Federal CAA established Air Quality Control Regions. This is a method of dividing the country into regional air basins. The Project Site is located in the Southeast Desert Sea Intrastate Air Quality Control Region (40 CFR Part 81.167).

2.3.2.2 National Ambient Air Quality Standards

EPA, in response to the Federal CAA of 1970, established National Ambient Air Quality Standards (NAAQS) in 40 CFR Part 50. The NAAQS include both primary and secondary standards for six “criteria” pollutants. These criteria pollutants are O_3, CO, NO_2, SO_2, respirable and fine particulate matter (PM_{10} and $PM_{2.5}$), and lead.

Primary standards were established to protect human health, and secondary standards were designed to protect property and natural ecosystems from the effects of air pollution.

The State of California has adopted California Ambient Air Quality Standards (CAAQS) that are in some cases more stringent than the NAAQS and which regulate the allowable air concentrations of additional pollutants. The CAAQS and NAAQS are summarized in Table 2-1, National and California Ambient Air Quality Standards (ARB 2015b), and include standards for H_2S and vinyl chloride which are not relevant to the Project.

The EPA, ARB, and the local air districts determine air quality attainment status by comparing local ambient air quality measurements from the State or local ambient air monitoring stations with the NAAQS and CAAQS. Those areas that are below the standards are classified as “attainment” areas; areas that equal or exceed the standards are classified as “nonattainment” areas. Areas that have insufficient air quality data may be identified as unclassifiable areas. These attainment designations are determined on a pollutant-by-pollutant basis. The Project vicinity is designated as a State nonattainment area for O_3 and PM_{10} based on air quality monitoring data showing exceedances of the State standards.

TABLE 2-1
NATIONAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS

		California Standards [a]	National Standards [b]	
Pollutant	Averaging Time	Concentration [c]	Primary [c, d]	Secondary [e]
Ozone	1 hour	0.09 ppm (180 µg/m^3)	–	Same as primary standard
	8 hour	0.070 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3)	
Respirable particulate matter (PM$_{10}$) [f]	24 hour	50 µg/m^3	150 µg/m^3	Same as primary standard
	Annual arithmetic mean	20 µg/m^3	–	
Fine particulate matter (PM$_{2.5}$) [f]	24 hour	–	35 µg/m^3	Same as primary standard
	Annual arithmetic mean	12 µg/m^3	12.0 µg/m^3	15 µg/m
Carbon monoxide (CO)	8 hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	None
	1 hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	
	8 hour (Lake Tahoe)	6 ppm (7 mg/m^3)	–	–
Nitrogen dioxide (NO$_2$) [g]	Annual arithmetic mean	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)	Same as primary standard
	1 hour	0.18 ppm (339 µg/m^3)	100 ppb (188 µg/m^3)	None
Sulfur dioxide (SO$_2$) [h]	Annual arithmetic mean	–	0.030 ppm (for certain areas) [h]	–
	24 hour	0.04 ppm (105 µg/m^3)	0.14 ppm (for certain areas) [h]	–
	3 hour	–	–	0.5 ppm (1,300 µg/m^3)
	1 hour	0.25 ppm (655 µg/m^3)	75 ppb (196 µg/m^3)	–
Lead [i, j]	30-day average	1.5 µg/m^3	–	–
	Calendar quarter	–	1.5 µg/m^3 (for certain areas) [j]	Same as primary standard
	Rolling 3-month average	–	0.15 µg/m^3	
Visibility-reducing particles [k]	8 hour	See footnote k	No national standards	
Sulfates	24 hour	25 µg/m^3	No national standards	
Hydrogen sulfide	1 hour	0.03 ppm (42 µg/m^3)	No national standards	
Vinyl chloride [i]	24 hour	0.01 ppm (26 µg/m^3)	No national standards	

TABLE 2-1 (CONTINUED)
NATIONAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS

Notes:
mg/m^3 = milligrams per cubic meter; ppb = parts per billion; ppm = parts per million; µg/m^3 = micrograms per cubic meter.

[a] California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1- and 24-hour), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility-reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

[b] National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standards.

[c] Concentration expressed first in the units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25 degrees Celsius and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and reference pressure of 760 torr; (ppm) in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[d] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

[e] National Secondary Standards: The levels of air quality necessary to protect public welfare from any known or anticipated adverse effects of a pollutant.

[f] On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 µg/m^3 to 12.0 µg/m^3. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m^3, as was the annual secondary standard of 15 µg/m^3. The existing 24-hour PM_{10} standards (primary and secondary) of 150 µg/m^3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

[g] To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. California standards are in units of ppm. To directly compare the national 1-hour standard to the California standards the units can be converted from 100 ppb to 0.100 ppm.

[h] On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until 1 year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved. To directly compare the 1-hour national standard to the California standard, the units can be converted to ppm. In this case, the national standard of 75 ppb is identical of 0.075 ppm.

[i] ARB has identified lead and vinyl chloride as toxic air contaminants with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[j] The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 µg/m^3 as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standards are approved.

[k] In 1989, ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are “extinction of 0.23 per kilometer” and the “extinction of 0.07 per kilometer” for the statewide and Lake Tahoe Air Basin standards, respectively.

Source: California ARB 2015b.

Table 2-2, Attainment Status for the eastern portion of Riverside County with respect to NAAQS and CAAQS, presents the attainment status of the MDAQMD with respect to both Federal and State ambient standards (ARB 2015c). Figure 3, MDAQMD Boundary and Project Vehicle Miles, presents the boundary of MDAQMD jurisdiction boundary relative to the Project site and area roadways.

TABLE 2-2
ATTAINMENT STATUS FOR THE PORTION OF RIVERSIDE COUNTY WITHIN MDAQMD WITH RESPECT TO NATIONAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS

Pollutant	Federal Attainment Status	State Attainment Status
O_3	Unclassified/Attainment	Nonattainment
CO	Unclassified/Attainment	Unclassified
NO_2	Unclassified/Attainment	Attainment
SO_2	Unclassified	Attainment
PM_{10}	Unclassified	Nonattainment
$PM_{2.5}$	Unclassified/Attainment	Unclassified
Lead	Unclassified/Attainment	Attainment

Source: National Area Designations and State Area Designations, ARB, 2015 (http://www.arb.ca. gov/desig/adm/adm.htm).

2.3.2.3 General Conformity Compliance

Section 176 of the CAA requires that Federal agency activities, including licensing and permitting, within EPA-designated nonattainment or maintenance areas must comply with applicable General and Transportation Conformity Rules/Regulations. 40 CFR 93 § 153 defines the General Conformity *de minimis* levels, which are the minimum thresholds for which a conformity determination must be performed, for various criteria pollutants in various areas. The General Conformity *de minimis* levels are summarized in Table 2-3.

The General Conformity Rules ensure that the actions taken by Federal agencies in nonattainment and maintenance areas are consistent with (“conform to”) a State’s plans to attain the NAAQS. The BLM has a responsibility to conduct General Conformity analyses (and when applicable, issue formal conformity determinations) prior to conducting or approving activities within designated non-attainment or maintenance areas.

The MDAQMD has been the delegated local authority by the EPA to implement and enforce most Federal requirements that are applicable to the Project. Compliance with the MDAQMD regulations assures compliance and consistency with the corresponding Federal requirements as well.

TABLE 2-3
FEDERAL GENERAL CONFORMITY *DE MINIMIS* LEVELS

Pollutant	Area Type	Tons/Year
Ozone (VOC or NO_x)	Serious nonattainment	50
	Severe nonattainment	25
	Extreme nonattainment	10
	Other areas outside an ozone transport region	100
Ozone (NO_x)	Marginal and moderate nonattainment inside an ozone transport region	100
	Maintenance	100
Ozone (VOC)	Marginal and moderate nonattainment inside an ozone transport region	50
	Maintenance within an ozone transport region	50
	Maintenance outside an ozone transport region	100
CO, SO_2 and NO_2	All nonattainment and maintenance	100
PM_{10}	Serious nonattainment	70
	Moderate nonattainment and maintenance	100
$PM_{2.5}$ – direct emissions, SO_2, NO_x (unless determined not to be a significant precursor), VOC or ammonia (if determined to be significant precursors)	All nonattainment and maintenance	100
Lead (Pb)	All nonattainment and maintenance	25

2.3.2.4 Greenhouse Gas Endangerment

On December 2, 2009, the EPA announced that GHGs threaten the public health and welfare of the American people. The EPA also stated that GHG emissions from on-road vehicles contribute to that threat. The decision was based on Massachusetts v. EPA (Supreme Court Case 05-1120) which argued that GHGs are air pollutants covered by the Clean Air Act and that the EPA has authority to regulate those emissions.

2.3.2.5 Clean Vehicles

Congress first passed the Corporate Average Fuel Economy law in 1975 to increase the fuel economy of cars and light duty trucks. The law has become more stringent over time. On May 19, 2009, President Obama put in motion a new national policy to increase fuel economy for all new cars and trucks sold in the United States. On April 1, 2010, the EPA and the Department of Transportation's National Highway Safety Administration announced a joint final rule establishing a national program that would reduce greenhouse gas emissions and improve fuel economy for new cars and trucks sold in the United States.

The first phase of the national program applied to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. They required these vehicles to meet an estimated combined average emissions level of 250 grams of carbon dioxide per mile, equivalent to 35.5 miles per gallon if the automobile industry were to meet this CO_2 level solely through fuel economy improvements. Together, these standards would cut CO_2 emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012–2016). The second phase of the national program would involve proposing new fuel economy and GHG standards for model years 2017 through 2025.

On October 25, 2010, the EPA and the U.S. Department of Transportation proposed the first national standards to reduce greenhouse gas emissions and improve fuel efficiency of heavy-duty trucks and buses. For combination tractors, the agencies require engine and vehicle standards that begin in the 2014 model year and are expected to achieve up to a 20 percent reduction in carbon dioxide emissions and fuel consumption by the 2018 model year. For heavy-duty pickup trucks and vans, the agencies require separate gasoline and diesel truck standards, which phase in starting in the 2014 model year and are expected to achieve up to a 10 percent reduction for gasoline vehicles and 15 percent reduction for diesel vehicles by 2018 model year (12 and 17 percent respectively, if accounting for air conditioning leakage). Lastly, for vocational vehicles, the agencies require engine and vehicle standards starting in the 2014 model year which are expected to achieve up to a 10 percent reduction in fuel consumption and carbon dioxide emissions by 2018 model year.

2.4 STATE REGULATIONS

2.4.1 California Environmental Quality Act

The CEQA Guidelines (OPR 2014) define a significant effect on the environment as "a substantial, or potentially substantial, adverse change in the environment." To determine if a project would have a significant impact on air quality, the type, level, and impact of emissions generated by the project must be evaluated. The following air quality significance thresholds are contained in Appendix G of the CEQA Guidelines. A significant impact would occur if the project would:

1. Conflict with or obstruct implementation of the applicable air quality plan
2. Violate any air quality standard or contribute substantially to an existing or projected air quality violation
3. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable national or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)

4. Expose sensitive receptors to substantial pollutant concentrations
5. Create objectionable odors affecting a substantial number of people

Likewise, the following greenhouse gas significance thresholds are contained in Appendix G of the CEQA Guidelines, which were amendments adopted into the Guidelines on March 18, 2010, pursuant to SB 97. A significant impact would occur if the project would:

1. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment
2. Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases

Riverside County, in cooperation with MDAQMD, will be the lead agency implementing CEQA for the Project. CEQA requires agencies to identify the significant environmental impacts of a project, and to avoid or mitigate those impacts, if feasible. The MDAQMD's CEQA thresholds are discussed in the Section 2.5. In addition, for the GHG, Riverside County utilizes a significance threshold of 3,000 metric ton of carbon dioxide equivalents (CO_2e) per year. For projects exceeding the threshold, project-specific mitigation is needed and should demonstrate a 25 percent reduction from the business as usual scenario. The future EIR work will comply with the procedures of Riverside County and the MDAQMD for implementing CEQA.

2.4.2 ARB Requirements

The California ARB's primary responsibilities are to develop, adopt, implement, and enforce the State's motor vehicle pollution control program; to administer and coordinate the State's air pollution research program; to adopt and update, as necessary, the CAAQS; to review the operations of the local air quality management districts (AQMD); and to review and coordinate preparation of the State Implementation Plan (SIP) for achievement of the NAAQS and CAAQS. Both the NAAQS and CAAQS are shown in Table 2-1. ARB has implemented the following State or Federal stationary source regulatory programs in accordance with the requirements of the Federal Clean Air Act and California Health & Safety Code (HSC):

- SIP
- California Clean Air Act
- Toxic Air Contaminant Program
- Airborne Toxic Control Measure for Stationary Compression-ignition Engines
- Nuisance Regulation
- Air Toxics "Hot Spots" Act

- Climate Change Regulatory Program

2.4.3 Health & Safety Code §39500 *et seq.* State Implementation Plan

Required by the Federal CAA, the SIP must demonstrate the means by which all areas of the State will attain and maintain NAAQS within the federally mandated deadlines. The local air districts prepare the SIP and ARB reviews and coordinates preparation of the SIP. Local districts must adopt new rules (and/or revise existing rules) and demonstrate that the resulting emission reductions, in conjunction with reductions in mobile source emissions, will result in the attainment of NAAQS. The relevant MDAQMD Rules and Regulations that have also been incorporated into the SIP are discussed in Section 2.5 (Local Regulations).

2.4.4 HSC §40910 – 40930 – California Clean Air Act

Established in 1989, the California Clean Air Act requires local districts to attain and maintain both national and State ambient air quality standards at the "earliest practicable date." Local districts must prepare air quality plans demonstrating the means by which the ambient air quality standards will be attained and maintained. The relevant components of the MDAQMD Air Quality Plan are discussed with the local regulations in Section 2.5.

2.4.5 HSC §39650 – 39675 – Toxic Air Contaminant Program

Established in 1983, the TAC Identification and Control Act created a two-step process to identify toxic air contaminants and control their emissions. ARB identifies and prioritizes the pollutants to be considered for identification as toxic air contaminants, and also assesses the potential for human exposure to a substance; the Office of Environmental Health Hazard Assessment (OEHHA) evaluates the corresponding health effects. Both agencies collaborate in the preparation of a risk assessment report, which concludes whether a substance poses a significant health risk and should be identified as a toxic air contaminant. In 1993, the Legislature amended the program to identify the 187 Federal hazardous air pollutants as toxic air contaminants. ARB reviews the emission sources of an identified toxic air contaminant and, if necessary, develops air toxics control measures to reduce the emissions.

TACs in California are regulated primarily through the Tanner Air Toxics Act (Chapter 1047, Statutes of 1983) and the Air Toxics Hot Spots Information and Assessment Act (Chapter 1252, Statutes of 1987). Assembly Bill 1807 sets forth a formal procedure for ARB to designate substances as TACs. Research, public participation, and scientific peer review must occur before ARB can designate a substance as a TAC. The Air Toxics Hot Spots Information and Assessment Act requires that TAC emissions from stationary sources be quantified and compiled into an inventory according to criteria and guidelines developed by ARB, and if directed to do so by the local air district, a health risk assessment (HRA) must be prepared to determine the potential health impacts of such emissions.

OEHHA recently published its Revised Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments on March 6, 2015. ARB also adopted this guidance and issued its Hotspots Analysis and Reporting Program Version 2 (HARP 2), which is an updated software suite used to assist with the programmatic requirements of the Air Toxics "Hot Spots" Program for the permitting and the compliance of AB2588.

2.4.6 Title 17, California Code of Regulations, §93115 – Airborne Toxic Control Measure for Stationary Compression-ignition Engines

The purpose of the airborne toxic control measure (ATCM) is to reduce DPM and criteria pollutant emissions from stationary Diesel-fueled compression ignition engines. The ATCM applies to stationary compression-ignition engines with a rating greater than 50 brake horsepower. The ATCM requires the use of ARB-certified Diesel fuel or equivalent, and limits emissions from, and operations of, compression ignition engines. Owners or Operators of portable engines and certain other types of equipment can register their units under the ARB's Statewide Portable Equipment Registration Program (PERP) in order to operate their equipment throughout California without having to obtain individual permits from local air districts.

2.4.7 California Health & Safety Code §41700 – Nuisance Regulation

This regulation provides that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."

2.4.8 Stats. 2006, Ch. 488 and California Health & Safety Code § 38500–38590 – California Climate Change Regulatory Program

The State of California adopted the Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32) on September 27, 2006, which requires sources within the State to reduce carbon emissions by approximately 25 percent by the year 2020. The California Climate Action Registry had already published protocols for voluntary reporting of GHG emissions from a number of sectors of the economy, and ARB has adopted regulations to limit GHG emissions from electric power plants and other specific source categories. In addition, ARB has issued guidance with recommended emission factors for calculating GHG emissions.

AB 32 also sets the following milestone dates for ARB to take specific actions:

- **June 30, 2007.** Identify a list of discrete early action GHG emission reduction measures (first report published April 20, 2007, with additional measures adopted on October 25, 2007).

- **January 1, 2008.** Establish a statewide GHG emission cap for 2020 that is equivalent to 1990 emissions.
- **January 1, 2008.** Adopt mandatory reporting rules for significant sources of GHGs.
- **January 1, 2009.** Adopt a scoping plan that will indicate how GHG emission reductions will be achieved from significant GHG sources through regulations, market-based compliance mechanisms, and other actions, including recommendation of a de minimis threshold for GHG emissions, below which sources would be exempt from reduction requirements.
- **January 1, 2011.** Adopt regulations to achieve maximum technologically feasible and cost-effective GHG emission reductions, including provisions for both market-based and alternative compliance mechanisms.
- **January 1, 2012.** Regulations adopted prior to January 1, 2010, become effective.
- **January 1, 2013.** Cap-and-Trade program begins.
- **May 22, 2014.** ARB approves its First Update to the Climate Change Scoping Plan.
- **December 31, 2020.** Deadline for achieving 2020 GHG emissions cap.

The ARB Board approved a Climate Change Scoping Plan in December 2008. The Scoping Plan outlines the California's strategy to achieve the 2020 greenhouse gas emissions limit. The Scoping Plan "proposes a comprehensive set of actions designed to reduce overall greenhouse gas emissions in California, improve our environment, reduce our dependence on oil, diversify our energy sources, save energy, create new jobs, and enhance public health" (California Air Resources Board 2008). The measures in the Scoping Plan have been in place since 2012.

In May 2014, ARB released its First Update to the Climate Change Scoping Plan (ARB 2014). This Update identifies the next steps for California's leadership on climate change. While California continues on its path to meet the near-term 2020 greenhouse gas limit, it must also set a clear path toward long-term, deep GHG emission reductions. This report highlights California's success to date in reducing its GHG emissions and lays the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050. ARB approved its First Update to the Climate Change Scoping Plan on May 22, 2014.

Senate Bill (SB) 97, adopted August 21, 2007, required the California Office of Planning and Research (OPR) to develop CEQA guidelines "for the mitigation of GHG emissions or the effects of GHG emissions" by July 1, 2009. SB 97 further required the Resources Agency Secretary to adopt these CEQA guidelines by January 1, 2010. Finally, SB 97 removes GHG emissions as a cause of action under CEQA for specified State-financed infrastructure projects until January 1, 2010.

The Project EIR/EIS is required to include the Project's emission rates of greenhouse gases (CO_2, CH_4, N_2O, and SF_6) from all on-site and off-site (direct and indirect) emission sources, including diesel equipment, delivery trucks, worker vehicles, maintenance vehicles, and the diesel firewater pump (if any).

2.4.9 Pavley Regulations

California AB 1493, enacted on July 22, 2002, required the ARB to develop and adopt regulations that reduce greenhouse gases emitted by passenger vehicles and light duty trucks. The regulation was stalled by automaker lawsuits and by the EPA's denial of an implementation waiver. On January 21, 2009, the ARB requested that the EPA reconsider its previous waiver denial. On January 26, 2009, President Obama directed that the EPA assess whether the denial of the waiver was appropriate. On June 30, 2009, the EPA granted the waiver request.

The standards phase in during the 2009 through 2016 model years. When fully phased in, the near term (2009–2012) standards will result in about a 22-percent reduction compared with the 2002 fleet, and the mid-term (20132016) standards will result in about a 30-percent reduction. Several technologies stand out as providing significant reductions in emissions at favorable costs. These include discrete variable valve lift or camless valve actuation to optimize valve operation rather than relying on fixed valve timing and lift as has historically been done; turbocharging to boost power and allow for engine downsizing; improved multi-speed transmissions; and improved air conditioning systems that operate optimally, leak less, and/or use an alternative refrigerant.

2.5 LOCAL REGULATIONS

When California's air pollution statutes were reorganized in the mid-1960s, local districts were required to be established in each county of the State. There are three different types of districts: county, regional (including the MDAQMD), and unified. In addition, special air quality management district (AQMD), with more comprehensive authority over non-vehicular sources, as well as transportation and other regional planning responsibilities, have been established by the Legislature for several regions in California. Local districts have principal responsibility to do the following:

- Develop plans for meeting the NAAQS and CAAQS
- Develop control measures for non-vehicular sources of air pollution necessary to achieve and maintain both state and federal air quality standards
- Implement permit programs established for the construction, modification, and operation of sources of air pollution
- Enforce air pollution statutes and regulations governing non-vehicular sources

- Develop programs to reduce emissions from indirect sources

2.5.1 HSC §40914 – Mojave Desert Air Quality Plans

Air quality plans define the proposed strategies, including stationary source and transportation control measures and new source review rules that will be implemented to attain and maintain the State ambient air quality standards. The proposed Project is located in the southern and eastern portion of MDAQMD's jurisdictional area. There is no applicable MDAQMD air quality plan or SIP for this area. However, the relevant MDAQMD requirements are discussed with Rules and Regulations in the following Section.

2.5.2 MDAQMD's CEQA Significance Thresholds (MDAQMD 2011)

Any project in the MDAQMD area will be determined significant if it triggers or exceeds the most appropriate evaluation criteria listed in MDAQMD's "CEQA and Federal Conformity Guidelines (August 2011)". The criteria are summarized as follows. In general, the emissions comparison (criteria number 1) is sufficient:

1. Generates total emissions (direct and indirect) in excess of the thresholds given in Table 2-4

**TABLE 2-4
MDAQMD'S CEQA SIGNIFICANT
EMISSIONS THRESHOLDS[1]**

Pollutant	Annual Threshold (Tons)	Daily Threshold (Pounds)
Greenhouse gases (CO_2e)	100,000	548,000
Carbon monoxide (CO)	100	548
Oxides of nitrogen (NO_x)	25	137
Volatile organic compounds (VOC)	25	137
Oxides of sulfur (SO_x)	25	137
Particulate matter (PM_{10})	15	82
Particulate matter ($PM_{2.5}$)	15	82
Hydrogen Sulfide (H_2S)	10	54
Lead (Pb)	0.6	3

[1] Source: MDAQMD CEQA and Federal Conformity Guidelines, 2011.

2. Generates a violation of any ambient air quality standard when added to the local background
3. Does not conform with the applicable attainment or maintenance plan(s)

4. Exposes sensitive receptors to substantial pollutant concentrations, including those resulting in a cancer risk greater than or equal to 10 in a million and/or a Hazard Index (HI) (non-cancerous) greater than or equal to 1 (*refer to the Sensitive Receptor Land Use discussion above)

The MDAQMD requires projects with significant emissions to incorporate mitigation sufficient to reduce its impact to a level that is not significant. A project that cannot be mitigated to a level that is not significant must incorporate all feasible mitigation. Note that the emission thresholds are given as a daily value and an annual value, so that multi-phased projects (such as a project with a construction phase and a separate operational phase) with phases shorter than one year can be compared to the daily value.

2.5.3 HSC §4000 et seq., HSC §40200 *et seq*., Indicated MDAQMD Rules – MDAQMD Rules and Regulations (MDAQMD 2015)

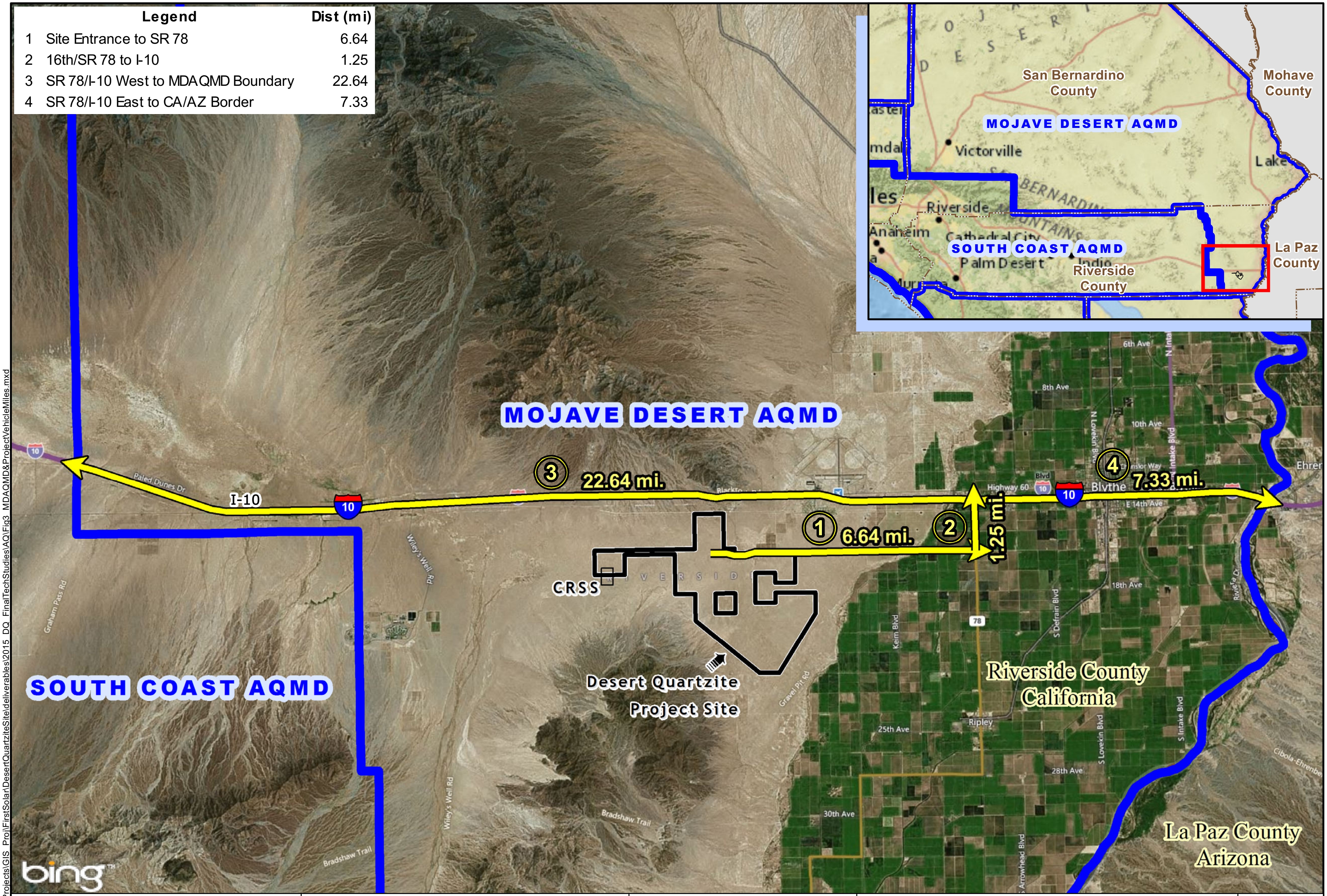
The MDAQMD has jurisdiction over the Desert Quartzite Solar Project, as discussed above. The general prohibitory rules in Regulation IV applicable to the Project are summarized below:

- **Rule 401 – Visible Emissions.** Prohibits visible emissions as dark as, or darker than, Ringelmann No. 1 for periods greater than three minutes in any hour.

- **Rule 402 – Nuisance.** Prohibits the discharge from a facility of air pollutants that cause injury, detriment, nuisance, or annoyance to the public, or that damage business or property.

- **Rule 403 – Fugitive Dust.** Prohibits visible dust emissions off property due to transport, handling, construction, or storage activity. Requires dust minimization during grading and clearing of land. Limits the difference between upwind and downwind PM concentrations of 100 $\mu g/m^3$ (5 hour average). Requires removal of particulate matter from equipment prior to movement on paved streets.

In addition, the MDAQMD's Regulation XX – Conformity (Federal General Conformity Rules) is also applicable to the Project.


MOJAVE DESERT AQMD
SOUTH COAST AQMD
I-10
10
③ 22.64 mi.
① 6.64 mi.
② 1.25 mi.
④ 7.33 mi.
CRSS
Desert Quartzite Project Site
Riverside County California
La Paz County Arizona
Paled Dunes Dr
Wiley's Well Rd
Graham Pass Rd
Bradshaw Trail
Gravel Pit Rd
Highway 60
Blythe
E 14th Ave
6th Ave
8th Ave
10th Ave
18th Ave
25th Ave
28th Ave
30th Ave
Kern Blvd
S Defrain Blvd
N Lovekin Blvd
S Lovekin Blvd
S Intake Blvd
N Intake Blvd
Arrowhead Blvd
Riveria Dr
Ripley
78
Ehrenberg
Cibola-Ehrenberg
San Bernardino County
Mohave County
MOJAVE DESERT AQMD
Victorville
Lake
Riverside
Anaheim
Cathedral City
SOUTH COAST AQMD
Palm Desert
Indio
Riverside County
La Paz County
bing

Legend		Dist (mi)
1	Site Entrance to SR 78	6.64
2	16th/SR 78 to I-10	1.25
3	SR 78/I-10 West to MDAQMD Boundary	22.64
4	SR 78/I-10 East to CA/AZ Border	7.33

Air Quality Technical Study
Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

N
0 1 2 3 4 5 Miles
0 2 4 6 8 Kilometers

Source: [1] Bing Maps Aerial Imagery Web Mapping Service - (c) 2010 Microsoft Corporation and its datas upplier (Image Date: 3/13/2011).

Figure 3. MDAQMD Boundary and Project Vehicle Miles

2015

Document Path: V:\Projects\GIS Proj\FirstSolar\DesertQuartziteSite\deliverables\2015 DQ FinalTechStudies\AQ\Fig3 MDAQMD&ProjectVehicleMiles.mxd

SECTION 3.0
EXISTING BASELINE CONDITIONS

3.1 INTRODUCTION

As discussed in Section 1.1, the Project is proposed to be located within an overall Project site encompassing approximately 5,275 acres, including the 445-acre gen-tie line study corridor in the Blythe area of Riverside County. The solar facility is proposed to be constructed within an approximately 3,714-acre fenced portion of the overall site.

Sensitive receptors are people who are considered to be more sensitive than others to air pollutants. The reasons for greater than average sensitivity include pre-existing health conditions, age, proximity to emissions sources, or duration of exposure to air pollutants. Schools, hospitals, and convalescent homes are considered to be sensitive to poor air quality because children, elderly people, and the infirmed are more susceptible to respiratory distress and other air quality related health problems than the general public. Residential areas are considered sensitive to poor air quality because people are located in one place for extended periods of time, with associated greater exposure to ambient air quality. Recreational uses may also be considered sensitive due to the greater exposure to ambient air quality conditions because vigorous exercise associated with recreation places a high demand on the human breathing rates and respiratory system.

The Project area was surveyed for sensitive air quality receptors (e.g., schools, hospitals, churches, and recreational facilities). No schools, hospitals, convalescent homes or any other sensitive receptors are located within 1 mile of the proposed Project. The closest residence (apparent occupied mobile home trailer) is located approximately 3,700 feet north of the northeast corner of the Project boundary. The next two closest sensitive air quality receptors are located in the residential community of Nicholls Warm Springs/Mesa Verde approximately 5,200 and 5,350 feet north of the northeast corner of the Project site boundary.

Areas that do not meet the NAAQS or CAAQS (see Table 2-2 for designations) for a given criteria pollutant are designated as “nonattainment areas” by the EPA and/or the ARB. Further classifications are given to nonattainment areas to identify the severity and number of violations experienced, and the year in which attainment is anticipated based on implementation of attainment plans. The Project area is located in a portion of the Mojave Desert air basin considered an unclassified/attainment area for all of the NAAQS. The Project area is designated a moderate nonattainment area for the O_3 CAAQS and a nonattainment area for the PM_{10} CAAQS. The Project area is designated as unclassified/attainment for all CAAQS for the other criteria pollutants.

3.2 REGIONAL CLIMATE

Consistent with the typical weather of the interior deserts of Southern California, eastern Riverside County generally has an arid climate characterized by very low precipitation, hot summers, and mild winters. Temperature inversions may occur, but they not as strong as in coastal areas, where the marine influence plays an important role. The area's climatic conditions are strongly influenced by the large-scale sinking and warming of air in the semi-permanent subtropical high-pressure center over the eastern Pacific. This high-pressure system effectively blocks out most mid-latitude storms, except in winter when the ridge is weaker and farther south. The coastal mountains to the west also have a major influence on climate, serving as a meteorological boundary that effectively removes moisture from the marine air flowing from the Pacific.

The nearest full-time meteorological monitoring station to the proposed Project site is maintained at the Blythe Airport approximately 2.5 miles northeast of the Project site at latitude 33°37'N, longitude 114°43'W. Based on 86 years of climate data available from the U.S. Historical Climatological Network (1909-1994), the annual average temperature measured at Blythe is 70 degrees Fahrenheit (°F). Temperatures of 32°F or below rarely occur at this station, but temperatures of 100°F or above are more frequent, occurring from June through September. During the fall, Santa Ana winds can last for several days. These are strong, dry northerly winds from the Great Basin and result in high temperatures (greater than 90°F) and low relative humidity (often below 20 percent) in the Project area.

The average temperature and precipitation data collected at National Weather Service Blythe Airport station over a 60-year period (1949–2010) are presented in Table 3-1. The hottest month, July, has an average maximum temperature of 108.4°F and an average minimum temperature of 81.1°F. The coldest month, January, has an average maximum temperature of 66.8°F and an average minimum temperature of 41.6°F.

TABLE 3-1
AVERAGE TEMPERATURE AND PRECIPITATION DATA AT BLYTHE (1949–2010)

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Avg. max. temp. (°F)	66.8	72.0	78.4	86.4	95.2	104.5	108.4	106.7	101.4	89.8	76.0	66.6	87.7
Avg. min. temp. (°F)	41.6	45.4	50.2	56.5	64.5	72.7	81.1	80.2	73.1	60.8	48.6	41.2	59.7
Avg. total precipitation (in.)	0.49	0.44	0.36	0.15	0.02	0.02	0.23	0.62	0.35	0.26	0.20	0.41	3.54

Source: Western Regional Climate Center (http://www.wrcc.dri.edu) (WRCC 2015).

Monthly mean precipitation amounts at Blythe range from 0.02 inch in May or June to 0.62 inch in August. Relative humidity levels are generally low. In the summer, relative humidity averages 20 to 40 percent in the early morning and 10 to 30 percent in the afternoon. In winter, relative humidity averages 30 to 50 percent in the early morning and 10 to 30 percent in the afternoon. Wind speeds are normally light or calm.

Eastern Riverside County receives a portion of its annual rainfall from November to March, when the semi-permanent high-pressure system over the eastern Pacific Ocean moves south, allowing storms to move through the area; and another portion of its annual rainfall at the height of summer, when the southwestern monsoon is present. In August, the boundary between the easterly, tropical trade winds and the mid-latitude westerlies sometimes moves north of the Project site, and thunderstorms can develop and move into the vicinity. The average annual precipitation at the Blythe meteorological station is about 3.5 inches. Local wind circulations are channeled north-south through the Colorado River Valley. Winds are typically of light to moderate strength from either the northwest or the south. An annual wind rose is presented on Figure 4.

3.3 EXISTING AMBIENT AIR QUALITY

Ambient air concentrations of O_3, NO_2, SO_2, CO, PM_{10}, and $PM_{2.5}$ are recorded at monitoring stations in Riverside County operated by ARB and/or MDAQMD. Ambient air quality monitoring data for O_3, PM_{10}, $PM_{2.5}$, CO, NO_2, and SO_2 were compared to the most stringent applicable standards for the years 2011 through 2013 at the most representative monitoring stations for each pollutant in Table 3-2. O_3 data are from the Blythe-445 West Murphy Street monitoring station; PM_{10}, $PM_{2.5}$, NO_2, and CO data are from the Palm Springs Fire Station monitoring station; and SO_2 data are from the Victorville-14306 Park Avenue monitoring station.

TABLE 3-2
AIR QUALITY DATA FOR THE BLYTHE PROJECT AREA (2011–2013)

Pollutant	Parameter	2011	2012	2013
Ozone (O_3)	Peak 1-hour value (ppm)	0.073	0.084	0.065
	Days above the CAAQS (0.09 ppm)	0	0	0
	Peak 8-hour value CAAQS (ppm)	0.068	0.077	0.061
	Design value 8-hour NAAQS (ppm)	ND	0.068	0.066
	Days above the CAAQS (0.070 ppm)	0	12	0
	Days above the NAAQS (0.075 ppm)	0	2	0
Nitrogen dioxide (NO_2)	Peak 1-hour value (ppb)	45	45	52
	Design value 1-hour NAAQS (ppb)	39	39	39
	Days above the CAAQS (180 ppb)	0	0	0
	Days above the NAAQS (100 ppb)	0	0	0
	Annual Average (ppb)	8	8	7
Respirable Particulate matter less than or equal to 10 microns in diameter (PM_{10})	Peak 24-hour value (µg/m^3)	42	37	129
	High second high 24-hour value (µg/m^3)	38	30	83
	Days above CAAQS (50 µg/m^3)	0	0	2
	Days above NAAQS (150 µg/m^3)	0	0	0
	Annual Average (µg/m^3)	18.1	16.1	22.1
Fine particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$)	Design value 24-hour NAAQS (µg/m^3)	13	13	13
	Days above NAAQS (35 µg/m^3)	0	0	0
	Annual average (µg/m^3)	6	6.5	6.5
	Design value annual NAAQS (µg/m^3)	6.2	6.1	6.3
Carbon monoxide (CO)	Peak 1-hour value (ppm)	3	0.9	3.2
	Days above the NAAQS (35 ppm)	0	0	0
	Peak 8-hour value (ppm)	0.65	0.45	ND
	Days above the CAAQS (9.0 ppm)	0	0	0
	Days above the NAAQS (9 ppm)	0	0	0
Sulfur dioxide (SO_2)	Peak 1-hour value (ppm)	0.013	0.006	0.004
	Days above the CAAQS (0.25 ppm)	0	0	0
	Days above the NAAQS (0.075 ppm)	0	0	0
	Peak 24-hour value (ppm)	0.007	0.003	0.002
	Days above the CAAQS (0.04 ppm)	0	0	0

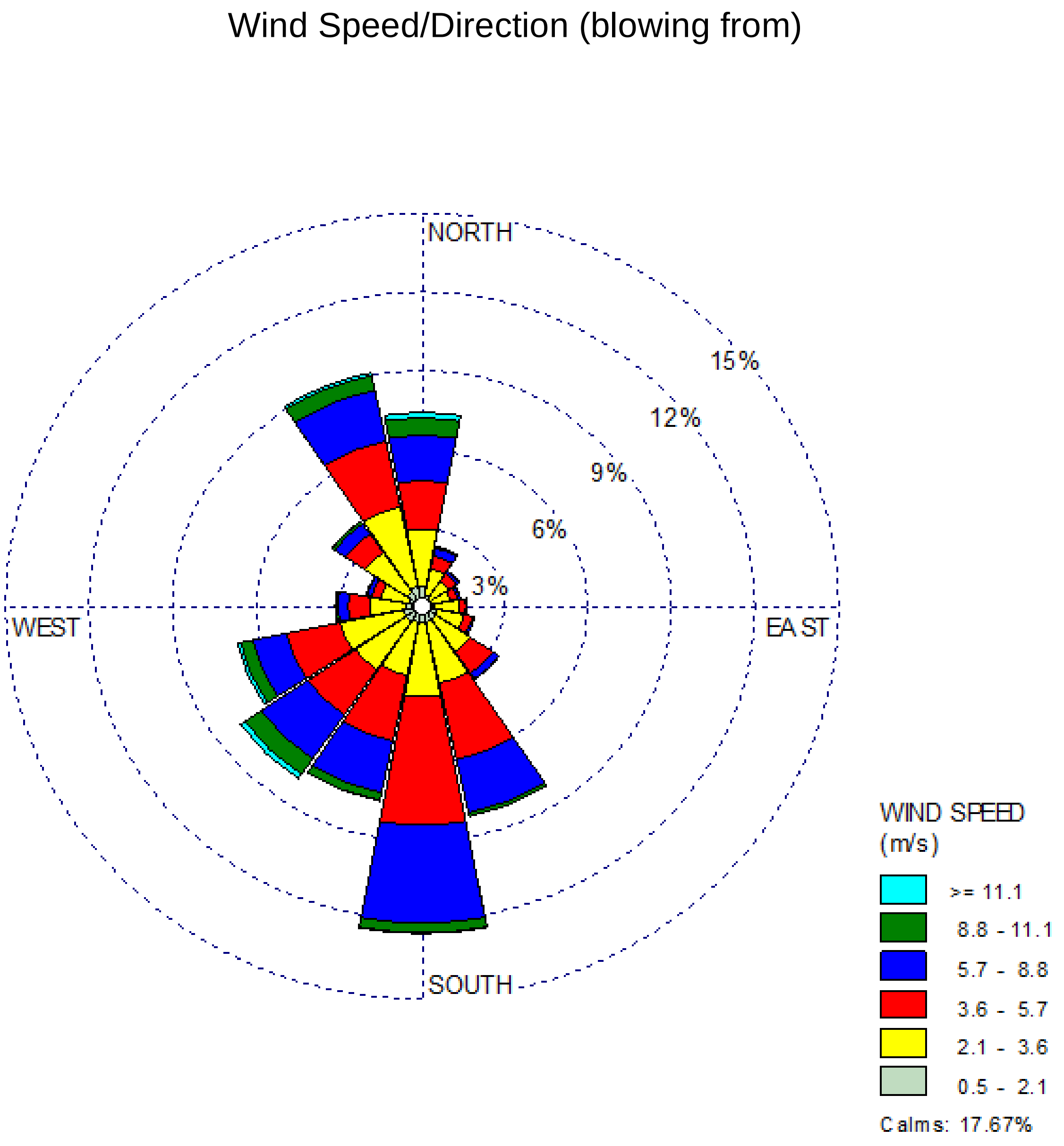
Notes:

ND = no data available.

Monitoring data from EPA and ARB monitoring databases http://www.epa.gov/airdata/ and http://www.arb.ca.gov/adam/.

O_3 data are from Blythe; PM_{10}, $PM_{2.5}$, NO_2, and CO data are from Palm Springs; and SO_2 data are from Victorville.

2014 air quality monitoring data have not been fully QA/QC by ARB at the time this report was prepared. Therefore, these data are not presented in this Table.



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Air Quality Technical Study
Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

Source: Blythe Airport, 2006-2010

Figure 4. Annual Wind Rose (Blythe, CA 2006-2010)

2015

SECTION 4.0
IMPACT ASSESSMENT

4.1 IMPACT THRESHOLDS AND ASSESSMENT CRITERIA

Emission estimates have been prepared to evaluate air quality impacts from Project construction and operational activities under CEQA and NEPA. Effects due to the Project activities would be considered significant if they would exceed an applicable CEQA significant threshold or an applicable NEPA Federal general conformity de minimis level. These thresholds and criteria were discussed in Section 2.0. The specific Federal NEPA, Riverside County CEQA, and MDAQMD’s CEQA thresholds for the Project were discussed in the Sections 2.3, 2.4, and 2.5 and presented in Tables 2-3 and 2-4. The Project data and assumptions used in the analyses, the methodology used in the emission calculations, the results, and findings from the analyses are described and are presented in the following sections.

4.2 ASSUMPTIONS AND METHODOLOGY

Project construction is anticipated to start in late 2016 for a 25-month construction timeframe which is considered to be the worst case for impact assessment purposes. The estimated construction workforce is expected to result in up to 450 vehicle trips per day, with a maximum of 810 vehicle trips per day during peak construction. The workforce is assumed to commute to the site from within 35 miles on average from the Project site and within the southern portion of the MDAQMD; it is common for a large portion of the workforce to voluntarily carpool regularly. In addition to commute trips by construction workers, approximately 14,400 truck deliveries of equipment, materials and fuel were estimated to be required over the course of the construction period. Construction phase-related truck deliveries are estimated to require one-way distances (within the boundaries of the MDAQMD) as follows: equipment and material deliveries at 30.5 miles; aggregate and concrete at 13 miles; and fuel at 10 miles. Construction activities will include site preparation and grading, solar array foundation installation, equipment installation, and gen-tie line tower and conductor installation along the gen-tie route. The Project plans to utilize groundwater from either local well(s) or via installation of on-site groundwater wells. Alternately, trucking water to the Project site from an off-site source(s) may be required for the entire assumed 25-month construction period, which would potentially require up to approximately 57,000 water deliveries. The worst-case water trucking scenario is included in the emission estimations. Construction of the proposed solar facilities would occur primarily within the approximately 3,714-acre fenced area and is estimated to involve up to 838,000 yards of balanced on-site cut-and-fill.

The primary emission sources during the construction of the Project would include exhaust from heavy construction equipment and vehicles and fugitive dust generated in areas disturbed by grading, excavating, earth moving, and the movement of various construction vehicles around the site.

Fuel combustion emissions during construction would result from:

- Exhaust from the off-road construction equipment, including diesel construction equipment used for site grading, excavation, and construction of on-site structures, generators, and water trucks used to control construction dust emissions
- Exhaust from on-road construction vehicles, including diesel fuel trucks and water trucks used to transport fuel and water between Blythe local area and the construction site, and from diesel trucks used to deliver concrete, material, equipment, and construction supplies to the construction site
- Exhaust from vehicles used by workers to commute to the construction site

Fugitive dust emissions from the construction of the Project would result from:

- Site grading/excavation activities at the construction site
- Installation of the 230 kV gen-tie line foundations
- Installation of conductors along the gen-tie route
- Installation of solar array foundation and related equipment installation
- On-site vehicle and equipment travel on unpaved surfaces
- Off-site travel of worker vehicles and trucks on unpaved and paved roads

Construction equipment and vehicle exhaust emissions were estimated using equipment lists and construction scheduling information provided in the attached construction summary tables in the Appendix A. Mass emissions of all criteria pollutants and greenhouse gases from on-site diesel-fueled construction equipment were estimated using equipment-specific OFFROAD2011/2007 software published by the ARB. ARB's EMFAC2014 model was used to generate vehicle class specific emission factors for criteria pollutants and greenhouse gases for diesel and gasoline fueled on-road vehicles.

Assumptions used in calculating Project construction emissions included a 25-month construction period with 5 construction days per week (21 work-days per month). The weight and speed for equipment and vehicle were assumed from EMFAC/OFFROAD guidance, EPA AP-42, and other similar solar project and construction project experience. An approximate 0.1-mile travel distance from the Project laydown to Project access road entrance was assumed and used for the on-site unpaved road travelling emission calculations. Project-related vehicular traffic along an approximate 5.6-mile-long section of unpaved road from the Project access road site entrance to the east along 16th Avenue/Seeley Avenue prior to reaching the paved roadway segment west of the intersection with SR-78 was also considered in the emission estimates. The Project-related vehicular traffic distances on off-site paved roads were measured and included in the emission estimates. All of the off-site road travel was assumed to be within the MDAQMD jurisdiction area.

Fugitive dust emissions resulting from on-site soil disturbances were estimated using EPA AP-42 emission factors for activities including bulldozing and dirt-pushing, travel on paved and unpaved roads, and material handling the aggregate materials. $PM_{2.5}$ emissions were scaled from factors determined using guidance from SCAQMD Final Methodology to Calculate $PM_{2.5}$ and $PM_{2.5}$ Significance Thresholds (10/1/2006, Appendix A Updated CEIDARS Table with $PM_{2.5}$ Fractions) (SCAQMD 2006).

For operation, the workforce for Operations and Maintenance (O&M) and security purposes was estimated to be 5 full-time workers. The expected annual demand for water is approximately 38 acre feet per year (AFY). Of this amount, approximately 20 AFY would be used for process water, fire protection, dust control, vegetation management, and at the O&M building, and 18 AFY would be used for up to two annual panel washings. Only limited deliveries would be necessary for replacement PV modules and equipment during Up to 25 daily round trips was estimated for workers and deliveries. The off-road equipment is not expected to be used during the Project operation. The methodology to estimate the operational emissions and construction emissions from the on-road vehicles are identical.

4.3 PROJECT EMISSION CONTROL MEASURES

The emission control measures of frequent watering (at least three times per day), and limiting speeds to 15 miles per hour were assumed to achieve a combined dust control efficiency of 83 percent (SCAQMD 2012) during temporary construction activities for traveling on unpaved surfaces at the Project site and the approximately 5.6-mile off-site unpaved access road (16th Avenue/Seeley Avenue) to SR-78. The 83 percent of combined dust mitigation efficiency from watering and limiting speeds to 15 miles per hour was also used for the bulldozing, grading, dirt piling, and material handling activities. All the dust generated from travelling on paved roads off-site was assumed to be non-mitigated for the purposes of estimating emissions.

The emission control measures of frequent watering (at least three times per day), and limiting speeds to 15 miles per hour were also assumed to achieve a combined dust control efficiency of 83 percent (SCAQMD 2012) for traveling on unpaved surfaces at the Project site and the approximately 5.6-mile off-site unpaved access road (16th Avenue/Seeley Avenue) to SR-78 during the operational phase of the Project. Alternately, and in lieu of watering 3 times daily, the Applicant may apply dust suppressants on unpaved road surfaces on an annual basis during the operational phase which is assumed to achieve the same dust control efficiency.

4.4 IMPACT ASSESSMENT RESULTS

The summary of Project construction emissions within the MDAQMD’s jurisdiction and the applicable CEQA thresholds for this Project are presented in Table 4-1 and Table 4-2 below. The detailed construction data and information are presented in Appendix A.

A summary of Project operational emissions within the MDAQMD’s jurisdiction and the applicable CEQA thresholds for this Project are presented in Table 4-3 below. The detailed operational data and information can be found in the Appendix B. In addition, a summary of estimated Project GHG emissions within the MDAQMD’s jurisdiction and the applicable CEQA thresholds for this Project are presented in Table 4-4. The detailed GHG emissions calculations, data and information are presented in Appendices A and B.

4.5 FINDINGS

The CEQA significance criteria for air quality and GHG from Appendix G (a) of the CEQA Guidelines were listed in Section 2.4.1. A significant air quality impact would occur if the project would:

a. Conflict with or obstruct implementation of the applicable air quality plan
b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation
c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable national or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)
d. Expose sensitive receptors to substantial pollutant concentrations
e. Create objectionable odors affecting a substantial number of people

A significant GHG impact would occur if the project would:

f. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment
g. Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases

TABLE 4-1
PROJECT CONSTRUCTION DAILY EMISSION ESTIMATIONS (LBS/DAY)

	Pollutant									
Daily Emissions (Pounds per Day)	Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NO_x	SO_x	CO	ROG
On-site emissions	279.93	14.37	294.30	32.95	13.22	46.17	271.61	0.50	158.55	24.86
Off-site emissions	2,539.00	2.90	2,541.91	261.26	2.76	264.02	151.38	0.85	342.55	19.75
Total	2,818.94	17.27	2,836.21	294.21	15.98	310.19	422.99	1.35	501.10	44.61
MDAQMD CEQA daily threshold	NA	NA	82	NA	NA	82	137	137	548	137
Exceed the thresholds (Yes/No)	NA	NA	Yes	NA	NA	Yes	Yes	No	No	No

Note: NA = Not Applicable.

TABLE 4-2
PROJECT CONSTRUCTION ANNUAL EMISSION ESTIMATIONS (TONS/YEAR)

	Pollutant									
Annual Emissions (Tons per Year)	Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NO_x	SO_x	CO	ROG
On-site emissions	31.05	1.62	32.67	3.68	1.49	5.17	30.19	0.06	17.96	2.80
Off-site emissions	266.97	0.29	267.26	27.47	0.27	27.75	15.00	0.09	37.13	2.05
Total	298.02	1.91	299.92	31.15	1.76	32.91	45.19	0.15	55.09	4.86
MDAQMD CEQA daily threshold	NA	NA	15	NA	NA	15	25	25	100	25
Exceed the thresholds (Yes/No)	NA	NA	Yes	NA	NA	Yes	Yes	No	No	No

Note: NA = Not Applicable.

TABLE 4-3
PROJECT OPERATIONAL ANNUAL EMISSION ESTIMATIONS (TONS/YEAR)

	Pollutant									
Annual Emissions (Tons per Year)	Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NO_x	SO_x	CO	ROG
On-site emissions	0.16	0.00	0.16	0.02	0.0001	0.02	0.01	0.00001	0.0019	0.0004
Off-site emissions	9.02	0.03	9.04	0.93	0.02	0.96	1.26	0.003	0.61	0.09
Total	9.17	0.03	9.20	0.95	0.02	0.97	1.26	0.003	0.61	0.09
MDAQMD CEQA daily threshold	NA	NA	15	NA	NA	15	25	25	100	25
Exceed the thresholds (yes/no)	NA	NA	No	NA	NA	No	No	No	No	No

Note: NA = Not Applicable.

TABLE 4-4
PROJECT GHG EMISSION ESTIMATIONS – ANNUAL (TONS/YEAR AND METRIC TONS/YEAR)

	Pollutant			
Annual Emissions	CO_2	CH_4	N_2O	Total GHG – CO_2e
On-site emissions in operation (tons/year)	1.31	0.00	0.00	1.3
Off-site emissions in operation (tons/year)	304.16	0.01	0.00	306
Total construction emissions (amortized over 30 years) (tons/year)	463.7	0.03	0.01	468
Total (tons/year)	769.17	0.04	0.01	775
Total (metric tons/year)	697.47	0.04	0.01	703
MDAQMD CEQA annual threshold (tons/year)	NA	NA	NA	100,000
Riverside County CEQA threshold (metric tons/year)	NA	NA	NA	3,000
Exceed the thresholds (yes/no)	NA	NA	NA	No

In addition, MDAQMD's "CEQA and Federal Conformity Guidelines (August 2011) as provided in in Section 2.5.1 of this report are as follows:

1) Generates total emissions (direct and indirect) in excess of the thresholds given in Table 2-4
2) Generates a violation of any ambient air quality standard when added to the local background
3) Does not conform with the applicable attainment or maintenance plan(s)
4) Exposes sensitive receptors to substantial pollutant concentrations, including those resulting in a cancer risk greater than or equal to 10 in a million and/or a Hazard Index (HI) (non-cancerous) greater than or equal to 1

Conformance with these thresholds is summarized below.

The emission estimate results in Tables 4-1 and 4-2 show that the emissions associated with Project construction activities are expected to exceed applicable MDAQMD CEQA thresholds for NO_x, PM_{10}, and $PM_{2.5}$ emissions, and hence have the potential to be a significant impact. The emission estimates in Table 4-3 show that the air quality impacts from operation of the Project would all be below MDAQMD CEQA thresholds and, therefore, the impacts would not be considered significant. In addition, the emission estimates in Table 4-4 show that GHG emissions would be below both the MDAQMD and Riverside County CEQA thresholds and, therefore, GHG impacts would not be considered significant (Appendix G (a), (f), and (g) of the CEQA Guidelines and (1) and (2) of the MDAQMD CEQA Guidelines).

Because the Project is located in the Federal attainment/unclassified area (see Figure 3), there is no applicable air quality plan and SIP from MDAQMD and ARB. Therefore, the Project will not conflict or obstruct implementation of the applicable air quality plan (Appendix G (a), (b) and (c) of the CEQA Guidelines and (3) of the MDAQMD CEQA Guidelines).Since all of the Project's construction and operational activities and travels were assumed to be within the Federal attainment/unclassified area in MDAQMD, there are no applicable Federal General Conformity de minimis levels to compare to the total Project direct and indirect emissions. Therefore, the Project complies with the NEPA and Federal General Conformity Rules.

For the TACs impact and the requirements of the California's Air Toxic "Hot Spots" program, the primarily concerned TAC of the Project is the DPM from the construction and operational activities. The operational PM emissions are estimated to be below CEQA significance thresholds. Although the construction PM emissions exceed the applicable CEQA significant thresholds, the 25-month DPM exposure duration is considered to be a short period of time for DPM's long term health risk cancer impact, therefore, the impact from the construction DPM is not likely to be significant. DPM does not have an acute health risk, but has cancer risk that is based on long-term exposure which for residences is 30 years (OEHHA 2012). More importantly, since there are no sensitive receptors located within 1,000 feet of the proposed Project site, the HRA is not required as per MDQAMD's CEQA implementation guidelines (MDAQMD 2011) and, therefore, there's no significant impact due to TACs (Appendix G (d) of the CEQA Guidelines and (4) of the MDAQMD CEQA Guidelines).

Operation of the Project would not add any new odor sources. Photovoltaic Solar projects are not typically large generators of odors. As a result, the Project's construction and operational activities would not create objectionable odors affecting a substantial number of people. The odor impact would be less than significant (Appendix G (e) of the CEQA Guidelines).

SECTION 5.0
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SECTION 6.0
LIST OF PREPARERS

Name of Preparer	Title	Responsibility
Sam Wang	Senior Air Quality Engineer	Task lead, entire report and appendices
Sara J. Head, QEP	Regional Program Manager	Independent technical review
Lynn Baringer	Air Quality Analyst	Section 1 and Section 3
Erika Michelotti	Environmental Scientist	Detailed check of emissions calculations

APPENDIX A
PROJECT CONSTRUCTION EMISSION ESTIMATIONS

Desert Quartzite Solar Project
Construction Emission Estimations
Emission Inventory Summary
Prepared by URS, September 2015

Project Construction Maximum Annual Emissions (ton/year)

Worse Year (from Month 10th to Month 21th)

Annual Emission (ton per year)	Emissions (tpy)													
	Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
On-site														
Off-road Equipment														
5 CY Dump Truck	0.10	0.01	0.11	0.01	0.01	0.02	0.27	0.00	0.11	0.02	52.11	0.00	0.00	52.62
Air Compressor	0.13	0.01	0.14	0.01	0.01	0.02	0.14	0.00	0.16	0.03	16.15	0.00	0.00	16.83
ATV	1.18	0.14	1.32	0.12	0.13	0.25	1.55	0.00	0.44	0.30	106.49	0.01	0.01	108.33
Auger	0.09	0.01	0.10	0.01	0.01	0.01	0.18	0.00	0.09	0.01	47.36	0.00	0.00	47.59
Backhoe/Excavator	0.02	0.03	0.05	0.00	0.03	0.03	0.37	0.00	0.57	0.03	82.30	0.01	0.00	83.64
Cable Plow	0.09	0.02	0.11	0.05	0.01	0.07	0.20	0.00	0.14	0.02	20.59	0.00	0.00	21.08
Cable Trencher	0.11	0.01	0.12	0.06	0.01	0.07	0.09	0.00	0.14	0.02	12.43	0.00	0.00	13.14
Compactor	0.07	0.01	0.08	0.01	0.00	0.01	0.11	0.00	0.13	0.01	23.42	0.00	0.00	23.74
Crane	0.30	0.03	0.33	0.03	0.03	0.06	0.79	0.00	0.28	0.05	112.32	0.01	0.00	113.51
Crawler Tractor	0.02	0.00	0.02	0.00	0.00	0.00	0.06	0.00	0.04	0.00	7.37	0.00	0.00	7.50
Dozer (D6)	0.07	0.02	0.09	0.04	0.02	0.06	0.32	0.00	0.21	0.03	32.60	0.00	0.00	33.27
Forklift	0.07	0.00	0.08	0.01	0.00	0.01	0.08	0.00	0.10	0.01	15.20	0.00	0.00	15.45
Forklift (10 K) (Aerial Lift)	0.40	0.03	0.43	0.04	0.03	0.07	0.52	0.00	0.66	0.03	97.48	0.01	0.00	99.12
Forklift (5 K)	0.20	0.02	0.22	0.02	0.02	0.04	0.34	0.00	0.43	0.02	62.89	0.01	0.00	63.95
Generator	0.03	0.00	0.03	0.00	0.00	0.01	0.03	0.00	0.04	0.01	4.75	0.00	0.00	4.89
Generator (45 kW)	1.08	0.09	1.18	0.11	0.09	0.19	1.04	0.00	1.28	0.20	165.46	0.03	0.01	170.26
Generator (Office)(45 kW)	0.45	0.04	0.49	0.04	0.04	0.08	0.43	0.00	0.53	0.08	68.47	0.01	0.01	70.45
Generator (Security, IT)(30 kW)	0.39	0.04	0.43	0.04	0.04	0.07	0.43	0.00	0.53	0.08	68.47	0.01	0.01	70.45
Loader	0.02	0.01	0.03	0.00	0.01	0.01	0.24	0.00	0.27	0.02	45.95	0.00	0.00	46.46
Man/Aerial Lift	0.03	0.00	0.03	0.00	0.00	0.00	0.02	0.00	0.02	0.00	3.06	0.00	0.00	3.16
Mini Excavator	0.07	0.00	0.07	0.01	0.00	0.01	0.05	0.00	0.10	0.01	9.45	0.00	0.00	9.76
Mini-Trencher	0.44	0.03	0.48	0.24	0.03	0.27	0.36	0.00	0.58	0.07	49.73	0.02	0.01	52.55
Motor Grader	4.08	0.03	4.12	0.44	0.03	0.47	1.01	0.00	0.38	0.06	164.34	0.01	0.00	166.05
Post Machine	0.74	0.07	0.81	0.07	0.06	0.14	0.98	0.00	0.94	0.13	131.28	0.01	0.00	132.61
Roller/Vibrator/Padder	3.48	0.02	3.50	0.38	0.02	0.39	0.43	0.00	0.50	0.03	87.95	0.01	0.00	89.15
Scraper	0.29	0.10	0.38	0.16	0.09	0.25	2.08	0.00	0.56	0.15	205.68	0.02	0.01	208.37
Sheepsfoot Roller	3.68	0.03	3.71	0.40	0.03	0.42	0.38	0.00	0.34	0.03	50.79	0.01	0.00	51.78
Skid Steer	0.14	0.08	0.22	0.02	0.07	0.09	1.39	0.00	1.83	0.09	290.69	0.02	0.01	293.56
Tensioner	0.03	0.00	0.04	0.00	0.00	0.01	0.10	0.00	0.05	0.01	9.39	0.00	0.00	9.48
Tractor	0.09	0.01	0.10	0.01	0.01	0.02	0.14	0.00	0.16	0.01	27.57	0.00	0.00	27.88
Tractor Buster	2.26	0.01	2.27	0.24	0.01	0.26	0.28	0.00	0.31	0.02	53.61	0.00	0.00	54.20
Tractor Disk	0.22	0.01	0.23	0.02	0.01	0.03	0.40	0.00	0.19	0.02	90.80	0.00	0.00	91.58
Truck	0.06	0.01	0.06	0.01	0.01	0.01	0.16	0.00	0.06	0.01	27.88	0.00	0.00	28.17
Truck (Onroad)	3.24	0.38	3.61	0.32	0.35	0.67	8.40	0.02	3.16	0.64	1,442.03	0.09	0.04	1,456.65
Truck Mounted Digger	0.03	0.00	0.03	0.00	0.00	0.00	0.06	0.00	0.03	0.00	16.58	0.00	0.00	16.65
Truck, flatbed (onroad)	0.43	0.05	0.48	0.04	0.05	0.09	1.11	0.00	0.42	0.09	191.21	0.01	0.01	193.15
Water Pull	0.23	0.03	0.26	0.02	0.03	0.05	0.67	0.00	0.25	0.05	114.61	0.01	0.00	115.78
Water Pump	0.24	0.02	0.26	0.02	0.02	0.05	0.26	0.00	0.07	0.05	18.06	0.00	0.00	18.37
Water truck	1.75	0.20	1.96	0.18	0.19	0.36	4.55	0.01	1.71	0.35	780.77	0.05	0.02	788.68
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	0.03	0.00	0.03	0.00	0.00	0.01	0.08	0.00	0.03	0.01	13.28	0.00	0.00	13.41
On-road Vehicles														
Aggregate Base Delivery Trucks	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.07
Concrete Delivery Trucks	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.26
Material Delivery Trucks	0.14	0.00	0.14	0.01	0.00	0.01	0.01	0.00	0.00	0.00	1.40	0.00	0.00	1.40
Tracker Deliveries Trucks	0.20	0.00	0.20	0.02	0.00	0.02	0.01	0.00	0.00	0.00	2.00	0.00	0.00	2.01
Water Haul Trucks	1.17	0.00	1.17	0.12	0.00	0.12	0.05	0.00	0.01	0.00	10.06	0.00	0.00	10.08
Worker Vehicles	3.11	0.00	3.11	0.31	0.00	0.31	0.01	0.00	0.10	0.00	19.89	0.00	0.00	20.08
Fuel Trucks	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.08
On-site Emissions Subtotal	**31.05**	**1.62**	**32.67**	**3.68**	**1.49**	**5.17**	**30.19**	**0.06**	**17.96**	**2.80**	**4,854.33**	**0.40**	**0.18**	**4,917.22**

Off-site														
On-road Vehicles (unpaved road)														
Aggregate Base Delivery Trucks	0.39	0.00	0.39	0.04	0.00	0.04	0.02	0.00	0.00	0.00	3.93	0.00	0.00	3.94
Concrete Delivery Trucks	1.46	0.00	1.46	0.15	0.00	0.15	0.09	0.00	0.02	0.01	14.75	0.00	0.00	14.80
Material Delivery Trucks	7.81	0.01	7.81	0.78	0.01	0.79	0.46	0.00	0.08	0.03	78.82	0.00	0.00	79.06
Tracker Deliveries Trucks	11.18	0.01	11.20	1.12	0.01	1.13	0.66	0.00	0.12	0.05	112.94	0.00	0.00	113.28
Water Haul Trucks	65.76	0.07	65.83	6.60	0.06	6.66	3.02	0.01	0.40	0.19	567.27	0.01	0.00	568.65
Worker Vehicles	175.46	0.01	175.47	17.58	0.01	17.58	0.53	0.01	5.68	0.21	1,121.94	0.07	0.03	1,132.71
Fuel Trucks	0.55	0.00	0.55	0.06	0.00	0.06	0.03	0.00	0.00	0.00	4.75	0.00	0.00	4.76
On-road Vehicles (paved road)														
Aggregate Base Delivery Trucks	0.00	0.00	0.01	0.00	0.00	0.00	0.03	0.00	0.01	0.00	5.13	0.00	0.00	5.14
Concrete Delivery Trucks	0.02	0.00	0.02	0.00	0.00	0.01	0.11	0.00	0.02	0.01	19.25	0.00	0.00	19.31
Material Delivery Trucks	0.32	0.04	0.35	0.08	0.04	0.11	2.02	0.00	0.37	0.14	347.44	0.01	0.00	348.48
Tracker Deliveries Trucks	0.45	0.05	0.50	0.11	0.05	0.16	2.90	0.00	0.54	0.20	497.82	0.01	0.00	499.32
Water Haul Trucks	0.38	0.05	0.43	0.10	0.05	0.15	2.34	0.00	0.31	0.14	438.53	0.01	0.00	439.59
Worker Vehicles	3.19	0.05	3.23	0.86	0.04	0.90	2.78	0.06	29.57	1.07	5,840.44	0.35	0.16	5,896.54
Fuel Trucks	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	3.67	0.00	0.00	3.68
Off-site Emissions Subtotal	**266.97**	**0.29**	**267.26**	**27.47**	**0.27**	**27.75**	**15.00**	**0.09**	**37.13**	**2.05**	**9,056.68**	**0.46**	**0.21**	**9,129.27**
Grand Total	**298.02**	**1.91**	**299.92**	**31.15**	**1.76**	**32.91**	**45.19**	**0.15**	**55.09**	**4.86**	**13,911.01**	**0.85**	**0.38**	**14,046.49**

MDAQMD CEQA annual threshold (tpy)				15			15	25	25	100	25				100,000.00
Exceed the threshold (YES/NO)				**yes**			**yes**	**yes**	**no**	**no**	**no**				**no**

Project Construction Maximum Daily Emissions (lb/day)

Worse case (Any month from Month 17th to Month 19th)

Daily Emission (pounds per day)	Emissions (lb/day)													
	Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
On-site														
Off-road Equipment														
5 CY Dump Truck	0.78	0.08	0.86	0.08	0.08	0.15	2.12	0.00	0.88	0.15	413.58	0.03	0.01	417.61
Air Compressor	1.01	0.10	1.11	0.10	0.09	0.19	1.11	0.00	1.30	0.22	128.17	0.03	0.02	133.59
ATV	9.38	1.11	10.48	0.94	1.02	1.96	12.31	0.01	3.48	2.39	845.15	0.09	0.04	859.74
Auger	0.75	0.04	0.79	0.07	0.04	0.12	1.46	0.00	0.68	0.08	375.87	0.01	0.01	377.66
Backhoe/Excavator	0.21	0.25	0.46	0.03	0.23	0.26	3.42	0.01	5.25	0.29	762.05	0.08	0.03	774.41
Cable Plow	0.74	0.13	0.87	0.41	0.12	0.52	1.61	0.00	1.15	0.15	163.39	0.02	0.01	167.29
Cable Trencher	0.88	0.06	0.94	0.48	0.06	0.54	0.70	0.00	1.14	0.14	98.66	0.04	0.02	104.27
Compactor	0.56	0.04	0.61	0.06	0.04	0.10	0.90	0.00	1.06	0.06	185.84	0.02	0.01	188.39
Crane	2.74	0.31	3.05	0.27	0.28	0.56	7.37	0.01	2.57	0.48	1,043.65	0.07	0.03	1,054.64
Crawler Tractor	0.35	0.06	0.41	0.04	0.06	0.09	1.13	0.00	0.85	0.09	140.45	0.01	0.01	142.82
Dozer (D6)	0.70	0.18	0.88	0.39	0.16	0.55	3.08	0.00	1.99	0.25	310.47	0.04	0.02	316.83
Forklift	0.73	0.04	0.77	0.07	0.04	0.11	0.80	0.00	1.01	0.05	149.75	0.02	0.01	152.25
Forklift (10 K) (Aerial Lift)	3.19	0.23	3.42	0.32	0.21	0.53	4.15	0.01	5.24	0.27	773.68	0.08	0.04	786.63
Forklift (5 K)	1.60	0.15	1.75	0.16	0.14	0.30	2.68	0.01	3.38	0.18	499.15	0.05	0.02	507.50
Generator	0.52	0.05	0.57	0.05	0.05	0.10	0.57	0.00	0.70	0.11	90.56	0.02	0.01	93.19
Generator (45 kW)	10.66	0.92	11.59	1.07	0.85	1.91	10.25	0.02	12.64	1.99	1,630.13	0.30	0.13	1,677.40
Generator (Office)(45 kW)	3.55	0.31	3.86	0.36	0.28	0.64	3.42	0.01	4.21	0.66	543.38	0.10	0.04	559.13
Generator (Security, IT)(30 kW)	3.12	0.31	3.43	0.31	0.28	0.60	3.42	0.01	4.21	0.66	543.38	0.10	0.04	559.13
Loader	0.18	0.12	0.29	0.03	0.11	0.13	2.27	0.00	2.52	0.17	437.60	0.03	0.01	442.47
Man/Aerial Lift	0.25	0.00	0.25	0.02	0.00	0.03	0.14	0.00	0.20	0.01	24.30	0.00	0.00	25.05
Mini Excavator	0.53	0.03	0.56	0.05	0.03	0.08	0.44	0.00	0.79	0.06	74.99	0.02	0.01	77.49
Mini-Trencher	3.52	0.25	3.78	1.94	0.23	2.17	2.82	0.01	4.57	0.54	394.66	0.14	0.06	417.09
Motor Grader	42.03	0.34	42.37	4.54	0.31	4.85	10.39	0.02	3.87	0.61	1,692.07	0.11	0.05	1,709.67
Post Machine	5.91	0.56	6.47	0.59	0.51	1.11	7.75	0.01	7.47	1.05	1,041.90	0.07	0.03	1,052.48
Roller/Vibrator/Padder	29.22	0.17	29.38	3.15	0.16	3.31	3.59	0.01	4.20	0.24	739.05	0.06	0.03	749.18
Scraper	2.82	0.94	3.76	1.55	0.86	2.41	20.35	0.02	5.45	1.43	2,009.11	0.17	0.07	2,035.34
Sheepsfoot Roller	29.22	0.22	29.44	3.15	0.20	3.36	2.98	0.00	2.71	0.27	403.12	0.05	0.02	410.92
Skid Steer	1.12	0.63	1.76	0.17	0.58	0.75	11.24	0.03	14.86	0.72	2,358.33	0.15	0.07	2,381.61
Tensioner	0.63	0.07	0.70	0.06	0.07	0.13	1.88	0.00	0.98	0.11	178.79	0.01	0.00	180.54
Tractor	0.73	0.06	0.79	0.07	0.05	0.13	1.14	0.00	1.26	0.08	218.80	0.02	0.01	221.24
Tractor Buster	21.53	0.14	21.66	2.32	0.12	2.45	2.65	0.01	2.95	0.20	510.53	0.04	0.02	516.22
Tractor Disk	2.08	0.13	2.21	0.21	0.12	0.32	3.81	0.01	1.78	0.22	864.78	0.05	0.02	872.17
Truck	0.78	0.10	0.87	0.08	0.09	0.17	2.21	0.00	0.83	0.17	379.38	0.02	0.01	383.23
Truck (Onroad)	28.95	3.37	32.32	2.90	3.10	6.00	75.16	0.15	28.28	5.74	12,899.01	0.82	0.37	13,029.75
Truck Mounted Digger	0.57	0.04	0.61	0.06	0.03	0.09	1.22	0.00	0.57	0.07	315.73	0.01	0.00	317.24
Truck, flatbed (onroad)	3.41	0.40	3.80	0.34	0.36	0.71	8.84	0.02	3.33	0.68	1,517.53	0.10	0.04	1,532.91
Water Pull	2.15	0.29	2.44	0.22	0.26	0.48	6.36	0.01	2.39	0.49	1,091.56	0.07	0.03	1,102.62
Water Pump	2.08	0.20	2.29	0.21	0.19	0.40	2.28	0.00	0.64	0.44	156.35	0.02	0.01	159.05
Water truck	15.90	1.85	17.75	1.59	1.70	3.29	41.26	0.08	15.52	3.15	7,081.81	0.45	0.20	7,153.59
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	0.57	0.07	0.63	0.06	0.06	0.12	1.47	0.00	0.55	0.11	252.92	0.02	0.01	255.49
On-road Vehicles														
Aggregate Base Delivery Trucks	0.13	0.00	0.13	0.01	0.00	0.01	0.01	0.00	0.00	0.00	1.31	0.00	0.00	1.32
Concrete Delivery Trucks	0.49	0.00	0.49	0.05	0.00	0.05	0.03	0.00	0.01	0.00	4.97	0.00	0.00	4.98
Material Delivery Trucks	1.93	0.00	1.93	0.19	0.00	0.20	0.11	0.00	0.02	0.01	19.47	0.00	0.00	19.53
Tracker Deliveries Trucks	1.57	0.00	1.58	0.16	0.00	0.16	0.09	0.00	0.02	0.01	15.89	0.00	0.00	15.94
Water Haul Trucks	11.57	0.01	11.59	1.16	0.01	1.17	0.53	0.00	0.07	0.03	99.84	0.00	0.00	100.08
Worker Vehicles	28.50	0.00	28.50	2.85	0.00	2.86	0.09	0.00	0.92	0.03	182.25	0.01	0.00	184.00
Fuel Trucks	0.08	0.00	0.08	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.73	0.00	0.00	0.73
On-site Emissions Subtotal	**279.93**	**14.37**	**294.30**	**32.95**	**13.22**	**46.17**	**271.61**	**0.50**	**158.55**	**24.86**	**43,664.06**	**3.53**	**1.58**	**44,224.37**

Off-site														
On-road Vehicles (unpaved road)														
Aggregate Base Delivery Trucks	7.32	0.01	7.33	0.73	0.01	0.74	0.43	0.00	0.08	0.03	73.95	0.00	0.00	74.17
Concrete Delivery Trucks	27.74	0.03	27.77	2.78	0.03	2.81	1.63	0.00	0.30	0.11	280.11	0.01	0.00	280.95
Material Delivery Trucks	108.74	0.12	108.86	10.89	0.11	11.00	6.39	0.01	1.18	0.45	1,098.04	0.02	0.01	1,101.34
Tracker Deliveries Trucks	88.77	0.10	88.86	8.89	0.09	8.98	5.21	0.01	0.96	0.37	896.36	0.02	0.01	899.05
Water Haul Trucks	652.77	0.65	653.42	65.47	0.62	66.10	30.00	0.05	4.01	1.86	5,630.85	0.09	0.04	5,644.52
Worker Vehicles	1,607.54	0.08	1,607.62	161.02	0.07	161.10	4.89	0.10	52.03	1.89	10,279.03	0.62	0.28	10,377.77
Fuel Trucks	4.76	0.00	4.77	0.48	0.00	0.48	0.22	0.00	0.03	0.01	41.09	0.00	0.00	41.19
On-road Vehicles (paved road)														
Aggregate Base Delivery Trucks	0.09	0.01	0.10	0.02	0.01	0.03	0.56	0.00	0.10	0.04	96.50	0.00	0.00	96.79
Concrete Delivery Trucks	0.33	0.04	0.37	0.08	0.04	0.12	2.13	0.00	0.39	0.15	365.54	0.01	0.00	366.63
Material Delivery Trucks	4.39	0.52	4.91	1.11	0.49	1.60	28.15	0.05	5.21	1.97	4,839.96	0.09	0.04	4,854.49
Tracker Deliveries Trucks	3.58	0.42	4.00	0.90	0.40	1.31	22.98	0.04	4.25	1.61	3,950.99	0.07	0.03	3,962.85
Water Haul Trucks	3.74	0.50	4.24	1.00	0.48	1.48	23.19	0.04	3.10	1.43	4,352.93	0.07	0.03	4,363.50
Worker Vehicles	29.20	0.42	29.62	7.88	0.39	8.27	25.45	0.54	270.87	9.83	53,509.30	3.24	1.45	54,023.30
Fuel Trucks	0.03	0.00	0.03	0.01	0.00	0.01	0.17	0.00	0.02	0.01	31.76	0.00	0.00	31.84
Off-site Emissions Subtotal	**2,539.00**	**2.90**	**2,541.91**	**261.26**	**2.76**	**264.02**	**151.38**	**0.85**	**342.55**	**19.75**	**85,446.42**	**4.24**	**1.90**	**86,118.40**
Grand Total	**2,818.94**	**17.27**	**2,836.21**	**294.21**	**15.98**	**310.19**	**422.99**	**1.35**	**501.10**	**44.61**	**129,110.48**	**7.77**	**3.48**	**130,342.77**

MDAQMD CEQA daily threshold (lb/day)				82			82	137	137	548	137				548,000
Exceed the threshold (YES/NO)				**yes**			**yes**	**yes**	**no**	**no**	**no**				**no**

Project Federal General Conformity Compliance

Project Construction Total Direct and Indirect Emissions (ton/year)	Emissions (tpy)									
	Fugitive Dust PM_{10}	**Exhaust PM_{10}**	**Total PM_{10}**	**Fugitive Dust $PM_{2.5}$**	**Exhaust $PM_{2.5}$**	**Total $PM_{2.5}$**	**NOx**	**SOx**	**CO**	**ROG**
Riverside County - MDAQMD										
2016	4.12	0.05	4.17	0.44	0.04	0.49	1.21	0.00	0.73	0.10
2017	216.23	1.52	217.75	22.66	1.41	24.07	35.07	0.11	40.29	3.69
2018	245.51	1.52	247.03	25.65	1.41	27.06	36.67	0.12	45.11	3.96
Applicable *De Minimis* Levels			N/A			N/A	N/A	N/A	N/A	N/A
Exceed the threshold in any year (YES/NO)			**N/A**			**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
LA-SCAB, CA										
2016	0.07	0.01	0.07	0.02	0.01	0.02	0.42	0.00	0.08	0.03
2017	1.33	0.16	1.48	0.33	0.15	0.48	8.51	0.01	1.58	0.60
2018	1.94	0.23	2.17	0.49	0.22	0.71	12.44	0.02	2.30	0.87
Applicable *De Minimis* Levels			100.00			100.00	10.00	100.00	100.00	10.00
Exceed the threshold in any year (YES/NO)			**NO**			**NO**	**YES**	**NO**	**NO**	**NO**
Phoenix, AZ										
2016	0.01	0.00	0.01	0.00	0.00	0.00	0.04	0.00	0.01	0.00
2017	0.98	0.11	1.09	0.25	0.11	0.36	6.26	0.01	1.16	0.44
2018	0.87	0.10	0.97	0.22	0.10	0.32	5.55	0.01	1.03	0.39
Applicable *De Minimis* Levels			70.00				100.00		100.00	100.00
Exceed the threshold in any year (YES/NO)			**NO**				**NO**		**NO**	**NO**

N/A: not applicable

Desert Quartzite Solar Project

Construction Emission Estimations

TABLE 1 OFF-SITE CONSTRUCTION PHASE TRIPS

TABLE 1 OFF-SITE CONSTRUCTION PHASE TRIPS - ESTIMATED CONSTRUCTION PHASE ONE-WAY TRIPS[1] By MONTH

CONSTRUCTION PHASE TRIPS	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sept 2017	Oct 2017	Nov 2017	Dec 2017	Jan 2018	Feb 2018	Mar 2018	Apr 2018	May 2018	Jun 2018	Jul 2018	Aug 2018	Sept 2018	Oct 2018	Nov 2018	Dec 2018	Total Trips (One-Way)
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	
Activity 1: Move-On (Laydown, Construction Trailers, and Parking Area) (109 acres)																										
Worker Trips (Workers = 60)	2,520	2,520																					-			5,040
Material Delivery Trucks	920	920																								1,840
Aggregate Base	200	200																								400
Off-site Water Haul Trucks	560	560																								1,120
Sub-totals	4,200	4,200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8,400
Activity 2, Site Grading (Site Preparations/Clearing/Grading) (3,756 Acres)																										
Worker Trips (Workers = 80)		3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360				-			60,480
Material Delivery Trucks		20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20							360
Off-site Water Haul Trucks		2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600							46,800
Sub-totals	-	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980	5,980				-	-	-	107,640
Activity 3, Construction - Solar Array Structural Components																										
Worker Trips (Workers = 160)				6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720	6,720		-			120,960
Material Delivery Trucks				20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20					360
Off-site Water Haul Trucks				960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960					17,280
Sub-totals	-	-	-	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	7,700	-	-		-	138,600
Activity 4, Trenching - PCS Excavation, PCS Placement, UG Cabling Trenching (Underground Work) (200 acres disturbed)																										
Worker Trips (Workers = 80)					3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	3,360	-			60,480
Material Delivery Trucks					200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200				3,600
Off-site Water Haul Trucks					960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960				17,280
Sub-totals	-	-	-	-	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	4,520	-		-	81,360
Activity 5, Construction - Solar Module Installation																										
Worker Trips (Workers = 310)						13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020	13,020			234,360
Material Delivery Trucks (Trackers)						800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800			14,400
Off-site Water Haul Trucks						960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960	960			17,280
Sub-totals	-	-	-	-	-	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	14,780	-	-	266,040
Activity 6, Construction - Substation (7 acres)																										
Worker Trips (Workers = 60)																	2,520	2,520	2,520	2,520	2,520	2,520	-			15,120
Material Delivery Trucks																	480	480	480	480	480	480				2,880
Aggregate Base																	66	67	67	67	67	66				400
Concrete Delivery Trucks																	44	44	44	44	44	44				264
Off-site Water Haul Trucks																	960	960	960	960	960	960				5,760
Sub-totals	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4,070	4,071	4,071	4,071	4,071	4,070	-	-	-	24,424
Activity 7, Construction - Gen-Tie (10 acres)																										
Worker Trips (Workers = 60)																	2,520	2,520	2,520	2,520	2,520	2,520	-			15,120
Material Delivery Trucks																	100	100	100	100	100	100				600
Concrete Delivery Trucks																	200	200	200	200	200	200				1,200
Off-site Water Haul Trucks																	960	960	960	960	960	960				5,760
Sub-totals	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,780	3,780	3,780	3,780	3,780	3,780	-	-	-	22,680
Activity 8, Construction (O&M Building) (Added)																										
Worker Trips (Workers = 60)																	2,520	2,520	2,520	2,520	2,520	2,520	-			15,120
Material Delivery Trucks																	160	160	160	160	160	160				960
Concrete Delivery Trucks																	6	7	7	7	7	6				40
Off-site Water Haul Trucks																	-	-	-	-	-	-				-
Sub-totals	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,686	2,687	2,687	2,687	2,687	2,686	-	-	-	16,120
Activity 9, Construction (Testing/Cleanup/Restoration) (Added)																										
Worker Trips (Workers = 60)																				2,520	2,520	2,520	2,520	2,520	2,520	15,120
Material Delivery Trucks																				80	80	80	80	80	80	480
Off-site Water Haul Trucks																				420	420	420	420	420	420	2,520
Sub-totals	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		3,020	3,020	3,020	3,020	3,020	3,020	18,120
TOTALS	4,200	10,180	5,980	13,680	18,200	32,980	32,980	32,980	32,980	32,980	32,980	32,980	32,980	32,980	32,980	32,980	43,516	43,518	43,518	40,558	40,558	32,856	17,800	3,020	3,020	**683,384**

NOTES:

[1] Each trip to the Project site (i.e., worker or truck delivery) requires two, one-way trips (i.e., one round trip).
[2] All workers would arrive at the Project site by 7 am, thereby avoiding the AM peak traffic period; all workers are assumed to depart the site at 5 pm during the PM peak period.
[3] Material deliveries are expected to occur primarily during non-peak traffic periods (i.e., avoid 7-9 am and 4-6 pm periods).
[4] All water haul deliveries would occur during non-peak traffic periods.
[5] This table does not include fuel truck trips; see Table 1.1 below for fuel trucks per month.

TABLE 1.1 CONSTRUCTION ONE-WAY PHASE TRIPS TOTAL

	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sept 2017	Oct 2017	Nov 2017	Dec 2017	Jan 2018	Feb 2018	Mar 2018	Apr 2018	May 2018	Jun 2018	Jul 2018	Aug 2018	Sept 2018	Oct 2018	Nov 2018	Dec 2018	**Totals**
Aggregate Base Delivery Trucks	200	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	66	67	67	67	67	66	-	-	-	**800**
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	250	251	251	251	251	250	-	-	-	**1,504**
Material Delivery Trucks	920	940	20	40	240	240	240	240	240	240	240	240	240	240	240	240	980	980	980	1,040	1,040	1,020	80	80	80	**11,080**
Tracker Deliveries Trucks	-	-	-	-	-	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	-	-	**14,400**
Water Haul Trucks	560	3,160	2,600	3,560	4,520	5,480	5,480	5,480	5,480	5,480	5,480	5,480	5,480	5,480	5,480	5,480	7,400	7,400	7,400	5,220	5,220	4,260	1,380	420	420	**113,800**
Worker Vehicles	2,520	5,880	3,360	10,080	13,440	26,460	26,460	26,460	26,460	26,460	26,460	26,460	26,460	26,460	26,460	26,460	34,020	34,020	34,020	33,180	33,180	26,460	15,540	2,520	2,520	**541,800**
Fuel Trucks	10	20	10	26	34	48	48	48	48	48	48	48	48	48	48	48	54	54	54	48	48	32	18	6	6	**948**
Total vehicle trips (Incl Water and Fuel)	4,210	10,200	5,990	13,706	18,234	33,028	33,028	33,028	33,028	33,028	33,028	33,028	33,028	33,028	33,028	33,028	43,570	43,572	43,572	40,606	40,606	32,888	17,818	3,026	3,026	**684,332**
UPDATED Vehicle Trips (No Water or Fuel)	3,640	7,020	3,380	10,120	13,680	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	27,500	36,116	36,118	36,118	35,338	35,338	28,596	16,420	2,600	2,600	**569,584**

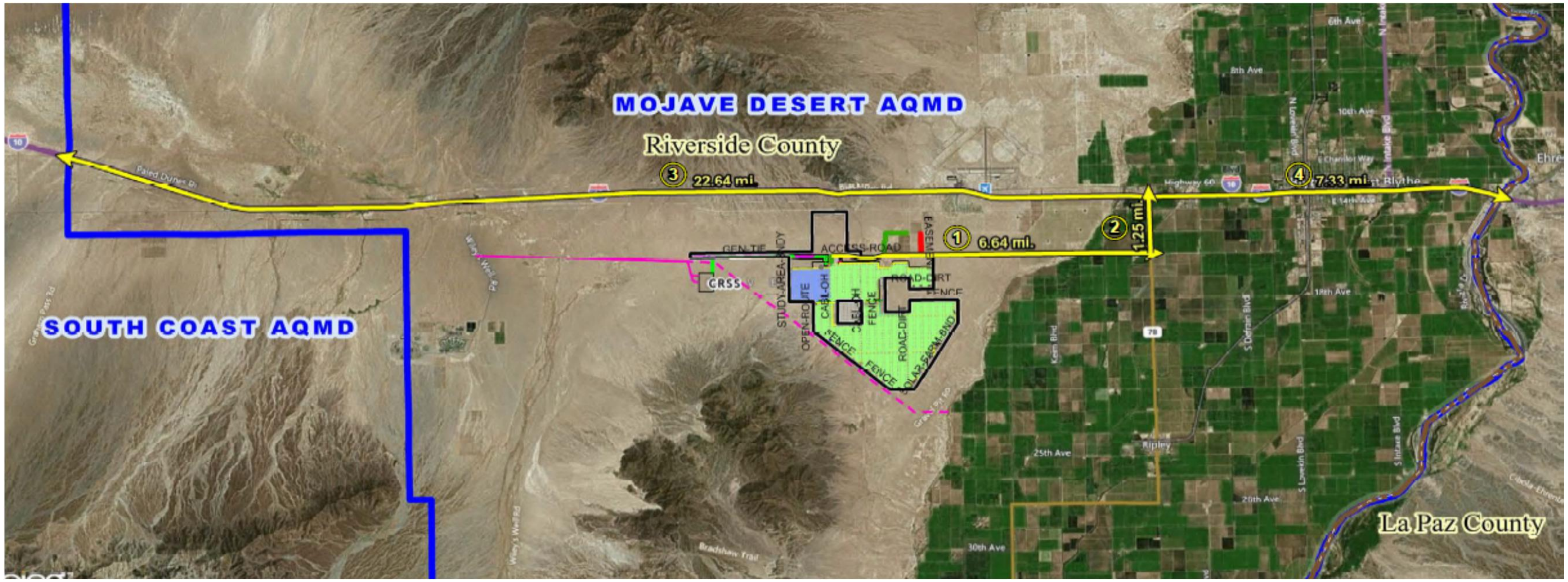
NOTES:

1. Assume the tank capacity for the fuel truck is 4000 gallon.
2. Number of fuel truck is calculated from total hours of construction equipment utilization, fuel tank truck capacity, and average fuel consumption.
3. Assume the average fuel consumption is 4 gallon per hour for each construction equipment.
4. Reference: http://www.epa.gov/cleandiesel/documents/420b10025.pdf

TABLE 1.2 TRIP DISTANCE (1 WAY; R/T = X2)

	Miles unpaved road, onsite laydown area to site entrance (assumption)	Miles unpaved road, site entrance to paved road (eastbound 16th at Stephenson)	Miles paved road in MDAQMD area	Total one way distance (all in MDAQMD area), miles
Aggregate Base Delivery Trucks	0.1	5.64	7.36	13
Concrete Delivery Trucks	0.1	5.64	7.36	13
Material Delivery Trucks	0.1	5.64	24.86	30.5
Tracker Deliveries Trucks	0.1	5.64	24.86	30.5
Water Haul Trucks	0.1	5.64	4.36	10
Worker Vehicles	0.1	5.64	29.36	35
Fuel Trucks	0.1	5.64	4.36	10

All miles in MDAQMD



Desert Quartzite Solar Project

Construction Emission Estimations

TABLE 2 CONSTRUCTION EQUIPMENT UTILIZATION

Prepared by URS-AECOM; updated as of 8/20/15

ESTIMATED CONSTRUCTION ACTIVITY DURATION in MONTHS/EQUIPMENT PIECES per MONTH

CONSTRUCTION EQUIPMENT DESCRIPTION	Hours Daily Operation	LOAD FACTOR[1]	HP	Dec 2016 1	Jan 2017 2	Feb 2017 3	Mar 2017 4	Apr 2017 5	May 2017 6	Jun 2017 7	Jul 2017 8	Aug 2017 9	Sept 2017 10	Oct 2017 11	Nov 2017 12	Dec 2017 13	Jan 2018 14	Feb 2018 15	Mar 2018 16	Apr 2018 17	May 2018 18	Jun 2018 19	Jul 2018 20	Aug 2018 21	Sept 2018 22	Oct 2018 23	Nov 2018 24	Dec 2018 25	TOTAL EQUIPMENT PIECE MONTHS[2]	TOTAL HOURS
Activity 1: Move-On (Laydown, Construction Trailers, and Parking Area) (109 acres)																														
Water truck	8	0.38	230	2	2																								4	672
Water Pull	8	0.41	185	2	2																								4	672
Motor Grader	6	0.41	185	3	3																								6	756
Scraper	6	0.4	365	3	3																								6	756
Dozer (D6)	6	0.4	158	1	1																								2	252
Loader	6	0.36	190	2	2																								4	504
Tractor Buster	6	0.42	120	2	2																								4	504
Tractor Disk	6	0.42	300	2	2																								4	504
Roller/Vibrator/Padder	6	0.38	160	1	1																								2	252
Skid Steer	6	0.40	83	3	3																								6	756
Generator (Office)(45 kW)	24	0.74	60	1	1																								2	1,008
Generator (Security, IT)(30 kW)	24	0.74	40	1	1																								2	1,008
Truck (Onroad)	4	0.38	238	10	10																								20	1,680
Water Well Pump	8	0.74	45	2	2																								4	672
Sub-totals				35	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70	9,996
Activity 2, Grading - Site Preparation (2,900 acres, 18 months)(Assumes no onsite electrical connection)																														
Water truck	8	0.38	230		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2							36	6,048
Water Pull	8	0.41	185		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2							36	6,048
Motor Grader	6	0.41	185		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3							54	6,804
Dozer (D6)	6	0.4	158		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							18	2,268
Loader	6	0.36	190		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2							36	4,536
Skid Steer	6	0.40	83		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3							54	6,804
Tractor Buster	6	0.42	120		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2							36	4,536
Tractor Disk	6	0.42	300		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2							36	4,536
Truck (onroad)	4	0.38	238		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10							180	15,120
Generator (Office)(45 kW)	24	0.74	60		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							18	9,072
Generator (Security, IT)(30 kW)	24	0.74	40		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							18	9,072
Roller/Vibrator/Padder	6	0.38	160		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							18	2,268
Scraper	6	0.4	365		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3							54	6,804
Water Pump	8	0.74	45		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2							36	6,048
Sub-totals				-	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	35	-	-	-	-	-	-	630	89,964
Activity 3, Construction - Solar Array Structural Components (18 months)																														
Water truck	8	0.38	238				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3					54	9,072
ATV	4	0.4	24				20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20					360	30,240
Air Compressor	6	0.48	49				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					18	2,268
Crane	2	0.29	400				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					18	756
Forklift (5 K)	4	0.2	67				5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5					90	7,560
Forklift (10 K) (Aerial Lift)	4	0.31	110				5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5					90	7,560
Post Machine	6	0.40	49				7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7					126	15,876
Skid Steer	4	0.4	80				10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10					180	15,120
Truck, flatbed (onroad)	4	0.38	238				2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2					36	3,024
Truck (onroad)	4	0.38	238				15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15					270	22,680
Generator (45 kW)	24	0.74	60				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					18	9,072
Sub-totals				-	-	-	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	-	-	-	-	1,260	123,228

Activity 4, Trenching (Underground Work) (18 months)

Water truck	8	0.38	230					2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				36	6,048
Backhoe/Excavator	4	0.37	90					4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4				72	6,048
Cable Plow	6	0.42	120					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				18	2,268
Cable Trencher	6	0.5	42					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				18	2,268
Compactor	4	0.43	180					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				18	1,512
Roller/Vibrator/Padder	6	0.38	180					2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				36	4,536
Mini-Trencher	6	0.5	40					4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4				72	9,072
Sheepsfoot Roller	6	0.38	95					3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3				54	6,804
5 CY Dump Truck	4	0.38	480					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				18	1,512
Sub-totals				-	-	-	-	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	-	-	-	342	40,068

Activity 5, Construction - Solar Module Installation (18 months)

Water truck	8	0.38	230						3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3			54	9,072
ATV	4	0.4	24						20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20			360	30,240
Air Compressor	6	0.48	49						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			18	2,268
Crane	2	0.29	400						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			18	756
Forklift (5 K)	4	0.2	67						5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5			90	7,560
Forklift (10 K) (Aerial Lift)	4	0.31	110						5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5			90	7,560
Post Machine	6	0.40	49						7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7			126	15,876
Skid Steer	4	0.4	80						10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10			180	15,120
Truck, flatbed (onroad)	4	0.38	238						2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			36	3,024
Truck (onroad)	4	0.38	238						15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15			270	22,680
Sub-totals				-	-	-	-	-	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	-	-	1,242	114,156

Activity 6, Construction - Substation (18 months)

Water truck	8	0.38	230					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				18	3,024
Auger	4	0.5	238					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				18	1,512
Backhoe/Excavator	4	0.37	90					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				18	1,512
Crane	5	0.29	400					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				18	1,890
Forklift	4	0.2	90					2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				36	3,024
Mini Excavator	6	0.5	42					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				18	2,268
Man/Aerial Lift	4	0.31	60					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				18	1,512
Tractor	6	0.36	190					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				18	2,268
Truck, flatbed (onroad)	2	0.38	200					2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				36	1,512
Truck (onroad)	2	0.38	200					4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4				72	3,024
Generator (45 kW)	24	0.74	60					1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				18	9,072
Sub-totals				-	-	-	-	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	-	-	-	288	30,618

Activity 7, Construction - Gen-Tie (10 acres, 6 months)

Water truck	8	0.38	230																	2	2	2	2	2	2				12	2,016
Backhoe/Excavator	4	0.37	90																	1	1	1	1	1	1				6	504
Crane	4	0.29	400																	1	1	1	1	1	1				6	504
Crawler Tractor	4	0.29	147																	1	1	1	1	1	1				6	504
Truck Mounted Digger	4	0.42	190																	1	1	1	1	1	1				6	504
Forklift	4	0.2	145																	1	1	1	1	1	1				6	504
Generator	4	0.74	45																	1	1	1	1	1	1				6	504
Generator (45 kW)	24	0.74	60																	1	1	1	1	1	1				6	3,024
Tensioner	4	0.42	238																	1	1	1	1	1	1				6	504
Truck (onroad)	4	0.38	200																	7	7	7	7	7	7				42	3,528
Wire Truck	4	0.38	238																	1	1	1	1	1	1				6	504
Sub-totals				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18	18	18	18	18	18	-	-	-	108	12,600

Activity 8, Construction - O&M Building (6 months)

Water truck	8	0.38	230																	1	1	1	1	1	1				6	1,008
Backhoe/Excavator	1	0.37	90																	1	1	1	1	1	1				6	126
Motor Grader	1	0.41	185																	1	1	1	1	1	1				6	126
Scraper	1	0.4	365																	1	1	1	1	1	1				6	126
Truck	2	0.38	200																	3	3	3	3	3	3				18	756
Sub-totals				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	7	7	7	7	7	-	-	-	42	2,142

	Activity 9, Construction - Testing/Cleanup/Restoration (6 months)																														
	Water truck	8	0.38	230																				2	2	2	2	2	2	12	2,016
	Backhoe/Excavator	4	0.37	90																				1	1	1	1	1	1	6	504
	Motor Grader	6	0.41	185																				1	1	1	1	1	1	6	756
	Scraper	6	0.4	365																				2	2	2	2	2	2	12	1,512
	Truck	2	0.38	200																				3	3	3	3	3	3	18	756
	Water Pump	8	0.74	45																				1	1	1	1	1	1	6	1,008
	Generator (Office)(45 kW)	24	0.74	60																				1	1	1	1	1	1	6	3,024
	Generator (Security, IT)(30 kW)	24	0.74	40																				1	1	1	1	1	1	6	3,024
	Sub-totals				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	12	12	12	12	12	72	12,600
	TOTAL				35	70	35	105	140	209	209	209	209	209	209	209	209	209	209	209	234	234	234	211	211	141	81	12	12	4,054	435,372

ESTIMATED CONSTRUCTION ACTIVITY DURATION in MONTHS/EQUIPMENT PIECES per MONTH

activity	CONSTRUCTION EQUIPMENT DESCRIPTION	Hours Daily Operation	LOAD FACTOR^1	HP	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sept 2017	Oct 2017	Nov 2017	Dec 2017	Jan 2018	Feb 2018	Mar 2018	Apr 2018	May 2018	Jun 2018	Jul 2018	Aug 2018	Sept 2018	Oct 2018	Nov 2018	Dec 2018	TOTAL EQUIPMENT PIECE MONTHS^2	TOTAL HOURS
Activity 1: Move-On (Laydown, Construction Trailers, and Parking Area) (109 acres)	Water truck	8	0.38	230	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	672
	Water Pull	8	0.41	185	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	672
	Motor Grader	6	0.41	185	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	756
	Scraper	6	0.40	365	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	756
	Dozer (D6)	6	0.40	158	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	252
	Loader	6	0.36	190	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	504
	Tractor Buster	6	0.42	120	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	504
	Tractor Disk	6	0.42	300	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	504
	Roller/Vibrator/Padder	6	0.38	160	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	252
	Skid Steer	6	0.40	83	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	756
	Generator (Office)(45 kW)	24	0.74	60	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1,008
	Generator (Security, IT)(30 kW)	24	0.74	40	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1,008
	Truck (Onroad)	4	0.38	238	10	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	1,680
	Water Well Pump	8	0.74	45	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	672
Activity 2, Grading - Site Preparation (2,900 acres, 18 months)(Assumes no onsite electrical connection)	Water truck	8	0.38	230	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	-	-	-	-	-	36	6,048
	Water Pull	8	0.41	185	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	-	-	-	-	-	36	6,048
	Motor Grader	6	0.41	185	-	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-	-	-	-	54	6,804
	Dozer (D6)	6	0.40	158	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	18	2,268
	Loader	6	0.36	190	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	-	-	-	-	-	36	4,536
	Skid Steer	6	0.40	83	-	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-	-	-	-	54	6,804
	Tractor Buster	6	0.42	120	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	-	-	-	-	-	36	4,536
	Tractor Disk	6	0.42	300	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	-	-	-	-	-	36	4,536
	Truck (onroad)	4	0.38	238	-	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	-	-	-	-	-	-	180	15,120
	Generator (Office)(45 kW)	24	0.74	60	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	18	9,072
	Generator (Security, IT)(30 kW)	24	0.74	40	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	18	9,072
	Roller/Vibrator/Padder	6	0.38	160	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	18	2,268
	Scraper	6	0.40	365	-	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-	-	-	-	54	6,804
	Water Pump	8	0.74	45	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	-	-	-	-	-	36	6,048
Activity 3, Construction - Solar Array Structural Components (18 months)	Water truck	8	0.38	238	-	-	-	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-	-	54	9,072
	ATV	4	0.40	24	-	-	-	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	-	-	-	-	360	30,240
	Air Compressor	6	0.48	49	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	18	2,268
	Crane	2	0.29	400	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	18	756
	Forklift (5 K)	4	0.20	67	-	-	-	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	-	-	-	-	90	7,560
	Forklift (10 K) (Aerial Lift)	4	0.31	110	-	-	-	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	-	-	-	-	90	7,560
	Post Machine	6	0.40	49	-	-	-	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	-	-	-	-	126	15,876
	Skid Steer	4	0.40	80	-	-	-	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	-	-	-	-	180	15,120
	Truck, flatbed (onroad)	4	0.38	238	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	-	-	-	36	3,024
	Truck (onroad)	4	0.38	238	-	-	-	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	-	-	-	-	270	22,680
	Generator (45 kW)	24	0.74	60	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	18	9,072

Activity 4, Trenching (Underground Work) (18 months)	Water truck	8	0.38	230	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	-	-	36	6,048
	Backhoe/Excavator	4	0.37	90	-	-	-	-	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	-	-	-	72	6,048
	Cable Plow	6	0.42	120	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	18	2,268
	Cable Trencher	6	0.50	42	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	18	2,268
	Compactor	4	0.43	180	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	18	1,512
	Roller/Vibrator/Padder	6	0.38	180	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	-	-	36	4,536
	Mini-Trencher	6	0.50	40	-	-	-	-	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	-	-	-	72	9,072
	Sheepsfoot Roller	6	0.38	95	-	-	-	-	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	-	-	54	6,804
	5 CY Dump Truck	4	0.38	480	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	18	1,512
Activity 5, Construction - Solar Module Installation (18 months)	Water truck	8	0.38	230	-	-	-	-	-	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	-	-	54	9,072
	ATV	4	0.40	24	-	-	-	-	-	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	-	-	360	30,240
	Air Compressor	6	0.48	49	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	18	2,268
	Crane	2	0.29	400	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	18	756
	Forklift (5 K)	4	0.20	67	-	-	-	-	-	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	-	-	90	7,560
	Forklift (10 K) (Aerial Lift)	4	0.31	110	-	-	-	-	-	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	-	-	90	7,560
	Post Machine	6	0.40	49	-	-	-	-	-	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	-	-	126	15,876
	Skid Steer	4	0.40	80	-	-	-	-	-	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	-	-	180	15,120
	Truck, flatbed (onroad)	4	0.38	238	-	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	-	36	3,024
	Truck (onroad)	4	0.38	238	-	-	-	-	-	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	-	-	270	22,680
Activity 6, Construction - Substation (18 months)	Water truck	8	0.38	230	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	18	3,024
	Auger	4	0.50	238	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	18	1,512
	Backhoe/Excavator	4	0.37	90	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	18	1,512
	Crane	5	0.29	400	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	18	1,890
	Forklift	4	0.20	90	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	-	-	36	3,024
	Mini Excavator	6	0.50	42	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	18	2,268
	Man/Aerial Lift	4	0.31	60	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	18	1,512
	Tractor	6	0.36	190	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	18	2,268
	Truck, flatbed (onroad)	2	0.38	200	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	-	-	-	36	1,512
	Truck (onroad)	2	0.38	200	-	-	-	-	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	-	-	-	72	3,024
	Generator (45 kW)	24	0.74	60	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	18	9,072
Activity 7, Construction - Gen-Tie (10 acres, 6 months)	Water truck	8	0.38	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	2	2	2	-	-	-	12	2,016
	Backhoe/Excavator	4	0.37	90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	-	-	-	6	504
	Crane	4	0.29	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	-	-	-	6	504
	Crawler Tractor	4	0.29	147	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	-	-	-	6	504
	Truck Mounted Digger	4	0.42	190	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	-	-	-	6	504
	Forklift	4	0.20	145	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	-	-	-	6	504
	Generator	4	0.74	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	-	-	-	6	504
	Generator (45 kW)	24	0.74	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	-	-	-	6	3,024
	Tensioner	4	0.42	238	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	-	-	-	6	504
	Truck (onroad)	4	0.38	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	7	7	7	7	7	-	-	-	42	3,528
	Wire Truck	4	0.38	238	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	-	-	-	6	504
Activity 8, Construction - O&M Building (6 months)	Water truck	8	0.38	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	-	-	-	6	1,008
	Backhoe/Excavator	1	0.37	90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	-	-	-	6	126
	Motor Grader	1	0.41	185	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	-	-	-	6	126
	Scraper	1	0.40	365	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	-	-	-	6	126
	Truck	2	0.38	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3	3	3	3	-	-	-	18	756
Activity 9, Construction - Testing/Cleanup/Restoration (6 months)	Water truck	8	0.38	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	2	2	2	12	2,016
	Backhoe/Excavator	4	0.37	90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	6	504
	Motor Grader	6	0.41	185	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	6	756
	Scraper	6	0.40	365	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	2	2	2	12	1,512
	Truck	2	0.38	200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3	3	3	3	18	756
	Water Pump	8	0.74	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	6	1,008
	Generator (Office)(45 kW)	24	0.74	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	6	3,024
	Generator (Security, IT)(30 kW)	24	0.74	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	6	3,024

Row Labels	Max of HP	Max of Hours	Max of LOAD	Sum of Dec	Sum of Jan	Sum of Feb	Sum of Mar	Sum of Apr	Sum of May	Sum of Jun	Sum of Jul	Sum of Aug	Sum of Sept	Sum of Oct	Sum of Nov	Sum of Dec	Sum of Jan	Sum of Feb	Sum of Mar	Sum of Apr	Sum of May	Sum of Jun	Sum of Jul	Sum of Aug	Sum of Sept	Sum of Oct	Sum of Nov	Sum of Dec
5 CY Dump Truck	480	4	0.38	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Air Compressor	49	6	0.48	0	0	0	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	0	0
ATV	24	4	0.4	0	0	0	20	20	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	20	20	0	0
Auger	238	4	0.5	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Backhoe/Excavator	90	4	0.37	0	0	0	0	5	5	5	5	5	5	5	5	5	5	5	5	7	7	7	8	8	8	1	1	1
Cable Plow	120	6	0.42	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Cable Trencher	42	6	0.5	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Compactor	180	4	0.43	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Crane	400	5	0.29	0	0	0	1	2	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	3	1	0	0
Crawler Tractor	147	4	0.29	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0
Dozer (D6)	158	6	0.4	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
Forklift	145	4	0.2	0	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	0	0	0
Forklift (10 K) (Aerial Lift)	110	4	0.31	0	0	0	5	5	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	5	5	0	0
Forklift (5 K)	67	4	0.2	0	0	0	5	5	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	5	5	0	0
Generator	45	4	0.74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0
Generator (45 kW)	60	24	0.74	0	0	0	1	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	2	0	0	0
Generator (Office)(45 kW)	60	24	0.74	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Generator (Security, IT)(30 kW)	40	24	0.74	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Loader	190	6	0.36	2	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
Man/Aerial Lift	60	4	0.31	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Mini Excavator	42	6	0.5	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Mini-Trencher	40	6	0.5	0	0	0	0	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	0	0
Motor Grader	185	6	0.41	3	6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	2	2	2	1	1	1
Post Machine	49	6	0.4	0	0	0	7	7	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	7	7	0	0
Roller/Vibrator/Padder	180	6	0.38	1	2	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	0	0	0
Scraper	365	6	0.4	3	6	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	3	3	3	2	2	2
Sheepsfoot Roller	95	6	0.38	0	0	0	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0	0	0
Skid Steer	83	6	0.4	3	6	3	13	13	23	23	23	23	23	23	23	23	23	23	23	23	23	23	20	20	10	10	0	0
Tensioner	238	4	0.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0
Tractor	190	6	0.36	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
Tractor Buster	120	6	0.42	2	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
Tractor Disk	300	6	0.42	2	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
Truck	200	2	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	6	6	6	3	3	3
Truck (Onroad)	238	4	0.38	10	20	10	25	29	44	44	44	44	44	44	44	44	44	44	44	51	51	51	41	41	26	15	0	0
Truck Mounted Digger	190	4	0.42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0
Truck, flatbed (onroad)	238	4	0.38	0	0	0	2	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	4	2	0	0
Water Pull	185	8	0.41	2	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
Water Pump	45	8	0.74	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1
Water truck	238	8	0.38	2	4	2	5	8	11	11	11	11	11	11	11	11	11	11	11	14	14	14	14	14	11	5	2	2
Water Well Pump	45	8	0.74	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wire Truck	238	4	0.38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0
Grand Total	**480**	**24**	**0.74**	**35**	**70**	**35**	**105**	**140**	**209**	**209**	**209**	**209**	**209**	**209**	**209**	**209**	**209**	**209**	**209**	**234**	**234**	**234**	**211**	**211**	**141**	**81**	**12**	**12**
				238	476	238	587	786	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1111	1242	1242	1242	1104	1104	755	425	100	100

Desert Quartzite Solar Project

Construction Emission Estimations

TABLE 3 ESTIMATED CONSTRUCTION DISTURBANCE SUMMARY

Prepared by URS-AECOM; updated as of 8/20/15

CONSTRUCTION DISTURBANCE BY MONTH[1]

Disturbance Breakdown by Activity [1,2]	Dec 2016 1	Jan 2017 2	Feb 2017 3	Mar 2017 4	Apr 2017 5	May 2017 6	Jun 2017 7	Jul 2017 8	Aug 2017 9	Sept 2017 10	Oct 2017 11	Nov 2017 12	Dec 2017 13	Jan 2018 14	Feb 2018 15	Mar 2018 16	Apr 2018 17	May 2018 18	Jun 2018 19	Jul 2018 20	Aug 2018 21	Sept 2018 22	Oct 2018 23	Nov 2018 24	Dec 2018 25	Acres Disturbed	Total Months	Monthly Average Per Activity		Total Disturbance by Activity	
Activity 1: Grading - Move On (109 Acres) (2 months)																															
Acreage Disturbance (ac)	55	55		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	109	2	55	ac	109	ac
Cut/Fill (cy)	13,500	13,500		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			13,500	cy	27,000	cy
Activity 2, Grading - Site Preparation (3,756 Acres)(18 months)																															
Acreage Disturbance (ac)	-	209	209	209	209	209	209	209	209	209	209	209	209	209	209	209	209	209	209				-	-	-	3,756	18	209	ac	3,756	ac
Cut/Fill (cy)	-	42,080	42,080	42,080	42,080	42,080	42,080	42,080	42,080	42,080	42,080	42,080	42,080	42,080	42,080	42,080	42,080	42,080	42,080				-	-	-			42,080	cy	757,440	cy
Activity 3, Construction - Solar Array Structural Components																															
Acreage Disturbance (ac)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ac	-	ac
Cut/Fill (cy)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			-	cy	-	cy
Activity 4, Trenching - PCS Excavation, PCS Placement, UG Cabling (18 months)																															
Acreage Disturbance (ac)	-	-	-	-	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	-	-	-	200	18	11	ac	200	ac
Cut/Fill (cy)	-	-	-	-	2,241	2,241	2,241	2,241	2,241	2,241	2,241	2,241	2,241	2,241	2,241	2,241	2,241	2,241	2,241	2,241	2,241	2,241	-	-	-			2,241	cy	40,338	cy
Activity 5, Construction - Solar Module Installation (18 months)																															
Acreage Disturbance (ac)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ac	-	ac
Cut/Fill (cy)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			-	cy	-	cy
Activity 6, Construction - Substation (7 acres) (6 months)																															
Acreage Disturbance (ac)																	1	1	1	1	1	1				7	6	1.2	ac	7.0	ac
Cut/Fill (cy)	-	-	-	-													235	235	235	235	235	235						235	cy	1,410	cy
Activity 7, Construction - Gen-Tie (10 acres) (6 months)																															
Acreage Disturbance (ac)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	2	2	2	-	-	-	10	6	2	ac	10	ac
Cut/Fill (cy)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,017	2,017	2,017	2,017	2,017	2,017	-	-	-			2,017	cy	12,102	cy
Activity 8, Construction - O&M Building (6 months)																															
Acreage Disturbance (ac)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							-	-	-		-	-	ac	-	ac
Cut/Fill (cy)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							-	-	-			-	cy	-	cy
Activity 9, Construction - Testing/Cleanup/Restoration (6 months)																															
Acreage Disturbance (ac)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							-	-	-		-	-	ac	-	ac
Cut/Fill (cy)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							-	-	-			-	cy	-	cy
Totals (Activities 1 - 9)																															
Disturbance (ac)	55	263	209	209	220	220	220	220	220	220	220	220	220	220	220	220	223	223	223	14	14	14	-	-	-		24	**Total Disturbance**		**Total Cut/Fill**	
Cut/Fill (cy)	13,500	55,580	42,080	42,080	44,321	44,321	44,321	44,321	44,321	44,321	44,321	44,321	44,321	44,321	44,321	44,321	46,573	46,573	46,573	4,493	4,493	4,493	-	-	-			4,082	ac	838,290	cy

NOTES:

[1] Disturbance numbers (acres and cubic yards) are averaged on a monthly basis over the duration of the Activity and could vary on a month-to-month basis.

[2] Cut and fill volumes are for balanced, onsite cut and fill operations.

Desert Quartzite Solar Project

Construction Emission Estimations

Emission Factors

Prepared by URS-AECOM; updated as of August 2015

1. Mobile Source (off-road Equipment and on-road vehicles) - Exhaust Emission Factors

				Emission Factors									
Equipment	**HP**	**EF source**	**EF source name (hp)**	**Exhausted PM_{10}**	**Exhausted $PM_{2.5}$**	**NO_x**	**SO_x**	**CO**	**ROG**	**CO_2**	**CH_4**	**N_2O**	**Total GHG - CO_2e**
Off-road Equipment (unit: lb/hr)													
5 CY Dump Truck	480	OFFROAD2011/2007	Off-Highway Trucks (500)	0.05	0.05	1.39	0.00	0.58	0.10	272.09	0.02	0.01	274.74
Air Compressor	49	OFFROAD2011/2007	Other Construction Equipment/Air Compressor (50)	0.02	0.02	0.19	0.00	0.23	0.04	22.25	0.01	0.00	23.19
ATV	24	OFFROAD2011/2007	Other Construction Equipment (50/25)	0.02	0.02	0.19	0.00	0.05	0.04	13.21	0.00	0.00	13.43
Auger	238	OFFROAD2011/2007	Bore/Drill Rigs (250)	0.02	0.02	0.73	0.00	0.34	0.04	187.93	0.01	0.00	188.83
Backhoe/Excavator	90	OFFROAD2011/2007	Excavators (120)	0.02	0.02	0.33	0.00	0.51	0.03	73.56	0.01	0.00	74.75
Cable Plow	120	OFFROAD2011/2007	Trencher (120)	0.05	0.05	0.64	0.00	0.46	0.06	64.84	0.01	0.00	66.38
Cable Trencher	42	OFFROAD2011/2007	Trencher (50)	0.02	0.02	0.23	0.00	0.38	0.05	32.89	0.01	0.01	34.76
Compactor	180	OFFROAD2011/2007	Rollers (175)	0.02	0.02	0.53	0.00	0.61	0.03	108.05	0.01	0.00	109.53
Crane	400	OFFROAD2011/2007	Cranes (500)	0.05	0.05	1.27	0.00	0.44	0.08	179.94	0.01	0.01	181.83
Crawler Tractor	147	OFFROAD2011/2007	Crawler Tractors (175)	0.05	0.05	0.97	0.00	0.74	0.07	121.08	0.01	0.01	123.12
Dozer (D6)	158	OFFROAD2011/2007	Rubber Tired Dozers (175)	0.07	0.07	1.29	0.00	0.83	0.10	129.36	0.02	0.01	132.01
Forklift	145	OFFROAD2011/2007	Rough Terrain Forklifts (120)	0.02	0.02	0.33	0.00	0.42	0.02	62.39	0.01	0.00	63.44
Forklift (10 K) (Aerial Lift)	110	OFFROAD2011/2007	Rough Terrain Forklifts (120)	0.02	0.02	0.33	0.00	0.42	0.02	62.39	0.01	0.00	63.44
Forklift (5 K)	67	OFFROAD2011/2007	Rough Terrain Forklifts (120)	0.02	0.02	0.33	0.00	0.42	0.02	62.39	0.01	0.00	63.44
Generator	45	OFFROAD2011/2007	Other Construction Equipment /Generator Set (50)	0.02	0.02	0.19	0.00	0.24	0.04	30.60	0.01	0.00	31.48
Generator (45 kW)	60	OFFROAD2011/2007	Other Construction Equipment /Generator Set (50)	0.02	0.02	0.19	0.00	0.24	0.04	30.60	0.01	0.00	31.48
Generator (Office)(45 kW)	60	OFFROAD2011/2007	Other Construction Equipment /Generator Set (50)	0.02	0.02	0.19	0.00	0.24	0.04	30.60	0.01	0.00	31.48
Generator (Security, IT)(30 kW)	40	OFFROAD2011/2007	Other Construction Equipment /Generator Set (50)	0.02	0.02	0.19	0.00	0.24	0.04	30.60	0.01	0.00	31.48
Loader	190	OFFROAD2011/2007	Tractors/Loaders/Backhoes (175)	0.03	0.02	0.53	0.00	0.58	0.04	101.30	0.01	0.00	102.42
Man/Aerial Lift	60	OFFROAD2011/2007	Aerial Lifts (50)	0.00	0.00	0.12	0.00	0.16	0.01	19.60	0.00	0.00	20.20
Mini Excavator	42	OFFROAD2011/2007	Excavators (50)	0.01	0.01	0.15	0.00	0.26	0.02	25.00	0.01	0.00	25.83
Mini-Trencher	40	OFFROAD2011/2007	Trencher (50)	0.02	0.02	0.23	0.00	0.38	0.05	32.89	0.01	0.01	34.76
Motor Grader	185	OFFROAD2011/2007	Grader (250)	0.03	0.03	1.06	0.00	0.39	0.06	171.96	0.01	0.01	173.75
Post Machine	49	OFFROAD2011/2007	Bore/Drill Rigs (50)	0.02	0.02	0.23	0.00	0.22	0.03	31.01	0.00	0.00	31.32
Roller/Vibrator/Padder	180	OFFROAD2011/2007	Rollers (175)	0.02	0.02	0.53	0.00	0.61	0.03	108.05	0.01	0.00	109.53
Scraper	365	OFFROAD2011/2007	Scrapers (250)	0.10	0.09	2.12	0.00	0.57	0.15	209.28	0.02	0.01	212.01
Sheepsfoot Roller	95	OFFROAD2011/2007	Rollers (120)	0.03	0.03	0.44	0.00	0.40	0.04	58.94	0.01	0.00	60.08
Skid Steer	83	OFFROAD2011/2007	Skid Steer Loaders (120)	0.01	0.01	0.20	0.00	0.27	0.01	42.72	0.00	0.00	43.15
Tensioner	238	OFFROAD2011/2007	Other Construction Equipment (250/175)	0.04	0.04	1.12	0.00	0.59	0.07	106.42	0.01	0.00	107.46
Tractor	190	OFFROAD2011/2007	Tractors/Loaders/Backhoes (175)	0.03	0.02	0.53	0.00	0.58	0.04	101.30	0.01	0.00	102.42
Tractor Buster	120	OFFROAD2011/2007	Tractors/Loaders/Backhoes (175)	0.03	0.02	0.53	0.00	0.58	0.04	101.30	0.01	0.00	102.42
Tractor Disk	300	OFFROAD2011/2007	Tractors/Loaders/Backhoes (250)	0.03	0.02	0.76	0.00	0.35	0.04	171.58	0.01	0.00	173.05
Truck	200	OFFROAD2011/2007	Off-Highway Trucks (250)	0.04	0.04	0.97	0.00	0.36	0.07	166.40	0.01	0.00	168.08
Truck (Onroad)	238	OFFROAD2011/2007	Off-Highway Trucks (250)	0.04	0.04	0.97	0.00	0.36	0.07	166.40	0.01	0.00	168.08
Truck Mounted Digger	190	OFFROAD2011/2007	Bore/Drill Rigs (250)	0.02	0.02	0.73	0.00	0.34	0.04	187.93	0.01	0.00	188.83
Truck, flatbed (onroad)	238	OFFROAD2011/2007	Off-Highway Trucks (250)	0.04	0.04	0.97	0.00	0.36	0.07	166.40	0.01	0.00	168.08
Water Pull	185	OFFROAD2011/2007	Off-Highway Trucks (250)	0.04	0.04	0.97	0.00	0.36	0.07	166.40	0.01	0.00	168.08
Water Pump	45	OFFROAD2011/2007	Other Construction Equipment (50/25)	0.02	0.02	0.19	0.00	0.05	0.04	13.21	0.00	0.00	13.43
Water truck	238	OFFROAD2011/2007	Off-Highway Trucks (250)	0.04	0.04	0.97	0.00	0.36	0.07	166.40	0.01	0.00	168.08
Water Well Pump	45	OFFROAD2011/2007	Other Construction Equipment (50/25)	0.02	0.02	0.19	0.00	0.05	0.04	13.21	0.00	0.00	13.43
Wire Truck	238	OFFROAD2011/2007	Off-Highway Trucks (250)	0.04	0.04	0.97	0.00	0.36	0.07	166.40	0.01	0.00	168.08
On-road Vehicle - Running Exhaust (unit: lb/mile)													
Aggregate Base Delivery Trucks		EMFAC2014	T7 tractor construction	0.00	0.00	0.02	0.00	0.00	0.00	4.17	0.00	0.00	4.18
Concrete Delivery Trucks		EMFAC2014	T7 tractor construction	0.00	0.00	0.02	0.00	0.00	0.00	4.17	0.00	0.00	4.18
Material Delivery Trucks		EMFAC2014	T7 tractor construction	0.00	0.00	0.02	0.00	0.00	0.00	4.17	0.00	0.00	4.18
Tracker Deliveries Trucks		EMFAC2014	T7 tractor construction	0.00	0.00	0.02	0.00	0.00	0.00	4.17	0.00	0.00	4.18
Water Haul Trucks		EMFAC2014	T6 Instate Construction Heavy	0.00	0.00	0.02	0.00	0.00	0.00	2.83	0.00	0.00	2.84
Worker Vehicles		EMFAC2014	LDA/LDT1/LDT2	0.00	0.00	0.00	0.00	0.01	0.00	1.13	0.00	0.00	1.14
Fuel Trucks		EMFAC2014	T6 Instate Construction Heavy	0.00	0.00	0.02	0.00	0.00	0.00	2.83	0.00	0.00	2.84
On-road Vehicle - Starting Exhaust (unit: lb/trip)													
Worker Vehicles		EMFAC2014	LDA/LDT1/LDT2	0.00	0.00	0.00	0.00	0.01	0.00	0.25	0.00	0.00	0.26

NOTE:

1. Assume all construction equipment use diesel.
2. Use aggregated fuel in EMFAC2014 for all vehicles.
3. All emission factors for on-road vehicles from EMFAC2014, except N2O EFs which are scaled from CH4.
4. Onsite speed is limited to 15 mph
Offsite speed is limited to 55 mph, for freeway
Offsite speed is limited to 40 mph, for local paved road
Offsite speed is limited to 30 mph, for local unpaved road
5. The load factors in Table 2 are usage factor in the emissions calculations.
6. Assume the emissions from wind erosion are negligible between the project construction and the current site condition.
7. $PM_{2.5}$ emission factors determined using guidance from SCAQMD Final - Methodology to Calculate $PM_{2.5}$ and $PM_{2.5}$ Significance Thresholds 10/1/2006, Appendix A - Updated CEIDARS Table with $PM_{2.5}$ Fractions

- $PM_{2.5}$ Fraction of PM_{10}, Brake wear = 0.429
- $PM_{2.5}$ Fraction of PM_{10}, Diesel = 0.920
- $PM_{2.5}$ Fraction of PM_{10}, Gasoline-catalyst = 0.928
- $PM_{2.5}$ Fraction of PM_{10}, Tire wear = 0.250
- $PM_{2.5}$ Fraction of PM_{10}, Diesel off-road equipment = 0.920

8. Greenhouse Gas Global Warming Potential (GWP) - Table A-1 of 40 CFR Part 98 Subpart A

- CO_2 GWP = 1
- CH_4 GWP = 25
- N_2O GWP = 298

2. Mobile Source (off-road Equipment and on-road vehicles) - Fugitive Dust Emission Factors

Unpaved Road Fugitive Dust Emissions

Emission Factor Equation:
(1) Travel on unpaved surfaces

$E = k * (s/12)^a * (W/3)^b * [(365 - P)/365]$

Source: EPA AP-42 Section 13.2.2 Unpaved Roads Equations 1a and 2
E = size-specific emission factor (lb/VMT)
k, a, b = empirical constants
8.5 s = surface material silt content (%) Table 13.2.2-1 Construction sites - Scraper routes
W = mean vehicle weight (tons)

constants

	$PM_{2.5}$	PM_{10}
k (lb/VMT)	0.15	1.5
a	0.9	0.9
b	0.45	0.45

Industrial Roads

17 P = Mean number of days per year with at least 0.01 inches of precipitation (from WRCC (040924) BLYTHE, 1931-2006 average)
1 VMT/hr, assumption (each equipment in average)

(2) Bulldozing & grading Source: EPA AP-42 Section 11.9

$E = p * 1 * s^{1.5} / M^{1.4}$ PM10 Emissions from bulldozing (lb/hr); Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES (Overburden)
0.75 p = particle size multiplier for PM10
6.9 s = Silt content (%) (from Table 11.9-3 for bulldozers overburden)
7.9 M = Moisture content of surface material (%) (from Table 11.9-3 for bulldozers overburden)
0.75 lb/hr of PM10

$E = p * 5.7 * s^{1.2} / M^{1.3}$ PM2.5 Emissions from bulldozing (lb/hr); Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES (Overburden)
0.105 p = particle size multiplier for PM2.5
6.9 s = Silt content (%) (from Table 11.9-3 for bulldozers overburden)
7.9 M = Moisture content of surface material (%) (from Table 11.9-3 for bulldozers overburden)
0.41 lb/hr of PM2.5

$E = p * 0.051 * S^{2.0}$ PM10 Emissions from grading (lb/VMT); Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES (Overburden)
0.6 p = particle size multiplier for PM10
7.1 S = mean vehicle speed (mph) (from Table 11.9-3 for grader)
1.54 lb/VMT of PM10

$E = p * 0.040 * S^{2.5}$ PM2.5 Emissions from grading (lb/VMT); Table 11.9-1 EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES (Overburden)
0.031 p = particle size multiplier for PM2.5
7.1 S = mean vehicle speed (mph) (from Table 11.9-3 for grader)
0.17 lb/VMT of PM2.5
25 months of earth work
10 total construction hours per work day
1 adjusted usage factor (assume equipment is in operation this % of the day)
21 construction days per month

(3) Dirt Piling or Material Handling Source: PM10 Emissions from Material Handling (lb/ton) from EPA AP-42 Chapter 13.2.4 Eq. 1
$E = k * 0.0032 * (U/5)^{1.3} / (M/2)^{1.4}$ E = Emission factor (lb/ton material handled)
8 U = Mean Wind speed (mph) (from Blythe historical met data) https://weatherspark.com/averages/29776/Blythe-California-United-States
12 M = Moisture content of surface material (%) (from Table 13.2.4-1 for cover at municipal landfill)

constants

	$PM_{2.5}$	PM_{10}
k	0.053	0.35

0.00003 lb/ton of PM2.5
0.00017 lb/ton of PM10
Assume 50% soil movement from loaders, 25% from excavator and 25% from skid steer

Total amount of material handling calculation

1,597	yd3/day	4,978	ton/day	1,245	ton/hr
838,290	yd3/project	2,613,632	tons/project	6236	density of soil (lb/yd3)

(The range of surficial soil density (total unit weight) is from about sigma low 115 to sigma high 135 lb/cf. Use the highest as the most conservative value.)

total project
838,290 cubic yds of cut
4,082 total acres disturbed as described in Project Description and only half of this soil is picked up and moved via the equipment

		(1) Travel on unpaved surfaces			(2) Bulldozing & grading			(3) Dirt Piling or Material Handling			Sum Total Mitigated EF		
	Weight (ton)	$PM_{2.5}$ EF (lbs/hr)	PM_{10} EF (lbs/hr)	Mitigation Efficiency	$PM_{2.5}$ EF (lbs/hr)	PM_{10} EF (lbs/hr)	Mitigation Efficiency	$PM_{2.5}$ EF (lbs/hr)	PM_{10} EF (lbs/hr)	Mitigation Efficiency	$PM_{2.5}$ EF (lbs/hr)	PM_{10} EF (lbs/hr)	Mitigation Efficiency
Off-road Equipment													
5 CY Dump Truck	32	0.30	3.04	83%							0.05	0.51	83%
Air Compressor	3	0.10	1.05	83%							0.02	0.18	83%
ATV	2	0.09	0.87	83%							0.01	0.15	83%
Auger	16	0.22	2.23	83%							0.04	0.37	83%
Backhoe/Excavator	6							0.01	0.05	61%	0.00	0.02	61%
Cable Plow	8				0.41	0.75	61%				0.16	0.29	61%
Cable Trencher	3				0.41	0.75	61%				0.16	0.29	61%
Compactor	12	0.20	1.96	83%							0.03	0.33	83%
Crane	27	0.28	2.82	83%							0.05	0.47	83%
Crawler Tractor	10	0.18	1.80	83%							0.03	0.30	83%
Dozer (D6)	11				0.41	0.75	61%				0.16	0.29	61%
Forklift	10	0.18	1.80	83%							0.03	0.30	83%
Forklift (10 K) (Aerial Lift)	7	0.15	1.54	83%							0.03	0.26	83%
Forklift (5 K)	4	0.12	1.19	83%							0.02	0.20	83%
Generator	3	0.10	1.05	83%							0.02	0.18	83%
Generator (45 kW)	4	0.12	1.19	83%							0.02	0.20	83%
Generator (Office)(45 kW)	4	0.12	1.19	83%							0.02	0.20	83%
Generator (Security, IT)(30 kW)	3	0.10	1.05	83%							0.02	0.18	83%
Loader	13							0.02	0.10	61%	0.01	0.04	61%
Man/Aerial Lift	4	0.12	1.19	83%							0.02	0.20	83%
Mini Excavator	3	0.10	1.05	83%							0.02	0.18	83%
Mini-Trencher	3				0.41	0.75	61%				0.16	0.29	61%
Motor Grader	12				1.18	10.95	61%				0.46	4.27	61%
Post Machine	3	0.10	1.05	83%							0.02	0.18	83%
Roller/Vibrator/Padder	12				1.18	10.95	61%				0.46	4.27	61%
Scraper	24				0.41	0.75	61%				0.16	0.29	61%
Sheepsfoot Roller	6				1.18	10.95	61%				0.46	4.27	61%
Skid Steer	6							0.01	0.05	61%	0.00	0.02	61%
Tensioner	16	0.22	2.23	83%							0.04	0.37	83%
Tractor	13	0.20	2.03	83%							0.03	0.34	83%
Tractor Buster	8				1.18	10.95	61%				0.46	4.27	61%
Tractor Disk	20	0.25	2.46	83%							0.04	0.41	83%
Truck	13	0.20	2.03	83%							0.03	0.34	83%
Truck (Onroad)	16	0.22	2.23	83%							0.04	0.37	83%
Truck Mounted Digger	13	0.20	2.03	83%							0.03	0.34	83%
Truck, flatbed (onroad)	16	0.22	2.23	83%							0.04	0.37	83%
Water Pull	12	0.20	1.96	83%							0.03	0.33	83%
Water Pump	3	0.10	1.05	83%							0.02	0.18	83%
Water truck	16	0.22	2.23	83%							0.04	0.37	83%
Water Well Pump	3	0.10	1.05	83%							0.02	0.18	83%
Wire Truck	16	0.22	2.23	83%							0.04	0.37	83%

		(1) Travel on unpaved surfaces			Sum Total Mitigated EF		
	Weight (ton)	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)	Mitigation Efficiency	$PM_{2.5}$ EF (lbs/VMT)	PM_{10} EF (lbs/VMT)	Mitigation Efficiency
On-road Vehicle (on-site)							
Aggregate Base Delivery Trucks	20	0.25	2.46	83%	0.04	0.41	83%
Concrete Delivery Trucks	20	0.25	2.46	83%	0.04	0.41	83%
Material Delivery Trucks	20	0.25	2.46	83%	0.04	0.41	83%
Tracker Deliveries Trucks	20	0.25	2.46	83%	0.04	0.41	83%
Water Haul Trucks	12	0.20	1.96	83%	0.03	0.33	83%
Worker Vehicles	3	0.10	1.05	83%	0.02	0.18	83%
Fuel Trucks	12	0.20	1.96	83%	0.03	0.33	83%
On-road Vehicle (off-site)							
Aggregate Base Delivery Trucks	20	0.25	2.46	83%	0.04	0.41	83%
Concrete Delivery Trucks	20	0.25	2.46	83%	0.04	0.41	83%
Material Delivery Trucks	20	0.25	2.46	83%	0.04	0.41	83%
Tracker Deliveries Trucks	20	0.25	2.46	83%	0.04	0.41	83%
Water Haul Trucks	12	0.20	1.96	83%	0.03	0.33	83%
Worker Vehicles	3	0.10	1.05	83%	0.02	0.18	83%
Fuel Trucks	12	0.20	1.96	83%	0.03	0.33	83%

Paved Road Fugitive Dust Emissions

(1) Travel on paved road

$E = [k * (sL)^{0.91} * (W)^{1.02}] (1 - P/4N)$

Source: EPA AP-42 Section 13.2.1 Paved Roads Equation 2
E = particulate emission factor (lb/VMT),
k = particle size multiplier for particle size range and units of interest
0.06 sL = road surface silt loading (grams per square meter) (g/m^2), From AP-42 Table 13.2.1-2, ADT 5,000 to 10,000.
W = average weight (tons) of the vehicles traveling the road

	$PM_{2.5}$	PM_{10}
k (lb/VMT)	0.00054	0.0022

17 P = Mean number of days per year with at least 0.01 inches of precipitation (from WRCC (040924) BLYTHE, 1931-2006 average)
365 N = number of days in the year (averaging period)

		(1) Travel on paved road			**Sum Total Mitigated EF**		
	Weight (ton)	**$PM_{2.5}$ EF (lbs/VMT)**	**PM_{10} EF (lbs/VMT)**	**Mitigation Efficiency**	**$PM_{2.5}$ EF (lbs/VMT)**	**PM_{10} EF (lbs/VMT)**	**Mitigation Efficiency**
On-road Vehicle							
Aggregate Base Delivery Trucks	20	0.0009	0.0036	0%	0.00	0.00	0%
Concrete Delivery Trucks	20	0.0009	0.0036	0%	0.00	0.00	0%
Material Delivery Trucks	20	0.0009	0.0036	0%	0.00	0.00	0%
Tracker Deliveries Trucks	20	0.0009	0.0036	0%	0.00	0.00	0%
Water Haul Trucks	12	0.0005	0.0021	0%	0.00	0.00	0%
Worker Vehicles	3	0.0001	0.0005	0%	0.00	0.00	0%
Fuel Trucks	12	0.0005	0.0021	0%	0.00	0.00	0%

3. Fugitive Dust Mitigation Measures and Efficiencies

Area	**Mitigation Measure**	**Control Efficiency**
1. Construction Activities	Apply water every 3 hours to disturbed areas	61%
2. Construction traffic	Limit on-site vehicle speeds (on unpaved roads) to 15 mph by radar enforcement.	57%
3. Post-demolition stabilization	Apply dust suppressants (e.g., polymer emulsion) to disturbed areas upon completion of demolition.	84%
4. Travel over unpaved roads	Apply chemical dust suppressant annually to unpaved parking areas.	84%
5. Storage pile wind erosion	Water the storage pile by hand or apply cover when wind events are declared.	90%
	Require construction of 3-sided enclosures with 50% porosity.	75%
Combination of 1, 2, and 3/4		97%
Combination of 1 and 2		83%

Source: SCAQMD Air Quality Analysis Handbook, 2012. Tables XI-A, XI-D, and XI-E.
Available from: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust

Desert Quartzite Solar Project
Construction Emission Estimations
Detailed Emission Inventory
Prepared by URS-AECOM; updated as of August 2015

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)													
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 1															
On-site															
Off-road Equipment															
5 CY Dump Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Air Compressor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ATV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Auger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Backhoe/Excavator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cable Plow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cable Trencher	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Compactor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crawler Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dozer (D6)	50	14.80	3.72	18.52	8.13	3.42	11.56	64.78	0.07	41.69	5.26	6,519.77	0.84	0.38	6,653.37
Forklift	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forklift (10 K) (Aerial Lift)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forklift (5 K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (45 kW)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	91	3.70	2.43	6.13	0.56	2.24	2.80	47.73	0.10	53.02	3.52	9,189.56	0.65	0.29	9,291.96
Man/Aerial Lift	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mini Excavator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mini-Trencher	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Motor Grader	155	661.97	5.35	667.32	71.48	4.93	76.40	163.63	0.30	60.94	9.54	26,650.16	1.75	0.78	26,927.36
Post Machine	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roller/Vibrator/Padder	48	204.51	1.18	205.69	22.08	1.09	23.17	25.15	0.06	29.43	1.67	5,173.38	0.45	0.20	5,244.23
Scraper	151	44.39	14.76	59.14	24.40	13.57	37.97	320.52	0.36	85.89	22.56	31,643.46	2.61	1.17	32,056.64
Sheepsfoot Roller	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Skid Steer	151	3.08	1.73	4.81	0.47	1.59	2.06	30.79	0.08	40.71	1.98	6,459.78	0.40	0.18	6,523.54
Tensioner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor Buster	106	452.08	2.84	454.91	48.81	2.61	51.42	55.68	0.12	61.86	4.10	10,721.16	0.75	0.34	10,840.62
Tractor Disk	106	43.71	2.66	46.36	4.37	2.45	6.82	80.05	0.20	37.37	4.67	18,160.33	0.98	0.44	18,315.49
Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck (Onroad)	319	119.22	13.88	133.10	11.92	12.77	24.70	309.48	0.60	116.43	23.63	53,113.56	3.39	1.52	53,651.91
Truck Mounted Digger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck, flatbed (onroad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Pull	138	45.20	5.99	51.20	4.52	5.51	10.03	133.56	0.26	50.25	10.20	22,922.69	1.47	0.66	23,155.03
Water Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water truck	128	47.69	5.55	53.24	4.77	5.11	9.88	123.79	0.24	46.57	9.45	21,245.42	1.36	0.61	21,460.76
Water Well Pump	249	43.72	4.30	48.03	4.37	3.96	8.33	47.82	0.04	13.52	9.29	3,283.40	0.36	0.16	3,340.08
Wire Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-road Vehicles															
Aggregate Base Delivery Trucks	20	8.26	0.01	8.27	0.83	0.01	0.84	0.49	0.00	0.09	0.03	83.44	0.00	0.00	83.69
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	92	38.01	0.04	38.05	3.81	0.04	3.85	2.23	0.00	0.41	0.16	383.81	0.01	0.00	384.97
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	56	18.39	0.02	18.41	1.84	0.02	1.86	0.85	0.00	0.11	0.05	158.66	0.00	0.00	159.05
Worker Vehicles	252	44.34	0.00	44.34	4.44	0.00	4.44	0.13	0.00	1.44	0.05	283.50	0.02	0.01	286.23
Fuel Trucks	1	0.33	0.00	0.33	0.03	0.00	0.03	0.02	0.00	0.00	0.00	2.83	0.00	0.00	2.84
On-site Emissions Subtotal		**1,933.61**	**77.38**	**2,010.99**	**230.86**	**71.19**	**302.05**	**1,550.15**	**2.73**	**816.75**	**134.04**	**238,816.71**	**19.20**	**8.61**	**241,861.29**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	1,128	466.04	0.50	466.54	46.67	0.48	47.15	27.37	0.04	5.06	1.92	4,705.90	0.09	0.04	4,720.03
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	5,189	2,143.76	2.31	2,146.07	214.67	2.21	216.88	125.89	0.21	23.29	8.82	21,647.16	0.41	0.18	21,712.12
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	3,158	1,037.37	1.04	1,038.40	104.05	0.99	105.04	47.67	0.09	6.37	2.95	8,948.49	0.14	0.06	8,970.21
Worker Vehicles	14,213	2,500.62	0.13	2,500.75	250.48	0.12	250.59	7.60	0.16	80.94	2.94	15,989.61	0.97	0.43	16,143.20
Fuel Trucks	56	18.52	0.02	18.54	1.86	0.02	1.88	0.85	0.00	0.11	0.05	159.79	0.00	0.00	160.18
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	1,472	5.57	0.65	6.22	1.40	0.63	2.03	35.71	0.06	6.61	2.50	6,141.04	0.12	0.05	6,159.47
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	22,871	86.54	10.17	96.71	21.82	9.73	31.55	554.88	0.91	102.66	38.87	95,416.39	1.81	0.81	95,702.72
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	2,442	5.94	0.80	6.74	1.59	0.77	2.35	36.85	0.07	4.92	2.28	6,917.62	0.11	0.05	6,934.42
Worker Vehicles	73,987	45.42	0.66	46.08	12.25	0.61	12.86	39.58	0.84	421.36	15.28	83,236.68	5.04	2.26	84,036.24
Fuel Trucks	44	0.11	0.01	0.12	0.03	0.01	0.04	0.66	0.00	0.09	0.04	123.53	0.00	0.00	123.83
Off-site Emissions Subtotal		**6,309.90**	**16.28**	**6,326.18**	**654.81**	**15.55**	**670.36**	**877.06**	**2.37**	**651.42**	**75.65**	**243,286.22**	**8.68**	**3.89**	**244,662.42**
Total Emissions In This Month (pounds)		**8,243.51**	**93.66**	**8,337.17**	**885.67**	**86.74**	**972.42**	**2,427.21**	**5.10**	**1,468.17**	**209.70**	**482,102.93**	**27.88**	**12.50**	**486,523.71**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)													
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 2															
On-site															
Off-road Equipment															
5 CY Dump Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Air Compressor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ATV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Auger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Backhoe/Excavator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cable Plow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cable Trencher	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Compactor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crawler Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dozer (D6)	101	29.59	7.44	37.03	16.27	6.84	23.11	129.56	0.15	83.38	10.52	13,039.54	1.68	0.76	13,306.74
Forklift	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forklift (10 K) (Aerial Lift)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forklift (5 K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (45 kW)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (Office)(45 kW)	746	149.29	12.91	162.20	14.93	11.88	26.81	143.46	0.30	177.01	27.88	22,821.78	4.17	1.87	23,483.53
Generator (Security, IT)(30 kW)	746	131.16	12.91	144.08	13.12	11.88	24.99	143.46	0.30	177.01	27.88	22,821.78	4.17	1.87	23,483.53
Loader	181	7.40	4.87	12.26	1.12	4.48	5.60	95.45	0.21	106.05	7.03	18,379.13	1.29	0.58	18,583.92
Man/Aerial Lift	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mini Excavator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mini-Trencher	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Motor Grader	310	1,323.94	10.71	1,334.64	142.95	9.85	152.80	327.26	0.60	121.88	19.08	53,300.31	3.50	1.57	53,854.71
Post Machine	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roller/Vibrator/Padder	96	409.02	2.36	411.38	44.16	2.17	46.33	50.29	0.12	58.87	3.34	10,346.77	0.89	0.40	10,488.46
Scraper	302	88.78	29.51	118.29	48.80	27.15	75.95	641.04	0.71	171.79	45.13	63,286.92	5.21	2.34	64,113.29
Sheepsfoot Roller	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Skid Steer	302	6.16	3.46	9.62	0.93	3.18	4.11	61.58	0.15	81.42	3.95	12,919.57	0.80	0.36	13,047.08
Tensioner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor Buster	212	904.15	5.68	909.83	97.63	5.22	102.85	111.36	0.24	123.72	8.21	21,442.32	1.51	0.68	21,681.24
Tractor Disk	212	87.41	5.32	92.73	8.74	4.89	13.63	160.09	0.41	74.73	9.34	36,320.66	1.96	0.88	36,630.99
Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck (Onroad)	638	238.43	27.77	266.20	23.84	25.55	49.39	618.95	1.20	232.86	47.26	106,227.11	6.79	3.04	107,303.81
Truck Mounted Digger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck, flatbed (onroad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Pull	276	90.41	11.98	102.39	9.04	11.03	20.07	267.13	0.52	100.50	20.40	45,845.39	2.93	1.31	46,310.07
Water Pump	249	43.72	4.30	48.03	4.37	3.96	8.33	47.82	0.04	13.52	9.29	3,283.40	0.36	0.16	3,340.08
Water truck	255	95.37	11.11	106.48	9.54	10.22	19.76	247.58	0.48	93.14	18.90	42,490.84	2.72	1.22	42,921.53
Water Well Pump	249	43.72	4.30	48.03	4.37	3.96	8.33	47.82	0.04	13.52	9.29	3,283.40	0.36	0.16	3,340.08
Wire Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-road Vehicles															
Aggregate Base Delivery Trucks	20	8.26	0.01	8.27	0.83	0.01	0.84	0.49	0.00	0.09	0.03	83.44	0.00	0.00	83.69
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	94	38.84	0.04	38.88	3.89	0.04	3.93	2.28	0.00	0.42	0.16	392.16	0.01	0.00	393.34
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	316	103.79	0.10	103.89	10.41	0.10	10.51	4.77	0.01	0.64	0.30	895.30	0.01	0.01	897.48
Worker Vehicles	588	103.45	0.01	103.46	10.36	0.00	10.37	0.31	0.01	3.35	0.12	661.51	0.04	0.02	667.86
Fuel Trucks	2	0.66	0.00	0.66	0.07	0.00	0.07	0.03	0.00	0.00	0.00	5.67	0.00	0.00	5.68
On-site Emissions Subtotal		**3,903.56**	**154.78**	**4,058.34**	**465.37**	**142.40**	**607.78**	**3,100.75**	**5.47**	**1,633.90**	**268.11**	**477,846.99**	**38.40**	**17.21**	**483,937.10**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	1,128	466.04	0.50	466.54	46.67	0.48	47.15	27.37	0.04	5.06	1.92	4,705.90	0.09	0.04	4,720.03
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	5,302	2,190.37	2.36	2,192.72	219.34	2.25	221.59	128.62	0.21	23.80	9.01	22,117.75	0.42	0.19	22,184.12
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	17,822	5,853.73	5.84	5,859.57	587.12	5.59	592.71	269.01	0.48	35.93	16.65	50,495.03	0.77	0.35	50,617.64
Worker Vehicles	33,163	5,834.78	0.29	5,835.07	584.45	0.27	584.72	17.74	0.38	188.86	6.85	37,309.09	2.26	1.01	37,667.47
Fuel Trucks	113	37.05	0.04	37.09	3.72	0.04	3.75	1.70	0.00	0.23	0.11	319.59	0.00	0.00	320.36
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	1,472	5.57	0.65	6.22	1.40	0.63	2.03	35.71	0.06	6.61	2.50	6,141.04	0.12	0.05	6,159.47
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	23,368	88.42	10.39	98.81	22.29	9.94	32.23	566.94	0.93	104.89	39.72	97,490.66	1.84	0.83	97,783.21
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	13,778	33.52	4.52	38.04	8.95	4.32	13.27	207.96	0.37	27.78	12.87	39,035.16	0.60	0.27	39,129.95
Worker Vehicles	172,637	105.99	1.53	107.52	28.59	1.42	30.00	92.36	1.95	983.17	35.66	194,218.93	11.76	5.27	196,084.56
Fuel Trucks	87	0.21	0.03	0.24	0.06	0.03	0.08	1.32	0.00	0.18	0.08	247.06	0.00	0.00	247.66
Off-site Emissions Subtotal		**14,615.67**	**26.15**	**14,641.83**	**1,502.59**	**24.96**	**1,527.55**	**1,348.73**	**4.43**	**1,376.51**	**125.36**	**452,080.21**	**17.87**	**8.01**	**454,914.47**
Total Emissions In This Month (pounds)		**18,519.23**	**180.94**	**18,700.17**	**1,967.96**	**167.37**	**2,135.33**	**4,449.48**	**9.90**	**3,010.41**	**393.47**	**929,927.20**	**56.27**	**25.23**	**938,851.57**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)														
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 3															
On-site															
Off-road Equipment															
5 CY Dump Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Air Compressor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ATV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Auger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Backhoe/Excavator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cable Plow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cable Trencher	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Compactor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crawler Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dozer (D6)	50	14.80	3.72	18.52	8.13	3.42	11.56	64.78	0.07	41.69	5.26	6,519.77	0.84	0.38	6,653.37
Forklift	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forklift (10 K) (Aerial Lift)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forklift (5 K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (45 kW)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	91	3.70	2.43	6.13	0.56	2.24	2.80	47.73	0.10	53.02	3.52	9,189.56	0.65	0.29	9,291.96
Man/Aerial Lift	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mini Excavator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mini-Trencher	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Motor Grader	155	661.97	5.35	667.32	71.48	4.93	76.40	163.63	0.30	60.94	9.54	26,650.16	1.75	0.78	26,927.36
Post Machine	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roller/Vibrator/Padder	48	204.51	1.18	205.69	22.08	1.09	23.17	25.15	0.06	29.43	1.67	5,173.38	0.45	0.20	5,244.23
Scraper	151	44.39	14.76	59.14	24.40	13.57	37.97	320.52	0.36	85.89	22.56	31,643.46	2.61	1.17	32,056.64
Sheepsfoot Roller	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Skid Steer	151	3.08	1.73	4.81	0.47	1.59	2.06	30.79	0.08	40.71	1.98	6,459.78	0.40	0.18	6,523.54
Tensioner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor Buster	106	452.08	2.84	454.91	48.81	2.61	51.42	55.68	0.12	61.86	4.10	10,721.16	0.75	0.34	10,840.62
Tractor Disk	106	43.71	2.66	46.36	4.37	2.45	6.82	80.05	0.20	37.37	4.67	18,160.33	0.98	0.44	18,315.49
Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck (Onroad)	319	119.22	13.88	133.10	11.92	12.77	24.70	309.48	0.60	116.43	23.63	53,113.56	3.39	1.52	53,651.91
Truck Mounted Digger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck, flatbed (onroad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Pull	138	45.20	5.99	51.20	4.52	5.51	10.03	133.56	0.26	50.25	10.20	22,922.69	1.47	0.66	23,155.03
Water Pump	249	43.72	4.30	48.03	4.37	3.96	8.33	47.82	0.04	13.52	9.29	3,283.40	0.36	0.16	3,340.08
Water truck	128	47.69	5.55	53.24	4.77	5.11	9.88	123.79	0.24	46.57	9.45	21,245.42	1.36	0.61	21,460.76
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-road Vehicles															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	2	0.83	0.00	0.83	0.08	0.00	0.08	0.05	0.00	0.01	0.00	8.34	0.00	0.00	8.37
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	260	85.40	0.09	85.48	8.57	0.08	8.65	3.92	0.01	0.52	0.24	736.64	0.01	0.01	738.43
Worker Vehicles	336	59.12	0.00	59.12	5.92	0.00	5.92	0.18	0.00	1.91	0.07	378.00	0.02	0.01	381.64
Fuel Trucks	1	0.33	0.00	0.33	0.03	0.00	0.03	0.02	0.00	0.00	0.00	2.83	0.00	0.00	2.84
On-site Emissions Subtotal		**1,969.95**	**77.40**	**2,047.35**	**234.51**	**71.21**	**305.72**	**1,550.60**	**2.73**	**817.15**	**134.06**	**239,030.28**	**19.20**	**8.61**	**242,075.80**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	113	46.60	0.05	46.65	4.67	0.05	4.71	2.74	0.00	0.51	0.19	470.59	0.01	0.00	472.00
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	14,664	4,816.36	4.81	4,821.17	483.08	4.60	487.68	221.34	0.40	29.57	13.70	41,546.54	0.64	0.29	41,647.42
Worker Vehicles	18,950	3,334.16	0.17	3,334.33	333.97	0.16	334.13	10.14	0.21	107.92	3.91	21,319.48	1.29	0.58	21,524.27
Fuel Trucks	56	18.52	0.02	18.54	1.86	0.02	1.88	0.85	0.00	0.11	0.05	159.79	0.00	0.00	160.18
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	497	1.88	0.22	2.10	0.47	0.21	0.69	12.06	0.02	2.23	0.85	2,074.27	0.04	0.02	2,080.49
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	11,336	27.58	3.72	31.30	7.37	3.56	10.92	171.11	0.31	22.86	10.59	32,117.54	0.49	0.22	32,195.53
Worker Vehicles	98,650	60.56	0.88	61.44	16.34	0.81	17.15	52.78	1.12	561.81	20.38	110,982.24	6.72	3.01	112,048.32
Fuel Trucks	44	0.11	0.01	0.12	0.03	0.01	0.04	0.66	0.00	0.09	0.04	123.53	0.00	0.00	123.83
Off-site Emissions Subtotal		**8,305.78**	**9.87**	**8,315.65**	**847.78**	**9.41**	**857.19**	**471.67**	**2.06**	**725.10**	**49.71**	**208,793.99**	**9.19**	**4.12**	**210,252.05**
Total Emissions In This Month (pounds)		**10,275.73**	**87.27**	**10,363.00**	**1,082.29**	**80.62**	**1,162.91**	**2,022.27**	**4.80**	**1,542.24**	**183.77**	**447,824.27**	**28.40**	**12.73**	**452,327.85**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)													
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 4															
On-site															
Off-road Equipment															
5 CY Dump Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Air Compressor	60	10.63	1.05	11.68	1.06	0.96	2.03	11.63	0.02	13.67	2.26	1,345.76	0.36	0.16	1,402.67
ATV	672	98.46	11.63	110.09	9.85	10.70	20.55	129.25	0.11	36.54	25.12	8,874.05	0.97	0.43	9,027.23
Auger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Backhoe/Excavator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cable Plow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cable Trencher	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Compactor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crane	30	14.39	1.62	16.01	1.44	1.49	2.93	38.70	0.05	13.47	2.52	5,479.16	0.36	0.16	5,536.85
Crawler Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dozer (D6)	50	14.80	3.72	18.52	8.13	3.42	11.56	64.78	0.07	41.69	5.26	6,519.77	0.84	0.38	6,653.37
Forklift	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forklift (10 K) (Aerial Lift)	130	33.52	2.44	35.96	3.35	2.24	5.60	43.55	0.10	55.05	2.86	8,123.67	0.86	0.38	8,259.60
Forklift (5 K)	84	16.81	1.57	18.39	1.68	1.45	3.13	28.10	0.06	35.51	1.85	5,241.08	0.55	0.25	5,328.77
Generator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	91	3.70	2.43	6.13	0.56	2.24	2.80	47.73	0.10	53.02	3.52	9,189.56	0.65	0.29	9,291.96
Man/Aerial Lift	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mini Excavator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mini-Trencher	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Motor Grader	155	661.97	5.35	667.32	71.48	4.93	76.40	163.63	0.30	60.94	9.54	26,650.16	1.75	0.78	26,927.36
Post Machine	353	62.04	5.87	67.91	6.20	5.40	11.61	81.33	0.14	78.38	11.03	10,939.96	0.70	0.31	11,051.03
Roller/Vibrator/Padder	48	204.51	1.18	205.69	22.08	1.09	23.17	25.15	0.06	29.43	1.67	5,173.38	0.45	0.20	5,244.23
Scraper	151	44.39	14.76	59.14	24.40	13.57	37.97	320.52	0.36	85.89	22.56	31,643.46	2.61	1.17	32,056.64
Sheepsfoot Roller	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Skid Steer	655	13.35	7.49	20.84	2.02	6.89	8.91	133.43	0.33	176.42	8.56	27,992.39	1.74	0.78	28,268.67
Tensioner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor Buster	106	452.08	2.84	454.91	48.81	2.61	51.42	55.68	0.12	61.86	4.10	10,721.16	0.75	0.34	10,840.62
Tractor Disk	106	43.71	2.66	46.36	4.37	2.45	6.82	80.05	0.20	37.37	4.67	18,160.33	0.98	0.44	18,315.49
Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck (Onroad)	798	298.04	34.71	332.75	29.80	31.93	61.74	773.69	1.49	291.07	59.07	132,783.89	8.49	3.80	134,129.77
Truck Mounted Digger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck, flatbed (onroad)	64	23.84	2.78	26.62	2.38	2.55	4.94	61.90	0.12	23.29	4.73	10,622.71	0.68	0.30	10,730.38
Water Pull	138	45.20	5.99	51.20	4.52	5.51	10.03	133.56	0.26	50.25	10.20	22,922.69	1.47	0.66	23,155.03
Water Pump	249	43.72	4.30	48.03	4.37	3.96	8.33	47.82	0.04	13.52	9.29	3,283.40	0.36	0.16	3,340.08
Water truck	319	119.22	13.88	133.10	11.92	12.77	24.70	309.48	0.60	116.43	23.63	53,113.56	3.39	1.52	53,651.91
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-road Vehicles															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	4	1.65	0.00	1.65	0.17	0.00	0.17	0.10	0.00	0.02	0.01	16.69	0.00	0.00	16.74
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	356	116.93	0.12	117.04	11.73	0.11	11.84	5.37	0.01	0.72	0.33	1,008.63	0.02	0.01	1,011.08
Worker Vehicles	1,008	177.35	0.01	177.36	17.76	0.01	17.77	0.54	0.01	5.74	0.21	1,134.01	0.07	0.03	1,144.91
Fuel Trucks	3	0.85	0.00	0.85	0.09	0.00	0.09	0.04	0.00	0.01	0.00	7.37	0.00	0.00	7.38
On-site Emissions Subtotal		**2,716.04**	**145.77**	**2,861.81**	**309.68**	**134.11**	**443.79**	**2,771.20**	**5.00**	**1,545.81**	**254.80**	**435,179.50**	**34.29**	**15.37**	**440,617.07**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	226	93.21	0.10	93.31	9.33	0.10	9.43	5.47	0.01	1.01	0.38	941.18	0.02	0.01	944.01
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	20,078	6,594.71	6.58	6,601.29	661.44	6.30	667.74	303.06	0.54	40.48	18.75	56,886.80	0.87	0.39	57,024.94
Worker Vehicles	56,851	10,002.48	0.51	10,002.98	1,001.91	0.47	1,002.38	30.41	0.64	323.77	11.74	63,958.43	3.87	1.74	64,572.81
Fuel Trucks	147	48.16	0.05	48.21	4.83	0.05	4.88	2.21	0.00	0.30	0.14	415.47	0.01	0.00	416.47
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	994	3.76	0.44	4.20	0.95	0.42	1.37	24.13	0.04	4.46	1.69	4,148.54	0.08	0.04	4,160.99
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	15,522	37.76	5.09	42.85	10.09	4.87	14.95	234.28	0.42	31.30	14.50	43,976.32	0.67	0.30	44,083.11
Worker Vehicles	295,949	181.69	2.63	184.32	49.01	2.43	51.44	158.33	3.35	1,685.43	61.14	332,946.73	20.17	9.04	336,144.97
Fuel Trucks	113	0.28	0.04	0.31	0.07	0.04	0.11	1.71	0.00	0.23	0.11	321.18	0.00	0.00	321.96
Off-site Emissions Subtotal		**16,962.05**	**15.43**	**16,977.48**	**1,737.64**	**14.66**	**1,752.30**	**759.61**	**5.01**	**2,086.98**	**108.45**	**503,594.65**	**25.69**	**11.52**	**507,669.24**
Total Emissions In This Month (pounds)		**19,678.09**	**161.20**	**19,839.29**	**2,047.31**	**148.77**	**2,196.09**	**3,530.81**	**10.01**	**3,632.79**	**363.25**	**938,774.15**	**59.98**	**26.89**	**948,286.31**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)													
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 5															
On-site															
Off-road Equipment															
5 CY Dump Truck	32	16.29	1.73	18.02	1.63	1.59	3.22	44.47	0.09	18.48	3.18	8,685.09	0.53	0.24	8,769.77
Air Compressor	60	10.63	1.05	11.68	1.06	0.96	2.03	11.63	0.02	13.67	2.26	1,345.76	0.36	0.16	1,402.67
ATV	672	98.46	11.63	110.09	9.85	10.70	20.55	129.25	0.11	36.54	25.12	8,874.05	0.97	0.43	9,027.23
Auger	42	15.69	0.93	16.61	1.57	0.85	2.42	30.57	0.09	14.37	1.69	7,893.18	0.24	0.11	7,930.90
Backhoe/Excavator	155	3.17	3.79	6.95	0.48	3.48	3.96	51.37	0.13	78.73	4.33	11,430.76	1.17	0.52	11,616.15
Cable Plow	53	15.54	2.67	18.20	8.54	2.45	10.99	33.87	0.04	24.13	3.21	3,431.17	0.52	0.23	3,513.02
Cable Trencher	63	18.50	1.33	19.83	10.17	1.23	11.39	14.79	0.03	24.02	2.84	2,071.96	0.74	0.33	2,189.72
Compactor	36	11.85	0.89	12.74	1.19	0.82	2.00	18.97	0.04	22.21	1.26	3,902.73	0.34	0.15	3,956.17
Crane	61	28.78	3.23	32.02	2.88	2.97	5.85	77.40	0.11	26.95	5.04	10,958.31	0.73	0.33	11,073.70
Crawler Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dozer (D6)	50	14.80	3.72	18.52	8.13	3.42	11.56	64.78	0.07	41.69	5.26	6,519.77	0.84	0.38	6,653.37
Forklift	34	10.16	0.63	10.79	1.02	0.58	1.59	11.24	0.02	14.21	0.74	2,096.43	0.22	0.10	2,131.51
Forklift (10 K) (Aerial Lift)	130	33.52	2.44	35.96	3.35	2.24	5.60	43.55	0.10	55.05	2.86	8,123.67	0.86	0.38	8,259.60
Forklift (5 K)	84	16.81	1.57	18.39	1.68	1.45	3.13	28.10	0.06	35.51	1.85	5,241.08	0.55	0.25	5,328.77
Generator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (45 kW)	746	149.29	12.91	162.20	14.93	11.88	26.81	143.46	0.30	177.01	27.88	22,821.78	4.17	1.87	23,483.53
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	91	3.70	2.43	6.13	0.56	2.24	2.80	47.73	0.10	53.02	3.52	9,189.56	0.65	0.29	9,291.96
Man/Aerial Lift	26	5.21	0.09	5.30	0.52	0.08	0.60	3.00	0.01	4.10	0.15	510.26	0.10	0.04	525.95
Mini Excavator	63	11.08	0.68	11.76	1.11	0.63	1.74	9.16	0.02	16.51	1.29	1,574.69	0.33	0.15	1,627.19
Mini-Trencher	252	73.98	5.34	79.32	40.67	4.91	45.58	59.17	0.11	96.07	11.38	8,287.85	2.97	1.33	8,758.87
Motor Grader	155	661.97	5.35	667.32	71.48	4.93	76.40	163.63	0.30	60.94	9.54	26,650.16	1.75	0.78	26,927.36
Post Machine	353	62.04	5.87	67.91	6.20	5.40	11.61	81.33	0.14	78.38	11.03	10,939.96	0.70	0.31	11,051.03
Roller/Vibrator/Padder	144	613.53	3.54	617.07	66.25	3.26	69.50	75.44	0.17	88.30	5.01	15,520.15	1.34	0.60	15,732.68
Scraper	151	44.39	14.76	59.14	24.40	13.57	37.97	320.52	0.36	85.89	22.56	31,643.46	2.61	1.17	32,056.64
Sheepsfoot Roller	144	613.53	4.65	618.18	66.25	4.28	70.52	62.51	0.10	57.00	5.65	8,465.53	1.03	0.46	8,629.25
Skid Steer	655	13.35	7.49	20.84	2.02	6.89	8.91	133.43	0.33	176.42	8.56	27,992.39	1.74	0.78	28,268.67
Tensioner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor	45	15.43	1.22	16.65	1.54	1.12	2.66	23.86	0.05	26.51	1.76	4,594.78	0.32	0.14	4,645.98
Tractor Buster	106	452.08	2.84	454.91	48.81	2.61	51.42	55.68	0.12	61.86	4.10	10,721.16	0.75	0.34	10,840.62
Tractor Disk	106	43.71	2.66	46.36	4.37	2.45	6.82	80.05	0.20	37.37	4.67	18,160.33	0.98	0.44	18,315.49
Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck (Onroad)	926	345.73	40.27	385.99	34.57	37.04	71.62	897.48	1.73	337.64	68.53	154,029.31	9.84	4.41	155,590.53
Truck Mounted Digger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck, flatbed (onroad)	128	47.69	5.55	53.24	4.77	5.11	9.88	123.79	0.24	46.57	9.45	21,245.42	1.36	0.61	21,460.76
Water Pull	138	45.20	5.99	51.20	4.52	5.51	10.03	133.56	0.26	50.25	10.20	22,922.69	1.47	0.66	23,155.03
Water Pump	249	43.72	4.30	48.03	4.37	3.96	8.33	47.82	0.04	13.52	9.29	3,283.40	0.36	0.16	3,340.08
Water truck	511	190.75	22.22	212.96	19.07	20.44	39.51	495.16	0.96	186.28	37.81	84,981.69	5.43	2.43	85,843.05
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-road Vehicles															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	24	9.92	0.01	9.93	0.99	0.01	1.00	0.58	0.00	0.11	0.04	100.13	0.00	0.00	100.43
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	452	148.46	0.15	148.61	14.89	0.14	15.03	6.82	0.01	0.91	0.42	1,280.62	0.02	0.01	1,283.73
Worker Vehicles	1,344	236.47	0.01	236.48	23.69	0.01	23.70	0.72	0.02	7.65	0.28	1,512.02	0.09	0.04	1,526.54
Fuel Trucks	3	1.12	0.00	1.12	0.11	0.00	0.11	0.05	0.00	0.01	0.00	9.63	0.00	0.00	9.66
On-site Emissions Subtotal		**4,266.74**	**196.85**	**4,463.59**	**521.66**	**181.10**	**702.76**	**3,668.41**	**6.77**	**2,244.92**	**340.63**	**589,832.71**	**50.25**	**22.52**	**597,801.15**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	1,354	559.24	0.60	559.84	56.00	0.58	56.58	32.84	0.05	6.08	2.30	5,647.09	0.11	0.05	5,664.03
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	25,493	8,373.05	8.36	8,381.41	839.81	7.99	847.81	384.79	0.69	51.40	23.81	72,227.07	1.11	0.50	72,402.45
Worker Vehicles	75,802	13,336.64	0.67	13,337.31	1,335.88	0.62	1,336.50	40.55	0.86	431.69	15.66	85,277.91	5.17	2.32	86,097.08
Fuel Trucks	192	62.98	0.06	63.05	6.32	0.06	6.38	2.89	0.01	0.39	0.18	543.30	0.01	0.00	544.62
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	5,966	22.58	2.65	25.23	5.69	2.54	8.23	144.75	0.24	26.78	10.14	24,891.23	0.47	0.21	24,965.93
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	19,707	47.95	6.46	54.41	12.81	6.18	18.99	297.46	0.53	39.73	18.41	55,835.11	0.85	0.38	55,970.69
Worker Vehicles	394,598	242.26	3.51	245.77	65.34	3.24	68.58	211.10	4.47	2,247.24	81.52	443,928.98	26.89	12.05	448,193.29
Fuel Trucks	148	0.36	0.05	0.41	0.10	0.05	0.14	2.24	0.00	0.30	0.14	420.00	0.01	0.00	421.02
Off-site Emissions Subtotal		**22,645.06**	**22.36**	**22,667.42**	**2,321.95**	**21.26**	**2,343.20**	**1,116.63**	**6.85**	**2,803.61**	**152.15**	**688,770.68**	**34.61**	**15.51**	**694,259.09**
Total Emissions In This Month (pounds)		**26,911.80**	**219.21**	**27,131.01**	**2,843.61**	**202.36**	**3,045.97**	**4,785.05**	**13.62**	**5,048.54**	**492.78**	**1,278,603.39**	**84.86**	**38.04**	**1,292,060.24**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)													
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 6															
On-site															
Off-road Equipment															
5 CY Dump Truck	32	16.29	1.73	18.02	1.63	1.59	3.22	44.47	0.09	18.48	3.18	8,685.09	0.53	0.24	8,769.77
Air Compressor	121	21.27	2.09	23.36	2.13	1.93	4.05	23.26	0.03	27.34	4.52	2,691.51	0.72	0.32	2,805.34
ATV	1,344	196.92	23.26	220.18	19.69	21.40	41.09	258.49	0.23	73.08	50.23	17,748.09	1.93	0.87	18,054.46
Auger	42	15.69	0.93	16.61	1.57	0.85	2.42	30.57	0.09	14.37	1.69	7,893.18	0.24	0.11	7,930.90
Backhoe/Excavator	155	3.17	3.79	6.95	0.48	3.48	3.96	51.37	0.13	78.73	4.33	11,430.76	1.17	0.52	11,616.15
Cable Plow	53	15.54	2.67	18.20	8.54	2.45	10.99	33.87	0.04	24.13	3.21	3,431.17	0.52	0.23	3,513.02
Cable Trencher	63	18.50	1.33	19.83	10.17	1.23	11.39	14.79	0.03	24.02	2.84	2,071.96	0.74	0.33	2,189.72
Compactor	36	11.85	0.89	12.74	1.19	0.82	2.00	18.97	0.04	22.21	1.26	3,902.73	0.34	0.15	3,956.17
Crane	91	43.18	4.85	48.03	4.32	4.46	8.78	116.10	0.16	40.42	7.56	16,437.47	1.09	0.49	16,610.55
Crawler Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dozer (D6)	50	14.80	3.72	18.52	8.13	3.42	11.56	64.78	0.07	41.69	5.26	6,519.77	0.84	0.38	6,653.37
Forklift	34	10.16	0.63	10.79	1.02	0.58	1.59	11.24	0.02	14.21	0.74	2,096.43	0.22	0.10	2,131.51
Forklift (10 K) (Aerial Lift)	260	67.04	4.88	71.92	6.70	4.49	11.19	87.09	0.19	110.10	5.72	16,247.33	1.71	0.77	16,519.20
Forklift (5 K)	168	33.62	3.15	36.77	3.36	2.90	6.26	56.19	0.12	71.03	3.69	10,482.15	1.11	0.50	10,657.55
Generator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (45 kW)	746	149.29	12.91	162.20	14.93	11.88	26.81	143.46	0.30	177.01	27.88	22,821.78	4.17	1.87	23,483.53
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	91	3.70	2.43	6.13	0.56	2.24	2.80	47.73	0.10	53.02	3.52	9,189.56	0.65	0.29	9,291.96
Man/Aerial Lift	26	5.21	0.09	5.30	0.52	0.08	0.60	3.00	0.01	4.10	0.15	510.26	0.10	0.04	525.95
Mini Excavator	63	11.08	0.68	11.76	1.11	0.63	1.74	9.16	0.02	16.51	1.29	1,574.69	0.33	0.15	1,627.19
Mini-Trencher	252	73.98	5.34	79.32	40.67	4.91	45.58	59.17	0.11	96.07	11.38	8,287.85	2.97	1.33	8,758.87
Motor Grader	155	661.97	5.35	667.32	71.48	4.93	76.40	163.63	0.30	60.94	9.54	26,650.16	1.75	0.78	26,927.36
Post Machine	706	124.07	11.75	135.82	12.41	10.81	23.21	162.65	0.28	156.77	22.06	21,879.91	1.40	0.63	22,102.06
Roller/Vibrator/Padder	144	613.53	3.54	617.07	66.25	3.26	69.50	75.44	0.17	88.30	5.01	15,520.15	1.34	0.60	15,732.68
Scraper	151	44.39	14.76	59.14	24.40	13.57	37.97	320.52	0.36	85.89	22.56	31,643.46	2.61	1.17	32,056.64
Sheepsfoot Roller	144	613.53	4.65	618.18	66.25	4.28	70.52	62.51	0.10	57.00	5.65	8,465.53	1.03	0.46	8,629.25
Skid Steer	1,159	23.62	13.25	36.87	3.58	12.19	15.76	236.06	0.58	312.13	15.14	49,525.01	3.08	1.38	50,013.80
Tensioner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor	45	15.43	1.22	16.65	1.54	1.12	2.66	23.86	0.05	26.51	1.76	4,594.78	0.32	0.14	4,645.98
Tractor Buster	106	452.08	2.84	454.91	48.81	2.61	51.42	55.68	0.12	61.86	4.10	10,721.16	0.75	0.34	10,840.62
Tractor Disk	106	43.71	2.66	46.36	4.37	2.45	6.82	80.05	0.20	37.37	4.67	18,160.33	0.98	0.44	18,315.49
Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck (Onroad)	1,404	524.55	61.09	585.65	52.46	56.21	108.66	1,361.70	2.63	512.28	103.97	233,699.65	14.94	6.70	236,068.39
Truck Mounted Digger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck, flatbed (onroad)	192	71.53	8.33	79.86	7.15	7.66	14.82	185.69	0.36	69.86	14.18	31,868.13	2.04	0.91	32,191.14
Water Pull	138	45.20	5.99	51.20	4.52	5.51	10.03	133.56	0.26	50.25	10.20	22,922.69	1.47	0.66	23,155.03
Water Pump	249	43.72	4.30	48.03	4.37	3.96	8.33	47.82	0.04	13.52	9.29	3,283.40	0.36	0.16	3,340.08
Water truck	702	262.28	30.55	292.82	26.23	28.10	54.33	680.85	1.31	256.14	51.98	116,849.82	7.47	3.35	118,034.19
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-road Vehicles															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	24	9.92	0.01	9.93	0.99	0.01	1.00	0.58	0.00	0.11	0.04	100.13	0.00	0.00	100.43
Tracker Deliveries Trucks	80	33.05	0.04	33.09	3.31	0.03	3.34	1.94	0.00	0.36	0.14	333.75	0.01	0.00	334.75
Water Haul Trucks	548	179.99	0.18	180.17	18.05	0.17	18.22	8.27	0.01	1.10	0.51	1,552.61	0.02	0.01	1,556.38
Worker Vehicles	2,646	465.54	0.02	465.56	46.63	0.02	46.65	1.42	0.03	15.07	0.55	2,976.79	0.18	0.08	3,005.38
Fuel Trucks	5	1.58	0.00	1.58	0.16	0.00	0.16	0.07	0.00	0.01	0.00	13.60	0.00	0.00	13.63
On-site Emissions Subtotal		**5,081.18**	**258.80**	**5,339.99**	**603.68**	**238.11**	**841.79**	**4,819.50**	**8.90**	**2,889.02**	**447.69**	**775,604.63**	**63.29**	**28.37**	**785,642.04**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	1,354	559.24	0.60	559.84	56.00	0.58	56.58	32.84	0.05	6.08	2.30	5,647.09	0.11	0.05	5,664.03
Tracker Deliveries Trucks	4,512	1,864.14	2.01	1,866.15	186.67	1.92	188.59	109.47	0.18	20.25	7.67	18,823.62	0.36	0.16	18,880.10
Water Haul Trucks	30,907	10,151.40	10.13	10,161.53	1,018.18	9.69	1,027.87	466.52	0.84	62.32	28.87	87,567.33	1.34	0.60	87,779.96
Worker Vehicles	149,234	26,256.51	1.33	26,257.83	2,630.01	1.22	2,631.24	79.84	1.69	849.89	30.83	167,890.88	10.17	4.56	169,503.62
Fuel Trucks	271	88.92	0.09	89.01	8.92	0.08	9.00	4.09	0.01	0.55	0.25	767.01	0.01	0.01	768.88
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	5,966	22.58	2.65	25.23	5.69	2.54	8.23	144.75	0.24	26.78	10.14	24,891.23	0.47	0.21	24,965.93
Tracker Deliveries Trucks	19,888	75.25	8.84	84.10	18.97	8.46	27.43	482.50	0.79	89.27	33.80	82,970.77	1.57	0.70	83,219.75
Water Haul Trucks	23,893	58.13	7.83	65.96	15.53	7.49	23.02	360.64	0.65	48.17	22.32	67,693.89	1.04	0.46	67,858.26
Worker Vehicles	776,866	476.95	6.90	483.85	128.65	6.37	135.02	415.61	8.80	4,424.26	160.48	873,985.17	52.94	23.73	882,380.54
Fuel Trucks	209	0.51	0.07	0.58	0.14	0.07	0.20	3.16	0.01	0.42	0.20	592.94	0.01	0.00	594.38
Off-site Emissions Subtotal		**39,553.63**	**40.45**	**39,594.08**	**4,068.76**	**38.43**	**4,107.18**	**2,099.41**	**13.24**	**5,528.00**	**296.85**	**1,330,829.94**	**68.01**	**30.49**	**1,341,615.45**
Total Emissions In This Month (pounds)		**44,634.81**	**299.25**	**44,934.06**	**4,672.44**	**276.53**	**4,948.97**	**6,918.91**	**22.14**	**8,417.01**	**744.54**	**2,106,434.57**	**131.30**	**58.86**	**2,127,257.49**

Month 7

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)													
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
On-site															
Off-road Equipment															
5 CY Dump Truck	32	16.29	1.73	18.02	1.63	1.59	3.22	44.47	0.09	18.48	3.18	8,685.09	0.53	0.24	8,769.77
Air Compressor	121	21.27	2.09	23.36	2.13	1.93	4.05	23.26	0.03	27.34	4.52	2,691.51	0.72	0.32	2,805.34
ATV	1,344	196.92	23.26	220.18	19.69	21.40	41.09	258.49	0.23	73.08	50.23	17,748.09	1.93	0.87	18,054.46
Auger	42	15.69	0.93	16.61	1.57	0.85	2.42	30.57	0.09	14.37	1.69	7,893.18	0.24	0.11	7,930.90
Backhoe/Excavator	155	3.17	3.79	6.95	0.48	3.48	3.96	51.37	0.13	78.73	4.33	11,430.76	1.17	0.52	11,616.15
Cable Plow	53	15.54	2.67	18.20	8.54	2.45	10.99	33.87	0.04	24.13	3.21	3,431.17	0.52	0.23	3,513.02
Cable Trencher	63	18.50	1.33	19.83	10.17	1.23	11.39	14.79	0.03	24.02	2.84	2,071.96	0.74	0.33	2,189.72
Compactor	36	11.85	0.89	12.74	1.19	0.82	2.00	18.97	0.04	22.21	1.26	3,902.73	0.34	0.15	3,956.17
Crane	91	43.18	4.85	48.03	4.32	4.46	8.78	116.10	0.16	40.42	7.56	16,437.47	1.09	0.49	16,610.55
Crawler Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dozer (D6)	50	14.80	3.72	18.52	8.13	3.42	11.56	64.78	0.07	41.69	5.26	6,519.77	0.84	0.38	6,653.37
Forklift	34	10.16	0.63	10.79	1.02	0.58	1.59	11.24	0.02	14.21	0.74	2,096.43	0.22	0.10	2,131.51
Forklift (10 K) (Aerial Lift)	260	67.04	4.88	71.92	6.70	4.49	11.19	87.09	0.19	110.10	5.72	16,247.33	1.71	0.77	16,519.20
Forklift (5 K)	168	33.62	3.15	36.77	3.36	2.90	6.26	56.19	0.12	71.03	3.69	10,482.15	1.11	0.50	10,657.55
Generator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (45 kW)	746	149.29	12.91	162.20	14.93	11.88	26.81	143.46	0.30	177.01	27.88	22,821.78	4.17	1.87	23,483.53
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	91	3.70	2.43	6.13	0.56	2.24	2.80	47.73	0.10	53.02	3.52	9,189.56	0.65	0.29	9,291.96
Man/Aerial Lift	26	5.21	0.09	5.30	0.52	0.08	0.60	3.00	0.01	4.10	0.15	510.26	0.10	0.04	525.95
Mini Excavator	63	11.08	0.68	11.76	1.11	0.63	1.74	9.16	0.02	16.51	1.29	1,574.69	0.33	0.15	1,627.19
Mini-Trencher	252	73.98	5.34	79.32	40.67	4.91	45.58	59.17	0.11	96.07	11.38	8,287.85	2.97	1.33	8,758.87
Motor Grader	155	661.97	5.35	667.32	71.48	4.93	76.40	163.63	0.30	60.94	9.54	26,650.16	1.75	0.78	26,927.36
Post Machine	706	124.07	11.75	135.82	12.41	10.81	23.21	162.65	0.28	156.77	22.06	21,879.91	1.40	0.63	22,102.06
Roller/Vibrator/Padder	144	613.53	3.54	617.07	66.25	3.26	69.50	75.44	0.17	88.30	5.01	15,520.15	1.34	0.60	15,732.68
Scraper	151	44.39	14.76	59.14	24.40	13.57	37.97	320.52	0.36	85.89	22.56	31,643.46	2.61	1.17	32,056.64
Sheepsfoot Roller	144	613.53	4.65	618.18	66.25	4.28	70.52	62.51	0.10	57.00	5.65	8,465.53	1.03	0.46	8,629.25
Skid Steer	1,159	23.62	13.25	36.87	3.58	12.19	15.76	236.06	0.58	312.13	15.14	49,525.01	3.08	1.38	50,013.80
Tensioner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor	45	15.43	1.22	16.65	1.54	1.12	2.66	23.86	0.05	26.51	1.76	4,594.78	0.32	0.14	4,645.98
Tractor Buster	106	452.08	2.84	454.91	48.81	2.61	51.42	55.68	0.12	61.86	4.10	10,721.16	0.75	0.34	10,840.62
Tractor Disk	106	43.71	2.66	46.36	4.37	2.45	6.82	80.05	0.20	37.37	4.67	18,160.33	0.98	0.44	18,315.49
Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck (Onroad)	1,404	524.55	61.09	585.65	52.46	56.21	108.66	1,361.70	2.63	512.28	103.97	233,699.65	14.94	6.70	236,068.39
Truck Mounted Digger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck, flatbed (onroad)	192	71.53	8.33	79.86	7.15	7.66	14.82	185.69	0.36	69.86	14.18	31,868.13	2.04	0.91	32,191.14
Water Pull	138	45.20	5.99	51.20	4.52	5.51	10.03	133.56	0.26	50.25	10.20	22,922.69	1.47	0.66	23,155.03
Water Pump	249	43.72	4.30	48.03	4.37	3.96	8.33	47.82	0.04	13.52	9.29	3,283.40	0.36	0.16	3,340.08
Water truck	702	262.28	30.55	292.82	26.23	28.10	54.33	680.85	1.31	256.14	51.98	116,849.82	7.47	3.35	118,034.19
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-road Vehicles															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	24	9.92	0.01	9.93	0.99	0.01	1.00	0.58	0.00	0.11	0.04	100.13	0.00	0.00	100.43
Tracker Deliveries Trucks	80	33.05	0.04	33.09	3.31	0.03	3.34	1.94	0.00	0.36	0.14	333.75	0.01	0.00	334.75
Water Haul Trucks	548	179.99	0.18	180.17	18.05	0.17	18.22	8.27	0.01	1.10	0.51	1,552.61	0.02	0.01	1,556.38
Worker Vehicles	2,646	465.54	0.02	465.56	46.63	0.02	46.65	1.42	0.03	15.07	0.55	2,976.79	0.18	0.08	3,005.38
Fuel Trucks	5	1.58	0.00	1.58	0.16	0.00	0.16	0.07	0.00	0.01	0.00	13.60	0.00	0.00	13.63
On-site Emissions Subtotal		**5,081.18**	**258.80**	**5,339.99**	**603.68**	**238.11**	**841.79**	**4,819.50**	**8.90**	**2,889.02**	**447.69**	**775,604.63**	**63.29**	**28.37**	**785,642.04**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	1,354	559.24	0.60	559.84	56.00	0.58	56.58	32.84	0.05	6.08	2.30	5,647.09	0.11	0.05	5,664.03
Tracker Deliveries Trucks	4,512	1,864.14	2.01	1,866.15	186.67	1.92	188.59	109.47	0.18	20.25	7.67	18,823.62	0.36	0.16	18,880.10
Water Haul Trucks	30,907	10,151.40	10.13	10,161.53	1,018.18	9.69	1,027.87	466.52	0.84	62.32	28.87	87,567.33	1.34	0.60	87,779.96
Worker Vehicles	149,234	26,256.51	1.33	26,257.83	2,630.01	1.22	2,631.24	79.84	1.69	849.89	30.83	167,890.88	10.17	4.56	169,503.62
Fuel Trucks	271	88.92	0.09	89.01	8.92	0.08	9.00	4.09	0.01	0.55	0.25	767.01	0.01	0.01	768.88
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	5,966	22.58	2.65	25.23	5.69	2.54	8.23	144.75	0.24	26.78	10.14	24,891.23	0.47	0.21	24,965.93
Tracker Deliveries Trucks	19,888	75.25	8.84	84.10	18.97	8.46	27.43	482.50	0.79	89.27	33.80	82,970.77	1.57	0.70	83,219.75
Water Haul Trucks	23,893	58.13	7.83	65.96	15.53	7.49	23.02	360.64	0.65	48.17	22.32	67,693.89	1.04	0.46	67,858.26
Worker Vehicles	776,866	476.95	6.90	483.85	128.65	6.37	135.02	415.61	8.80	4,424.26	160.48	873,985.17	52.94	23.73	882,380.54
Fuel Trucks	209	0.51	0.07	0.58	0.14	0.07	0.20	3.16	0.01	0.42	0.20	592.94	0.01	0.00	594.38
Off-site Emissions Subtotal		**39,553.63**	**40.45**	**39,594.08**	**4,068.76**	**38.43**	**4,107.18**	**2,099.41**	**13.24**	**5,528.00**	**296.85**	**1,330,829.94**	**68.01**	**30.49**	**1,341,615.45**
Total Emissions In This Month (pounds)		**44,634.81**	**299.25**	**44,934.06**	**4,672.44**	**276.53**	**4,948.97**	**6,918.91**	**22.14**	**8,417.01**	**744.54**	**2,106,434.57**	**131.30**	**58.86**	**2,127,257.49**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)													
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 8															
On-site															
Off-road Equipment															
5 CY Dump Truck	32	16.29	1.73	18.02	1.63	1.59	3.22	44.47	0.09	18.48	3.18	8,685.09	0.53	0.24	8,769.77
Air Compressor	121	21.27	2.09	23.36	2.13	1.93	4.05	23.26	0.03	27.34	4.52	2,691.51	0.72	0.32	2,805.34
ATV	1,344	196.92	23.26	220.18	19.69	21.40	41.09	258.49	0.23	73.08	50.23	17,748.09	1.93	0.87	18,054.46
Auger	42	15.69	0.93	16.61	1.57	0.85	2.42	30.57	0.09	14.37	1.69	7,893.18	0.24	0.11	7,930.90
Backhoe/Excavator	155	3.17	3.79	6.95	0.48	3.48	3.96	51.37	0.13	78.73	4.33	11,430.76	1.17	0.52	11,616.15
Cable Plow	53	15.54	2.67	18.20	8.54	2.45	10.99	33.87	0.04	24.13	3.21	3,431.17	0.52	0.23	3,513.02
Cable Trencher	63	18.50	1.33	19.83	10.17	1.23	11.39	14.79	0.03	24.02	2.84	2,071.96	0.74	0.33	2,189.72
Compactor	36	11.85	0.89	12.74	1.19	0.82	2.00	18.97	0.04	22.21	1.26	3,902.73	0.34	0.15	3,956.17
Crane	91	43.18	4.85	48.03	4.32	4.46	8.78	116.10	0.16	40.42	7.56	16,437.47	1.09	0.49	16,610.55
Crawler Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dozer (D6)	50	14.80	3.72	18.52	8.13	3.42	11.56	64.78	0.07	41.69	5.26	6,519.77	0.84	0.38	6,653.37
Forklift	34	10.16	0.63	10.79	1.02	0.58	1.59	11.24	0.02	14.21	0.74	2,096.43	0.22	0.10	2,131.51
Forklift (10 K) (Aerial Lift)	260	67.04	4.88	71.92	6.70	4.49	11.19	87.09	0.19	110.10	5.72	16,247.33	1.71	0.77	16,519.20
Forklift (5 K)	168	33.62	3.15	36.77	3.36	2.90	6.26	56.19	0.12	71.03	3.69	10,482.15	1.11	0.50	10,657.55
Generator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (45 kW)	746	149.29	12.91	162.20	14.93	11.88	26.81	143.46	0.30	177.01	27.88	22,821.78	4.17	1.87	23,483.53
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	91	3.70	2.43	6.13	0.56	2.24	2.80	47.73	0.10	53.02	3.52	9,189.56	0.65	0.29	9,291.96
Man/Aerial Lift	26	5.21	0.09	5.30	0.52	0.08	0.60	3.00	0.01	4.10	0.15	510.26	0.10	0.04	525.95
Mini Excavator	63	11.08	0.68	11.76	1.11	0.63	1.74	9.16	0.02	16.51	1.29	1,574.69	0.33	0.15	1,627.19
Mini-Trencher	252	73.98	5.34	79.32	40.67	4.91	45.58	59.17	0.11	96.07	11.38	8,287.85	2.97	1.33	8,758.87
Motor Grader	155	661.97	5.35	667.32	71.48	4.93	76.40	163.63	0.30	60.94	9.54	26,650.16	1.75	0.78	26,927.36
Post Machine	706	124.07	11.75	135.82	12.41	10.81	23.21	162.65	0.28	156.77	22.06	21,879.91	1.40	0.63	22,102.06
Roller/Vibrator/Padder	144	613.53	3.54	617.07	66.25	3.26	69.50	75.44	0.17	88.30	5.01	15,520.15	1.34	0.60	15,732.68
Scraper	151	44.39	14.76	59.14	24.40	13.57	37.97	320.52	0.36	85.89	22.56	31,643.46	2.61	1.17	32,056.64
Sheepsfoot Roller	144	613.53	4.65	618.18	66.25	4.28	70.52	62.51	0.10	57.00	5.65	8,465.53	1.03	0.46	8,629.25
Skid Steer	1,159	23.62	13.25	36.87	3.58	12.19	15.76	236.06	0.58	312.13	15.14	49,525.01	3.08	1.38	50,013.80
Tensioner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor	45	15.43	1.22	16.65	1.54	1.12	2.66	23.86	0.05	26.51	1.76	4,594.78	0.32	0.14	4,645.98
Tractor Buster	106	452.08	2.84	454.91	48.81	2.61	51.42	55.68	0.12	61.86	4.10	10,721.16	0.75	0.34	10,840.62
Tractor Disk	106	43.71	2.66	46.36	4.37	2.45	6.82	80.05	0.20	37.37	4.67	18,160.33	0.98	0.44	18,315.49
Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck (Onroad)	1,404	524.55	61.09	585.65	52.46	56.21	108.66	1,361.70	2.63	512.28	103.97	233,699.65	14.94	6.70	236,068.39
Truck Mounted Digger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck, flatbed (onroad)	192	71.53	8.33	79.86	7.15	7.66	14.82	185.69	0.36	69.86	14.18	31,868.13	2.04	0.91	32,191.14
Water Pull	138	45.20	5.99	51.20	4.52	5.51	10.03	133.56	0.26	50.25	10.20	22,922.69	1.47	0.66	23,155.03
Water Pump	249	43.72	4.30	48.03	4.37	3.96	8.33	47.82	0.04	13.52	9.29	3,283.40	0.36	0.16	3,340.08
Water truck	702	262.28	30.55	292.82	26.23	28.10	54.33	680.85	1.31	256.14	51.98	116,849.82	7.47	3.35	118,034.19
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-road Vehicles															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	24	9.92	0.01	9.93	0.99	0.01	1.00	0.58	0.00	0.11	0.04	100.13	0.00	0.00	100.43
Tracker Deliveries Trucks	80	33.05	0.04	33.09	3.31	0.03	3.34	1.94	0.00	0.36	0.14	333.75	0.01	0.00	334.75
Water Haul Trucks	548	179.99	0.18	180.17	18.05	0.17	18.22	8.27	0.01	1.10	0.51	1,552.61	0.02	0.01	1,556.38
Worker Vehicles	2,646	465.54	0.02	465.56	46.63	0.02	46.65	1.42	0.03	15.07	0.55	2,976.79	0.18	0.08	3,005.38
Fuel Trucks	5	1.58	0.00	1.58	0.16	0.00	0.16	0.07	0.00	0.01	0.00	13.60	0.00	0.00	13.63
On-site Emissions Subtotal		**5,081.18**	**258.80**	**5,339.99**	**603.68**	**238.11**	**841.79**	**4,819.50**	**8.90**	**2,889.02**	**447.69**	**775,604.63**	**63.29**	**28.37**	**785,642.04**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	1,354	559.24	0.60	559.84	56.00	0.58	56.58	32.84	0.05	6.08	2.30	5,647.09	0.11	0.05	5,664.03
Tracker Deliveries Trucks	4,512	1,864.14	2.01	1,866.15	186.67	1.92	188.59	109.47	0.18	20.25	7.67	18,823.62	0.36	0.16	18,880.10
Water Haul Trucks	30,907	10,151.40	10.13	10,161.53	1,018.18	9.69	1,027.87	466.52	0.84	62.32	28.87	87,567.33	1.34	0.60	87,779.96
Worker Vehicles	149,234	26,256.51	1.33	26,257.83	2,630.01	1.22	2,631.24	79.84	1.69	849.89	30.83	167,890.88	10.17	4.56	169,503.62
Fuel Trucks	271	88.92	0.09	89.01	8.92	0.08	9.00	4.09	0.01	0.55	0.25	767.01	0.01	0.01	768.88
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	5,966	22.58	2.65	25.23	5.69	2.54	8.23	144.75	0.24	26.78	10.14	24,891.23	0.47	0.21	24,965.93
Tracker Deliveries Trucks	19,888	75.25	8.84	84.10	18.97	8.46	27.43	482.50	0.79	89.27	33.80	82,970.77	1.57	0.70	83,219.75
Water Haul Trucks	23,893	58.13	7.83	65.96	15.53	7.49	23.02	360.64	0.65	48.17	22.32	67,693.89	1.04	0.46	67,858.26
Worker Vehicles	776,866	476.95	6.90	483.85	128.65	6.37	135.02	415.61	8.80	4,424.26	160.48	873,985.17	52.94	23.73	882,380.54
Fuel Trucks	209	0.51	0.07	0.58	0.14	0.07	0.20	3.16	0.01	0.42	0.20	592.94	0.01	0.00	594.38
Off-site Emissions Subtotal		**39,553.63**	**40.45**	**39,594.08**	**4,068.76**	**38.43**	**4,107.18**	**2,099.41**	**13.24**	**5,528.00**	**296.85**	**1,330,829.94**	**68.01**	**30.49**	**1,341,615.45**
Total Emissions In This Month (pounds)		**44,634.81**	**299.25**	**44,934.06**	**4,672.44**	**276.53**	**4,948.97**	**6,918.91**	**22.14**	**8,417.01**	**744.54**	**2,106,434.57**	**131.30**	**58.86**	**2,127,257.49**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)													
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 9															
On-site															
Off-road Equipment															
5 CY Dump Truck	32	16.29	1.73	18.02	1.63	1.59	3.22	44.47	0.09	18.48	3.18	8,685.09	0.53	0.24	8,769.77
Air Compressor	121	21.27	2.09	23.36	2.13	1.93	4.05	23.26	0.03	27.34	4.52	2,691.51	0.72	0.32	2,805.34
ATV	1,344	196.92	23.26	220.18	19.69	21.40	41.09	258.49	0.23	73.08	50.23	17,748.09	1.93	0.87	18,054.46
Auger	42	15.69	0.93	16.61	1.57	0.85	2.42	30.57	0.09	14.37	1.69	7,893.18	0.24	0.11	7,930.90
Backhoe/Excavator	155	3.17	3.79	6.95	0.48	3.48	3.96	51.37	0.13	78.73	4.33	11,430.76	1.17	0.52	11,616.15
Cable Plow	53	15.54	2.67	18.20	8.54	2.45	10.99	33.87	0.04	24.13	3.21	3,431.17	0.52	0.23	3,513.02
Cable Trencher	63	18.50	1.33	19.83	10.17	1.23	11.39	14.79	0.03	24.02	2.84	2,071.96	0.74	0.33	2,189.72
Compactor	36	11.85	0.89	12.74	1.19	0.82	2.00	18.97	0.04	22.21	1.26	3,902.73	0.34	0.15	3,956.17
Crane	91	43.18	4.85	48.03	4.32	4.46	8.78	116.10	0.16	40.42	7.56	16,437.47	1.09	0.49	16,610.55
Crawler Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dozer (D6)	50	14.80	3.72	18.52	8.13	3.42	11.56	64.78	0.07	41.69	5.26	6,519.77	0.84	0.38	6,653.37
Forklift	34	10.16	0.63	10.79	1.02	0.58	1.59	11.24	0.02	14.21	0.74	2,096.43	0.22	0.10	2,131.51
Forklift (10 K) (Aerial Lift)	260	67.04	4.88	71.92	6.70	4.49	11.19	87.09	0.19	110.10	5.72	16,247.33	1.71	0.77	16,519.20
Forklift (5 K)	168	33.62	3.15	36.77	3.36	2.90	6.26	56.19	0.12	71.03	3.69	10,482.15	1.11	0.50	10,657.55
Generator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (45 kW)	746	149.29	12.91	162.20	14.93	11.88	26.81	143.46	0.30	177.01	27.88	22,821.78	4.17	1.87	23,483.53
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	91	3.70	2.43	6.13	0.56	2.24	2.80	47.73	0.10	53.02	3.52	9,189.56	0.65	0.29	9,291.96
Man/Aerial Lift	26	5.21	0.09	5.30	0.52	0.08	0.60	3.00	0.01	4.10	0.15	510.26	0.10	0.04	525.95
Mini Excavator	63	11.08	0.68	11.76	1.11	0.63	1.74	9.16	0.02	16.51	1.29	1,574.69	0.33	0.15	1,627.19
Mini-Trencher	252	73.98	5.34	79.32	40.67	4.91	45.58	59.17	0.11	96.07	11.38	8,287.85	2.97	1.33	8,758.87
Motor Grader	155	661.97	5.35	667.32	71.48	4.93	76.40	163.63	0.30	60.94	9.54	26,650.16	1.75	0.78	26,927.36
Post Machine	706	124.07	11.75	135.82	12.41	10.81	23.21	162.65	0.28	156.77	22.06	21,879.91	1.40	0.63	22,102.06
Roller/Vibrator/Padder	144	613.53	3.54	617.07	66.25	3.26	69.50	75.44	0.17	88.30	5.01	15,520.15	1.34	0.60	15,732.68
Scraper	151	44.39	14.76	59.14	24.40	13.57	37.97	320.52	0.36	85.89	22.56	31,643.46	2.61	1.17	32,056.64
Sheepsfoot Roller	144	613.53	4.65	618.18	66.25	4.28	70.52	62.51	0.10	57.00	5.65	8,465.53	1.03	0.46	8,629.25
Skid Steer	1,159	23.62	13.25	36.87	3.58	12.19	15.76	236.06	0.58	312.13	15.14	49,525.01	3.08	1.38	50,013.80
Tensioner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor	45	15.43	1.22	16.65	1.54	1.12	2.66	23.86	0.05	26.51	1.76	4,594.78	0.32	0.14	4,645.98
Tractor Buster	106	452.08	2.84	454.91	48.81	2.61	51.42	55.68	0.12	61.86	4.10	10,721.16	0.75	0.34	10,840.62
Tractor Disk	106	43.71	2.66	46.36	4.37	2.45	6.82	80.05	0.20	37.37	4.67	18,160.33	0.98	0.44	18,315.49
Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck (Onroad)	1,404	524.55	61.09	585.65	52.46	56.21	108.66	1,361.70	2.63	512.28	103.97	233,699.65	14.94	6.70	236,068.39
Truck Mounted Digger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck, flatbed (onroad)	192	71.53	8.33	79.86	7.15	7.66	14.82	185.69	0.36	69.86	14.18	31,868.13	2.04	0.91	32,191.14
Water Pull	138	45.20	5.99	51.20	4.52	5.51	10.03	133.56	0.26	50.25	10.20	22,922.69	1.47	0.66	23,155.03
Water Pump	249	43.72	4.30	48.03	4.37	3.96	8.33	47.82	0.04	13.52	9.29	3,283.40	0.36	0.16	3,340.08
Water truck	702	262.28	30.55	292.82	26.23	28.10	54.33	680.85	1.31	256.14	51.98	116,849.82	7.47	3.35	118,034.19
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-road Vehicles															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	24	9.92	0.01	9.93	0.99	0.01	1.00	0.58	0.00	0.11	0.04	100.13	0.00	0.00	100.43
Tracker Deliveries Trucks	80	33.05	0.04	33.09	3.31	0.03	3.34	1.94	0.00	0.36	0.14	333.75	0.01	0.00	334.75
Water Haul Trucks	548	179.99	0.18	180.17	18.05	0.17	18.22	8.27	0.01	1.10	0.51	1,552.61	0.02	0.01	1,556.38
Worker Vehicles	2,646	465.54	0.02	465.56	46.63	0.02	46.65	1.42	0.03	15.07	0.55	2,976.79	0.18	0.08	3,005.38
Fuel Trucks	5	1.58	0.00	1.58	0.16	0.00	0.16	0.07	0.00	0.01	0.00	13.60	0.00	0.00	13.63
On-site Emissions Subtotal		**5,081.18**	**258.80**	**5,339.99**	**603.68**	**238.11**	**841.79**	**4,819.50**	**8.90**	**2,889.02**	**447.69**	**775,604.63**	**63.29**	**28.37**	**785,642.04**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	1,354	559.24	0.60	559.84	56.00	0.58	56.58	32.84	0.05	6.08	2.30	5,647.09	0.11	0.05	5,664.03
Tracker Deliveries Trucks	4,512	1,864.14	2.01	1,866.15	186.67	1.92	188.59	109.47	0.18	20.25	7.67	18,823.62	0.36	0.16	18,880.10
Water Haul Trucks	30,907	10,151.40	10.13	10,161.53	1,018.18	9.69	1,027.87	466.52	0.84	62.32	28.87	87,567.33	1.34	0.60	87,779.96
Worker Vehicles	149,234	26,256.51	1.33	26,257.83	2,630.01	1.22	2,631.24	79.84	1.69	849.89	30.83	167,890.88	10.17	4.56	169,503.62
Fuel Trucks	271	88.92	0.09	89.01	8.92	0.08	9.00	4.09	0.01	0.55	0.25	767.01	0.01	0.01	768.88
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	5,966	22.58	2.65	25.23	5.69	2.54	8.23	144.75	0.24	26.78	10.14	24,891.23	0.47	0.21	24,965.93
Tracker Deliveries Trucks	19,888	75.25	8.84	84.10	18.97	8.46	27.43	482.50	0.79	89.27	33.80	82,970.77	1.57	0.70	83,219.75
Water Haul Trucks	23,893	58.13	7.83	65.96	15.53	7.49	23.02	360.64	0.65	48.17	22.32	67,693.89	1.04	0.46	67,858.26
Worker Vehicles	776,866	476.95	6.90	483.85	128.65	6.37	135.02	415.61	8.80	4,424.26	160.48	873,985.17	52.94	23.73	882,380.54
Fuel Trucks	209	0.51	0.07	0.58	0.14	0.07	0.20	3.16	0.01	0.42	0.20	592.94	0.01	0.00	594.38
Off-site Emissions Subtotal		**39,553.63**	**40.45**	**39,594.08**	**4,068.76**	**38.43**	**4,107.18**	**2,099.41**	**13.24**	**5,528.00**	**296.85**	**1,330,829.94**	**68.01**	**30.49**	**1,341,615.45**
Total Emissions In This Month (pounds)		**44,634.81**	**299.25**	**44,934.06**	**4,672.44**	**276.53**	**4,948.97**	**6,918.91**	**22.14**	**8,417.01**	**744.54**	**2,106,434.57**	**131.30**	**58.86**	**2,127,257.49**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)													
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 10															
On-site															
Off-road Equipment															
5 CY Dump Truck	32	16.29	1.73	18.02	1.63	1.59	3.22	44.47	0.09	18.48	3.18	8,685.09	0.53	0.24	8,769.77
Air Compressor	121	21.27	2.09	23.36	2.13	1.93	4.05	23.26	0.03	27.34	4.52	2,691.51	0.72	0.32	2,805.34
ATV	1,344	196.92	23.26	220.18	19.69	21.40	41.09	258.49	0.23	73.08	50.23	17,748.09	1.93	0.87	18,054.46
Auger	42	15.69	0.93	16.61	1.57	0.85	2.42	30.57	0.09	14.37	1.69	7,893.18	0.24	0.11	7,930.90
Backhoe/Excavator	155	3.17	3.79	6.95	0.48	3.48	3.96	51.37	0.13	78.73	4.33	11,430.76	1.17	0.52	11,616.15
Cable Plow	53	15.54	2.67	18.20	8.54	2.45	10.99	33.87	0.04	24.13	3.21	3,431.17	0.52	0.23	3,513.02
Cable Trencher	63	18.50	1.33	19.83	10.17	1.23	11.39	14.79	0.03	24.02	2.84	2,071.96	0.74	0.33	2,189.72
Compactor	36	11.85	0.89	12.74	1.19	0.82	2.00	18.97	0.04	22.21	1.26	3,902.73	0.34	0.15	3,956.17
Crane	91	43.18	4.85	48.03	4.32	4.46	8.78	116.10	0.16	40.42	7.56	16,437.47	1.09	0.49	16,610.55
Crawler Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dozer (D6)	50	14.80	3.72	18.52	8.13	3.42	11.56	64.78	0.07	41.69	5.26	6,519.77	0.84	0.38	6,653.37
Forklift	34	10.16	0.63	10.79	1.02	0.58	1.59	11.24	0.02	14.21	0.74	2,096.43	0.22	0.10	2,131.51
Forklift (10 K) (Aerial Lift)	260	67.04	4.88	71.92	6.70	4.49	11.19	87.09	0.19	110.10	5.72	16,247.33	1.71	0.77	16,519.20
Forklift (5 K)	168	33.62	3.15	36.77	3.36	2.90	6.26	56.19	0.12	71.03	3.69	10,482.15	1.11	0.50	10,657.55
Generator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (45 kW)	746	149.29	12.91	162.20	14.93	11.88	26.81	143.46	0.30	177.01	27.88	22,821.78	4.17	1.87	23,483.53
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	91	3.70	2.43	6.13	0.56	2.24	2.80	47.73	0.10	53.02	3.52	9,189.56	0.65	0.29	9,291.96
Man/Aerial Lift	26	5.21	0.09	5.30	0.52	0.08	0.60	3.00	0.01	4.10	0.15	510.26	0.10	0.04	525.95
Mini Excavator	63	11.08	0.68	11.76	1.11	0.63	1.74	9.16	0.02	16.51	1.29	1,574.69	0.33	0.15	1,627.19
Mini-Trencher	252	73.98	5.34	79.32	40.67	4.91	45.58	59.17	0.11	96.07	11.38	8,287.85	2.97	1.33	8,758.87
Motor Grader	155	661.97	5.35	667.32	71.48	4.93	76.40	163.63	0.30	60.94	9.54	26,650.16	1.75	0.78	26,927.36
Post Machine	706	124.07	11.75	135.82	12.41	10.81	23.21	162.65	0.28	156.77	22.06	21,879.91	1.40	0.63	22,102.06
Roller/Vibrator/Padder	144	613.53	3.54	617.07	66.25	3.26	69.50	75.44	0.17	88.30	5.01	15,520.15	1.34	0.60	15,732.68
Scraper	151	44.39	14.76	59.14	24.40	13.57	37.97	320.52	0.36	85.89	22.56	31,643.46	2.61	1.17	32,056.64
Sheepsfoot Roller	144	613.53	4.65	618.18	66.25	4.28	70.52	62.51	0.10	57.00	5.65	8,465.53	1.03	0.46	8,629.25
Skid Steer	1,159	23.62	13.25	36.87	3.58	12.19	15.76	236.06	0.58	312.13	15.14	49,525.01	3.08	1.38	50,013.80
Tensioner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor	45	15.43	1.22	16.65	1.54	1.12	2.66	23.86	0.05	26.51	1.76	4,594.78	0.32	0.14	4,645.98
Tractor Buster	106	452.08	2.84	454.91	48.81	2.61	51.42	55.68	0.12	61.86	4.10	10,721.16	0.75	0.34	10,840.62
Tractor Disk	106	43.71	2.66	46.36	4.37	2.45	6.82	80.05	0.20	37.37	4.67	18,160.33	0.98	0.44	18,315.49
Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck (Onroad)	1,404	524.55	61.09	585.65	52.46	56.21	108.66	1,361.70	2.63	512.28	103.97	233,699.65	14.94	6.70	236,068.39
Truck Mounted Digger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck, flatbed (onroad)	192	71.53	8.33	79.86	7.15	7.66	14.82	185.69	0.36	69.86	14.18	31,868.13	2.04	0.91	32,191.14
Water Pull	138	45.20	5.99	51.20	4.52	5.51	10.03	133.56	0.26	50.25	10.20	22,922.69	1.47	0.66	23,155.03
Water Pump	249	43.72	4.30	48.03	4.37	3.96	8.33	47.82	0.04	13.52	9.29	3,283.40	0.36	0.16	3,340.08
Water truck	702	262.28	30.55	292.82	26.23	28.10	54.33	680.85	1.31	256.14	51.98	116,849.82	7.47	3.35	118,034.19
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-road Vehicles															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	24	9.92	0.01	9.93	0.99	0.01	1.00	0.58	0.00	0.11	0.04	100.13	0.00	0.00	100.43
Tracker Deliveries Trucks	80	33.05	0.04	33.09	3.31	0.03	3.34	1.94	0.00	0.36	0.14	333.75	0.01	0.00	334.75
Water Haul Trucks	548	179.99	0.18	180.17	18.05	0.17	18.22	8.27	0.01	1.10	0.51	1,552.61	0.02	0.01	1,556.38
Worker Vehicles	2,646	465.54	0.02	465.56	46.63	0.02	46.65	1.42	0.03	15.07	0.55	2,976.79	0.18	0.08	3,005.38
Fuel Trucks	5	1.58	0.00	1.58	0.16	0.00	0.16	0.07	0.00	0.01	0.00	13.60	0.00	0.00	13.63
On-site Emissions Subtotal		**5,081.18**	**258.80**	**5,339.99**	**603.68**	**238.11**	**841.79**	**4,819.50**	**8.90**	**2,889.02**	**447.69**	**775,604.63**	**63.29**	**28.37**	**785,642.04**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	1,354	559.24	0.60	559.84	56.00	0.58	56.58	32.84	0.05	6.08	2.30	5,647.09	0.11	0.05	5,664.03
Tracker Deliveries Trucks	4,512	1,864.14	2.01	1,866.15	186.67	1.92	188.59	109.47	0.18	20.25	7.67	18,823.62	0.36	0.16	18,880.10
Water Haul Trucks	30,907	10,151.40	10.13	10,161.53	1,018.18	9.69	1,027.87	466.52	0.84	62.32	28.87	87,567.33	1.34	0.60	87,779.96
Worker Vehicles	149,234	26,256.51	1.33	26,257.83	2,630.01	1.22	2,631.24	79.84	1.69	849.89	30.83	167,890.88	10.17	4.56	169,503.62
Fuel Trucks	271	88.92	0.09	89.01	8.92	0.08	9.00	4.09	0.01	0.55	0.25	767.01	0.01	0.01	768.88
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	5,966	22.58	2.65	25.23	5.69	2.54	8.23	144.75	0.24	26.78	10.14	24,891.23	0.47	0.21	24,965.93
Tracker Deliveries Trucks	19,888	75.25	8.84	84.10	18.97	8.46	27.43	482.50	0.79	89.27	33.80	82,970.77	1.57	0.70	83,219.75
Water Haul Trucks	23,893	58.13	7.83	65.96	15.53	7.49	23.02	360.64	0.65	48.17	22.32	67,693.89	1.04	0.46	67,858.26
Worker Vehicles	776,866	476.95	6.90	483.85	128.65	6.37	135.02	415.61	8.80	4,424.26	160.48	873,985.17	52.94	23.73	882,380.54
Fuel Trucks	209	0.51	0.07	0.58	0.14	0.07	0.20	3.16	0.01	0.42	0.20	592.94	0.01	0.00	594.38
Off-site Emissions Subtotal		**39,553.63**	**40.45**	**39,594.08**	**4,068.76**	**38.43**	**4,107.18**	**2,099.41**	**13.24**	**5,528.00**	**296.85**	**1,330,829.94**	**68.01**	**30.49**	**1,341,615.45**
Total Emissions In This Month (pounds)		**44,634.81**	**299.25**	**44,934.06**	**4,672.44**	**276.53**	**4,948.97**	**6,918.91**	**22.14**	**8,417.01**	**744.54**	**2,106,434.57**	**131.30**	**58.86**	**2,127,257.49**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)													
		Fugitive Dust PM$_{10}$	Exhaust PM$_{10}$	Total PM$_{10}$	Fugitive Dust PM$_{2.5}$	Exhaust PM$_{2.5}$	Total PM$_{2.5}$	NOx	SOx	CO	ROG	CO$_2$	CH$_4$	N$_2$O	Total GHG - CO$_2$e
Month 11															
On-site															
Off-road Equipment															
5 CY Dump Truck	32	16.29	1.73	18.02	1.63	1.59	3.22	44.47	0.09	18.48	3.18	8,685.09	0.53	0.24	8,769.77
Air Compressor	121	21.27	2.09	23.36	2.13	1.93	4.05	23.26	0.03	27.34	4.52	2,691.51	0.72	0.32	2,805.34
ATV	1,344	196.92	23.26	220.18	19.69	21.40	41.09	258.49	0.23	73.08	50.23	17,748.09	1.93	0.87	18,054.46
Auger	42	15.69	0.93	16.61	1.57	0.85	2.42	30.57	0.09	14.37	1.69	7,893.18	0.24	0.11	7,930.90
Backhoe/Excavator	155	3.17	3.79	6.95	0.48	3.48	3.96	51.37	0.13	78.73	4.33	11,430.76	1.17	0.52	11,616.15
Cable Plow	53	15.54	2.67	18.20	8.54	2.45	10.99	33.87	0.04	24.13	3.21	3,431.17	0.52	0.23	3,513.02
Cable Trencher	63	18.50	1.33	19.83	10.17	1.23	11.39	14.79	0.03	24.02	2.84	2,071.96	0.74	0.33	2,189.72
Compactor	36	11.85	0.89	12.74	1.19	0.82	2.00	18.97	0.04	22.21	1.26	3,902.73	0.34	0.15	3,956.17
Crane	91	43.18	4.85	48.03	4.32	4.46	8.78	116.10	0.16	40.42	7.56	16,437.47	1.09	0.49	16,610.55
Crawler Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dozer (D6)	50	14.80	3.72	18.52	8.13	3.42	11.56	64.78	0.07	41.69	5.26	6,519.77	0.84	0.38	6,653.37
Forklift	34	10.16	0.63	10.79	1.02	0.58	1.59	11.24	0.02	14.21	0.74	2,096.43	0.22	0.10	2,131.51
Forklift (10 K) (Aerial Lift)	260	67.04	4.88	71.92	6.70	4.49	11.19	87.09	0.19	110.10	5.72	16,247.33	1.71	0.77	16,519.20
Forklift (5 K)	168	33.62	3.15	36.77	3.36	2.90	6.26	56.19	0.12	71.03	3.69	10,482.15	1.11	0.50	10,657.55
Generator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (45 kW)	746	149.29	12.91	162.20	14.93	11.88	26.81	143.46	0.30	177.01	27.88	22,821.78	4.17	1.87	23,483.53
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	91	3.70	2.43	6.13	0.56	2.24	2.80	47.73	0.10	53.02	3.52	9,189.56	0.65	0.29	9,291.96
Man/Aerial Lift	26	5.21	0.09	5.30	0.52	0.08	0.60	3.00	0.01	4.10	0.15	510.26	0.10	0.04	525.95
Mini Excavator	63	11.08	0.68	11.76	1.11	0.63	1.74	9.16	0.02	16.51	1.29	1,574.69	0.33	0.15	1,627.19
Mini-Trencher	252	73.98	5.34	79.32	40.67	4.91	45.58	59.17	0.11	96.07	11.38	8,287.85	2.97	1.33	8,758.87
Motor Grader	155	661.97	5.35	667.32	71.48	4.93	76.40	163.63	0.30	60.94	9.54	26,650.16	1.75	0.78	26,927.36
Post Machine	706	124.07	11.75	135.82	12.41	10.81	23.21	162.65	0.28	156.77	22.06	21,879.91	1.40	0.63	22,102.06
Roller/Vibrator/Padder	144	613.53	3.54	617.07	66.25	3.26	69.50	75.44	0.17	88.30	5.01	15,520.15	1.34	0.60	15,732.68
Scraper	151	44.39	14.76	59.14	24.40	13.57	37.97	320.52	0.36	85.89	22.56	31,643.46	2.61	1.17	32,056.64
Sheepsfoot Roller	144	613.53	4.65	618.18	66.25	4.28	70.52	62.51	0.10	57.00	5.65	8,465.53	1.03	0.46	8,629.25
Skid Steer	1,159	23.62	13.25	36.87	3.58	12.19	15.76	236.06	0.58	312.13	15.14	49,525.01	3.08	1.38	50,013.80
Tensioner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor	45	15.43	1.22	16.65	1.54	1.12	2.66	23.86	0.05	26.51	1.76	4,594.78	0.32	0.14	4,645.98
Tractor Buster	106	452.08	2.84	454.91	48.81	2.61	51.42	55.68	0.12	61.86	4.10	10,721.16	0.75	0.34	10,840.62
Tractor Disk	106	43.71	2.66	46.36	4.37	2.45	6.82	80.05	0.20	37.37	4.67	18,160.33	0.98	0.44	18,315.49
Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck (Onroad)	1,404	524.55	61.09	585.65	52.46	56.21	108.66	1,361.70	2.63	512.28	103.97	233,699.65	14.94	6.70	236,068.39
Truck Mounted Digger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck, flatbed (onroad)	192	71.53	8.33	79.86	7.15	7.66	14.82	185.69	0.36	69.86	14.18	31,868.13	2.04	0.91	32,191.14
Water Pull	138	45.20	5.99	51.20	4.52	5.51	10.03	133.56	0.26	50.25	10.20	22,922.69	1.47	0.66	23,155.03
Water Pump	249	43.72	4.30	48.03	4.37	3.96	8.33	47.82	0.04	13.52	9.29	3,283.40	0.36	0.16	3,340.08
Water truck	702	262.28	30.55	292.82	26.23	28.10	54.33	680.85	1.31	256.14	51.98	116,849.82	7.47	3.35	118,034.19
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-road Vehicles															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	24	9.92	0.01	9.93	0.99	0.01	1.00	0.58	0.00	0.11	0.04	100.13	0.00	0.00	100.43
Tracker Deliveries Trucks	80	33.05	0.04	33.09	3.31	0.03	3.34	1.94	0.00	0.36	0.14	333.75	0.01	0.00	334.75
Water Haul Trucks	548	179.99	0.18	180.17	18.05	0.17	18.22	8.27	0.01	1.10	0.51	1,552.61	0.02	0.01	1,556.38
Worker Vehicles	2,646	465.54	0.02	465.56	46.63	0.02	46.65	1.42	0.03	15.07	0.55	2,976.79	0.18	0.08	3,005.38
Fuel Trucks	5	1.58	0.00	1.58	0.16	0.00	0.16	0.07	0.00	0.01	0.00	13.60	0.00	0.00	13.63
On-site Emissions Subtotal		**5,081.18**	**258.80**	**5,339.99**	**603.68**	**238.11**	**841.79**	**4,819.50**	**8.90**	**2,889.02**	**447.69**	**775,604.63**	**63.29**	**28.37**	**785,642.04**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	1,354	559.24	0.60	559.84	56.00	0.58	56.58	32.84	0.05	6.08	2.30	5,647.09	0.11	0.05	5,664.03
Tracker Deliveries Trucks	4,512	1,864.14	2.01	1,866.15	186.67	1.92	188.59	109.47	0.18	20.25	7.67	18,823.62	0.36	0.16	18,880.10
Water Haul Trucks	30,907	10,151.40	10.13	10,161.53	1,018.18	9.69	1,027.87	466.52	0.84	62.32	28.87	87,567.33	1.34	0.60	87,779.96
Worker Vehicles	149,234	26,256.51	1.33	26,257.83	2,630.01	1.22	2,631.24	79.84	1.69	849.89	30.83	167,890.88	10.17	4.56	169,503.62
Fuel Trucks	271	88.92	0.09	89.01	8.92	0.08	9.00	4.09	0.01	0.55	0.25	767.01	0.01	0.01	768.88
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	5,966	22.58	2.65	25.23	5.69	2.54	8.23	144.75	0.24	26.78	10.14	24,891.23	0.47	0.21	24,965.93
Tracker Deliveries Trucks	19,888	75.25	8.84	84.10	18.97	8.46	27.43	482.50	0.79	89.27	33.80	82,970.77	1.57	0.70	83,219.75
Water Haul Trucks	23,893	58.13	7.83	65.96	15.53	7.49	23.02	360.64	0.65	48.17	22.32	67,693.89	1.04	0.46	67,858.26
Worker Vehicles	776,866	476.95	6.90	483.85	128.65	6.37	135.02	415.61	8.80	4,424.26	160.48	873,985.17	52.94	23.73	882,380.54
Fuel Trucks	209	0.51	0.07	0.58	0.14	0.07	0.20	3.16	0.01	0.42	0.20	592.94	0.01	0.00	594.38
Off-site Emissions Subtotal		**39,553.63**	**40.45**	**39,594.08**	**4,068.76**	**38.43**	**4,107.18**	**2,099.41**	**13.24**	**5,528.00**	**296.85**	**1,330,829.94**	**68.01**	**30.49**	**1,341,615.45**
Total Emissions In This Month (pounds)		**44,634.81**	**299.25**	**44,934.06**	**4,672.44**	**276.53**	**4,948.97**	**6,918.91**	**22.14**	**8,417.01**	**744.54**	**2,106,434.57**	**131.30**	**58.86**	**2,127,257.49**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)													
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 12															
On-site															
Off-road Equipment															
5 CY Dump Truck	32	16.29	1.73	18.02	1.63	1.59	3.22	44.47	0.09	18.48	3.18	8,685.09	0.53	0.24	8,769.77
Air Compressor	121	21.27	2.09	23.36	2.13	1.93	4.05	23.26	0.03	27.34	4.52	2,691.51	0.72	0.32	2,805.34
ATV	1,344	196.92	23.26	220.18	19.69	21.40	41.09	258.49	0.23	73.08	50.23	17,748.09	1.93	0.87	18,054.46
Auger	42	15.69	0.93	16.61	1.57	0.85	2.42	30.57	0.09	14.37	1.69	7,893.18	0.24	0.11	7,930.90
Backhoe/Excavator	155	3.17	3.79	6.95	0.48	3.48	3.96	51.37	0.13	78.73	4.33	11,430.76	1.17	0.52	11,616.15
Cable Plow	53	15.54	2.67	18.20	8.54	2.45	10.99	33.87	0.04	24.13	3.21	3,431.17	0.52	0.23	3,513.02
Cable Trencher	63	18.50	1.33	19.83	10.17	1.23	11.39	14.79	0.03	24.02	2.84	2,071.96	0.74	0.33	2,189.72
Compactor	36	11.85	0.89	12.74	1.19	0.82	2.00	18.97	0.04	22.21	1.26	3,902.73	0.34	0.15	3,956.17
Crane	91	43.18	4.85	48.03	4.32	4.46	8.78	116.10	0.16	40.42	7.56	16,437.47	1.09	0.49	16,610.55
Crawler Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dozer (D6)	50	14.80	3.72	18.52	8.13	3.42	11.56	64.78	0.07	41.69	5.26	6,519.77	0.84	0.38	6,653.37
Forklift	34	10.16	0.63	10.79	1.02	0.58	1.59	11.24	0.02	14.21	0.74	2,096.43	0.22	0.10	2,131.51
Forklift (10 K) (Aerial Lift)	260	67.04	4.88	71.92	6.70	4.49	11.19	87.09	0.19	110.10	5.72	16,247.33	1.71	0.77	16,519.20
Forklift (5 K)	168	33.62	3.15	36.77	3.36	2.90	6.26	56.19	0.12	71.03	3.69	10,482.15	1.11	0.50	10,657.55
Generator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (45 kW)	746	149.29	12.91	162.20	14.93	11.88	26.81	143.46	0.30	177.01	27.88	22,821.78	4.17	1.87	23,483.53
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	91	3.70	2.43	6.13	0.56	2.24	2.80	47.73	0.10	53.02	3.52	9,189.56	0.65	0.29	9,291.96
Man/Aerial Lift	26	5.21	0.09	5.30	0.52	0.08	0.60	3.00	0.01	4.10	0.15	510.26	0.10	0.04	525.95
Mini Excavator	63	11.08	0.68	11.76	1.11	0.63	1.74	9.16	0.02	16.51	1.29	1,574.69	0.33	0.15	1,627.19
Mini-Trencher	252	73.98	5.34	79.32	40.67	4.91	45.58	59.17	0.11	96.07	11.38	8,287.85	2.97	1.33	8,758.87
Motor Grader	155	661.97	5.35	667.32	71.48	4.93	76.40	163.63	0.30	60.94	9.54	26,650.16	1.75	0.78	26,927.36
Post Machine	706	124.07	11.75	135.82	12.41	10.81	23.21	162.65	0.28	156.77	22.06	21,879.91	1.40	0.63	22,102.06
Roller/Vibrator/Padder	144	613.53	3.54	617.07	66.25	3.26	69.50	75.44	0.17	88.30	5.01	15,520.15	1.34	0.60	15,732.68
Scraper	151	44.39	14.76	59.14	24.40	13.57	37.97	320.52	0.36	85.89	22.56	31,643.46	2.61	1.17	32,056.64
Sheepsfoot Roller	144	613.53	4.65	618.18	66.25	4.28	70.52	62.51	0.10	57.00	5.65	8,465.53	1.03	0.46	8,629.25
Skid Steer	1,159	23.62	13.25	36.87	3.58	12.19	15.76	236.06	0.58	312.13	15.14	49,525.01	3.08	1.38	50,013.80
Tensioner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor	45	15.43	1.22	16.65	1.54	1.12	2.66	23.86	0.05	26.51	1.76	4,594.78	0.32	0.14	4,645.98
Tractor Buster	106	452.08	2.84	454.91	48.81	2.61	51.42	55.68	0.12	61.86	4.10	10,721.16	0.75	0.34	10,840.62
Tractor Disk	106	43.71	2.66	46.36	4.37	2.45	6.82	80.05	0.20	37.37	4.67	18,160.33	0.98	0.44	18,315.49
Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck (Onroad)	1,404	524.55	61.09	585.65	52.46	56.21	108.66	1,361.70	2.63	512.28	103.97	233,699.65	14.94	6.70	236,068.39
Truck Mounted Digger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck, flatbed (onroad)	192	71.53	8.33	79.86	7.15	7.66	14.82	185.69	0.36	69.86	14.18	31,868.13	2.04	0.91	32,191.14
Water Pull	138	45.20	5.99	51.20	4.52	5.51	10.03	133.56	0.26	50.25	10.20	22,922.69	1.47	0.66	23,155.03
Water Pump	249	43.72	4.30	48.03	4.37	3.96	8.33	47.82	0.04	13.52	9.29	3,283.40	0.36	0.16	3,340.08
Water truck	702	262.28	30.55	292.82	26.23	28.10	54.33	680.85	1.31	256.14	51.98	116,849.82	7.47	3.35	118,034.19
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-road Vehicles															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	24	9.92	0.01	9.93	0.99	0.01	1.00	0.58	0.00	0.11	0.04	100.13	0.00	0.00	100.43
Tracker Deliveries Trucks	80	33.05	0.04	33.09	3.31	0.03	3.34	1.94	0.00	0.36	0.14	333.75	0.01	0.00	334.75
Water Haul Trucks	548	179.99	0.18	180.17	18.05	0.17	18.22	8.27	0.01	1.10	0.51	1,552.61	0.02	0.01	1,556.38
Worker Vehicles	2,646	465.54	0.02	465.56	46.63	0.02	46.65	1.42	0.03	15.07	0.55	2,976.79	0.18	0.08	3,005.38
Fuel Trucks	5	1.58	0.00	1.58	0.16	0.00	0.16	0.07	0.00	0.01	0.00	13.60	0.00	0.00	13.63
On-site Emissions Subtotal		**5,081.18**	**258.80**	**5,339.99**	**603.68**	**238.11**	**841.79**	**4,819.50**	**8.90**	**2,889.02**	**447.69**	**775,604.63**	**63.29**	**28.37**	**785,642.04**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	1,354	559.24	0.60	559.84	56.00	0.58	56.58	32.84	0.05	6.08	2.30	5,647.09	0.11	0.05	5,664.03
Tracker Deliveries Trucks	4,512	1,864.14	2.01	1,866.15	186.67	1.92	188.59	109.47	0.18	20.25	7.67	18,823.62	0.36	0.16	18,880.10
Water Haul Trucks	30,907	10,151.40	10.13	10,161.53	1,018.18	9.69	1,027.87	466.52	0.84	62.32	28.87	87,567.33	1.34	0.60	87,779.96
Worker Vehicles	149,234	26,256.51	1.33	26,257.83	2,630.01	1.22	2,631.24	79.84	1.69	849.89	30.83	167,890.88	10.17	4.56	169,503.62
Fuel Trucks	271	88.92	0.09	89.01	8.92	0.08	9.00	4.09	0.01	0.55	0.25	767.01	0.01	0.01	768.88
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	5,966	22.58	2.65	25.23	5.69	2.54	8.23	144.75	0.24	26.78	10.14	24,891.23	0.47	0.21	24,965.93
Tracker Deliveries Trucks	19,888	75.25	8.84	84.10	18.97	8.46	27.43	482.50	0.79	89.27	33.80	82,970.77	1.57	0.70	83,219.75
Water Haul Trucks	23,893	58.13	7.83	65.96	15.53	7.49	23.02	360.64	0.65	48.17	22.32	67,693.89	1.04	0.46	67,858.26
Worker Vehicles	776,866	476.95	6.90	483.85	128.65	6.37	135.02	415.61	8.80	4,424.26	160.48	873,985.17	52.94	23.73	882,380.54
Fuel Trucks	209	0.51	0.07	0.58	0.14	0.07	0.20	3.16	0.01	0.42	0.20	592.94	0.01	0.00	594.38
Off-site Emissions Subtotal		**39,553.63**	**40.45**	**39,594.08**	**4,068.76**	**38.43**	**4,107.18**	**2,099.41**	**13.24**	**5,528.00**	**296.85**	**1,330,829.94**	**68.01**	**30.49**	**1,341,615.45**
Total Emissions In This Month (pounds)		**44,634.81**	**299.25**	**44,934.06**	**4,672.44**	**276.53**	**4,948.97**	**6,918.91**	**22.14**	**8,417.01**	**744.54**	**2,106,434.57**	**131.30**	**58.86**	**2,127,257.49**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)													
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 13															
On-site															
Off-road Equipment															
5 CY Dump Truck	32	16.29	1.73	18.02	1.63	1.59	3.22	44.47	0.09	18.48	3.18	8,685.09	0.53	0.24	8,769.77
Air Compressor	121	21.27	2.09	23.36	2.13	1.93	4.05	23.26	0.03	27.34	4.52	2,691.51	0.72	0.32	2,805.34
ATV	1,344	196.92	23.26	220.18	19.69	21.40	41.09	258.49	0.23	73.08	50.23	17,748.09	1.93	0.87	18,054.46
Auger	42	15.69	0.93	16.61	1.57	0.85	2.42	30.57	0.09	14.37	1.69	7,893.18	0.24	0.11	7,930.90
Backhoe/Excavator	155	3.17	3.79	6.95	0.48	3.48	3.96	51.37	0.13	78.73	4.33	11,430.76	1.17	0.52	11,616.15
Cable Plow	53	15.54	2.67	18.20	8.54	2.45	10.99	33.87	0.04	24.13	3.21	3,431.17	0.52	0.23	3,513.02
Cable Trencher	63	18.50	1.33	19.83	10.17	1.23	11.39	14.79	0.03	24.02	2.84	2,071.96	0.74	0.33	2,189.72
Compactor	36	11.85	0.89	12.74	1.19	0.82	2.00	18.97	0.04	22.21	1.26	3,902.73	0.34	0.15	3,956.17
Crane	91	43.18	4.85	48.03	4.32	4.46	8.78	116.10	0.16	40.42	7.56	16,437.47	1.09	0.49	16,610.55
Crawler Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dozer (D6)	50	14.80	3.72	18.52	8.13	3.42	11.56	64.78	0.07	41.69	5.26	6,519.77	0.84	0.38	6,653.37
Forklift	34	10.16	0.63	10.79	1.02	0.58	1.59	11.24	0.02	14.21	0.74	2,096.43	0.22	0.10	2,131.51
Forklift (10 K) (Aerial Lift)	260	67.04	4.88	71.92	6.70	4.49	11.19	87.09	0.19	110.10	5.72	16,247.33	1.71	0.77	16,519.20
Forklift (5 K)	168	33.62	3.15	36.77	3.36	2.90	6.26	56.19	0.12	71.03	3.69	10,482.15	1.11	0.50	10,657.55
Generator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (45 kW)	746	149.29	12.91	162.20	14.93	11.88	26.81	143.46	0.30	177.01	27.88	22,821.78	4.17	1.87	23,483.53
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	91	3.70	2.43	6.13	0.56	2.24	2.80	47.73	0.10	53.02	3.52	9,189.56	0.65	0.29	9,291.96
Man/Aerial Lift	26	5.21	0.09	5.30	0.52	0.08	0.60	3.00	0.01	4.10	0.15	510.26	0.10	0.04	525.95
Mini Excavator	63	11.08	0.68	11.76	1.11	0.63	1.74	9.16	0.02	16.51	1.29	1,574.69	0.33	0.15	1,627.19
Mini-Trencher	252	73.98	5.34	79.32	40.67	4.91	45.58	59.17	0.11	96.07	11.38	8,287.85	2.97	1.33	8,758.87
Motor Grader	155	661.97	5.35	667.32	71.48	4.93	76.40	163.63	0.30	60.94	9.54	26,650.16	1.75	0.78	26,927.36
Post Machine	706	124.07	11.75	135.82	12.41	10.81	23.21	162.65	0.28	156.77	22.06	21,879.91	1.40	0.63	22,102.06
Roller/Vibrator/Padder	144	613.53	3.54	617.07	66.25	3.26	69.50	75.44	0.17	88.30	5.01	15,520.15	1.34	0.60	15,732.68
Scraper	151	44.39	14.76	59.14	24.40	13.57	37.97	320.52	0.36	85.89	22.56	31,643.46	2.61	1.17	32,056.64
Sheepsfoot Roller	144	613.53	4.65	618.18	66.25	4.28	70.52	62.51	0.10	57.00	5.65	8,465.53	1.03	0.46	8,629.25
Skid Steer	1,159	23.62	13.25	36.87	3.58	12.19	15.76	236.06	0.58	312.13	15.14	49,525.01	3.08	1.38	50,013.80
Tensioner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor	45	15.43	1.22	16.65	1.54	1.12	2.66	23.86	0.05	26.51	1.76	4,594.78	0.32	0.14	4,645.98
Tractor Buster	106	452.08	2.84	454.91	48.81	2.61	51.42	55.68	0.12	61.86	4.10	10,721.16	0.75	0.34	10,840.62
Tractor Disk	106	43.71	2.66	46.36	4.37	2.45	6.82	80.05	0.20	37.37	4.67	18,160.33	0.98	0.44	18,315.49
Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck (Onroad)	1,404	524.55	61.09	585.65	52.46	56.21	108.66	1,361.70	2.63	512.28	103.97	233,699.65	14.94	6.70	236,068.39
Truck Mounted Digger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck, flatbed (onroad)	192	71.53	8.33	79.86	7.15	7.66	14.82	185.69	0.36	69.86	14.18	31,868.13	2.04	0.91	32,191.14
Water Pull	138	45.20	5.99	51.20	4.52	5.51	10.03	133.56	0.26	50.25	10.20	22,922.69	1.47	0.66	23,155.03
Water Pump	249	43.72	4.30	48.03	4.37	3.96	8.33	47.82	0.04	13.52	9.29	3,283.40	0.36	0.16	3,340.08
Water truck	702	262.28	30.55	292.82	26.23	28.10	54.33	680.85	1.31	256.14	51.98	116,849.82	7.47	3.35	118,034.19
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-road Vehicles															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	24	9.92	0.01	9.93	0.99	0.01	1.00	0.58	0.00	0.11	0.04	100.13	0.00	0.00	100.43
Tracker Deliveries Trucks	80	33.05	0.04	33.09	3.31	0.03	3.34	1.94	0.00	0.36	0.14	333.75	0.01	0.00	334.75
Water Haul Trucks	548	179.99	0.18	180.17	18.05	0.17	18.22	8.27	0.01	1.10	0.51	1,552.61	0.02	0.01	1,556.38
Worker Vehicles	2,646	465.54	0.02	465.56	46.63	0.02	46.65	1.42	0.03	15.07	0.55	2,976.79	0.18	0.08	3,005.38
Fuel Trucks	5	1.58	0.00	1.58	0.16	0.00	0.16	0.07	0.00	0.01	0.00	13.60	0.00	0.00	13.63
On-site Emissions Subtotal		**5,081.18**	**258.80**	**5,339.99**	**603.68**	**238.11**	**841.79**	**4,819.50**	**8.90**	**2,889.02**	**447.69**	**775,604.63**	**63.29**	**28.37**	**785,642.04**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	1,354	559.24	0.60	559.84	56.00	0.58	56.58	32.84	0.05	6.08	2.30	5,647.09	0.11	0.05	5,664.03
Tracker Deliveries Trucks	4,512	1,864.14	2.01	1,866.15	186.67	1.92	188.59	109.47	0.18	20.25	7.67	18,823.62	0.36	0.16	18,880.10
Water Haul Trucks	30,907	10,151.40	10.13	10,161.53	1,018.18	9.69	1,027.87	466.52	0.84	62.32	28.87	87,567.33	1.34	0.60	87,779.96
Worker Vehicles	149,234	26,256.51	1.33	26,257.83	2,630.01	1.22	2,631.24	79.84	1.69	849.89	30.83	167,890.88	10.17	4.56	169,503.62
Fuel Trucks	271	88.92	0.09	89.01	8.92	0.08	9.00	4.09	0.01	0.55	0.25	767.01	0.01	0.01	768.88
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	5,966	22.58	2.65	25.23	5.69	2.54	8.23	144.75	0.24	26.78	10.14	24,891.23	0.47	0.21	24,965.93
Tracker Deliveries Trucks	19,888	75.25	8.84	84.10	18.97	8.46	27.43	482.50	0.79	89.27	33.80	82,970.77	1.57	0.70	83,219.75
Water Haul Trucks	23,893	58.13	7.83	65.96	15.53	7.49	23.02	360.64	0.65	48.17	22.32	67,693.89	1.04	0.46	67,858.26
Worker Vehicles	776,866	476.95	6.90	483.85	128.65	6.37	135.02	415.61	8.80	4,424.26	160.48	873,985.17	52.94	23.73	882,380.54
Fuel Trucks	209	0.51	0.07	0.58	0.14	0.07	0.20	3.16	0.01	0.42	0.20	592.94	0.01	0.00	594.38
Off-site Emissions Subtotal		**39,553.63**	**40.45**	**39,594.08**	**4,068.76**	**38.43**	**4,107.18**	**2,099.41**	**13.24**	**5,528.00**	**296.85**	**1,330,829.94**	**68.01**	**30.49**	**1,341,615.45**
Total Emissions In This Month (pounds)		**44,634.81**	**299.25**	**44,934.06**	**4,672.44**	**276.53**	**4,948.97**	**6,918.91**	**22.14**	**8,417.01**	**744.54**	**2,106,434.57**	**131.30**	**58.86**	**2,127,257.49**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)													
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 14															
On-site															
Off-road Equipment															
5 CY Dump Truck	32	16.29	1.73	18.02	1.63	1.59	3.22	44.47	0.09	18.48	3.18	8,685.09	0.53	0.24	8,769.77
Air Compressor	121	21.27	2.09	23.36	2.13	1.93	4.05	23.26	0.03	27.34	4.52	2,691.51	0.72	0.32	2,805.34
ATV	1,344	196.92	23.26	220.18	19.69	21.40	41.09	258.49	0.23	73.08	50.23	17,748.09	1.93	0.87	18,054.46
Auger	42	15.69	0.93	16.61	1.57	0.85	2.42	30.57	0.09	14.37	1.69	7,893.18	0.24	0.11	7,930.90
Backhoe/Excavator	155	3.17	3.79	6.95	0.48	3.48	3.96	51.37	0.13	78.73	4.33	11,430.76	1.17	0.52	11,616.15
Cable Plow	53	15.54	2.67	18.20	8.54	2.45	10.99	33.87	0.04	24.13	3.21	3,431.17	0.52	0.23	3,513.02
Cable Trencher	63	18.50	1.33	19.83	10.17	1.23	11.39	14.79	0.03	24.02	2.84	2,071.96	0.74	0.33	2,189.72
Compactor	36	11.85	0.89	12.74	1.19	0.82	2.00	18.97	0.04	22.21	1.26	3,902.73	0.34	0.15	3,956.17
Crane	91	43.18	4.85	48.03	4.32	4.46	8.78	116.10	0.16	40.42	7.56	16,437.47	1.09	0.49	16,610.55
Crawler Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dozer (D6)	50	14.80	3.72	18.52	8.13	3.42	11.56	64.78	0.07	41.69	5.26	6,519.77	0.84	0.38	6,653.37
Forklift	34	10.16	0.63	10.79	1.02	0.58	1.59	11.24	0.02	14.21	0.74	2,096.43	0.22	0.10	2,131.51
Forklift (10 K) (Aerial Lift)	260	67.04	4.88	71.92	6.70	4.49	11.19	87.09	0.19	110.10	5.72	16,247.33	1.71	0.77	16,519.20
Forklift (5 K)	168	33.62	3.15	36.77	3.36	2.90	6.26	56.19	0.12	71.03	3.69	10,482.15	1.11	0.50	10,657.55
Generator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (45 kW)	746	149.29	12.91	162.20	14.93	11.88	26.81	143.46	0.30	177.01	27.88	22,821.78	4.17	1.87	23,483.53
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	91	3.70	2.43	6.13	0.56	2.24	2.80	47.73	0.10	53.02	3.52	9,189.56	0.65	0.29	9,291.96
Man/Aerial Lift	26	5.21	0.09	5.30	0.52	0.08	0.60	3.00	0.01	4.10	0.15	510.26	0.10	0.04	525.95
Mini Excavator	63	11.08	0.68	11.76	1.11	0.63	1.74	9.16	0.02	16.51	1.29	1,574.69	0.33	0.15	1,627.19
Mini-Trencher	252	73.98	5.34	79.32	40.67	4.91	45.58	59.17	0.11	96.07	11.38	8,287.85	2.97	1.33	8,758.87
Motor Grader	155	661.97	5.35	667.32	71.48	4.93	76.40	163.63	0.30	60.94	9.54	26,650.16	1.75	0.78	26,927.36
Post Machine	706	124.07	11.75	135.82	12.41	10.81	23.21	162.65	0.28	156.77	22.06	21,879.91	1.40	0.63	22,102.06
Roller/Vibrator/Padder	144	613.53	3.54	617.07	66.25	3.26	69.50	75.44	0.17	88.30	5.01	15,520.15	1.34	0.60	15,732.68
Scraper	151	44.39	14.76	59.14	24.40	13.57	37.97	320.52	0.36	85.89	22.56	31,643.46	2.61	1.17	32,056.64
Sheepsfoot Roller	144	613.53	4.65	618.18	66.25	4.28	70.52	62.51	0.10	57.00	5.65	8,465.53	1.03	0.46	8,629.25
Skid Steer	1,159	23.62	13.25	36.87	3.58	12.19	15.76	236.06	0.58	312.13	15.14	49,525.01	3.08	1.38	50,013.80
Tensioner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor	45	15.43	1.22	16.65	1.54	1.12	2.66	23.86	0.05	26.51	1.76	4,594.78	0.32	0.14	4,645.98
Tractor Buster	106	452.08	2.84	454.91	48.81	2.61	51.42	55.68	0.12	61.86	4.10	10,721.16	0.75	0.34	10,840.62
Tractor Disk	106	43.71	2.66	46.36	4.37	2.45	6.82	80.05	0.20	37.37	4.67	18,160.33	0.98	0.44	18,315.49
Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck (Onroad)	1,404	524.55	61.09	585.65	52.46	56.21	108.66	1,361.70	2.63	512.28	103.97	233,699.65	14.94	6.70	236,068.39
Truck Mounted Digger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck, flatbed (onroad)	192	71.53	8.33	79.86	7.15	7.66	14.82	185.69	0.36	69.86	14.18	31,868.13	2.04	0.91	32,191.14
Water Pull	138	45.20	5.99	51.20	4.52	5.51	10.03	133.56	0.26	50.25	10.20	22,922.69	1.47	0.66	23,155.03
Water Pump	249	43.72	4.30	48.03	4.37	3.96	8.33	47.82	0.04	13.52	9.29	3,283.40	0.36	0.16	3,340.08
Water truck	702	262.28	30.55	292.82	26.23	28.10	54.33	680.85	1.31	256.14	51.98	116,849.82	7.47	3.35	118,034.19
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-road Vehicles															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	24	9.92	0.01	9.93	0.99	0.01	1.00	0.58	0.00	0.11	0.04	100.13	0.00	0.00	100.43
Tracker Deliveries Trucks	80	33.05	0.04	33.09	3.31	0.03	3.34	1.94	0.00	0.36	0.14	333.75	0.01	0.00	334.75
Water Haul Trucks	548	179.99	0.18	180.17	18.05	0.17	18.22	8.27	0.01	1.10	0.51	1,552.61	0.02	0.01	1,556.38
Worker Vehicles	2,646	465.54	0.02	465.56	46.63	0.02	46.65	1.42	0.03	15.07	0.55	2,976.79	0.18	0.08	3,005.38
Fuel Trucks	5	1.58	0.00	1.58	0.16	0.00	0.16	0.07	0.00	0.01	0.00	13.60	0.00	0.00	13.63
On-site Emissions Subtotal		**5,081.18**	**258.80**	**5,339.99**	**603.68**	**238.11**	**841.79**	**4,819.50**	**8.90**	**2,889.02**	**447.69**	**775,604.63**	**63.29**	**28.37**	**785,642.04**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	1,354	559.24	0.60	559.84	56.00	0.58	56.58	32.84	0.05	6.08	2.30	5,647.09	0.11	0.05	5,664.03
Tracker Deliveries Trucks	4,512	1,864.14	2.01	1,866.15	186.67	1.92	188.59	109.47	0.18	20.25	7.67	18,823.62	0.36	0.16	18,880.10
Water Haul Trucks	30,907	10,151.40	10.13	10,161.53	1,018.18	9.69	1,027.87	466.52	0.84	62.32	28.87	87,567.33	1.34	0.60	87,779.96
Worker Vehicles	149,234	26,256.51	1.33	26,257.83	2,630.01	1.22	2,631.24	79.84	1.69	849.89	30.83	167,890.88	10.17	4.56	169,503.62
Fuel Trucks	271	88.92	0.09	89.01	8.92	0.08	9.00	4.09	0.01	0.55	0.25	767.01	0.01	0.01	768.88
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	5,966	22.58	2.65	25.23	5.69	2.54	8.23	144.75	0.24	26.78	10.14	24,891.23	0.47	0.21	24,965.93
Tracker Deliveries Trucks	19,888	75.25	8.84	84.10	18.97	8.46	27.43	482.50	0.79	89.27	33.80	82,970.77	1.57	0.70	83,219.75
Water Haul Trucks	23,893	58.13	7.83	65.96	15.53	7.49	23.02	360.64	0.65	48.17	22.32	67,693.89	1.04	0.46	67,858.26
Worker Vehicles	776,866	476.95	6.90	483.85	128.65	6.37	135.02	415.61	8.80	4,424.26	160.48	873,985.17	52.94	23.73	882,380.54
Fuel Trucks	209	0.51	0.07	0.58	0.14	0.07	0.20	3.16	0.01	0.42	0.20	592.94	0.01	0.00	594.38
Off-site Emissions Subtotal		**39,553.63**	**40.45**	**39,594.08**	**4,068.76**	**38.43**	**4,107.18**	**2,099.41**	**13.24**	**5,528.00**	**296.85**	**1,330,829.94**	**68.01**	**30.49**	**1,341,615.45**
Total Emissions In This Month (pounds)		**44,634.81**	**299.25**	**44,934.06**	**4,672.44**	**276.53**	**4,948.97**	**6,918.91**	**22.14**	**8,417.01**	**744.54**	**2,106,434.57**	**131.30**	**58.86**	**2,127,257.49**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)													
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 15															
On-site															
Off-road Equipment															
5 CY Dump Truck	32	16.29	1.73	18.02	1.63	1.59	3.22	44.47	0.09	18.48	3.18	8,685.09	0.53	0.24	8,769.77
Air Compressor	121	21.27	2.09	23.36	2.13	1.93	4.05	23.26	0.03	27.34	4.52	2,691.51	0.72	0.32	2,805.34
ATV	1,344	196.92	23.26	220.18	19.69	21.40	41.09	258.49	0.23	73.08	50.23	17,748.09	1.93	0.87	18,054.46
Auger	42	15.69	0.93	16.61	1.57	0.85	2.42	30.57	0.09	14.37	1.69	7,893.18	0.24	0.11	7,930.90
Backhoe/Excavator	155	3.17	3.79	6.95	0.48	3.48	3.96	51.37	0.13	78.73	4.33	11,430.76	1.17	0.52	11,616.15
Cable Plow	53	15.54	2.67	18.20	8.54	2.45	10.99	33.87	0.04	24.13	3.21	3,431.17	0.52	0.23	3,513.02
Cable Trencher	63	18.50	1.33	19.83	10.17	1.23	11.39	14.79	0.03	24.02	2.84	2,071.96	0.74	0.33	2,189.72
Compactor	36	11.85	0.89	12.74	1.19	0.82	2.00	18.97	0.04	22.21	1.26	3,902.73	0.34	0.15	3,956.17
Crane	91	43.18	4.85	48.03	4.32	4.46	8.78	116.10	0.16	40.42	7.56	16,437.47	1.09	0.49	16,610.55
Crawler Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dozer (D6)	50	14.80	3.72	18.52	8.13	3.42	11.56	64.78	0.07	41.69	5.26	6,519.77	0.84	0.38	6,653.37
Forklift	34	10.16	0.63	10.79	1.02	0.58	1.59	11.24	0.02	14.21	0.74	2,096.43	0.22	0.10	2,131.51
Forklift (10 K) (Aerial Lift)	260	67.04	4.88	71.92	6.70	4.49	11.19	87.09	0.19	110.10	5.72	16,247.33	1.71	0.77	16,519.20
Forklift (5 K)	168	33.62	3.15	36.77	3.36	2.90	6.26	56.19	0.12	71.03	3.69	10,482.15	1.11	0.50	10,657.55
Generator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (45 kW)	746	149.29	12.91	162.20	14.93	11.88	26.81	143.46	0.30	177.01	27.88	22,821.78	4.17	1.87	23,483.53
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	91	3.70	2.43	6.13	0.56	2.24	2.80	47.73	0.10	53.02	3.52	9,189.56	0.65	0.29	9,291.96
Man/Aerial Lift	26	5.21	0.09	5.30	0.52	0.08	0.60	3.00	0.01	4.10	0.15	510.26	0.10	0.04	525.95
Mini Excavator	63	11.08	0.68	11.76	1.11	0.63	1.74	9.16	0.02	16.51	1.29	1,574.69	0.33	0.15	1,627.19
Mini-Trencher	252	73.98	5.34	79.32	40.67	4.91	45.58	59.17	0.11	96.07	11.38	8,287.85	2.97	1.33	8,758.87
Motor Grader	155	661.97	5.35	667.32	71.48	4.93	76.40	163.63	0.30	60.94	9.54	26,650.16	1.75	0.78	26,927.36
Post Machine	706	124.07	11.75	135.82	12.41	10.81	23.21	162.65	0.28	156.77	22.06	21,879.91	1.40	0.63	22,102.06
Roller/Vibrator/Padder	144	613.53	3.54	617.07	66.25	3.26	69.50	75.44	0.17	88.30	5.01	15,520.15	1.34	0.60	15,732.68
Scraper	151	44.39	14.76	59.14	24.40	13.57	37.97	320.52	0.36	85.89	22.56	31,643.46	2.61	1.17	32,056.64
Sheepsfoot Roller	144	613.53	4.65	618.18	66.25	4.28	70.52	62.51	0.10	57.00	5.65	8,465.53	1.03	0.46	8,629.25
Skid Steer	1,159	23.62	13.25	36.87	3.58	12.19	15.76	236.06	0.58	312.13	15.14	49,525.01	3.08	1.38	50,013.80
Tensioner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor	45	15.43	1.22	16.65	1.54	1.12	2.66	23.86	0.05	26.51	1.76	4,594.78	0.32	0.14	4,645.98
Tractor Buster	106	452.08	2.84	454.91	48.81	2.61	51.42	55.68	0.12	61.86	4.10	10,721.16	0.75	0.34	10,840.62
Tractor Disk	106	43.71	2.66	46.36	4.37	2.45	6.82	80.05	0.20	37.37	4.67	18,160.33	0.98	0.44	18,315.49
Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck (Onroad)	1,404	524.55	61.09	585.65	52.46	56.21	108.66	1,361.70	2.63	512.28	103.97	233,699.65	14.94	6.70	236,068.39
Truck Mounted Digger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck, flatbed (onroad)	192	71.53	8.33	79.86	7.15	7.66	14.82	185.69	0.36	69.86	14.18	31,868.13	2.04	0.91	32,191.14
Water Pull	138	45.20	5.99	51.20	4.52	5.51	10.03	133.56	0.26	50.25	10.20	22,922.69	1.47	0.66	23,155.03
Water Pump	249	43.72	4.30	48.03	4.37	3.96	8.33	47.82	0.04	13.52	9.29	3,283.40	0.36	0.16	3,340.08
Water truck	702	262.28	30.55	292.82	26.23	28.10	54.33	680.85	1.31	256.14	51.98	116,849.82	7.47	3.35	118,034.19
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-road Vehicles															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	24	9.92	0.01	9.93	0.99	0.01	1.00	0.58	0.00	0.11	0.04	100.13	0.00	0.00	100.43
Tracker Deliveries Trucks	80	33.05	0.04	33.09	3.31	0.03	3.34	1.94	0.00	0.36	0.14	333.75	0.01	0.00	334.75
Water Haul Trucks	548	179.99	0.18	180.17	18.05	0.17	18.22	8.27	0.01	1.10	0.51	1,552.61	0.02	0.01	1,556.38
Worker Vehicles	2,646	465.54	0.02	465.56	46.63	0.02	46.65	1.42	0.03	15.07	0.55	2,976.79	0.18	0.08	3,005.38
Fuel Trucks	5	1.58	0.00	1.58	0.16	0.00	0.16	0.07	0.00	0.01	0.00	13.60	0.00	0.00	13.63
On-site Emissions Subtotal		**5,081.18**	**258.80**	**5,339.99**	**603.68**	**238.11**	**841.79**	**4,819.50**	**8.90**	**2,889.02**	**447.69**	**775,604.63**	**63.29**	**28.37**	**785,642.04**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	1,354	559.24	0.60	559.84	56.00	0.58	56.58	32.84	0.05	6.08	2.30	5,647.09	0.11	0.05	5,664.03
Tracker Deliveries Trucks	4,512	1,864.14	2.01	1,866.15	186.67	1.92	188.59	109.47	0.18	20.25	7.67	18,823.62	0.36	0.16	18,880.10
Water Haul Trucks	30,907	10,151.40	10.13	10,161.53	1,018.18	9.69	1,027.87	466.52	0.84	62.32	28.87	87,567.33	1.34	0.60	87,779.96
Worker Vehicles	149,234	26,256.51	1.33	26,257.83	2,630.01	1.22	2,631.24	79.84	1.69	849.89	30.83	167,890.88	10.17	4.56	169,503.62
Fuel Trucks	271	88.92	0.09	89.01	8.92	0.08	9.00	4.09	0.01	0.55	0.25	767.01	0.01	0.01	768.88
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	5,966	22.58	2.65	25.23	5.69	2.54	8.23	144.75	0.24	26.78	10.14	24,891.23	0.47	0.21	24,965.93
Tracker Deliveries Trucks	19,888	75.25	8.84	84.10	18.97	8.46	27.43	482.50	0.79	89.27	33.80	82,970.77	1.57	0.70	83,219.75
Water Haul Trucks	23,893	58.13	7.83	65.96	15.53	7.49	23.02	360.64	0.65	48.17	22.32	67,693.89	1.04	0.46	67,858.26
Worker Vehicles	776,866	476.95	6.90	483.85	128.65	6.37	135.02	415.61	8.80	4,424.26	160.48	873,985.17	52.94	23.73	882,380.54
Fuel Trucks	209	0.51	0.07	0.58	0.14	0.07	0.20	3.16	0.01	0.42	0.20	592.94	0.01	0.00	594.38
Off-site Emissions Subtotal		**39,553.63**	**40.45**	**39,594.08**	**4,068.76**	**38.43**	**4,107.18**	**2,099.41**	**13.24**	**5,528.00**	**296.85**	**1,330,829.94**	**68.01**	**30.49**	**1,341,615.45**
Total Emissions In This Month (pounds)		**44,634.81**	**299.25**	**44,934.06**	**4,672.44**	**276.53**	**4,948.97**	**6,918.91**	**22.14**	**8,417.01**	**744.54**	**2,106,434.57**	**131.30**	**58.86**	**2,127,257.49**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)													
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 16															
On-site															
Off-road Equipment															
5 CY Dump Truck	32	16.29	1.73	18.02	1.63	1.59	3.22	44.47	0.09	18.48	3.18	8,685.09	0.53	0.24	8,769.77
Air Compressor	121	21.27	2.09	23.36	2.13	1.93	4.05	23.26	0.03	27.34	4.52	2,691.51	0.72	0.32	2,805.34
ATV	1,344	196.92	23.26	220.18	19.69	21.40	41.09	258.49	0.23	73.08	50.23	17,748.09	1.93	0.87	18,054.46
Auger	42	15.69	0.93	16.61	1.57	0.85	2.42	30.57	0.09	14.37	1.69	7,893.18	0.24	0.11	7,930.90
Backhoe/Excavator	155	3.17	3.79	6.95	0.48	3.48	3.96	51.37	0.13	78.73	4.33	11,430.76	1.17	0.52	11,616.15
Cable Plow	53	15.54	2.67	18.20	8.54	2.45	10.99	33.87	0.04	24.13	3.21	3,431.17	0.52	0.23	3,513.02
Cable Trencher	63	18.50	1.33	19.83	10.17	1.23	11.39	14.79	0.03	24.02	2.84	2,071.96	0.74	0.33	2,189.72
Compactor	36	11.85	0.89	12.74	1.19	0.82	2.00	18.97	0.04	22.21	1.26	3,902.73	0.34	0.15	3,956.17
Crane	91	43.18	4.85	48.03	4.32	4.46	8.78	116.10	0.16	40.42	7.56	16,437.47	1.09	0.49	16,610.55
Crawler Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dozer (D6)	50	14.80	3.72	18.52	8.13	3.42	11.56	64.78	0.07	41.69	5.26	6,519.77	0.84	0.38	6,653.37
Forklift	34	10.16	0.63	10.79	1.02	0.58	1.59	11.24	0.02	14.21	0.74	2,096.43	0.22	0.10	2,131.51
Forklift (10 K) (Aerial Lift)	260	67.04	4.88	71.92	6.70	4.49	11.19	87.09	0.19	110.10	5.72	16,247.33	1.71	0.77	16,519.20
Forklift (5 K)	168	33.62	3.15	36.77	3.36	2.90	6.26	56.19	0.12	71.03	3.69	10,482.15	1.11	0.50	10,657.55
Generator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (45 kW)	746	149.29	12.91	162.20	14.93	11.88	26.81	143.46	0.30	177.01	27.88	22,821.78	4.17	1.87	23,483.53
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	91	3.70	2.43	6.13	0.56	2.24	2.80	47.73	0.10	53.02	3.52	9,189.56	0.65	0.29	9,291.96
Man/Aerial Lift	26	5.21	0.09	5.30	0.52	0.08	0.60	3.00	0.01	4.10	0.15	510.26	0.10	0.04	525.95
Mini Excavator	63	11.08	0.68	11.76	1.11	0.63	1.74	9.16	0.02	16.51	1.29	1,574.69	0.33	0.15	1,627.19
Mini-Trencher	252	73.98	5.34	79.32	40.67	4.91	45.58	59.17	0.11	96.07	11.38	8,287.85	2.97	1.33	8,758.87
Motor Grader	155	661.97	5.35	667.32	71.48	4.93	76.40	163.63	0.30	60.94	9.54	26,650.16	1.75	0.78	26,927.36
Post Machine	706	124.07	11.75	135.82	12.41	10.81	23.21	162.65	0.28	156.77	22.06	21,879.91	1.40	0.63	22,102.06
Roller/Vibrator/Padder	144	613.53	3.54	617.07	66.25	3.26	69.50	75.44	0.17	88.30	5.01	15,520.15	1.34	0.60	15,732.68
Scraper	151	44.39	14.76	59.14	24.40	13.57	37.97	320.52	0.36	85.89	22.56	31,643.46	2.61	1.17	32,056.64
Sheepsfoot Roller	144	613.53	4.65	618.18	66.25	4.28	70.52	62.51	0.10	57.00	5.65	8,465.53	1.03	0.46	8,629.25
Skid Steer	1,159	23.62	13.25	36.87	3.58	12.19	15.76	236.06	0.58	312.13	15.14	49,525.01	3.08	1.38	50,013.80
Tensioner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor	45	15.43	1.22	16.65	1.54	1.12	2.66	23.86	0.05	26.51	1.76	4,594.78	0.32	0.14	4,645.98
Tractor Buster	106	452.08	2.84	454.91	48.81	2.61	51.42	55.68	0.12	61.86	4.10	10,721.16	0.75	0.34	10,840.62
Tractor Disk	106	43.71	2.66	46.36	4.37	2.45	6.82	80.05	0.20	37.37	4.67	18,160.33	0.98	0.44	18,315.49
Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck (Onroad)	1,404	524.55	61.09	585.65	52.46	56.21	108.66	1,361.70	2.63	512.28	103.97	233,699.65	14.94	6.70	236,068.39
Truck Mounted Digger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck, flatbed (onroad)	192	71.53	8.33	79.86	7.15	7.66	14.82	185.69	0.36	69.86	14.18	31,868.13	2.04	0.91	32,191.14
Water Pull	138	45.20	5.99	51.20	4.52	5.51	10.03	133.56	0.26	50.25	10.20	22,922.69	1.47	0.66	23,155.03
Water Pump	249	43.72	4.30	48.03	4.37	3.96	8.33	47.82	0.04	13.52	9.29	3,283.40	0.36	0.16	3,340.08
Water truck	702	262.28	30.55	292.82	26.23	28.10	54.33	680.85	1.31	256.14	51.98	116,849.82	7.47	3.35	118,034.19
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-road Vehicles															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	24	9.92	0.01	9.93	0.99	0.01	1.00	0.58	0.00	0.11	0.04	100.13	0.00	0.00	100.43
Tracker Deliveries Trucks	80	33.05	0.04	33.09	3.31	0.03	3.34	1.94	0.00	0.36	0.14	333.75	0.01	0.00	334.75
Water Haul Trucks	548	179.99	0.18	180.17	18.05	0.17	18.22	8.27	0.01	1.10	0.51	1,552.61	0.02	0.01	1,556.38
Worker Vehicles	2,646	465.54	0.02	465.56	46.63	0.02	46.65	1.42	0.03	15.07	0.55	2,976.79	0.18	0.08	3,005.38
Fuel Trucks	5	1.58	0.00	1.58	0.16	0.00	0.16	0.07	0.00	0.01	0.00	13.60	0.00	0.00	13.63
On-site Emissions Subtotal		**5,081.18**	**258.80**	**5,339.99**	**603.68**	**238.11**	**841.79**	**4,819.50**	**8.90**	**2,889.02**	**447.69**	**775,604.63**	**63.29**	**28.37**	**785,642.04**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	1,354	559.24	0.60	559.84	56.00	0.58	56.58	32.84	0.05	6.08	2.30	5,647.09	0.11	0.05	5,664.03
Tracker Deliveries Trucks	4,512	1,864.14	2.01	1,866.15	186.67	1.92	188.59	109.47	0.18	20.25	7.67	18,823.62	0.36	0.16	18,880.10
Water Haul Trucks	30,907	10,151.40	10.13	10,161.53	1,018.18	9.69	1,027.87	466.52	0.84	62.32	28.87	87,567.33	1.34	0.60	87,779.96
Worker Vehicles	149,234	26,256.51	1.33	26,257.83	2,630.01	1.22	2,631.24	79.84	1.69	849.89	30.83	167,890.88	10.17	4.56	169,503.62
Fuel Trucks	271	88.92	0.09	89.01	8.92	0.08	9.00	4.09	0.01	0.55	0.25	767.01	0.01	0.01	768.88
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	5,966	22.58	2.65	25.23	5.69	2.54	8.23	144.75	0.24	26.78	10.14	24,891.23	0.47	0.21	24,965.93
Tracker Deliveries Trucks	19,888	75.25	8.84	84.10	18.97	8.46	27.43	482.50	0.79	89.27	33.80	82,970.77	1.57	0.70	83,219.75
Water Haul Trucks	23,893	58.13	7.83	65.96	15.53	7.49	23.02	360.64	0.65	48.17	22.32	67,693.89	1.04	0.46	67,858.26
Worker Vehicles	776,866	476.95	6.90	483.85	128.65	6.37	135.02	415.61	8.80	4,424.26	160.48	873,985.17	52.94	23.73	882,380.54
Fuel Trucks	209	0.51	0.07	0.58	0.14	0.07	0.20	3.16	0.01	0.42	0.20	592.94	0.01	0.00	594.38
Off-site Emissions Subtotal		**39,553.63**	**40.45**	**39,594.08**	**4,068.76**	**38.43**	**4,107.18**	**2,099.41**	**13.24**	**5,528.00**	**296.85**	**1,330,829.94**	**68.01**	**30.49**	**1,341,615.45**
Total Emissions In This Month (pounds)		**44,634.81**	**299.25**	**44,934.06**	**4,672.44**	**276.53**	**4,948.97**	**6,918.91**	**22.14**	**8,417.01**	**744.54**	**2,106,434.57**	**131.30**	**58.86**	**2,127,257.49**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)												
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 17															
On-site															
Off-road Equipment															
5 CY Dump Truck	32	16.29	1.73	18.02	1.63	1.59	3.22	44.47	0.09	18.48	3.18	8,685.09	0.53	0.24	8,769.77
Air Compressor	121	21.27	2.09	23.36	2.13	1.93	4.05	23.26	0.03	27.34	4.52	2,691.51	0.72	0.32	2,805.34
ATV	1,344	196.92	23.26	220.18	19.69	21.40	41.09	258.49	0.23	73.08	50.23	17,748.09	1.93	0.87	18,054.46
Auger	42	15.69	0.93	16.61	1.57	0.85	2.42	30.57	0.09	14.37	1.69	7,893.18	0.24	0.11	7,930.90
Backhoe/Excavator	218	4.43	5.30	9.73	0.67	4.88	5.55	71.92	0.19	110.23	6.06	16,003.06	1.64	0.73	16,262.61
Cable Plow	53	15.54	2.67	18.20	8.54	2.45	10.99	33.87	0.04	24.13	3.21	3,431.17	0.52	0.23	3,513.02
Cable Trencher	63	18.50	1.33	19.83	10.17	1.23	11.39	14.79	0.03	24.02	2.84	2,071.96	0.74	0.33	2,189.72
Compactor	36	11.85	0.89	12.74	1.19	0.82	2.00	18.97	0.04	22.21	1.26	3,902.73	0.34	0.15	3,956.17
Crane	122	57.57	6.47	64.03	5.76	5.95	11.71	154.80	0.22	53.89	10.08	21,916.63	1.46	0.65	22,147.39
Crawler Tractor	24	7.36	1.31	8.67	0.74	1.21	1.94	23.66	0.03	17.92	1.82	2,949.48	0.31	0.14	2,999.28
Dozer (D6)	50	14.80	3.72	18.52	8.13	3.42	11.56	64.78	0.07	41.69	5.26	6,519.77	0.84	0.38	6,653.37
Forklift	50	15.24	0.94	16.18	1.52	0.87	2.39	16.86	0.04	21.31	1.11	3,144.65	0.33	0.15	3,197.26
Forklift (10 K) (Aerial Lift)	260	67.04	4.88	71.92	6.70	4.49	11.19	87.09	0.19	110.10	5.72	16,247.33	1.71	0.77	16,519.20
Forklift (5 K)	168	33.62	3.15	36.77	3.36	2.90	6.26	56.19	0.12	71.03	3.69	10,482.15	1.11	0.50	10,657.55
Generator	62	10.93	1.08	12.01	1.09	0.99	2.08	11.96	0.02	14.75	2.32	1,901.82	0.35	0.16	1,956.96
Generator (45 kW)	1,119	223.94	19.37	243.31	22.39	17.82	40.21	215.20	0.44	265.52	41.82	34,232.67	6.26	2.81	35,225.30
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	91	3.70	2.43	6.13	0.56	2.24	2.80	47.73	0.10	53.02	3.52	9,189.56	0.65	0.29	9,291.96
Man/Aerial Lift	26	5.21	0.09	5.30	0.52	0.08	0.60	3.00	0.01	4.10	0.15	510.26	0.10	0.04	525.95
Mini Excavator	63	11.08	0.68	11.76	1.11	0.63	1.74	9.16	0.02	16.51	1.29	1,574.69	0.33	0.15	1,627.19
Mini-Trencher	252	73.98	5.34	79.32	40.67	4.91	45.58	59.17	0.11	96.07	11.38	8,287.85	2.97	1.33	8,758.87
Motor Grader	207	882.62	7.14	889.76	95.30	6.57	101.87	218.17	0.40	81.25	12.72	35,533.54	2.33	1.04	35,903.14
Post Machine	706	124.07	11.75	135.82	12.41	10.81	23.21	162.65	0.28	156.77	22.06	21,879.91	1.40	0.63	22,102.06
Roller/Vibrator/Padder	144	613.53	3.54	617.07	66.25	3.26	69.50	75.44	0.17	88.30	5.01	15,520.15	1.34	0.60	15,732.68
Scraper	202	59.19	19.67	78.86	32.53	18.10	50.63	427.36	0.47	114.52	30.09	42,191.28	3.47	1.56	42,742.19
Sheepsfoot Roller	144	613.53	4.65	618.18	66.25	4.28	70.52	62.51	0.10	57.00	5.65	8,465.53	1.03	0.46	8,629.25
Skid Steer	1,159	23.62	13.25	36.87	3.58	12.19	15.76	236.06	0.58	312.13	15.14	49,525.01	3.08	1.38	50,013.80
Tensioner	35	13.18	1.49	14.67	1.32	1.37	2.69	39.46	0.04	20.66	2.37	3,754.50	0.23	0.10	3,791.33
Tractor	45	15.43	1.22	16.65	1.54	1.12	2.66	23.86	0.05	26.51	1.76	4,594.78	0.32	0.14	4,645.98
Tractor Buster	106	452.08	2.84	454.91	48.81	2.61	51.42	55.68	0.12	61.86	4.10	10,721.16	0.75	0.34	10,840.62
Tractor Disk	106	43.71	2.66	46.36	4.37	2.45	6.82	80.05	0.20	37.37	4.67	18,160.33	0.98	0.44	18,315.49
Truck	48	16.29	2.08	18.37	1.63	1.92	3.54	46.42	0.09	17.46	3.54	7,967.03	0.51	0.23	8,047.79
Truck (Onroad)	1,628	608.00	70.81	678.82	60.80	65.15	125.95	1,578.33	3.05	593.78	120.51	270,879.14	17.31	7.76	273,624.72
Truck Mounted Digger	35	12.00	0.78	12.78	1.20	0.72	1.92	25.68	0.07	12.07	1.42	6,630.28	0.20	0.09	6,661.95
Truck, flatbed (onroad)	192	71.53	8.33	79.86	7.15	7.66	14.82	185.69	0.36	69.86	14.18	31,868.13	2.04	0.91	32,191.14
Water Pull	138	45.20	5.99	51.20	4.52	5.51	10.03	133.56	0.26	50.25	10.20	22,922.69	1.47	0.66	23,155.03
Water Pump	249	43.72	4.30	48.03	4.37	3.96	8.33	47.82	0.04	13.52	9.29	3,283.40	0.36	0.16	3,340.08
Water truck	894	333.81	38.88	372.68	33.38	35.77	69.15	866.54	1.67	326.00	66.16	148,717.96	9.51	4.26	150,225.34
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	32	11.92	1.39	13.31	1.19	1.28	2.47	30.95	0.06	11.64	2.36	5,311.36	0.34	0.15	5,365.19
On-road Vehicles															
Aggregate Base Delivery Trucks	7	2.73	0.00	2.73	0.27	0.00	0.28	0.16	0.00	0.03	0.01	27.53	0.00	0.00	27.62
Concrete Delivery Trucks	25	10.33	0.01	10.34	1.03	0.01	1.04	0.61	0.00	0.11	0.04	104.30	0.00	0.00	104.61
Material Delivery Trucks	98	40.49	0.04	40.53	4.05	0.04	4.10	2.38	0.00	0.44	0.17	408.85	0.01	0.00	410.07
Tracker Deliveries Trucks	80	33.05	0.04	33.09	3.31	0.03	3.34	1.94	0.00	0.36	0.14	333.75	0.01	0.00	334.75
Water Haul Trucks	740	243.05	0.24	243.29	24.38	0.23	24.61	11.17	0.02	1.49	0.69	2,096.59	0.03	0.01	2,101.68
Worker Vehicles	3,402	598.55	0.03	598.58	59.95	0.03	59.98	1.82	0.04	19.37	0.70	3,827.30	0.23	0.10	3,864.06
Fuel Trucks	5	1.77	0.00	1.78	0.18	0.00	0.18	0.08	0.00	0.01	0.01	15.30	0.00	0.00	15.34
On-site Emissions Subtotal		**5,878.58**	**301.70**	**6,180.28**	**691.95**	**277.58**	**969.53**	**5,703.81**	**10.51**	**3,329.57**	**522.03**	**916,945.24**	**74.20**	**33.26**	**928,711.74**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	372	153.79	0.17	153.96	15.40	0.16	15.56	9.03	0.01	1.67	0.63	1,552.95	0.03	0.01	1,557.61
Concrete Delivery Trucks	1,410	582.54	0.63	583.17	58.33	0.60	58.93	34.21	0.06	6.33	2.40	5,882.38	0.11	0.05	5,900.03
Material Delivery Trucks	5,527	2,283.57	2.46	2,286.03	228.67	2.35	231.02	134.10	0.22	24.81	9.39	23,058.93	0.44	0.20	23,128.13
Tracker Deliveries Trucks	4,512	1,864.14	2.01	1,866.15	186.67	1.92	188.59	109.47	0.18	20.25	7.67	18,823.62	0.36	0.16	18,880.10
Water Haul Trucks	41,736	13,708.10	13.68	13,721.78	1,374.91	13.09	1,388.00	629.97	1.13	84.15	38.98	118,247.85	1.81	0.81	118,534.98
Worker Vehicles	191,873	33,758.36	1.71	33,760.07	3,381.45	1.57	3,383.02	102.65	2.17	1,092.72	39.64	215,859.71	13.08	5.86	217,933.22
Fuel Trucks	305	100.03	0.10	100.13	10.03	0.10	10.13	4.60	0.01	0.61	0.28	862.89	0.01	0.01	864.98
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	486	1.84	0.22	2.05	0.46	0.21	0.67	11.78	0.02	2.18	0.83	2,026.54	0.04	0.02	2,032.62
Concrete Delivery Trucks	1,840	6.96	0.82	7.78	1.76	0.78	2.54	44.64	0.07	8.26	3.13	7,676.30	0.15	0.07	7,699.33
Material Delivery Trucks	24,363	92.19	10.83	103.02	23.24	10.36	33.61	591.06	0.97	109.36	41.41	101,639.20	1.92	0.86	101,944.20
Tracker Deliveries Trucks	19,888	75.25	8.84	84.10	18.97	8.46	27.43	482.50	0.79	89.27	33.80	82,970.77	1.57	0.70	83,219.75
Water Haul Trucks	32,264	78.50	10.58	89.07	20.97	10.12	31.09	486.99	0.87	65.05	30.13	91,411.46	1.40	0.63	91,633.42
Worker Vehicles	998,827	613.22	8.88	622.09	165.40	8.20	173.60	534.36	11.31	5,688.34	206.34	1,123,695.22	68.06	30.51	1,134,489.27
Fuel Trucks	235	0.57	0.08	0.65	0.15	0.07	0.23	3.55	0.01	0.47	0.22	667.06	0.01	0.00	668.68
Off-site Emissions Subtotal		**53,319.08**	**60.98**	**53,380.05**	**5,486.43**	**57.98**	**5,544.41**	**3,178.91**	**17.82**	**7,193.48**	**414.85**	**1,794,374.88**	**88.98**	**39.89**	**1,808,486.33**
Total Emissions In This Month (pounds)		**59,197.66**	**362.68**	**59,560.33**	**6,178.37**	**335.56**	**6,513.94**	**8,882.71**	**28.33**	**10,523.05**	**936.88**	**2,711,320.12**	**163.18**	**73.15**	**2,737,198.07**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)													
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 18															
On-site															
Off-road Equipment															
5 CY Dump Truck	32	16.29	1.73	18.02	1.63	1.59	3.22	44.47	0.09	18.48	3.18	8,685.09	0.53	0.24	8,769.77
Air Compressor	121	21.27	2.09	23.36	2.13	1.93	4.05	23.26	0.03	27.34	4.52	2,691.51	0.72	0.32	2,805.34
ATV	1,344	196.92	23.26	220.18	19.69	21.40	41.09	258.49	0.23	73.08	50.23	17,748.09	1.93	0.87	18,054.46
Auger	42	15.69	0.93	16.61	1.57	0.85	2.42	30.57	0.09	14.37	1.69	7,893.18	0.24	0.11	7,930.90
Backhoe/Excavator	218	4.43	5.30	9.73	0.67	4.88	5.55	71.92	0.19	110.23	6.06	16,003.06	1.64	0.73	16,262.61
Cable Plow	53	15.54	2.67	18.20	8.54	2.45	10.99	33.87	0.04	24.13	3.21	3,431.17	0.52	0.23	3,513.02
Cable Trencher	63	18.50	1.33	19.83	10.17	1.23	11.39	14.79	0.03	24.02	2.84	2,071.96	0.74	0.33	2,189.72
Compactor	36	11.85	0.89	12.74	1.19	0.82	2.00	18.97	0.04	22.21	1.26	3,902.73	0.34	0.15	3,956.17
Crane	122	57.57	6.47	64.03	5.76	5.95	11.71	154.80	0.22	53.89	10.08	21,916.63	1.46	0.65	22,147.39
Crawler Tractor	24	7.36	1.31	8.67	0.74	1.21	1.94	23.66	0.03	17.92	1.82	2,949.48	0.31	0.14	2,999.28
Dozer (D6)	50	14.80	3.72	18.52	8.13	3.42	11.56	64.78	0.07	41.69	5.26	6,519.77	0.84	0.38	6,653.37
Forklift	50	15.24	0.94	16.18	1.52	0.87	2.39	16.86	0.04	21.31	1.11	3,144.65	0.33	0.15	3,197.26
Forklift (10 K) (Aerial Lift)	260	67.04	4.88	71.92	6.70	4.49	11.19	87.09	0.19	110.10	5.72	16,247.33	1.71	0.77	16,519.20
Forklift (5 K)	168	33.62	3.15	36.77	3.36	2.90	6.26	56.19	0.12	71.03	3.69	10,482.15	1.11	0.50	10,657.55
Generator	62	10.93	1.08	12.01	1.09	0.99	2.08	11.96	0.02	14.75	2.32	1,901.82	0.35	0.16	1,956.96
Generator (45 kW)	1,119	223.94	19.37	243.31	22.39	17.82	40.21	215.20	0.44	265.52	41.82	34,232.67	6.26	2.81	35,225.30
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	91	3.70	2.43	6.13	0.56	2.24	2.80	47.73	0.10	53.02	3.52	9,189.56	0.65	0.29	9,291.96
Man/Aerial Lift	26	5.21	0.09	5.30	0.52	0.08	0.60	3.00	0.01	4.10	0.15	510.26	0.10	0.04	525.95
Mini Excavator	63	11.08	0.68	11.76	1.11	0.63	1.74	9.16	0.02	16.51	1.29	1,574.69	0.33	0.15	1,627.19
Mini-Trencher	252	73.98	5.34	79.32	40.67	4.91	45.58	59.17	0.11	96.07	11.38	8,287.85	2.97	1.33	8,758.87
Motor Grader	207	882.62	7.14	889.76	95.30	6.57	101.87	218.17	0.40	81.25	12.72	35,533.54	2.33	1.04	35,903.14
Post Machine	706	124.07	11.75	135.82	12.41	10.81	23.21	162.65	0.28	156.77	22.06	21,879.91	1.40	0.63	22,102.06
Roller/Vibrator/Padder	144	613.53	3.54	617.07	66.25	3.26	69.50	75.44	0.17	88.30	5.01	15,520.15	1.34	0.60	15,732.68
Scraper	202	59.19	19.67	78.86	32.53	18.10	50.63	427.36	0.47	114.52	30.09	42,191.28	3.47	1.56	42,742.19
Sheepsfoot Roller	144	613.53	4.65	618.18	66.25	4.28	70.52	62.51	0.10	57.00	5.65	8,465.53	1.03	0.46	8,629.25
Skid Steer	1,159	23.62	13.25	36.87	3.58	12.19	15.76	236.06	0.58	312.13	15.14	49,525.01	3.08	1.38	50,013.80
Tensioner	35	13.18	1.49	14.67	1.32	1.37	2.69	39.46	0.04	20.66	2.37	3,754.50	0.23	0.10	3,791.33
Tractor	45	15.43	1.22	16.65	1.54	1.12	2.66	23.86	0.05	26.51	1.76	4,594.78	0.32	0.14	4,645.98
Tractor Buster	106	452.08	2.84	454.91	48.81	2.61	51.42	55.68	0.12	61.86	4.10	10,721.16	0.75	0.34	10,840.62
Tractor Disk	106	43.71	2.66	46.36	4.37	2.45	6.82	80.05	0.20	37.37	4.67	18,160.33	0.98	0.44	18,315.49
Truck	48	16.29	2.08	18.37	1.63	1.92	3.54	46.42	0.09	17.46	3.54	7,967.03	0.51	0.23	8,047.79
Truck (Onroad)	1,628	608.00	70.81	678.82	60.80	65.15	125.95	1,578.33	3.05	593.78	120.51	270,879.14	17.31	7.76	273,624.72
Truck Mounted Digger	35	12.00	0.78	12.78	1.20	0.72	1.92	25.68	0.07	12.07	1.42	6,630.28	0.20	0.09	6,661.95
Truck, flatbed (onroad)	192	71.53	8.33	79.86	7.15	7.66	14.82	185.69	0.36	69.86	14.18	31,868.13	2.04	0.91	32,191.14
Water Pull	138	45.20	5.99	51.20	4.52	5.51	10.03	133.56	0.26	50.25	10.20	22,922.69	1.47	0.66	23,155.03
Water Pump	249	43.72	4.30	48.03	4.37	3.96	8.33	47.82	0.04	13.52	9.29	3,283.40	0.36	0.16	3,340.08
Water truck	894	333.81	38.88	372.68	33.38	35.77	69.15	866.54	1.67	326.00	66.16	148,717.96	9.51	4.26	150,225.34
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	32	11.92	1.39	13.31	1.19	1.28	2.47	30.95	0.06	11.64	2.36	5,311.36	0.34	0.15	5,365.19
On-road Vehicles															
Aggregate Base Delivery Trucks	7	2.77	0.00	2.77	0.28	0.00	0.28	0.16	0.00	0.03	0.01	27.95	0.00	0.00	28.04
Concrete Delivery Trucks	25	10.37	0.01	10.38	1.04	0.01	1.05	0.61	0.00	0.11	0.04	104.71	0.00	0.00	105.03
Material Delivery Trucks	98	40.49	0.04	40.53	4.05	0.04	4.10	2.38	0.00	0.44	0.17	408.85	0.01	0.00	410.07
Tracker Deliveries Trucks	80	33.05	0.04	33.09	3.31	0.03	3.34	1.94	0.00	0.36	0.14	333.75	0.01	0.00	334.75
Water Haul Trucks	740	243.05	0.24	243.29	24.38	0.23	24.61	11.17	0.02	1.49	0.69	2,096.59	0.03	0.01	2,101.68
Worker Vehicles	3,402	598.55	0.03	598.58	59.95	0.03	59.98	1.82	0.04	19.37	0.70	3,827.30	0.23	0.10	3,864.06
Fuel Trucks	5	1.77	0.00	1.78	0.18	0.00	0.18	0.08	0.00	0.01	0.01	15.30	0.00	0.00	15.34
On-site Emissions Subtotal		**5,878.66**	**301.70**	**6,180.36**	**691.96**	**277.58**	**969.53**	**5,703.81**	**10.51**	**3,329.57**	**522.03**	**916,946.08**	**74.20**	**33.26**	**928,712.58**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	378	156.12	0.17	156.29	15.63	0.16	15.79	9.17	0.02	1.70	0.64	1,576.48	0.03	0.01	1,581.21
Concrete Delivery Trucks	1,416	584.87	0.63	585.50	58.57	0.60	59.17	34.34	0.06	6.35	2.41	5,905.91	0.11	0.05	5,923.63
Material Delivery Trucks	5,527	2,283.57	2.46	2,286.03	228.67	2.35	231.02	134.10	0.22	24.81	9.39	23,058.93	0.44	0.20	23,128.13
Tracker Deliveries Trucks	4,512	1,864.14	2.01	1,866.15	186.67	1.92	188.59	109.47	0.18	20.25	7.67	18,823.62	0.36	0.16	18,880.10
Water Haul Trucks	41,736	13,708.10	13.68	13,721.78	1,374.91	13.09	1,388.00	629.97	1.13	84.15	38.98	118,247.85	1.81	0.81	118,534.98
Worker Vehicles	191,873	33,758.36	1.71	33,760.07	3,381.45	1.57	3,383.02	102.65	2.17	1,092.72	39.64	215,859.71	13.08	5.86	217,933.22
Fuel Trucks	305	100.03	0.10	100.13	10.03	0.10	10.13	4.60	0.01	0.61	0.28	862.89	0.01	0.01	864.98
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	493	1.87	0.22	2.09	0.47	0.21	0.68	11.96	0.02	2.21	0.84	2,057.25	0.04	0.02	2,063.42
Concrete Delivery Trucks	1,847	6.99	0.82	7.81	1.76	0.79	2.55	44.82	0.07	8.29	3.14	7,707.00	0.15	0.07	7,730.13
Material Delivery Trucks	24,363	92.19	10.83	103.02	23.24	10.36	33.61	591.06	0.97	109.36	41.41	101,639.20	1.92	0.86	101,944.20
Tracker Deliveries Trucks	19,888	75.25	8.84	84.10	18.97	8.46	27.43	482.50	0.79	89.27	33.80	82,970.77	1.57	0.70	83,219.75
Water Haul Trucks	32,264	78.50	10.58	89.07	20.97	10.12	31.09	486.99	0.87	65.05	30.13	91,411.46	1.40	0.63	91,633.42
Worker Vehicles	998,827	613.22	8.88	622.09	165.40	8.20	173.60	534.36	11.31	5,688.34	206.34	1,123,695.22	68.06	30.51	1,134,489.27
Fuel Trucks	235	0.57	0.08	0.65	0.15	0.07	0.23	3.55	0.01	0.47	0.22	667.06	0.01	0.00	668.68
Off-site Emissions Subtotal		**53,323.79**	**60.99**	**53,384.78**	**5,486.91**	**58.00**	**5,544.90**	**3,179.54**	**17.82**	**7,193.60**	**414.89**	**1,794,483.35**	**88.98**	**39.89**	**1,808,595.13**
Total Emissions In This Month (pounds)		**59,202.46**	**362.69**	**59,565.14**	**6,178.86**	**335.57**	**6,514.44**	**8,883.35**	**28.33**	**10,523.17**	**936.92**	**2,711,429.43**	**163.18**	**73.15**	**2,737,307.71**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)												
		Fugitive Dust PM$_{10}$	Exhaust PM$_{10}$	Total PM$_{10}$	Fugitive Dust PM$_{2.5}$	Exhaust PM$_{2.5}$	Total PM$_{2.5}$	NOx	SOx	CO	ROG	CO$_2$	CH$_4$	N$_2$O	Total GHG - CO$_2$e
Month 19															
On-															
Off-road Equipment															
5 CY Dump Truck	32	16.29	1.73	18.02	1.63	1.59	3.22	44.47	0.09	18.48	3.18	8,685.09	0.53	0.24	8,769.77
Air Compressor	121	21.27	2.09	23.36	2.13	1.93	4.05	23.26	0.03	27.34	4.52	2,691.51	0.72	0.32	2,805.34
ATV	1,344	196.92	23.26	220.18	19.69	21.40	41.09	258.49	0.23	73.08	50.23	17,748.09	1.93	0.87	18,054.46
Auger	42	15.69	0.93	16.61	1.57	0.85	2.42	30.57	0.09	14.37	1.69	7,893.18	0.24	0.11	7,930.90
Backhoe/Excavator	218	4.43	5.30	9.73	0.67	4.88	5.55	71.92	0.19	110.23	6.06	16,003.06	1.64	0.73	16,262.61
Cable Plow	53	15.54	2.67	18.20	8.54	2.45	10.99	33.87	0.04	24.13	3.21	3,431.17	0.52	0.23	3,513.02
Cable Trencher	63	18.50	1.33	19.83	10.17	1.23	11.39	14.79	0.03	24.02	2.84	2,071.96	0.74	0.33	2,189.72
Compactor	36	11.85	0.89	12.74	1.19	0.82	2.00	18.97	0.04	22.21	1.26	3,902.73	0.34	0.15	3,956.17
Crane	122	57.57	6.47	64.03	5.76	5.95	11.71	154.80	0.22	53.89	10.08	21,916.63	1.46	0.65	22,147.39
Crawler Tractor	24	7.36	1.31	8.67	0.74	1.21	1.94	23.66	0.03	17.92	1.82	2,949.48	0.31	0.14	2,999.28
Dozer (D6)	50	14.80	3.72	18.52	8.13	3.42	11.56	64.78	0.07	41.69	5.26	6,519.77	0.84	0.38	6,653.37
Forklift	50	15.24	0.94	16.18	1.52	0.87	2.39	16.86	0.04	21.31	1.11	3,144.65	0.33	0.15	3,197.26
Forklift (10 K) (Aerial Lift)	260	67.04	4.88	71.92	6.70	4.49	11.19	87.09	0.19	110.10	5.72	16,247.33	1.71	0.77	16,519.20
Forklift (5 K)	168	33.62	3.15	36.77	3.36	2.90	6.26	56.19	0.12	71.03	3.69	10,482.15	1.11	0.50	10,657.55
Generator	62	10.93	1.08	12.01	1.09	0.99	2.08	11.96	0.02	14.75	2.32	1,901.82	0.35	0.16	1,956.96
Generator (45 kW)	1,119	223.94	19.37	243.31	22.39	17.82	40.21	215.20	0.44	265.52	41.82	34,232.67	6.26	2.81	35,225.30
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	91	3.70	2.43	6.13	0.56	2.24	2.80	47.73	0.10	53.02	3.52	9,189.56	0.65	0.29	9,291.96
Man/Aerial Lift	26	5.21	0.09	5.30	0.52	0.08	0.60	3.00	0.01	4.10	0.15	510.26	0.10	0.04	525.95
Mini Excavator	63	11.08	0.68	11.76	1.11	0.63	1.74	9.16	0.02	16.51	1.29	1,574.69	0.33	0.15	1,627.19
Mini-Trencher	252	73.98	5.34	79.32	40.67	4.91	45.58	59.17	0.11	96.07	11.38	8,287.85	2.97	1.33	8,758.87
Motor Grader	207	882.62	7.14	889.76	95.30	6.57	101.87	218.17	0.40	81.25	12.72	35,533.54	2.33	1.04	35,903.14
Post Machine	706	124.07	11.75	135.82	12.41	10.81	23.21	162.65	0.28	156.77	22.06	21,879.91	1.40	0.63	22,102.06
Roller/Vibrator/Padder	144	613.53	3.54	617.07	66.25	3.26	69.50	75.44	0.17	88.30	5.01	15,520.15	1.34	0.60	15,732.68
Scraper	202	59.19	19.67	78.86	32.53	18.10	50.63	427.36	0.47	114.52	30.09	42,191.28	3.47	1.56	42,742.19
Sheepsfoot Roller	144	613.53	4.65	618.18	66.25	4.28	70.52	62.51	0.10	57.00	5.65	8,465.53	1.03	0.46	8,629.25
Skid Steer	1,159	23.62	13.25	36.87	3.58	12.19	15.76	236.06	0.58	312.13	15.14	49,525.01	3.08	1.38	50,013.80
Tensioner	35	13.18	1.49	14.67	1.32	1.37	2.69	39.46	0.04	20.66	2.37	3,754.50	0.23	0.10	3,791.33
Tractor	45	15.43	1.22	16.65	1.54	1.12	2.66	23.86	0.05	26.51	1.76	4,594.78	0.32	0.14	4,645.98
Tractor Buster	106	452.08	2.84	454.91	48.81	2.61	51.42	55.68	0.12	61.86	4.10	10,721.16	0.75	0.34	10,840.62
Tractor Disk	106	43.71	2.66	46.36	4.37	2.45	6.82	80.05	0.20	37.37	4.67	18,160.33	0.98	0.44	18,315.49
Truck	48	16.29	2.08	18.37	1.63	1.92	3.54	46.42	0.09	17.46	3.54	7,967.03	0.51	0.23	8,047.79
Truck (Onroad)	1,628	608.00	70.81	678.82	60.80	65.15	125.95	1,578.33	3.05	593.78	120.51	270,879.14	17.31	7.76	273,624.72
Truck Mounted Digger	35	12.00	0.78	12.78	1.20	0.72	1.92	25.68	0.07	12.07	1.42	6,630.28	0.20	0.09	6,661.95
Truck, flatbed (onroad)	192	71.53	8.33	79.86	7.15	7.66	14.82	185.69	0.36	69.86	14.18	31,868.13	2.04	0.91	32,191.14
Water Pull	138	45.20	5.99	51.20	4.52	5.51	10.03	133.56	0.26	50.25	10.20	22,922.69	1.47	0.66	23,155.03
Water Pump	249	43.72	4.30	48.03	4.37	3.96	8.33	47.82	0.04	13.52	9.29	3,283.40	0.36	0.16	3,340.08
Water truck	894	333.81	38.88	372.68	33.38	35.77	69.15	866.54	1.67	326.00	66.16	148,717.96	9.51	4.26	150,225.34
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	32	11.92	1.39	13.31	1.19	1.28	2.47	30.95	0.06	11.64	2.36	5,311.36	0.34	0.15	5,365.19
On-road Vehicles															
Aggregate Base Delivery Trucks	7	2.77	0.00	2.77	0.28	0.00	0.28	0.16	0.00	0.03	0.01	27.95	0.00	0.00	28.04
Concrete Delivery Trucks	25	10.37	0.01	10.38	1.04	0.01	1.05	0.61	0.00	0.11	0.04	104.71	0.00	0.00	105.03
Material Delivery Trucks	98	40.49	0.04	40.53	4.05	0.04	4.10	2.38	0.00	0.44	0.17	408.85	0.01	0.00	410.07
Tracker Deliveries Trucks	80	33.05	0.04	33.09	3.31	0.03	3.34	1.94	0.00	0.36	0.14	333.75	0.01	0.00	334.75
Water Haul Trucks	740	243.05	0.24	243.29	24.38	0.23	24.61	11.17	0.02	1.49	0.69	2,096.59	0.03	0.01	2,101.68
Worker Vehicles	3,402	598.55	0.03	598.58	59.95	0.03	59.98	1.82	0.04	19.37	0.70	3,827.30	0.23	0.10	3,864.06
Fuel Trucks	5	1.77	0.00	1.78	0.18	0.00	0.18	0.08	0.00	0.01	0.01	15.30	0.00	0.00	15.34
On-site Emissions Subtotal		**5,878.66**	**301.70**	**6,180.36**	**691.96**	**277.58**	**969.53**	**5,703.81**	**10.51**	**3,329.57**	**522.03**	**916,946.08**	**74.20**	**33.26**	**928,712.58**
Off															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	378	156.12	0.17	156.29	15.63	0.16	15.79	9.17	0.02	1.70	0.64	1,576.48	0.03	0.01	1,581.21
Concrete Delivery Trucks	1,416	584.87	0.63	585.50	58.57	0.60	59.17	34.34	0.06	6.35	2.41	5,905.91	0.11	0.05	5,923.63
Material Delivery Trucks	5,527	2,283.57	2.46	2,286.03	228.67	2.35	231.02	134.10	0.22	24.81	9.39	23,058.93	0.44	0.20	23,128.13
Tracker Deliveries Trucks	4,512	1,864.14	2.01	1,866.15	186.67	1.92	188.59	109.47	0.18	20.25	7.67	18,823.62	0.36	0.16	18,880.10
Water Haul Trucks	41,736	13,708.10	13.68	13,721.78	1,374.91	13.09	1,388.00	629.97	1.13	84.15	38.98	118,247.85	1.81	0.81	118,534.98
Worker Vehicles	191,873	33,758.36	1.71	33,760.07	3,381.45	1.57	3,383.02	102.65	2.17	1,092.72	39.64	215,859.71	13.08	5.86	217,933.22
Fuel Trucks	305	100.03	0.10	100.13	10.03	0.10	10.13	4.60	0.01	0.61	0.28	862.89	0.01	0.01	864.98
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	493	1.87	0.22	2.09	0.47	0.21	0.68	11.96	0.02	2.21	0.84	2,057.25	0.04	0.02	2,063.42
Concrete Delivery Trucks	1,847	6.99	0.82	7.81	1.76	0.79	2.55	44.82	0.07	8.29	3.14	7,707.00	0.15	0.07	7,730.13
Material Delivery Trucks	24,363	92.19	10.83	103.02	23.24	10.36	33.61	591.06	0.97	109.36	41.41	101,639.20	1.92	0.86	101,944.20
Tracker Deliveries Trucks	19,888	75.25	8.84	84.10	18.97	8.46	27.43	482.50	0.79	89.27	33.80	82,970.77	1.57	0.70	83,219.75
Water Haul Trucks	32,264	78.50	10.58	89.07	20.97	10.12	31.09	486.99	0.87	65.05	30.13	91,411.46	1.40	0.63	91,633.42
Worker Vehicles	998,827	613.22	8.88	622.09	165.40	8.20	173.60	534.36	11.31	5,688.34	206.34	1,123,695.22	68.06	30.51	1,134,489.27
Fuel Trucks	235	0.57	0.08	0.65	0.15	0.07	0.23	3.55	0.01	0.47	0.22	667.06	0.01	0.00	668.68
Off-site Emissions Subtotal		**53,323.79**	**60.99**	**53,384.78**	**5,486.91**	**58.00**	**5,544.90**	**3,179.54**	**17.82**	**7,193.60**	**414.89**	**1,794,483.35**	**88.98**	**39.89**	**1,808,595.13**
Total Emissions In This Month (pounds)		**59,202.46**	**362.69**	**59,565.14**	**6,178.86**	**335.57**	**6,514.44**	**8,883.35**	**28.33**	**10,523.17**	**936.92**	**2,711,429.43**	**163.18**	**73.15**	**2,737,307.71**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)												
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 20															
On-site															
Off-road Equipment															
5 CY Dump Truck	32	16.29	1.73	18.02	1.63	1.59	3.22	44.47	0.09	18.48	3.18	8,685.09	0.53	0.24	8,769.77
Air Compressor	121	21.27	2.09	23.36	2.13	1.93	4.05	23.26	0.03	27.34	4.52	2,691.51	0.72	0.32	2,805.34
ATV	1,344	196.92	23.26	220.18	19.69	21.40	41.09	258.49	0.23	73.08	50.23	17,748.09	1.93	0.87	18,054.46
Auger	42	15.69	0.93	16.61	1.57	0.85	2.42	30.57	0.09	14.37	1.69	7,893.18	0.24	0.11	7,930.90
Backhoe/Excavator	249	5.07	6.06	11.12	0.77	5.57	6.34	82.19	0.21	125.97	6.92	18,289.21	1.87	0.84	18,585.84
Cable Plow	53	15.54	2.67	18.20	8.54	2.45	10.99	33.87	0.04	24.13	3.21	3,431.17	0.52	0.23	3,513.02
Cable Trencher	63	18.50	1.33	19.83	10.17	1.23	11.39	14.79	0.03	24.02	2.84	2,071.96	0.74	0.33	2,189.72
Compactor	36	11.85	0.89	12.74	1.19	0.82	2.00	18.97	0.04	22.21	1.26	3,902.73	0.34	0.15	3,956.17
Crane	122	57.57	6.47	64.03	5.76	5.95	11.71	154.80	0.22	53.89	10.08	21,916.63	1.46	0.65	22,147.39
Crawler Tractor	24	7.36	1.31	8.67	0.74	1.21	1.94	23.66	0.03	17.92	1.82	2,949.48	0.31	0.14	2,999.28
Dozer (D6)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forklift	50	15.24	0.94	16.18	1.52	0.87	2.39	16.86	0.04	21.31	1.11	3,144.65	0.33	0.15	3,197.26
Forklift (10 K) (Aerial Lift)	260	67.04	4.88	71.92	6.70	4.49	11.19	87.09	0.19	110.10	5.72	16,247.33	1.71	0.77	16,519.20
Forklift (5 K)	168	33.62	3.15	36.77	3.36	2.90	6.26	56.19	0.12	71.03	3.69	10,482.15	1.11	0.50	10,657.55
Generator	62	10.93	1.08	12.01	1.09	0.99	2.08	11.96	0.02	14.75	2.32	1,901.82	0.35	0.16	1,956.96
Generator (45 kW)	1,119	223.94	19.37	243.31	22.39	17.82	40.21	215.20	0.44	265.52	41.82	34,232.67	6.26	2.81	35,225.30
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Man/Aerial Lift	26	5.21	0.09	5.30	0.52	0.08	0.60	3.00	0.01	4.10	0.15	510.26	0.10	0.04	525.95
Mini Excavator	63	11.08	0.68	11.76	1.11	0.63	1.74	9.16	0.02	16.51	1.29	1,574.69	0.33	0.15	1,627.19
Mini-Trencher	252	73.98	5.34	79.32	40.67	4.91	45.58	59.17	0.11	96.07	11.38	8,287.85	2.97	1.33	8,758.87
Motor Grader	103	441.31	3.57	444.88	47.65	3.28	50.93	109.09	0.20	40.63	6.36	17,766.77	1.17	0.52	17,951.57
Post Machine	706	124.07	11.75	135.82	12.41	10.81	23.21	162.65	0.28	156.77	22.06	21,879.91	1.40	0.63	22,102.06
Roller/Vibrator/Padder	96	409.02	2.36	411.38	44.16	2.17	46.33	50.29	0.12	58.87	3.34	10,346.77	0.89	0.40	10,488.46
Scraper	151	44.39	14.76	59.14	24.40	13.57	37.97	320.52	0.36	85.89	22.56	31,643.46	2.61	1.17	32,056.64
Sheepsfoot Roller	144	613.53	4.65	618.18	66.25	4.28	70.52	62.51	0.10	57.00	5.65	8,465.53	1.03	0.46	8,629.25
Skid Steer	1,008	20.54	11.52	32.06	3.11	10.60	13.71	205.27	0.51	271.41	13.17	43,065.22	2.68	1.20	43,490.26
Tensioner	35	13.18	1.49	14.67	1.32	1.37	2.69	39.46	0.04	20.66	2.37	3,754.50	0.23	0.10	3,791.33
Tractor	45	15.43	1.22	16.65	1.54	1.12	2.66	23.86	0.05	26.51	1.76	4,594.78	0.32	0.14	4,645.98
Tractor Buster	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor Disk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck	96	32.57	4.17	36.74	3.26	3.83	7.09	92.84	0.18	34.93	7.09	15,934.07	1.02	0.46	16,095.57
Truck (Onroad)	1,309	488.79	56.93	545.72	48.88	52.37	101.25	1,268.86	2.45	477.35	96.88	217,765.58	13.92	6.24	219,972.82
Truck Mounted Digger	35	12.00	0.78	12.78	1.20	0.72	1.92	25.68	0.07	12.07	1.42	6,630.28	0.20	0.09	6,661.95
Truck, flatbed (onroad)	192	71.53	8.33	79.86	7.15	7.66	14.82	185.69	0.36	69.86	14.18	31,868.13	2.04	0.91	32,191.14
Water Pull	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Pump	124	21.86	2.15	24.01	2.19	1.98	4.17	23.91	0.02	6.76	4.65	1,641.70	0.18	0.08	1,670.04
Water truck	894	333.81	38.88	372.68	33.38	35.77	69.15	866.54	1.67	326.00	66.16	148,717.96	9.51	4.26	150,225.34
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	32	11.92	1.39	13.31	1.19	1.28	2.47	30.95	0.06	11.64	2.36	5,311.36	0.34	0.15	5,365.19
On-road Vehicles															
Aggregate Base Delivery Trucks	7	2.77	0.00	2.77	0.28	0.00	0.28	0.16	0.00	0.03	0.01	27.95	0.00	0.00	28.04
Concrete Delivery Trucks	25	10.37	0.01	10.38	1.04	0.01	1.05	0.61	0.00	0.11	0.04	104.71	0.00	0.00	105.03
Material Delivery Trucks	104	42.97	0.05	43.01	4.30	0.04	4.35	2.52	0.00	0.47	0.18	433.88	0.01	0.00	435.18
Tracker Deliveries Trucks	80	33.05	0.04	33.09	3.31	0.03	3.34	1.94	0.00	0.36	0.14	333.75	0.01	0.00	334.75
Water Haul Trucks	522	171.45	0.17	171.62	17.20	0.16	17.36	7.88	0.01	1.05	0.49	1,478.95	0.02	0.01	1,482.54
Worker Vehicles	3,318	583.77	0.03	583.80	58.47	0.03	58.50	1.78	0.04	18.90	0.69	3,732.80	0.23	0.10	3,768.66
Fuel Trucks	5	1.58	0.00	1.58	0.16	0.00	0.16	0.07	0.00	0.01	0.00	13.60	0.00	0.00	13.63
On-site Emissions Subtotal		**4,447.23**	**259.40**	**4,706.63**	**526.41**	**238.66**	**765.07**	**4,770.26**	**8.79**	**2,855.11**	**452.68**	**764,293.92**	**63.78**	**28.59**	**774,409.13**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	378	156.12	0.17	156.29	15.63	0.16	15.79	9.17	0.02	1.70	0.64	1,576.48	0.03	0.01	1,581.21
Concrete Delivery Trucks	1,416	584.87	0.63	585.50	58.57	0.60	59.17	34.34	0.06	6.35	2.41	5,905.91	0.11	0.05	5,923.63
Material Delivery Trucks	5,866	2,423.38	2.61	2,425.99	242.67	2.49	245.17	142.30	0.23	26.33	9.97	24,470.70	0.46	0.21	24,544.14
Tracker Deliveries Trucks	4,512	1,864.14	2.01	1,866.15	186.67	1.92	188.59	109.47	0.18	20.25	7.67	18,823.62	0.36	0.16	18,880.10
Water Haul Trucks	29,441	9,669.77	9.65	9,679.42	969.87	9.23	979.10	444.38	0.80	59.36	27.50	83,412.67	1.28	0.57	83,615.21
Worker Vehicles	187,135	32,924.82	1.66	32,926.49	3,297.95	1.54	3,299.49	100.11	2.12	1,065.74	38.66	210,529.84	12.75	5.72	212,552.16
Fuel Trucks	271	88.92	0.09	89.01	8.92	0.08	9.00	4.09	0.01	0.55	0.25	767.01	0.01	0.01	768.88
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	493	1.87	0.22	2.09	0.47	0.21	0.68	11.96	0.02	2.21	0.84	2,057.25	0.04	0.02	2,063.42
Concrete Delivery Trucks	1,847	6.99	0.82	7.81	1.76	0.79	2.55	44.82	0.07	8.29	3.14	7,707.00	0.15	0.07	7,730.13
Material Delivery Trucks	25,854	97.83	11.49	109.32	24.67	11.00	35.66	627.25	1.03	116.05	43.94	107,862.01	2.04	0.91	108,185.68
Tracker Deliveries Trucks	19,888	75.25	8.84	84.10	18.97	8.46	27.43	482.50	0.79	89.27	33.80	82,970.77	1.57	0.70	83,219.75
Water Haul Trucks	22,759	55.37	7.46	62.83	14.79	7.14	21.93	343.53	0.62	45.89	21.26	64,482.14	0.99	0.44	64,638.71
Worker Vehicles	974,165	598.08	8.66	606.73	161.32	7.99	169.31	521.16	11.03	5,547.89	201.24	1,095,949.66	66.38	29.76	1,106,477.19
Fuel Trucks	209	0.51	0.07	0.58	0.14	0.07	0.20	3.16	0.01	0.42	0.20	592.94	0.01	0.00	594.38
Off-site Emissions Subtotal		**48,547.93**	**54.37**	**48,602.31**	**5,002.40**	**51.68**	**5,054.08**	**2,878.25**	**16.97**	**6,990.30**	**391.51**	**1,707,108.01**	**86.18**	**38.63**	**1,720,774.59**
Total Emissions In This Month (pounds)		**52,995.16**	**313.77**	**53,308.93**	**5,528.81**	**290.33**	**5,819.15**	**7,648.51**	**25.76**	**9,845.42**	**844.19**	**2,471,401.92**	**149.96**	**67.22**	**2,495,183.72**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)													
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 21															
On-site															
Off-road Equipment															
5 CY Dump Truck	32	16.29	1.73	18.02	1.63	1.59	3.22	44.47	0.09	18.48	3.18	8,685.09	0.53	0.24	8,769.77
Air Compressor	121	21.27	2.09	23.36	2.13	1.93	4.05	23.26	0.03	27.34	4.52	2,691.51	0.72	0.32	2,805.34
ATV	1,344	196.92	23.26	220.18	19.69	21.40	41.09	258.49	0.23	73.08	50.23	17,748.09	1.93	0.87	18,054.46
Auger	42	15.69	0.93	16.61	1.57	0.85	2.42	30.57	0.09	14.37	1.69	7,893.18	0.24	0.11	7,930.90
Backhoe/Excavator	249	5.07	6.06	11.12	0.77	5.57	6.34	82.19	0.21	125.97	6.92	18,289.21	1.87	0.84	18,585.84
Cable Plow	53	15.54	2.67	18.20	8.54	2.45	10.99	33.87	0.04	24.13	3.21	3,431.17	0.52	0.23	3,513.02
Cable Trencher	63	18.50	1.33	19.83	10.17	1.23	11.39	14.79	0.03	24.02	2.84	2,071.96	0.74	0.33	2,189.72
Compactor	36	11.85	0.89	12.74	1.19	0.82	2.00	18.97	0.04	22.21	1.26	3,902.73	0.34	0.15	3,956.17
Crane	122	57.57	6.47	64.03	5.76	5.95	11.71	154.80	0.22	53.89	10.08	21,916.63	1.46	0.65	22,147.39
Crawler Tractor	24	7.36	1.31	8.67	0.74	1.21	1.94	23.66	0.03	17.92	1.82	2,949.48	0.31	0.14	2,999.28
Dozer (D6)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forklift	50	15.24	0.94	16.18	1.52	0.87	2.39	16.86	0.04	21.31	1.11	3,144.65	0.33	0.15	3,197.26
Forklift (10 K) (Aerial Lift)	260	67.04	4.88	71.92	6.70	4.49	11.19	87.09	0.19	110.10	5.72	16,247.33	1.71	0.77	16,519.20
Forklift (5 K)	168	33.62	3.15	36.77	3.36	2.90	6.26	56.19	0.12	71.03	3.69	10,482.15	1.11	0.50	10,657.55
Generator	62	10.93	1.08	12.01	1.09	0.99	2.08	11.96	0.02	14.75	2.32	1,901.82	0.35	0.16	1,956.96
Generator (45 kW)	1,119	223.94	19.37	243.31	22.39	17.82	40.21	215.20	0.44	265.52	41.82	34,232.67	6.26	2.81	35,225.30
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Man/Aerial Lift	26	5.21	0.09	5.30	0.52	0.08	0.60	3.00	0.01	4.10	0.15	510.26	0.10	0.04	525.95
Mini Excavator	63	11.08	0.68	11.76	1.11	0.63	1.74	9.16	0.02	16.51	1.29	1,574.69	0.33	0.15	1,627.19
Mini-Trencher	252	73.98	5.34	79.32	40.67	4.91	45.58	59.17	0.11	96.07	11.38	8,287.85	2.97	1.33	8,758.87
Motor Grader	103	441.31	3.57	444.88	47.65	3.28	50.93	109.09	0.20	40.63	6.36	17,766.77	1.17	0.52	17,951.57
Post Machine	706	124.07	11.75	135.82	12.41	10.81	23.21	162.65	0.28	156.77	22.06	21,879.91	1.40	0.63	22,102.06
Roller/Vibrator/Padder	96	409.02	2.36	411.38	44.16	2.17	46.33	50.29	0.12	58.87	3.34	10,346.77	0.89	0.40	10,488.46
Scraper	151	44.39	14.76	59.14	24.40	13.57	37.97	320.52	0.36	85.89	22.56	31,643.46	2.61	1.17	32,056.64
Sheepsfoot Roller	144	613.53	4.65	618.18	66.25	4.28	70.52	62.51	0.10	57.00	5.65	8,465.53	1.03	0.46	8,629.25
Skid Steer	1,008	20.54	11.52	32.06	3.11	10.60	13.71	205.27	0.51	271.41	13.17	43,065.22	2.68	1.20	43,490.26
Tensioner	35	13.18	1.49	14.67	1.32	1.37	2.69	39.46	0.04	20.66	2.37	3,754.50	0.23	0.10	3,791.33
Tractor	45	15.43	1.22	16.65	1.54	1.12	2.66	23.86	0.05	26.51	1.76	4,594.78	0.32	0.14	4,645.98
Tractor Buster	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor Disk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck	96	32.57	4.17	36.74	3.26	3.83	7.09	92.84	0.18	34.93	7.09	15,934.07	1.02	0.46	16,095.57
Truck (Onroad)	1,309	488.79	56.93	545.72	48.88	52.37	101.25	1,268.86	2.45	477.35	96.88	217,765.58	13.92	6.24	219,972.82
Truck Mounted Digger	35	12.00	0.78	12.78	1.20	0.72	1.92	25.68	0.07	12.07	1.42	6,630.28	0.20	0.09	6,661.95
Truck, flatbed (onroad)	192	71.53	8.33	79.86	7.15	7.66	14.82	185.69	0.36	69.86	14.18	31,868.13	2.04	0.91	32,191.14
Water Pull	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Pump	124	21.86	2.15	24.01	2.19	1.98	4.17	23.91	0.02	6.76	4.65	1,641.70	0.18	0.08	1,670.04
Water truck	894	333.81	38.88	372.68	33.38	35.77	69.15	866.54	1.67	326.00	66.16	148,717.96	9.51	4.26	150,225.34
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	32	11.92	1.39	13.31	1.19	1.28	2.47	30.95	0.06	11.64	2.36	5,311.36	0.34	0.15	5,365.19
On-road Vehicles															
Aggregate Base Delivery Trucks	7	2.77	0.00	2.77	0.28	0.00	0.28	0.16	0.00	0.03	0.01	27.95	0.00	0.00	28.04
Concrete Delivery Trucks	25	10.37	0.01	10.38	1.04	0.01	1.05	0.61	0.00	0.11	0.04	104.71	0.00	0.00	105.03
Material Delivery Trucks	104	42.97	0.05	43.01	4.30	0.04	4.35	2.52	0.00	0.47	0.18	433.88	0.01	0.00	435.18
Tracker Deliveries Trucks	80	33.05	0.04	33.09	3.31	0.03	3.34	1.94	0.00	0.36	0.14	333.75	0.01	0.00	334.75
Water Haul Trucks	522	171.45	0.17	171.62	17.20	0.16	17.36	7.88	0.01	1.05	0.49	1,478.95	0.02	0.01	1,482.54
Worker Vehicles	3,318	583.77	0.03	583.80	58.47	0.03	58.50	1.78	0.04	18.90	0.69	3,732.80	0.23	0.10	3,768.66
Fuel Trucks	5	1.58	0.00	1.58	0.16	0.00	0.16	0.07	0.00	0.01	0.00	13.60	0.00	0.00	13.63
On-site Emissions Subtotal		**4,447.23**	**259.40**	**4,706.63**	**526.41**	**238.66**	**765.07**	**4,770.26**	**8.79**	**2,855.11**	**452.68**	**764,293.92**	**63.78**	**28.59**	**774,409.13**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	378	156.12	0.17	156.29	15.63	0.16	15.79	9.17	0.02	1.70	0.64	1,576.48	0.03	0.01	1,581.21
Concrete Delivery Trucks	1,416	584.87	0.63	585.50	58.57	0.60	59.17	34.34	0.06	6.35	2.41	5,905.91	0.11	0.05	5,923.63
Material Delivery Trucks	5,866	2,423.38	2.61	2,425.99	242.67	2.49	245.17	142.30	0.23	26.33	9.97	24,470.70	0.46	0.21	24,544.14
Tracker Deliveries Trucks	4,512	1,864.14	2.01	1,866.15	186.67	1.92	188.59	109.47	0.18	20.25	7.67	18,823.62	0.36	0.16	18,880.10
Water Haul Trucks	29,441	9,669.77	9.65	9,679.42	969.87	9.23	979.10	444.38	0.80	59.36	27.50	83,412.67	1.28	0.57	83,615.21
Worker Vehicles	187,135	32,924.82	1.66	32,926.49	3,297.95	1.54	3,299.49	100.11	2.12	1,065.74	38.66	210,529.84	12.75	5.72	212,552.16
Fuel Trucks	271	88.92	0.09	89.01	8.92	0.08	9.00	4.09	0.01	0.55	0.25	767.01	0.01	0.01	768.88
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	493	1.87	0.22	2.09	0.47	0.21	0.68	11.96	0.02	2.21	0.84	2,057.25	0.04	0.02	2,063.42
Concrete Delivery Trucks	1,847	6.99	0.82	7.81	1.76	0.79	2.55	44.82	0.07	8.29	3.14	7,707.00	0.15	0.07	7,730.13
Material Delivery Trucks	25,854	97.83	11.49	109.32	24.67	11.00	35.66	627.25	1.03	116.05	43.94	107,862.01	2.04	0.91	108,185.68
Tracker Deliveries Trucks	19,888	75.25	8.84	84.10	18.97	8.46	27.43	482.50	0.79	89.27	33.80	82,970.77	1.57	0.70	83,219.75
Water Haul Trucks	22,759	55.37	7.46	62.83	14.79	7.14	21.93	343.53	0.62	45.89	21.26	64,482.14	0.99	0.44	64,638.71
Worker Vehicles	974,165	598.08	8.66	606.73	161.32	7.99	169.31	521.16	11.03	5,547.89	201.24	1,095,949.66	66.38	29.76	1,106,477.19
Fuel Trucks	209	0.51	0.07	0.58	0.14	0.07	0.20	3.16	0.01	0.42	0.20	592.94	0.01	0.00	594.38
Off-site Emissions Subtotal		**48,547.93**	**54.37**	**48,602.31**	**5,002.40**	**51.68**	**5,054.08**	**2,878.25**	**16.97**	**6,990.30**	**391.51**	**1,707,108.01**	**86.18**	**38.63**	**1,720,774.59**
Total Emissions In This Month (pounds)		**52,995.16**	**313.77**	**53,308.93**	**5,528.81**	**290.33**	**5,819.15**	**7,648.51**	**25.76**	**9,845.42**	**844.19**	**2,471,401.92**	**149.96**	**67.22**	**2,495,183.72**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)												
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 22															
On-site															
Off-road Equipment															
5 CY Dump Truck	32	16.29	1.73	18.02	1.63	1.59	3.22	44.47	0.09	18.48	3.18	8,685.09	0.53	0.24	8,769.77
Air Compressor	60	10.63	1.05	11.68	1.06	0.96	2.03	11.63	0.02	13.67	2.26	1,345.76	0.36	0.16	1,402.67
ATV	672	98.46	11.63	110.09	9.85	10.70	20.55	129.25	0.11	36.54	25.12	8,874.05	0.97	0.43	9,027.23
Auger	42	15.69	0.93	16.61	1.57	0.85	2.42	30.57	0.09	14.37	1.69	7,893.18	0.24	0.11	7,930.90
Backhoe/Excavator	249	5.07	6.06	11.12	0.77	5.57	6.34	82.19	0.21	125.97	6.92	18,289.21	1.87	0.84	18,585.84
Cable Plow	53	15.54	2.67	18.20	8.54	2.45	10.99	33.87	0.04	24.13	3.21	3,431.17	0.52	0.23	3,513.02
Cable Trencher	63	18.50	1.33	19.83	10.17	1.23	11.39	14.79	0.03	24.02	2.84	2,071.96	0.74	0.33	2,189.72
Compactor	36	11.85	0.89	12.74	1.19	0.82	2.00	18.97	0.04	22.21	1.26	3,902.73	0.34	0.15	3,956.17
Crane	91	43.18	4.85	48.03	4.32	4.46	8.78	116.10	0.16	40.42	7.56	16,437.47	1.09	0.49	16,610.55
Crawler Tractor	24	7.36	1.31	8.67	0.74	1.21	1.94	23.66	0.03	17.92	1.82	2,949.48	0.31	0.14	2,999.28
Dozer (D6)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forklift	50	15.24	0.94	16.18	1.52	0.87	2.39	16.86	0.04	21.31	1.11	3,144.65	0.33	0.15	3,197.26
Forklift (10 K) (Aerial Lift)	130	33.52	2.44	35.96	3.35	2.24	5.60	43.55	0.10	55.05	2.86	8,123.67	0.86	0.38	8,259.60
Forklift (5 K)	84	16.81	1.57	18.39	1.68	1.45	3.13	28.10	0.06	35.51	1.85	5,241.08	0.55	0.25	5,328.77
Generator	62	10.93	1.08	12.01	1.09	0.99	2.08	11.96	0.02	14.75	2.32	1,901.82	0.35	0.16	1,956.96
Generator (45 kW)	746	149.29	12.91	162.20	14.93	11.88	26.81	143.46	0.30	177.01	27.88	22,821.78	4.17	1.87	23,483.53
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Man/Aerial Lift	26	5.21	0.09	5.30	0.52	0.08	0.60	3.00	0.01	4.10	0.15	510.26	0.10	0.04	525.95
Mini Excavator	63	11.08	0.68	11.76	1.11	0.63	1.74	9.16	0.02	16.51	1.29	1,574.69	0.33	0.15	1,627.19
Mini-Trencher	252	73.98	5.34	79.32	40.67	4.91	45.58	59.17	0.11	96.07	11.38	8,287.85	2.97	1.33	8,758.87
Motor Grader	103	441.31	3.57	444.88	47.65	3.28	50.93	109.09	0.20	40.63	6.36	17,766.77	1.17	0.52	17,951.57
Post Machine	353	62.04	5.87	67.91	6.20	5.40	11.61	81.33	0.14	78.38	11.03	10,939.96	0.70	0.31	11,051.03
Roller/Vibrator/Padder	96	409.02	2.36	411.38	44.16	2.17	46.33	50.29	0.12	58.87	3.34	10,346.77	0.89	0.40	10,488.46
Scraper	151	44.39	14.76	59.14	24.40	13.57	37.97	320.52	0.36	85.89	22.56	31,643.46	2.61	1.17	32,056.64
Sheepsfoot Roller	144	613.53	4.65	618.18	66.25	4.28	70.52	62.51	0.10	57.00	5.65	8,465.53	1.03	0.46	8,629.25
Skid Steer	504	10.27	5.76	16.03	1.56	5.30	6.85	102.64	0.25	135.71	6.58	21,532.61	1.34	0.60	21,745.13
Tensioner	35	13.18	1.49	14.67	1.32	1.37	2.69	39.46	0.04	20.66	2.37	3,754.50	0.23	0.10	3,791.33
Tractor	45	15.43	1.22	16.65	1.54	1.12	2.66	23.86	0.05	26.51	1.76	4,594.78	0.32	0.14	4,645.98
Tractor Buster	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor Disk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck	96	32.57	4.17	36.74	3.26	3.83	7.09	92.84	0.18	34.93	7.09	15,934.07	1.02	0.46	16,095.57
Truck (Onroad)	830	309.96	36.10	346.06	31.00	33.21	64.21	804.64	1.55	302.71	61.44	138,095.25	8.83	3.96	139,494.96
Truck Mounted Digger	35	12.00	0.78	12.78	1.20	0.72	1.92	25.68	0.07	12.07	1.42	6,630.28	0.20	0.09	6,661.95
Truck, flatbed (onroad)	128	47.69	5.55	53.24	4.77	5.11	9.88	123.79	0.24	46.57	9.45	21,245.42	1.36	0.61	21,460.76
Water Pull	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Pump	124	21.86	2.15	24.01	2.19	1.98	4.17	23.91	0.02	6.76	4.65	1,641.70	0.18	0.08	1,670.04
Water truck	702	262.28	30.55	292.82	26.23	28.10	54.33	680.85	1.31	256.14	51.98	116,849.82	7.47	3.35	118,034.19
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	32	11.92	1.39	13.31	1.19	1.28	2.47	30.95	0.06	11.64	2.36	5,311.36	0.34	0.15	5,365.19
On-road Vehicles															
Aggregate Base Delivery Trucks	7	2.73	0.00	2.73	0.27	0.00	0.28	0.16	0.00	0.03	0.01	27.53	0.00	0.00	27.62
Concrete Delivery Trucks	25	10.33	0.01	10.34	1.03	0.01	1.04	0.61	0.00	0.11	0.04	104.30	0.00	0.00	104.61
Material Delivery Trucks	102	42.14	0.05	42.19	4.22	0.04	4.26	2.47	0.00	0.46	0.17	425.53	0.01	0.00	426.81
Tracker Deliveries Trucks	80	33.05	0.04	33.09	3.31	0.03	3.34	1.94	0.00	0.36	0.14	333.75	0.01	0.00	334.75
Water Haul Trucks	426	139.92	0.14	140.06	14.03	0.13	14.17	6.43	0.01	0.86	0.40	1,206.96	0.02	0.01	1,209.89
Worker Vehicles	2,646	465.54	0.02	465.56	46.63	0.02	46.65	1.42	0.03	15.07	0.55	2,976.79	0.18	0.08	3,005.38
Fuel Trucks	3	1.05	0.00	1.05	0.11	0.00	0.11	0.05	0.00	0.01	0.00	9.07	0.00	0.00	9.09
On-site Emissions Subtotal		**3,701.06**	**191.03**	**3,892.09**	**451.24**	**175.75**	**626.99**	**3,549.66**	**6.52**	**2,126.45**	**331.94**	**568,143.87**	**48.70**	**21.83**	**575,867.02**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	372	153.79	0.17	153.96	15.40	0.16	15.56	9.03	0.01	1.67	0.63	1,552.95	0.03	0.01	1,557.61
Concrete Delivery Trucks	1,410	582.54	0.63	583.17	58.33	0.60	58.93	34.21	0.06	6.33	2.40	5,882.38	0.11	0.05	5,900.03
Material Delivery Trucks	5,753	2,376.78	2.56	2,379.34	238.00	2.45	240.45	139.57	0.23	25.82	9.78	24,000.11	0.45	0.20	24,072.13
Tracker Deliveries Trucks	4,512	1,864.14	2.01	1,866.15	186.67	1.92	188.59	109.47	0.18	20.25	7.67	18,823.62	0.36	0.16	18,880.10
Water Haul Trucks	24,026	7,891.42	7.88	7,899.29	791.50	7.53	799.04	362.66	0.65	48.44	22.44	68,072.41	1.04	0.47	68,237.70
Worker Vehicles	149,234	26,256.51	1.33	26,257.83	2,630.01	1.22	2,631.24	79.84	1.69	849.89	30.83	167,890.88	10.17	4.56	169,503.62
Fuel Trucks	180	59.28	0.06	59.34	5.95	0.06	6.00	2.72	0.00	0.36	0.17	511.34	0.01	0.00	512.58
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	486	1.84	0.22	2.05	0.46	0.21	0.67	11.78	0.02	2.18	0.83	2,026.54	0.04	0.02	2,032.62
Concrete Delivery Trucks	1,840	6.96	0.82	7.78	1.76	0.78	2.54	44.64	0.07	8.26	3.13	7,676.30	0.15	0.07	7,699.33
Material Delivery Trucks	25,357	95.95	11.27	107.22	24.19	10.78	34.98	615.19	1.01	113.82	43.10	105,787.74	2.00	0.90	106,105.18
Tracker Deliveries Trucks	19,888	75.25	8.84	84.10	18.97	8.46	27.43	482.50	0.79	89.27	33.80	82,970.77	1.57	0.70	83,219.75
Water Haul Trucks	18,574	45.19	6.09	51.28	12.07	5.82	17.90	280.35	0.50	37.45	17.35	52,623.35	0.81	0.36	52,751.13
Worker Vehicles	776,866	476.95	6.90	483.85	128.65	6.37	135.02	415.61	8.80	4,424.26	160.48	873,985.17	52.94	23.73	882,380.54
Fuel Trucks	140	0.34	0.05	0.39	0.09	0.04	0.13	2.11	0.00	0.28	0.13	395.29	0.01	0.00	396.25
Off-site Emissions Subtotal		**39,886.94**	**48.80**	**39,935.74**	**4,112.06**	**46.42**	**4,158.48**	**2,589.67**	**14.02**	**5,628.30**	**332.73**	**1,412,198.87**	**69.68**	**31.23**	**1,423,248.61**
Total Emissions In This Month (pounds)		**43,588.00**	**239.83**	**43,827.83**	**4,563.30**	**222.17**	**4,785.47**	**6,139.34**	**20.54**	**7,754.75**	**664.67**	**1,980,342.74**	**118.38**	**53.07**	**1,999,115.63**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)													
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 23															
On-site															
Off-road Equipment															
5 CY Dump Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Air Compressor	60	10.63	1.05	11.68	1.06	0.96	2.03	11.63	0.02	13.67	2.26	1,345.76	0.36	0.16	1,402.67
ATV	672	98.46	11.63	110.09	9.85	10.70	20.55	129.25	0.11	36.54	25.12	8,874.05	0.97	0.43	9,027.23
Auger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Backhoe/Excavator	31	0.63	0.76	1.39	0.10	0.70	0.79	10.27	0.03	15.75	0.87	2,286.15	0.23	0.10	2,323.23
Cable Plow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cable Trencher	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Compactor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crane	30	14.39	1.62	16.01	1.44	1.49	2.93	38.70	0.05	13.47	2.52	5,479.16	0.36	0.16	5,536.85
Crawler Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dozer (D6)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forklift	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forklift (10 K) (Aerial Lift)	130	33.52	2.44	35.96	3.35	2.24	5.60	43.55	0.10	55.05	2.86	8,123.67	0.86	0.38	8,259.60
Forklift (5 K)	84	16.81	1.57	18.39	1.68	1.45	3.13	28.10	0.06	35.51	1.85	5,241.08	0.55	0.25	5,328.77
Generator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (45 kW)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Man/Aerial Lift	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mini Excavator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mini-Trencher	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Motor Grader	52	220.66	1.78	222.44	23.83	1.64	25.47	54.54	0.10	20.31	3.18	8,883.39	0.58	0.26	8,975.79
Post Machine	353	62.04	5.87	67.91	6.20	5.40	11.61	81.33	0.14	78.38	11.03	10,939.96	0.70	0.31	11,051.03
Roller/Vibrator/Padder	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scraper	101	29.59	9.84	39.43	16.27	9.05	25.32	213.68	0.24	57.26	15.04	21,095.64	1.74	0.78	21,371.10
Sheepsfoot Roller	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Skid Steer	504	10.27	5.76	16.03	1.56	5.30	6.85	102.64	0.25	135.71	6.58	21,532.61	1.34	0.60	21,745.13
Tensioner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor Buster	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor Disk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck	48	16.29	2.08	18.37	1.63	1.92	3.54	46.42	0.09	17.46	3.54	7,967.03	0.51	0.23	8,047.79
Truck (Onroad)	479	178.82	20.83	199.65	17.88	19.16	37.04	464.22	0.90	174.64	35.44	79,670.33	5.09	2.28	80,477.86
Truck Mounted Digger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck, flatbed (onroad)	64	23.84	2.78	26.62	2.38	2.55	4.94	61.90	0.12	23.29	4.73	10,622.71	0.68	0.30	10,730.38
Water Pull	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Pump	124	21.86	2.15	24.01	2.19	1.98	4.17	23.91	0.02	6.76	4.65	1,641.70	0.18	0.08	1,670.04
Water truck	319	119.22	13.88	133.10	11.92	12.77	24.70	309.48	0.60	116.43	23.63	53,113.56	3.39	1.52	53,651.91
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-road Vehicles															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	8	3.31	0.00	3.31	0.33	0.00	0.33	0.19	0.00	0.04	0.01	33.38	0.00	0.00	33.48
Tracker Deliveries Trucks	80	33.05	0.04	33.09	3.31	0.03	3.34	1.94	0.00	0.36	0.14	333.75	0.01	0.00	334.75
Water Haul Trucks	138	45.33	0.05	45.37	4.55	0.04	4.59	2.08	0.00	0.28	0.13	390.99	0.01	0.00	391.94
Worker Vehicles	1,554	273.41	0.01	273.43	27.39	0.01	27.40	0.83	0.02	8.85	0.32	1,748.27	0.11	0.05	1,765.07
Fuel Trucks	2	0.59	0.00	0.59	0.06	0.00	0.06	0.03	0.00	0.00	0.00	5.10	0.00	0.00	5.11
On-site Emissions Subtotal		**1,352.96**	**97.05**	**1,450.01**	**150.99**	**89.29**	**240.28**	**1,768.14**	**3.14**	**986.78**	**171.78**	**272,150.05**	**21.84**	**9.79**	**275,613.24**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	451	186.41	0.20	186.61	18.67	0.19	18.86	10.95	0.02	2.03	0.77	1,882.36	0.04	0.02	1,888.01
Tracker Deliveries Trucks	4,512	1,864.14	2.01	1,866.15	186.67	1.92	188.59	109.47	0.18	20.25	7.67	18,823.62	0.36	0.16	18,880.10
Water Haul Trucks	7,783	2,556.37	2.55	2,558.93	256.40	2.44	258.84	117.48	0.21	15.69	7.27	22,051.63	0.34	0.15	22,105.17
Worker Vehicles	87,646	15,420.49	0.78	15,421.27	1,544.61	0.72	1,545.33	46.89	0.99	499.14	18.11	98,602.58	5.97	2.68	99,549.74
Fuel Trucks	102	33.34	0.03	33.38	3.34	0.03	3.38	1.53	0.00	0.20	0.09	287.63	0.00	0.00	288.33
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	1,989	7.53	0.88	8.41	1.90	0.85	2.74	48.25	0.08	8.93	3.38	8,297.08	0.16	0.07	8,321.98
Tracker Deliveries Trucks	19,888	75.25	8.84	84.10	18.97	8.46	27.43	482.50	0.79	89.27	33.80	82,970.77	1.57	0.70	83,219.75
Water Haul Trucks	6,017	14.64	1.97	16.61	3.91	1.89	5.80	90.82	0.16	12.13	5.62	17,047.00	0.26	0.12	17,088.40
Worker Vehicles	456,254	280.11	4.05	284.17	75.55	3.74	79.30	244.09	5.17	2,598.38	94.25	513,292.88	31.09	13.94	518,223.49
Fuel Trucks	78	0.19	0.03	0.22	0.05	0.02	0.08	1.18	0.00	0.16	0.07	222.35	0.00	0.00	222.89
Off-site Emissions Subtotal		**20,438.48**	**21.35**	**20,459.83**	**2,110.08**	**20.26**	**2,130.34**	**1,153.16**	**7.60**	**3,246.18**	**171.03**	**763,477.90**	**39.79**	**17.84**	**769,787.87**
Total Emissions In This Month (pounds)		**21,791.44**	**118.40**	**21,909.84**	**2,261.07**	**109.56**	**2,370.63**	**2,921.30**	**10.75**	**4,232.96**	**342.81**	**1,035,627.95**	**61.63**	**27.63**	**1,045,401.11**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)														
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 24																
On-site																
Off-road Equipment																
5 CY Dump Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Air Compressor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ATV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Auger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Backhoe/Excavator	31	0.63	0.76	1.39	0.10	0.70	0.79	10.27	0.03	15.75	0.87	2,286.15	0.23	0.10	2,323.23
Cable Plow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cable Trencher	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Compactor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crawler Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dozer (D6)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forklift	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forklift (10 K) (Aerial Lift)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forklift (5 K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (45 kW)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Man/Aerial Lift	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mini Excavator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mini-Trencher	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Motor Grader	52	220.66	1.78	222.44	23.83	1.64	25.47	54.54	0.10	20.31	3.18	8,883.39	0.58	0.26	8,975.79
Post Machine	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roller/Vibrator/Padder	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scraper	101	29.59	9.84	39.43	16.27	9.05	25.32	213.68	0.24	57.26	15.04	21,095.64	1.74	0.78	21,371.10
Sheepsfoot Roller	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Skid Steer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tensioner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor Buster	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor Disk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck	48	16.29	2.08	18.37	1.63	1.92	3.54	46.42	0.09	17.46	3.54	7,967.03	0.51	0.23	8,047.79
Truck (Onroad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck Mounted Digger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck, flatbed (onroad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Pull	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Pump	124	21.86	2.15	24.01	2.19	1.98	4.17	23.91	0.02	6.76	4.65	1,641.70	0.18	0.08	1,670.04
Water truck	128	47.69	5.55	53.24	4.77	5.11	9.88	123.79	0.24	46.57	9.45	21,245.42	1.36	0.61	21,460.76
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-road Vehicles															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	8	3.31	0.00	3.31	0.33	0.00	0.33	0.19	0.00	0.04	0.01	33.38	0.00	0.00	33.48
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	42	13.79	0.01	13.81	1.38	0.01	1.40	0.63	0.00	0.08	0.04	119.00	0.00	0.00	119.28
Worker Vehicles	252	44.34	0.00	44.34	4.44	0.00	4.44	0.13	0.00	1.44	0.05	283.50	0.02	0.01	286.23
Fuel Trucks	1	0.20	0.00	0.20	0.02	0.00	0.02	0.01	0.00	0.00	0.00	1.70	0.00	0.00	1.70
On-site Emissions Subtotal		**538.58**	**35.10**	**573.68**	**68.97**	**32.29**	**101.26**	**617.06**	**1.01**	**342.69**	**64.72**	**86,378.69**	**8.79**	**3.94**	**87,772.92**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	451	186.41	0.20	186.61	18.67	0.19	18.86	10.95	0.02	2.03	0.77	1,882.36	0.04	0.02	1,888.01
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	2,369	778.03	0.78	778.80	78.04	0.74	78.78	35.75	0.06	4.78	2.21	6,711.36	0.10	0.05	6,727.66
Worker Vehicles	14,213	2,500.62	0.13	2,500.75	250.48	0.12	250.59	7.60	0.16	80.94	2.94	15,989.61	0.97	0.43	16,143.20
Fuel Trucks	34	11.11	0.01	11.13	1.11	0.01	1.13	0.51	0.00	0.07	0.03	95.88	0.00	0.00	96.11
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	1,989	7.53	0.88	8.41	1.90	0.85	2.74	48.25	0.08	8.93	3.38	8,297.08	0.16	0.07	8,321.98
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	1,831	4.46	0.60	5.06	1.19	0.57	1.76	27.64	0.05	3.69	1.71	5,188.22	0.08	0.04	5,200.82
Worker Vehicles	73,987	45.42	0.66	46.08	12.25	0.61	12.86	39.58	0.84	421.36	15.28	83,236.68	5.04	2.26	84,036.24
Fuel Trucks	26	0.06	0.01	0.07	0.02	0.01	0.03	0.39	0.00	0.05	0.02	74.12	0.00	0.00	74.30
Off-site Emissions Subtotal		**3,533.64**	**3.26**	**3,536.91**	**363.65**	**3.10**	**366.75**	**170.68**	**1.21**	**521.84**	**26.35**	**121,475.31**	**6.39**	**2.86**	**122,488.31**
Total Emissions In This Month (pounds)		**4,072.22**	**38.36**	**4,110.59**	**432.62**	**35.39**	**468.01**	**787.74**	**2.22**	**864.53**	**91.06**	**207,854.00**	**15.18**	**6.80**	**210,261.24**

Equipment/Vehicle Type	Total hours for all onsite equipment, total VMT for all on-road vehicles	Emissions (lbs)													
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
Month 25															
On-site															
Off-road Equipment															
5 CY Dump Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Air Compressor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ATV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Auger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Backhoe/Excavator	31	0.63	0.76	1.39	0.10	0.70	0.79	10.27	0.03	15.75	0.87	2,286.15	0.23	0.10	2,323.23
Cable Plow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cable Trencher	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Compactor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crane	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crawler Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dozer (D6)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forklift	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forklift (10 K) (Aerial Lift)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forklift (5 K)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (45 kW)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Generator (Office)(45 kW)	373	74.65	6.46	81.10	7.46	5.94	13.40	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Generator (Security, IT)(30 kW)	373	65.58	6.46	72.04	6.56	5.94	12.50	71.73	0.15	88.51	13.94	11,410.89	2.09	0.94	11,741.77
Loader	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Man/Aerial Lift	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mini Excavator	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mini-Trencher	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Motor Grader	52	220.66	1.78	222.44	23.83	1.64	25.47	54.54	0.10	20.31	3.18	8,883.39	0.58	0.26	8,975.79
Post Machine	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Roller/Vibrator/Padder	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scraper	101	29.59	9.84	39.43	16.27	9.05	25.32	213.68	0.24	57.26	15.04	21,095.64	1.74	0.78	21,371.10
Sheepsfoot Roller	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Skid Steer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tensioner	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor Buster	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tractor Disk	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck	48	16.29	2.08	18.37	1.63	1.92	3.54	46.42	0.09	17.46	3.54	7,967.03	0.51	0.23	8,047.79
Truck (Onroad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck Mounted Digger	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Truck, flatbed (onroad)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Pull	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Pump	124	21.86	2.15	24.01	2.19	1.98	4.17	23.91	0.02	6.76	4.65	1,641.70	0.18	0.08	1,670.04
Water truck	128	47.69	5.55	53.24	4.77	5.11	9.88	123.79	0.24	46.57	9.45	21,245.42	1.36	0.61	21,460.76
Water Well Pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wire Truck	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
On-road Vehicles															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	8	3.31	0.00	3.31	0.33	0.00	0.33	0.19	0.00	0.04	0.01	33.38	0.00	0.00	33.48
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	42	13.79	0.01	13.81	1.38	0.01	1.40	0.63	0.00	0.08	0.04	119.00	0.00	0.00	119.28
Worker Vehicles	252	44.34	0.00	44.34	4.44	0.00	4.44	0.13	0.00	1.44	0.05	283.50	0.02	0.01	286.23
Fuel Trucks	1	0.20	0.00	0.20	0.02	0.00	0.02	0.01	0.00	0.00	0.00	1.70	0.00	0.00	1.70
On-site Emissions Subtotal		**538.58**	**35.10**	**573.68**	**68.97**	**32.29**	**101.26**	**617.06**	**1.01**	**342.69**	**64.72**	**86,378.69**	**8.79**	**3.94**	**87,772.92**
Off-site															
On-road Vehicles (unpaved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	451	186.41	0.20	186.61	18.67	0.19	18.86	10.95	0.02	2.03	0.77	1,882.36	0.04	0.02	1,888.01
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	2,369	778.03	0.78	778.80	78.04	0.74	78.78	35.75	0.06	4.78	2.21	6,711.36	0.10	0.05	6,727.66
Worker Vehicles	14,213	2,500.62	0.13	2,500.75	250.48	0.12	250.59	7.60	0.16	80.94	2.94	15,989.61	0.97	0.43	16,143.20
Fuel Trucks	34	11.11	0.01	11.13	1.11	0.01	1.13	0.51	0.00	0.07	0.03	95.88	0.00	0.00	96.11
On-road Vehicles (paved road)															
Aggregate Base Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Concrete Delivery Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Material Delivery Trucks	1,989	7.53	0.88	8.41	1.90	0.85	2.74	48.25	0.08	8.93	3.38	8,297.08	0.16	0.07	8,321.98
Tracker Deliveries Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Haul Trucks	1,831	4.46	0.60	5.06	1.19	0.57	1.76	27.64	0.05	3.69	1.71	5,188.22	0.08	0.04	5,200.82
Worker Vehicles	73,987	45.42	0.66	46.08	12.25	0.61	12.86	39.58	0.84	421.36	15.28	83,236.68	5.04	2.26	84,036.24
Fuel Trucks	26	0.06	0.01	0.07	0.02	0.01	0.03	0.39	0.00	0.05	0.02	74.12	0.00	0.00	74.30
Off-site Emissions Subtotal		**3,533.64**	**3.26**	**3,536.91**	**363.65**	**3.10**	**366.75**	**170.68**	**1.21**	**521.84**	**26.35**	**121,475.31**	**6.39**	**2.86**	**122,488.31**
Total Emissions In This Month (pounds)		**4,072.22**	**38.36**	**4,110.59**	**432.62**	**35.39**	**468.01**	**787.74**	**2.22**	**864.53**	**91.06**	**207,854.00**	**15.18**	**6.80**	**210,261.24**

APPENDIX B
PROJECT OPERATIONAL EMISSION ESTIMATIONS

Desert Quartzite Solar Project

Operation Emission Estimations

Emission Inventory Summary

Prepared by URS, September 2015

Project Operation Annual Emissions (ton/year)

Annual Emission (ton per year)		Emissions (tpy)													
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
On-site															
On-road Vehicles															
Deliveries Trucks	111	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.23
Water Haul Trucks	619	0.10	0.00	0.10	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.88	0.00	0.00	0.88
Worker Vehicles	365	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.21
On-site Emissions Subtotal		**0.16**	**0.00**	**0.16**	**0.02**	**0.00**	**0.02**	**0.01**	**0.00**	**0.00**	**0.00**	**1.31**	**0.00**	**0.00**	**1.32**
Off-site															
On-road Vehicles (unpaved road)															
Deliveries Trucks	6,249	1.29	0.00	1.29	0.13	0.00	0.13	0.08	0.00	0.01	0.01	13.04	0.00	0.00	13.07
Water Haul Trucks	34,923	5.74	0.01	5.74	0.58	0.01	0.58	0.26	0.00	0.04	0.02	49.47	0.00	0.00	49.59
Worker Vehicles	20,586	1.81	0.00	1.81	0.18	0.00	0.18	0.01	0.00	0.06	0.00	11.58	0.00	0.00	11.69
On-road Vehicles (paved road)															
Deliveries Trucks	33,794	0.06	0.01	0.07	0.02	0.01	0.02	0.41	0.00	0.08	0.03	70.49	0.00	0.00	70.70
Water Haul Trucks	61,920	0.08	0.01	0.09	0.02	0.01	0.03	0.47	0.00	0.06	0.03	87.72	0.00	0.00	87.93
Worker Vehicles	127,750	0.04	0.00	0.04	0.01	0.00	0.01	0.03	0.00	0.36	0.01	71.86	0.00	0.00	72.55
Off-site Emissions Subtotal		**9.02**	**0.03**	**9.04**	**0.93**	**0.02**	**0.96**	**1.26**	**0.00**	**0.61**	**0.09**	**304.16**	**0.01**	**0.00**	**305.54**
Total Emissions (tons per year)		**9.17**	**0.03**	**9.20**	**0.95**	**0.02**	**0.97**	**1.26**	**0.00**	**0.61**	**0.09**	**305.47**	**0.01**	**0.00**	**306.86**

MDAQMD CEQA annual threshold (tpy)				15			15	25	25	100	25				100,000.00
				no			**no**	**no**	**no**	**no**	**no**				**no**

Project Federal General Conformity Compliance

Project Construction Total Direct and Indirect Emissions (ton/year)	Emissions (tpy)									
	Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG
Riverside County - MDAQMD										
Annual	9.17	0.03	9.20	0.95	0.02	0.97	1.26	0.00	0.61	0.09
Applicable *De Minimis* Levels			N/A			N/A	N/A	N/A	N/A	N/A
Exceed the threshold in any year (YES/NO)			**N/A**			**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

Desert Quartzite Solar Project

Operation Emission Estimations

CONSTRUCTION PHASE TRIPS

Prepared by URS, September 2015

TABLE 1.1 OPERATION PHASE TRIPS - ESTIMATED OPERATION PHASE ONE-WAY TRIPS (PER YEAR)

Vehicles	**# of trip**
Deliveries Trucks	1,108
Water Haul Trucks	6,192
Worker Vehicles	3,650
Total vehicle trips	**10,950**

= 8.48 round trips per day

NOTES:

1. Assuming 4,000 gallon capacity water trucks.
2. The operational phase of the Project is expected to require up to 38 AF per year (AFY) of water.

TABLE 1.2 TRIP DISTANCE ESTIMATES

	Miles unpaved road, onsite parking area to site entrance (assumption)	Miles unpaved road, site entrance to paved road (eastbound 16th at Stephenson)	Miles paved road in MDAQMD area	Total one way distance (all in MDAQMD area), miles
Deliveries Trucks	0.1	5.64	24.86	30.5
Water Haul Trucks	0.1	5.64	4.36	10
Worker Vehicles	0.1	5.64	29.36	35

Desert Quartzite Solar Project
Operation Emission Estimations
Emission Factors
Prepared by URS, September 2015

1. Mobile Source (off-road Equipment and on-road vehicles) - Exhaust Emission Factors

				Emission Factors									
Equipment	**HP**	**EF source**	**EF source name (hp)**	**Exhausted PM_{10}**	**Exhausted $PM_{2.5}$**	**NO_x**	**SO_x**	**CO**	**ROG**	**CO_2**	**CH_4**	**N_2O**	**Total GHG - CO_2e**
On-road Vehicle - Running Exhaust (unit: lb/mile)													
Deliveries Trucks		EMFAC2014	T7 tractor construction	4.45E-04	4.25E-04	2.43E-02	3.98E-05	4.49E-03	1.70E-03	4.17E+00	7.89E-05	3.54E-05	4.18E+00
Water Haul Trucks		EMFAC2014	T6 Instate Construction Heavy	3.28E-04	3.14E-04	1.51E-02	2.70E-05	2.02E-03	9.34E-04	2.83E+00	4.34E-05	1.94E-05	2.84E+00
Worker Vehicles		EMFAC2014	LDA/LDT1/LDT2	8.89E-06	8.21E-06	5.35E-04	1.13E-05	5.70E-03	2.07E-04	1.13E+00	6.81E-05	3.05E-05	1.14E+00

NOTE:

1. Use aggregated fuel in EMFAC2014 for all vehicles.
2. All emission factors for on-road vehicles from EMFAC2014, except N2O EFs which are scaled from CH4.
3. Onsite speed is limited to 15 mph
   Offsite speed is limited to 55 mph, for freeway
   Offsite speed is limited to 40 mph, for local paved road
   Offsite speed is limited to 30 mph, for local unpaved road
4. Greenhouse Gas Global Warming Potential (GWP) - Table A-1 of 40 CFR Part 98 Subpart A
   - CO_2 GWP = 1
   - CH_4 GWP = 25
   - N_2O GWP = 298

2. Mobile Source (off-road Equipment and on-road vehicles) - Fugitive Dust Emission Factors

Unpaved Road Fugitive Dust Emissions

Emission Factor Equation:

(1) Travel on unpaved surfaces

$E = k * (s/12)^a * (W/3)^b * [(365 - P)/365]$

Source: EPA AP-42 Section 13.2.2 Unpaved Roads Equations 1a and 2

E = size-specific emission factor (lb/VMT)

k, a, b = empirical constants

8.5 s = surface material silt content (%) Table 13.2.2-1 Construction sites - Scraper routes

W = mean vehicle weight (tons)

constants

	PM$_{2.5}$	PM$_{10}$
k (lb/VMT)	0.15	1.5
a	0.9	0.9
b	0.45	0.45

Industrial Roads

17 P = Mean number of days per year with at least 0.01 inches of precipitation (from WRCC (040924) BLYTHE, 1931-2006 average)

1 VMT/hr, assumption (each equipment in average)

		(1) Travel on unpaved surfaces			Sum Total Mitigated EF		
	Weight (ton)	PM$_{2.5}$ EF (lbs/VMT)	PM$_{10}$ EF (lbs/VMT)	Mitigation Efficiency	PM$_{2.5}$ EF (lbs/VMT)	PM$_{10}$ EF (lbs/VMT)	Mitigation Efficiency
On-road Vehicle (on-site)							
Deliveries Trucks	20	0.25	2.46	83%	0.04	0.41	83%
Water Haul Trucks	12	0.20	1.96	83%	0.03	0.33	83%
Worker Vehicles	3	0.10	1.05	83%	0.02	0.18	83%
On-road Vehicle (off-site)							
Deliveries Trucks	20	0.25	2.46	83%	0.04	0.41	83%
Water Haul Trucks	12	0.20	1.96	83%	0.03	0.33	83%
Worker Vehicles	3	0.10	1.05	83%	0.02	0.18	83%

Paved Road Fugitive Dust Emissions

(1) Travel on paved road

$E = [k * (sL)^{0.91} * (W)^{1.02}] (1 - P/4N)$

Source: EPA AP-42 Section 13.2.1 Paved Roads Equation 2

E = particulate emission factor (lb/VMT),

k = particle size multiplier for particle size range and units of interest

0.06 sL = road surface silt loading (grams per square meter) (g/m^2), From AP-42 Table 13.2.1-2, ADT 5,000 to 10,000.

W = average weight (tons) of the vehicles traveling the road

	$PM_{2.5}$	PM_{10}
k (lb/VMT)	0.00054	0.0022

17 P = Mean number of days per year with at least 0.01 inches of precipitation (from WRCC (040924) BLYTHE, 1931-2006 average)

365 N = number of days in the year (averaging period)

		(1) Travel on paved road			**Sum Total Mitigated EF**		
	Weight (ton)	**$PM_{2.5}$ EF (lbs/VMT)**	**PM_{10} EF (lbs/VMT)**	**Mitigation Efficiency**	**$PM_{2.5}$ EF (lbs/VMT)**	**PM_{10} EF (lbs/VMT)**	**Mitigation Efficiency**
On-road Vehicle							
Deliveries Trucks	20	0.0009	0.0036	0%	0.00	0.00	0%
Water Haul Trucks	12	0.0005	0.0021	0%	0.00	0.00	0%
Worker Vehicles	3	0.0001	0.0005	0%	0.00	0.00	0%

3. Fugitive Dust Mitigation Measures and Efficiencies

Area	Mitigation Measure	Control Efficiency
1. Construction Activities	Apply water every 3 hours to disturbed	61%
2. Construction traffic	Limit on-site vehicle speeds (on unpaved roads) to 15 mph by radar enforcement.	57%
3. Post-demolition stabilization	Apply dust suppressants (e.g., polymer emulsion) to disturbed areas upon	84%
4. Travel over unpaved roads	Apply chemical dust suppressant annually to unpaved parking	84%
5. Storage pile wind erosion	Water the storage pile by hand or apply cover when wind events are	90%
	Require construction of 3-sided enclosures with 50% porosity.	75%
Combination of 1, 2, and 3/4		97%
Combination of 1 and 2		83%

Source: SCAQMD Air Quality Analysis Handbook, 2012. Tables XI-A, XI-D, and XI-E.
Available from: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust

Desert Quartzite Solar Project
Operation Emission Estimations
Detailed Emission Inventory
Prepared by URS, September 2015

Equipment/Vehicle Type	Total VMT for on-road vehicles	Emissions (tons per year)													
		Fugitive Dust PM_{10}	Exhaust PM_{10}	Total PM_{10}	Fugitive Dust $PM_{2.5}$	Exhaust $PM_{2.5}$	Total $PM_{2.5}$	NOx	SOx	CO	ROG	CO_2	CH_4	N_2O	Total GHG - CO_2e
On-site															
On-road Vehicles															
Deliveries Trucks	111	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.23
Water Haul Trucks	619	0.10	0.00	0.10	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.88	0.00	0.00	0.88
Worker Vehicles	365	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.21
On-site Emissions Subtotal		**0.16**	**0.00**	**0.16**	**0.02**	**0.00**	**0.02**	**0.01**	**0.00**	**0.00**	**0.00**	**1.31**	**0.00**	**0.00**	**1.32**
Off-site															
On-road Vehicles (unpaved road)															
Deliveries Trucks	6,249	1.29	0.00	1.29	0.13	0.00	0.13	0.08	0.00	0.01	0.01	13.04	0.00	0.00	13.07
Water Haul Trucks	34,923	5.74	0.01	5.74	0.58	0.01	0.58	0.26	0.00	0.04	0.02	49.47	0.00	0.00	49.59
Worker Vehicles	20,586	1.81	0.00	1.81	0.18	0.00	0.18	0.01	0.00	0.06	0.00	11.58	0.00	0.00	11.69
On-road Vehicles (paved road)															
Deliveries Trucks	33,794	0.06	0.01	0.07	0.02	0.01	0.02	0.41	0.00	0.08	0.03	70.49	0.00	0.00	70.70
Water Haul Trucks	61,920	0.08	0.01	0.09	0.02	0.01	0.03	0.47	0.00	0.06	0.03	87.72	0.00	0.00	87.93
Worker Vehicles	127,750	0.04	0.00	0.04	0.01	0.00	0.01	0.03	0.00	0.36	0.01	71.86	0.00	0.00	72.55
Off-site Emissions Subtotal		**9.02**	**0.03**	**9.04**	**0.93**	**0.02**	**0.96**	**1.26**	**0.00**	**0.61**	**0.09**	**304.16**	**0.01**	**0.00**	**305.54**
Total Emissions (tons per year)		**9.17**	**0.03**	**9.20**	**0.95**	**0.02**	**0.97**	**1.26**	**0.00**	**0.61**	**0.09**	**305.47**	**0.01**	**0.00**	**306.86**

APPENDIX X

PROPOSED GROUNDWATER USE - NUMERICAL GROUNDWATER MODELING REPORT

PROPOSED GROUNDWATER USE - NUMERICAL GROUNDWATER MODELING REPORT

FOR THE
DESERT QUARTZITE SOLAR PROJECT
RIVERSIDE COUNTY, CALIFORNIA

PURCHASE ORDER 4800031614

Prepared for:

Desert Quartzite, LLC
135 Main Street, 6th Floor
San Francisco, CA 94105

Prepared by:

URS
130 Robin Hill Road, Suite 100
Santa Barbara, California 93117
(805) 692-0600 ◆ Fax: (805) 964-0259

Job No. 60482058

April 28, 2016

CERTIFICATION OF URS PREPARERS

This report was prepared under the direction of the following URS lead technical personnel:

Robert Urban, P.G. #7842, C.E.G. #2428
Expiration Date: January 31, 2017

Principal Engineering Geologist

Eddy Teasdale, P.G #7791, C.H.G #926
Expiration Date: September 30, 2016

Project Hydrogeologist

TABLE OF CONTENTS

Section **Page**

1.0 INTRODUCTION 1-1

1.1 HISTORICAL GROUNDWATER MODELING 1-2

2.0 BASIN HYDROGEOLOGY 2-1

2.1 GEOLOGY 2-1

2.1.1 Physiographic Setting 2-1
2.1.2 Regional Geology 2-1

2.2 GROUNDWATER CONDITIONS 2-2

2.2.1 Mesa 2-2
2.2.2 Floodplain 2-3
2.2.3 Aquifer Characteristics 2-3
2.2.4 Groundwater Balance – Palo Verde Valley 2-4

3.0 NUMERICAL GROUNDWATER MODEL 3-1

3.1 UPDATE OF THE PALO VERDE GROUNDWATER MODEL 3-2
3.2 MODEL SIMULATIONS – PROJECT ONLY PUMPING 3-3

3.2.1 700 AFY Construction Scenario 3-3
3.2.2 450 AFY Construction Scenario 3-4

3.3 SENSITIVITY ANALYSIS 3-4

4.0 GROUNDWATER MODEL RESULTS 4-1

4.1 IMPACT ASSESSMENT – PROJECT ONLY PUMPING 4-1

4.1.1 700 AFY Construction Scenario 4-1
4.1.2 450 AFY Construction Scenario 4-2
4.1.3 PVID Drains 4-2

4.2 IMPACT ASSESSMENT – CUMULATIVE PROJECTS PUMPING 4-3

5.0 SUMMARY 5-1
6.0 REFERENCES 6-1

Figures

Figure 1 Site Location Map
Figure 2 Water Supply Wells in the Vicinty of the Project Site
Figure 3a Regional Geologic Map
Figure 3b Regional Geologic Map Legend
Figure 4 Bottom Elevation Map for Palo Verde Mesa and Valley Groundwater Basins
Figure 5 Groundwater Flow in the Palo Verde Mesa and Valley
Figure 6 Groundwater Model Domain
Figure 7 Hydraulic Conductivity Zonation
Figure 8 Calibration – Actual vs. Predicted Water Levels
Figure 9 Actual vs Predicted Water Levels (Steady State Conditions 1980-2009)
Figure 10 BLM North Well: Predicted Drawdown – End of Construction (700 AFY) and Operation
Figure 11 BLM Central Well: Predicted Drawdown – End of Construction (700 AFY) and Operation
Figure 12 Private Parcel Well: Predicted Drawdown – End of Construction (700 AFY) and Operation
Figure 13 BLM South Well: Predicted Drawdown – End of Construction (700 AFY) and Operation
Figure 14 BLM North Well: Predicted Drawdown – End of Construction (450 AFY) and Operation
Figure 15 BLM Central Well: Predicted Drawdown – End of Construction (450 AFY) and Operation
Figure 16 Private Parcel Well: Predicted Drawdown – End of Construction (450 AFY) and Operation
Figure 17 BLM South Well: Predicted Drawdown – End of Construction (450 AFY) and Operation
Figure 18 Cumulative Energy Projects Map

Appendices

Appendix A Tables
Appendix B Groundwater Wells and Water Level Database (USGS)
Appendix C Desert Quartzite Solar Project Groundwater Modeling Files

SECTION 1.0
INTRODUCTION

The Project is a proposed 300 megawatt (MW) solar photovoltaic (PV) generating facility and associated generation-tie (gen-tie) line located in unincorporated eastern Riverside County, approximately 2.75 miles southwest of the City of Blythe (refer to Figure 1). The Project facility site encompasses approximately 4,845 acres of public lands administered by the U.S. Department of Interior, Bureau of Land Management (BLM) and a 160-acre private-owned parcel subject to the County of Riverside jurisdiction. The construction period for the Project is estimated to vary from 25 to 48 months. Assuming a 25-month construction period, water usage is estimated at 1,400 acre-feet (AF) maximum (i.e., 700 acre-feet per year [AFY] on average). Assuming a 48-month construction period, water usage is estimated at 1,800 AF (i.e., 450 AFY on average). For reference, there are 325,851 gallons per acre foot of water. During construction, water will be needed primarily for dust control and soil compaction, with small quantities used for sanitary and other purposes. It is currently estimated that up to approximately 1.5 million gallons per day of water may be needed during the construction phase of the Project. The operational phase of the Project is expected to require up to 38 AFY of water for 30 years. Of this volume, approximately 20 AFY would be used for fire protection, dust control, vegetation management, and at the operations and maintenance (O&M) building, and 18 AFY would be used for up to two annual panel washings. Total water usage over 32 to 34 years for construction and operation of the Project is estimated to range from 2,540 to 2,960 AF for the 25-month and 48-month construction scenarios, respectively, including 30 years of operation.

This report presents the results of the assessment of groundwater impacts that are predicted to result from groundwater extraction to supply the planned quantities and rates of water needed during the construction and operational phases of the Project over 32 to 34 years. The impact assessment was performed using a numerical groundwater model (hereafter referred to as the Palo Verde Groundwater Model [PVGM]) which was originally developed for the Blythe Solar Power Project (BSPP), located approximately 2 miles north of the Project site, and then updated for the McCoy Solar Energy Project (MSEP), located approximately 7 to 8 miles north of the Project site (AECOM 2010, 2011). As part of California Energy Commission's (CEC) Final Decision for the BSPP, the CEC requested and the BLM concurred, that a numerical groundwater flow model be developed to evaluate the effects of groundwater pumping necessary for the construction and operation of the BSPP. The resultant PVGM was developed and utilized to depict BSPP specific groundwater pumping rates and proposed locations of groundwater extraction. As part of project planning and permitting efforts for the MSEP, the PVGM was used in the form developed for the BSPP, but modified to include updated water level information and to accommodate the change in location of the proposed water supply wells for the MSEP. For detailed discussion of the development and updating of the PVGM, the reader is referred to the numerical groundwater model reports prepared for the BSPP and MSEP, respectively (AECOM 2010, 2011).

1.1 HISTORICAL GROUNDWATER MODELING

Two numerical groundwater models prepared for other nearby projects have been reviewed to provide an indication to the potential effects of groundwater pumping on-site at the Project. The first numerical groundwater model was prepared for the BSPP, located approximately 2 miles north of the Project site. A numerical groundwater model was developed for the BSPP to identify the effects of groundwater pumping on regional groundwater basins and recharge to the Colorado River system. The BSPP proposed to use 22,250 AF of water over a 30-year project lifespan to supply necessary water to the solar thermal power generating facility, significantly more that the planned water needs for the subject Project. The BSPP groundwater model was based on the U.S. Geological Survey (USGS) prepared groundwater model for the region and was updated with additional hydrogeologic project information and data for analysis. Details of this study are presented in the *Blythe Solar Power Project, Riverside County, California – Numerical Groundwater Flow Model of the Palo Verde Valley and Palo Verde Mesa* report (AECOM 2010). It is important to note that even though the water demands for the BSPP, as modeled, are significantly greater than the planned water needs for the Project, the groundwater modelling and analysis demonstrated that the predicted groundwater drawdown of 0.1 foot is contained within the Palo Verde Mesa and does not extend into the floodplain or to the Colorado River. The predicted drawdown, groundwater flow vectors, and groundwater elevations from BSPP groundwater pumping suggest little to no influence on the surface water in the Palo Verde Irrigation District (PVID) drains and no influence on the Colorado River.

A second numerical groundwater model was prepared for the MSEP, located approximately 7 to 8 miles north of the Project site. The MSEP water needs were estimated and evaluated for 1,650 AF during the 33-year lifespan of the proposed photovoltaic solar system. Numerical groundwater modeling of the MSEP included evaluation of impacts to groundwater with consideration of MSEP water demands, the cumulative water demands for proposed regional solar projects, and how the MSEP might affect a change in surface water of the PVID drains to underlying groundwater in the floodplain. Details of this study can be reviewed in the *Assessment of Proposed Groundwater Use – Results of Numerical Groundwater Modeling, McCoy Solar Energy Project, Palo Verde Mesa, Riverside County, California* report (AECOM 2011). The numerical model study suggested that the MSEP groundwater use would not significantly impact adjacent water supply wells or the groundwater basin storage, drawdown would be less than 1 foot in off-site wells, the radius of influence from groundwater pumping would not extend off of the Palo Verde Mesa, influence on the PVID drains was deemed unlikely, and the cumulative assessment of groundwater pumping revealed that the MSEP would not contribute to significant regional drawdown of the groundwater basin.

The balance of this report is organized as follows:

- 2.0 – Basin Hydrogeology
- 3.0 – Numerical Groundwater Model
- 4.0 – Groundwater Model Results
- 5.0 – Summary
- 6.0 – References
- Figures
- Appendices

SECTION 2.0
BASIN HYDROGEOLOGY

The Palo Verde Valley (mesa and floodplain) is located in the northwestern Colorado Desert, which is part of the greater Colorado Desert Geomorphic Province. The Palo Verde Valley is bounded by non-water-bearing rocks of the Big Maria and Little Maria Mountains on the north, by the McCoy and Mule Mountains on the west, by the Palo Verde Mountains to the south and the Colorado River on the east. The principal aquifer in the Palo Verde Valley, inclusive of both the mesa and floodplain, are the younger and older Holocene to Plio/Pleistocene-age Colorado River alluvial sediments above the Pliocene-age Bouse Formation and Miocene-age Fanglomerate. The underlying Pliocene and Miocene-age sediments are significantly less transmissive by comparison to the Colorado River alluvium. The Department of Water Resources (DWR) estimates that there is 6.84 million AF of water in storage in the Palo Verde Mesa Groundwater Basin (DWR 2004). In their assessment, the DWR includes the mesa and a portion of the floodplain in the Palo Verde Mesa Groundwater Basin.

2.1 GEOLOGY

2.1.1 Physiographic Setting

The Project site is located on the Palo Verde Mesa in the northwestern Colorado Desert, which is part of the greater Colorado Desert Geomorphic Province. This Province is characterized by isolated mountain ranges separated by broad alluvial-filled basins of Cenozoic-age sedimentary and volcanic materials overlying older rocks. The Palo Verde Valley is bounded by non-water-bearing rocks of the Big Maria and Little Maria Mountains on the north, the McCoy and Mule Mountains on the west, the Palo Verde Mountains to the south, and the Colorado River on the east (refer to Figures 1 and 2). Surface water drains from the surrounding mountains toward the Colorado River.

East of the Project eastern site boundary, a break in the slope forms the boundary between the Palo Verde Mesa and the Palo Verde Valley, which is 80 to 130 feet below the mesa. In this region, the Palo Verde Valley is roughly equivalent to the recent historic floodplain of the Colorado River (CEC 2010). Regionally, the ground surface slopes gently downward in a southeast direction at a gradient of less than 1 percent (CEC 2010).

2.1.2 Regional Geology

The Project is located on the Palo Verde Mesa and is characterized by the nearly level morphology of the mesa and gently to moderately sloping alluvial fans. Fluvial erosion and deposition are the major geomorphic processes in the immediate area. As shown on Figure 3, Regional Geologic Map, the predominant geologic units on the Project site are alluvium, ranging from the Pleistocene (2.6 million years ago [Ma] to 11,700 years before present [BP]) to Holocene (11,700 BP to present) ages, and consolidated rocks of pre-Tertiary age, which form the basement complex, and in some locations, Tertiary age volcanic rocks that overlie the basement complex. The alluvial deposits compose the shallow floodplain aquifer, and are the principal source of groundwater in the basin (Owen-Joyce 1984). The alluvium is composed of sand, silt, and clay with lenses of gravel. Most wells in the basin are screened in the coarser grained deposits and have moderate to high yields (Metzger 1973). The consolidated rocks are nearly impermeable except for fractured or weathered areas, and groundwater flow into and out of the bedrock is unknown. For the purposes of the groundwater model, the bedrock that forms the basement complex is treated as a non-water bearing unit.

The bedrock depths are generally deepest under the floodplain (depths range from about 900 to a maximum of 2,400 feet below the ground surface [bgs], with an average depth being about 1,400 feet bgs). Under the mesa areas in the location of the Project and west of the river, depth to bedrock ranges from 300 to 600 feet bgs. The configuration of the bedrock suggests a north-south elongate valley roughly paralleling the course of the Colorado River.

2.2 GROUNDWATER CONDITIONS

The basal elevation of the Palo Verde Mesa and Valley Groundwater Basins, inclusive of younger and older alluvium, is depicted on Figure 4. The interpretation of the basal elevations of the aquifers is derived from the interpretation of boring logs and the east-west and north-south cross sections contained in early investigations by the USGS (Metzger 1973) and additional lithologic data gathered from the investigation of the Palo Verde Mesa area by other proposed renewable energy projects. As the Palo Verde Groundwater Model was developed around the horizontal and vertical distribution of these sediments, this developed map formed the basis for the vertical dimension of the model layer comprised of younger and older alluvium. This basal elevation of the groundwater basin map depicts the alluvial sediments as an elongate deposit coincident with the north-south axis of the Colorado River and the alluvial deposits are the deepest along the central axis of the valley, thinning in the direction of the mesa and toward the bedrock outcrops. The younger alluvium is only found in the floodplain, is not found in the mesa areas, and thins south toward the southern gap in the Palo Verde Valley.

2.2.1 Mesa

The groundwater below the Project site occurs under apparently semi-confined to unconfined conditions in the older alluvium, with the water table at a depth of approximately 140 to 150 feet bgs. Along the mesa, there is a convergence of flow as water traveling out of McCoy Wash and from the Chuckwalla Valley flowing southeast and east, respectively, interact with water in the flood plain flowing south parallel to the Colorado River (Figure 5). This convergence of flow is supported by water quality data showing distinct differences in the sources of groundwater below the mesa and below the floodplain. According to historical measurements, water levels have remained generally stable on the mesa following a period of agricultural development that ended in 1980 (AECOM 2011).

2.2.2 Floodplain

The depth of groundwater in the floodplain ranges from approximately 8 feet in the northern part to about 19 feet bgs in the southern part and then becomes significantly shallower in the area of Cibola and the National Wildlife Refuge, where groundwater discharges to the Colorado River. Where side-by-side comparison can be made between wells completed in the younger and older alluvium of the Colorado River, there is only about a 1-foot difference in the water levels. This minor difference does not suggest a significant vertical gradient and is consistent with prior investigations conclusions that the groundwater in the floodplain occurs under generally unconfined conditions in the Colorado River alluvium. Therefore, the Palo Verde Groundwater Model was developed as a single layer model treating the younger and older alluvium as a single aquifer unit based on the similarity in water level and lithology.

Groundwater levels on the floodplain have historically been stable as a network of shallow drains belonging to the PVID conveys water that percolates from flood irrigating the fields and returns it to the groundwater and to the Colorado River.

2.2.3 Aquifer Characteristics

Properties used to define the aquifer characteristics include hydraulic conductivity, transmissivity, and storage coefficient. Hydraulic conductivity is the property of the aquifer material to transmit water, and is expressed in units of feet per day. Transmissivity is the hydraulic conductivity multiplied by the thickness of the sediments capable of storing water, and is expressed in units of gallons per day per foot (gpd/ft) or square feet per day (ft^2/d). Storage coefficient refers to the percentage of water that can be released from the aquifer material pore space, and is used for unconfined or water table conditions.

In their development of the groundwater model for the Parker-Palo Verde-Cibola area, which includes the Palo Verde Groundwater Basin, the USGS (Lieke 2008) evaluated published aquifer testing data and through statistical analysis derived a range of transmissivity values from 25 tests conducted along the river reporting a low value of 6,300 ft^2/d and an average value of 26,200 ft^2/d. In their model of Colorado River depletion, they selected a storage coefficient of 0.20 to approximate aquifer conditions throughout their model domain.

Groundwater production from wells on the mesa averages 1,650 gallons per minute (gpm). Prior investigations show that large well yields are common for properly designed and developed wells near the edge of the flood plain (DWR 1979). Well yields on the rest of the mesa and further west of the mesa-floodplain topographic break, where very-fine grained sand is the dominant lithology, are lower. However, there are water supply wells on the mesa that are reported to yield 2,750 gpm. The BSPP indicated a yield for a well on the mesa of over 3,000 gpm and a specific capacity of 125 gpm/ft. Yields greater than 1,000 gpm are reported in wells in the McCoy Wash area in the northeastern portion of the wash where it enters the floodplain. A pumping test of Well TW-1 on the BSPP site and completed in generally fine-grained alluvium yielded a specific capacity of 3 gpm/ft of drawdown and a transmissivity ranging from between 10,000 ft^2/d to 14,000 ft^2/d.

2.2.4 Groundwater Balance – Palo Verde Valley

An important element in the development of a numerical groundwater model is the establishment of a water balance for the area of the model domain. In this case, the model domain is the entire geographic area of the Palo Verde Valley, which encompasses the mesa and valley aquifers. A water balance is an account of all the groundwater recharge and discharge elements within a groundwater basin. The groundwater balance accounting derived for this groundwater modelling was utilized from the balance developed as part of the groundwater modeling effort conducted for the development of the MSEP, which in turn was developed from prior investigations, including the 2008 USGS study (Lieke et al. 2008). For a detailed discussion of the groundwater balance evaluation, the reader is referred to the numerical groundwater modeling report prepared for the MSEP (AECOM 2011). A general discussion of this accounting of groundwater balance for the Palo Verde Valley is summarized herein.

In the development of the water balance, the relative stability of the groundwater levels since the mid- to late-1980s is significant. This relative stability is a reflection of the management of the diverted water from the Colorado River through its application for irrigation and return of groundwater through the PVID drains. As water levels have fluctuated only a few feet and locally in response to irrigation, this would indicate a balance between inflow (recharge) and outflow (discharge) of groundwater within the Palo Verde Valley. As such, the groundwater balance was evaluated to achieve unity (no difference) between the estimated inflow and outflow. In preparation of the MSEP numerical groundwater modeling analysis and evaluation of the balance of inflow and outflow of groundwater through the Palo Verde Valley was evaluated and a summary table of these parameters was prepared as part of the report (AECOM 2011; see Table 1 in Appendix A of this report). As depicted in the Table included in Appendix A of this report, a water balance of approximately 426,600 AF is estimated from a balance of the recharge and discharge elements.

The significant components to the assessment of recharge and discharge within the Palo Verde Valley are the diversion and return of water for the PVID and the gain or loss of water from the Colorado River. These water volumes are several orders of magnitude more than mountain front recharge, underflow or discharge from groundwater pumping.

As noted above, the key elements of groundwater balance for recharge are agricultural return and canal seepage and loss from the Colorado River. The discharge or outflow of groundwater is largely comprised of the measured discharge from the drains, the unmeasured return or groundwater discharge to the river and evapotranspiration loss from non-native vegetation along the river within the groundwater basin. These elements comprise approximately 97 percent of the total outflow, of which discharge from the drains is about 84 percent.

SECTION 3.0
NUMERICAL GROUNDWATER MODEL

The groundwater model utilized for this analysis was first developed by the USGS (Lieke 2008) and then updated with project specific site information and modeling for subsequent solar development projects such as the BSPP and then the MSEP. For detailed discussion of the development of the groundwater model utilized in this numerical analysis, the reader is referred to the USGS report (Lieke 2008) on development of the groundwater model, as well as the numerical groundwater monitoring reports prepared for the BSPP and MSEP (AECOM 2010, 2011). Description of the development of the groundwater model and calibration of the model is described herein and summarized from the numerical modeling report (AECOM 2011) prepared for the MSEP as the groundwater model for this Project was largely utilized in the form prepared for the MSEP with the exception of adjusting pumping rates and locations specific to this Project.

The groundwater model developed and utilized for evaluating groundwater use for the previously permitted and approved BSPP, and then the MSEP, was utilized for evaluating potential impacts of groundwater use for the construction and operational phases of this Project. The Palo Verde Groundwater Model prepared for the BSPP was submitted for review on October 15, 2010, under the CEC SOIL&WATER Condition 16 requirement, and was accepted with minor comments by the CEC and BLM on December 17, 2010. The model was constructed as a single-layer (two dimensional) numerical groundwater flow model in MODFLOW2000 (Groundwater Modeling System [GMS] platform) (AECOM 2010). The model domain encompassed the entire Palo Verde Valley, inclusive of the mesa and floodplain, and the base of the model was established at the bottom of the younger and older Colorado River alluvium, as these are the productive aquifers in the valley (see Figure 6). A variety of boundary conditions were employed to simulate inflow and outflow of water from the model following the basin water balance. The Colorado River formed the eastern boundary of the model and was simulated using depth profiles provided by the U.S. Bureau of Reclamation (USBR) along selected locations of the river reach through the Palo Verde Valley. The river bottom elevation was linearly interpolated from these data for all river cells along the eastern boundary of the model domain.

In calibrating the Palo Verde Valley model, the hydraulic conductivity distribution was initially homogeneous and additional hydraulic conductivity zones were added as necessary to match the observed water levels and changes in hydraulic gradient in the floodplain and on the mesa. The final zonation of hydraulic conductivity is depicted on Figure 7.

The model was calibrated to steady-state conditions and average measured water levels from wells on both the mesa and floodplain from 1980 to 2009, and met the following calibration targets:

- Residual standard deviation divided by range in head for all targets was less than 10 percent,
- Absolute residual mean divided by range in head for all targets was less than 10 percent,
- Residual mean divided by range in head for all targets was 5 percent, and
- There was limited spatial bias in the distribution of residuals.

It is important to note that for the purposes of the numerical modeling for this Project, no additional calibration was conducted. Steady-state conditions of calibrating the model to actual observed conditions of groundwater levels was deemed not necessary as few available additional data points of water levels were available in publically available records in the USGS National Water Information System (NWIS) database, and those few available water levels were measured close to water levels already included in the existing groundwater model.

In addition to statistics, another standard method of judging calibration quality is to plot the measured water levels versus the computed water levels. In a perfect calibration, the points would lie along a straight line at a 45-degree angle indicating that the computed water levels match the observed water levels exactly. In reality, this never happens; however, the spread of data points about the perfect line is an overall indication of spatial bias in the model. Figure 8 shows that there is no large-scale bias in the calibration, with each broad area having the relative same degree of scatter about the 45-degree line.

Additionally, as part of the water balance calibration, the model also used the average measured discharge data from the PVID drains as a measure of model calibration, matching the average discharge data since 1993 reported by the USBR (USBR 2009). The model met calibration targets following generally accepted practices, and generally provided an adequate representation by comparison to the average water levels over the calibration period and flow directions and mixing along the mesa and floodplain boundary (see Figure 9).

3.1 UPDATE OF THE PALO VERDE GROUNDWATER MODEL

The Palo Verde Groundwater Model provided in January 2016 to URS was modified to reflect the pumping schemes proposed for the Project. The model grid spacing of between 20 and 2,000 feet was adjusted to be tighter (i.e., spacing of 20 feet) in the area of identified potential Project well locations on the Project site to better simulate pumping response (see Figure 6). Four potential and inactive water supply wells have been identified on the Project site, consisting of one well located in the northern portion of the project (BLM North Well), another well located approximately centrally in the site and on a private parcel (Private Parcel Well), another well south of the northern well and somewhat centrally located (BLM Central Well), and finally a southern most well (BLM South Well). Although all of these wells are currently not in operation or in a currently usable condition for supplying groundwater for the Project, these wells were evaluated as they are potential locations for water well development based on historical use. The water wells are depicted on all Figures in this report with the exception of Figure 8.

Groundwater levels and well construction data through 2010 for wells in the Palo Verde Valley geographic area were summarized as part of the MSEP numerical modeling report and are included in this report as Appendix B. The groundwater levels and well construction data were gathered from a review of the USGS NWIS database, and recent water level data provided from monitoring programs in the vicinity of the Project site. Water level data was reviewed and updated as part of the MSEP through 2011 and as noted above, new water level data was not significantly different than the preceding data collected in 2009, and as such addition of newer data would not significantly alter the average water level estimate used in the steady-state calibration. For this reason the model calibration was not updated and model simulations were performed using model calibrated to the average water level for the period of 1980 to 2009, as was utilized for the BSSP and MSEP modeling efforts. The modeling files for this Project are presented in Appendix C in electronic format (GMS files).

3.2 MODEL SIMULATIONS – PROJECT ONLY PUMPING

All water in California falls within one of three categories: surface water, percolating groundwater, or “subterranean streams that flow through known and definite channels.”

Model simulations were conducted separately for both the 25-month, 700 AFY and the 48-month, 450 AFY construction scenarios as discussed in Sections 3.2.1 and 3.2.2, respectively.

3.2.1 700 AFY Construction Scenario

Using the updated Palo Verde Groundwater Model, the Project-only pumping impacts were first simulated for the 25-month construction scenario assuming a total project water usage of 2,540 AF apportioned for the construction (1,400 AF) and operational (38 AFY for 30 years totaling 1,140 AF) periods. Four model simulations were conducted where each of the four wells located on the site were individually modeled at the required pumping rates for providing the necessary rates of groundwater extraction during construction and operation. The pumping rate for construction was set at 1,042 gpm as calculated to supply up to 1.5 million gallons of water per day. The pumping rate for annual operation use was set at 24 gpm as calculated to supply 38 acre feet of water annually. For the purposes of groundwater modeling, these calculated pumping rates assume steady-state continuous pumping during the construction and operational phases of the Project, respectively.

Using these pumping rates, four model scenarios were developed to simulate the effects from Project-only pumping whereby the location was changed for each respective water supply well.

The model stress periods were set at one-year increments and the model was run for each scenario to evaluate the effect from Project pumping on surrounding water supply wells within the mesa and evaluate the change in groundwater basin storage over the construction and operational life, which is assumed to be 32 years (two years for construction and 30 years of operation). For each model simulation conducted on each respective well location, the model simulation was iterated for transient and combined pumping conditions. For instance, each well was simulated to pump at a constant rate of 1,042 gpm for a period of two years and then followed by 30 years of pumping at a rate of 24 gpm. Figures 10 through 13 depict the combined groundwater pumping both at the end of construction followed by the end of operation for each well respectively over the entire Project lifetime.

Changes to flux from the Colorado River were not attempted, as prior modeling for the BSPP using a significantly higher pumping volume did not produce a change in the river flux attributable to groundwater (AECOM 2010).

3.2.2 450 AFY Construction Scenario

A construction and operational water use groundwater model simulation was conducted for the 48-month, 450 AFY construction scenario. This model simulates the use of 450 AFY for four years of construction followed by 38 AFY for 30 years of operation. The total water consumption for this scenario would utilize 1,800 AF of water during the construction period followed by 1,140 AF of water utilized during the operational phase. The water use for this scenario totals 2,940 AF. Based on a water use of 450 AFY during construction, the steady state construction pumping rate is calculated to be 279 gpm and the operational pumping rate is calculated to be 24 gpm. This alternate construction and operational water use scenario was modeled utilizing these respective pumping rates for each of the four water wells evaluated in this analysis.

3.3 SENSITIVITY ANALYSIS

Because site-specific hydrogeologic parameters were not available at the time of the preparation of this report, a sensitivity analysis of the most sensitive variables to groundwater flow is not anticipated to yield results different from results provided in the numerical modeling conducted as part of the MSEP. In the BSPP modeling (AECOM 2010), the most sensitive variables identified to produce the largest variation of results were: hydraulic conductivity, PVID drain conductance, Colorado River conductance, mountain front recharge, and storage coefficient. Once site-specific hydrogeologic parameters are available, it will be possible to update the groundwater model and simulations as well as perform a sensitivity analysis to validate and/or refine the results presented herein.

SECTION 4.0
GROUNDWATER MODEL RESULTS

The goals of the numerical modeling program are to simulate the proposed Project pumping using possible well locations to assess the pumping influence on water levels in adjacent water supply wells, assess the impacts to groundwater basin storage, and to assess the potential for impacting groundwater levels in the PVID drains located in the floodplain. The Palo Verde Groundwater Model was used to assess the Project-only effects of groundwater pumping necessary for the construction and operation of the Desert Quartzite solar project. A sensitivity analysis of key variables thereby providing a measure of uncertainty analysis of the Project only pumping and to assess the cumulative impacts from proposed renewable projects on the mesa is anticipated to be conducted once site-specific hydrogeologic information is available.. Figures 10 through 13 depict the predicted drawdown of groundwater and radius of influence for the each of the Project-only pumping scenarios under the 25-month, 700 AFY construction scenario. Figures 14 through 17 depict the results for the 48-month, 450 AFY construction scenario.

4.1 IMPACT ASSESSMENT – PROJECT ONLY PUMPING

4.1.1 700 AFY Construction Scenario

Figures 10 through 13 depict that regardless of the well location and the respective pumping rates, the influence from Project pumping under the 700 AFY construction scenario is not significant as the model predicted drawdown outside of the Project site boundary is generally less than 0.1 foot, both at the end of construction and at the end of operational pumping. Only the pumping from the BLM North well, which is located at the northern boundary of the Project, yielded a drawdown between 1.0 and 0.1 feet at the nearest off-site well located to the north, during the construction phase. However, this is considered a negligible drawdown to that off-site well due to the total depth of the off-site well and the presence of hundreds of feet of water column in that well. Once construction ends and the operational pumping rate is in effect, all model scenarios predict that drawdown is less than 0.1 foot offsite. Because the groundwater pumping scenarios were run for transient conditions, the simulations indicate that groundwater recharges the area following construction and decreases the sphere of influence from Project pumping. In general, the predicted cones of depression were similar between the Private Parcel Well, BLM Central Well, and BLM Southern Well. Drawdown predicted for the BLM North Well indicates more northerly drawdown, however, these values are less than 0.1 feet and are insignificant when considering the thickness of the aquifer and typical well installation in the region. Water wells installed in this region are typically several hundred feet deep with saturated thicknesses of several hundred feet.

The model predicts that the drawdown would primarily be constrained to the mesa area during construction and operation with some very limited drawdown of approximately 0.01

foot at the very western area of the valley area. Therefore, the modeling results indicate that there would be negligible impact to the PVID drains. Even where the model predicts that drawdown at the Private Parcel Well location drawdown would remain in the mesa area and, therefore, would have no impact to water levels in the PVID drains in the valley.

The conservative nature of the model in its assumptions of regional steady state conditions and in its construction, both vertically and laterally and in the grid spacing, would tend to greatly simplify the complexity of the hydrogeology, which in turn would tend to over predict the influence from the Project. For instance, it is anticipated that with an increased model grid spacing, the extent of influence from Project groundwater pumping would result in a decreased extent of drawdown from the Project pumping locations.

4.1.2 450 AFY Construction Scenario

The model for the construction and operational water use scenario of 450 AFY for four years followed by 38 AFY for a subsequent 30 years predicts drawdown of groundwater for each water well analyzed. The model predicts that drawdown would be limited to the mesa area during construction and operation for pumping from each of the four wells and furthermore, the extent of drawdown is less than predicted for the construction scenario with a higher pumping rate (700 AFY) though shorter 25-month duration. Therefore, the water use scenario utilizing 450 AFY during construction for four years followed by 30 years of water use at 38 AFY would have negligible impact to off-site water wells and the PVID drains. The graphical results of this analysis are presented on Figures 14 through 17.

4.1.3 PVID Drains

The cumulative change in flow through the PVID drains was evaluated for the two varying construction pumping rate scenarios and both scenarios show that there is a very small change in the PVID drain mass balance between the non-pumping and pumping condition at the end of construction and end of operation. For the 700 AFY construction scenario, there was a total change of about 476 AF at the end of the combined construction and operational period of 32 years. The total change represents variance of 0.0037 percent of the modeled throughput in the PVID drains over 32 years (12.8M AF). For the 450 AFY construction scenario, there was total change of about 520 AF at the end of the combined construction and operational period of 34 years. The total change represents variance of 0.0039 percent of the modeled throughput in the PVID drains over 34 years (13.5M AF). The results of this analysis are depicted on Tables 3A and 3B in Appendix A.

It is important to note that this small of a change could not be reliably measured in the PVID drains and thus the model prediction cannot be verified. The conservative nature of the model in its assumptions of regional steady state conditions and in its construction, both vertically and laterally and in the grid spacing, would tend to greatly simplify the complexity of the hydrogeology, which in turn would tend to over predict the influence from the Project and changes in the drain mass balance. As noted, the change is very small in relationship to the overall PVID drain throughput in the model, and as such should be considered within the error of the model to reliably predict the change in mass flux from the drains.

4.2 IMPACT ASSESSMENT – CUMULATIVE PROJECTS PUMPING

An assessment was conducted to evaluate the cumulative groundwater withdrawals over time by multiple proposed renewable and other energy projects within the geographic area of the Palo Verde Mesa/Valley. The cumulative project list was prepared in coordination with the BLM. Six other energy projects were identified on the mesa in addition to the proposed Desert Quartzite Solar Project as shown on Figure 18.

Evaluating the Project construction water use of 700 AFY for two years followed by operational use of 38 AFY for 30 years, the cumulative energy projects combined annual operational water requirement is estimated at 3,131 AFY. The Project represents about 1.2 percent of the total combined annual operational water use. Inclusive of both construction and operational water requirements, through 2050, the combined cumulative total water use from these projects is estimated to be about 108,773 AF. This represents about 1.6 percent of the 6.84 million AF of the estimated groundwater storage capacity of the Palo Verde Mesa Groundwater Basin.

Assuming the Project construction water use is 450 AFY for four years followed by operational use of 38 AFY for 30 years, the Project again represents about 1.2 percent of the total combined annual operational water use by all projects. Inclusive of both construction and operational water requirements, through 2050, the combined cumulative total water use from these projects is estimated to be about 109,097 AF. This again represents about 1.6 percent of the 6.84 million AF of the estimated groundwater storage capacity of the Palo Verde Mesa Groundwater Basin.

The results of the research showing the proposed water use and pumping schedules for each of the cumulative projects relative to the 700 AFY and 450 AFY Project construction scenarios are summarized in Appendix A (Tables 2A and 2B).

SECTION 5.0
SUMMARY

The goals of the numerical modeling performed for the Desert Quartzite Solar Project were to simulate the proposed Project pumping using different locations for possible water supply wells and to assess the pumping influence on adjacent water supply wells, the impacts to groundwater basin storage, and the potential impact to water levels in the PVID drains that recharge the Colorado River aquifer. The Palo Verde Groundwater Model was used to assess the Project-only effects.

From the modeling the following conclusions are offered:

- Based on the results of the numerical groundwater simulations performed, the proposed Project pumping would not significantly impact adjacent water supply wells or the groundwater basin storage.
- The drawdown outside the Project site boundary was not predicted to exceed one foot at any of the existing identified off-site well locations, including the well immediately north of the Project, for any of the four on-site well locations evaluated.
- The model predicted the radius of influence would not extend off the mesa even for pumping associated at the Private Parcel Well location. All other well locations had less than 0.1 foot of drawdown at the western edge of the Palo Verde Valley (eastern edge of the Palo Verde Mesa) either at the end of construction or at the end of operation, which is an insignificant amount of drawdown.
- Model-predicted drawdowns for all of the well scenarios indicate that there would not be any significant impact (i.e., less than 0.1 feet of drawdown) to the PVID drains, and therefore would not impact recharge to the Colorado River.

SECTION 6.0
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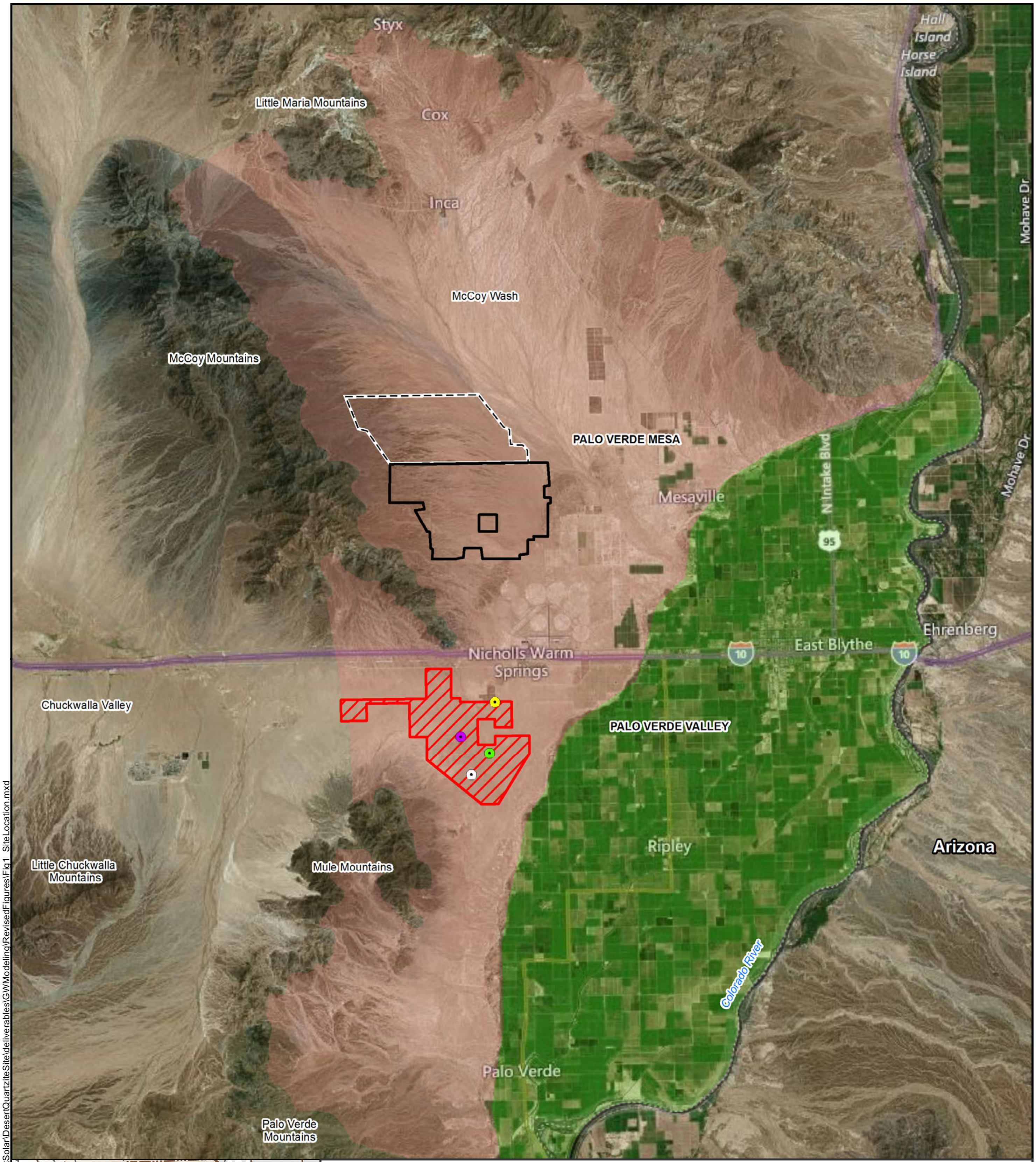
FIGURES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Horse Island
Little Maria Mountains
Cox
Mohave Dr
Inca
McCoy Wash
McCoy Mountains
PALO VERDE MESA
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Mohave Dr
Mesaville
95
Ehrenberg
10
East Blythe
10
Nicholls Warm Springs
Chuckwalla Valley
PALO VERDE VALLEY
Ripley
Arizona
Little Chuckwalla Mountains
Mule Mountains
Colorado River
Palo Verde
Palo Verde Mountains

S. L. O.
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NV
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Mohave
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San Bernardino
Santa Barbara
L. A.
Mapped Area
Ventura
La Paz
Riverside
10
PACIFIC OCEAN
San Diego
Imperial
8
Yuma

Legend

▨	Desert Quartzite Site Boundary
☐	Blythe Solar Power Project
⬚	McCoy Solar Energy Project
🟥	Palo Verde Mesa Groundwater Basin (Mesa Basin)
🟩	Palo Verde Valley Groundwater Basin (Valley Basin)

Project Wells

●	BLM North Well
●	BLM Central Well
●	Private Parcel Well
⊙	BLM South Well

Source: [1] Bing Maps Aerial Imagery Service - (c) 2010 Microsoft Corporation, accessed 01/2016, [2] California Geospatial Information Library PLS.

Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

N

0 2 4
Miles
1 in = 4 miles

Figure 1. Site Location Map

2016

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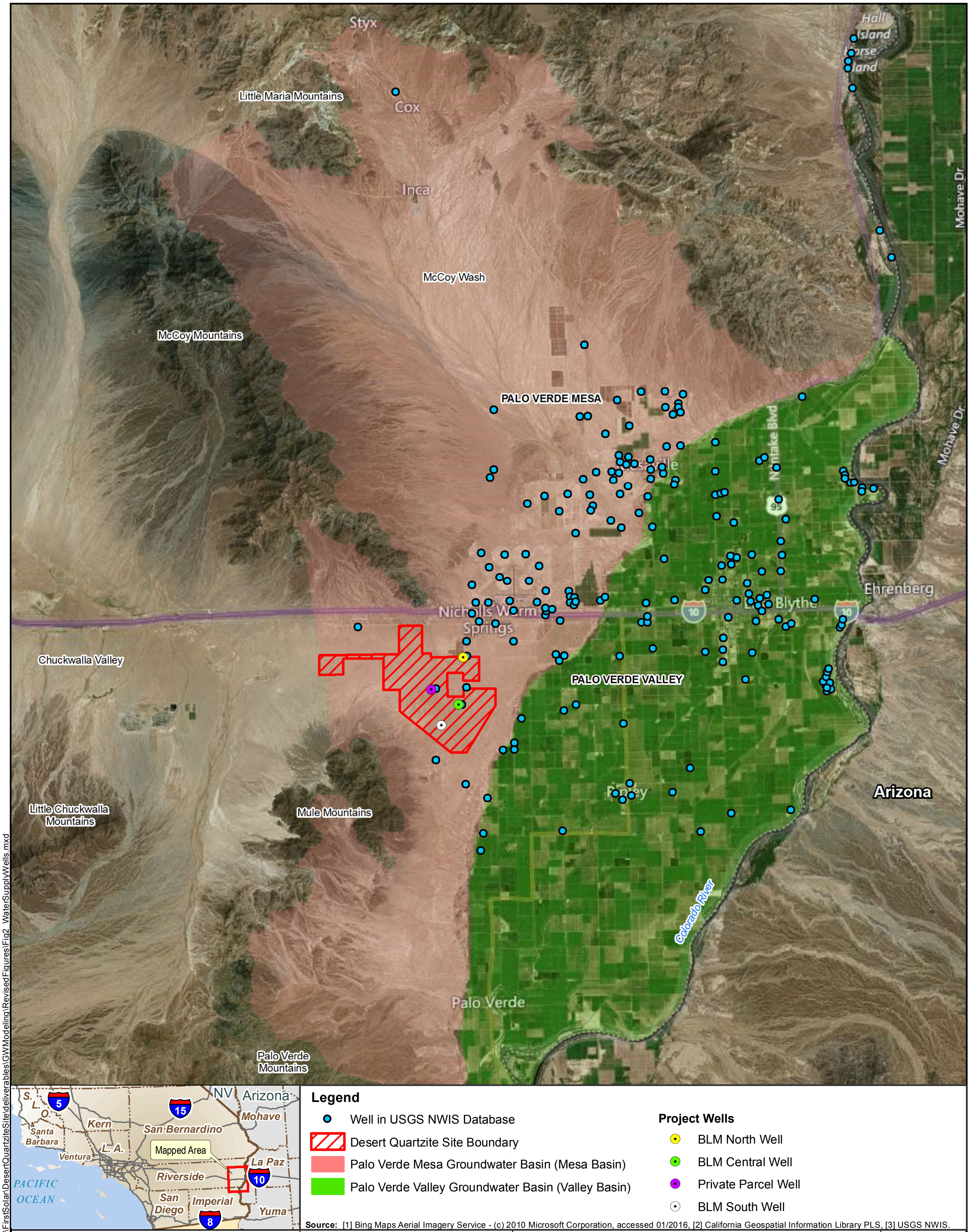
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Little Maria Mountains
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Hall Island
Horse Island
Inca
Mohave Dr
McCoy Wash
McCoy Mountains
PALO VERDE MESA
Neighbours Blvd
Mohave Dr
95
Ehrenberg
Nicholls Warm Springs
10
Blythe
Chuckwalla Valley
PALO VERDE VALLEY
Arizona
Little Chuckwalla Mountains
Mule Mountains
Ripley
Colorado River
Palo Verde
Palo Verde Mountains
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Mohave
Santa Barbara
Kern
San Bernardino
L. A.
Mapped Area
Ventura
La Paz
Riverside
10
PACIFIC OCEAN
San Diego
Imperial
8
Yuma
Legend
● Well in USGS NWIS Database
▨ Desert Quartzite Site Boundary
🟥 Palo Verde Mesa Groundwater Basin (Mesa Basin)
🟩 Palo Verde Valley Groundwater Basin (Valley Basin)
Project Wells
● BLM North Well
● BLM Central Well
● Private Parcel Well
● BLM South Well

Source: [1] Bing Maps Aerial Imagery Service - (c) 2010 Microsoft Corporation, accessed 01/2016, [2] California Geospatial Information Library PLS, [3] USGS NWIS.

Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

N

0 2 4 Miles

1 in = 4 miles

Figure 2. Water Supply Wells in the Vicinity of the Project Site

2016

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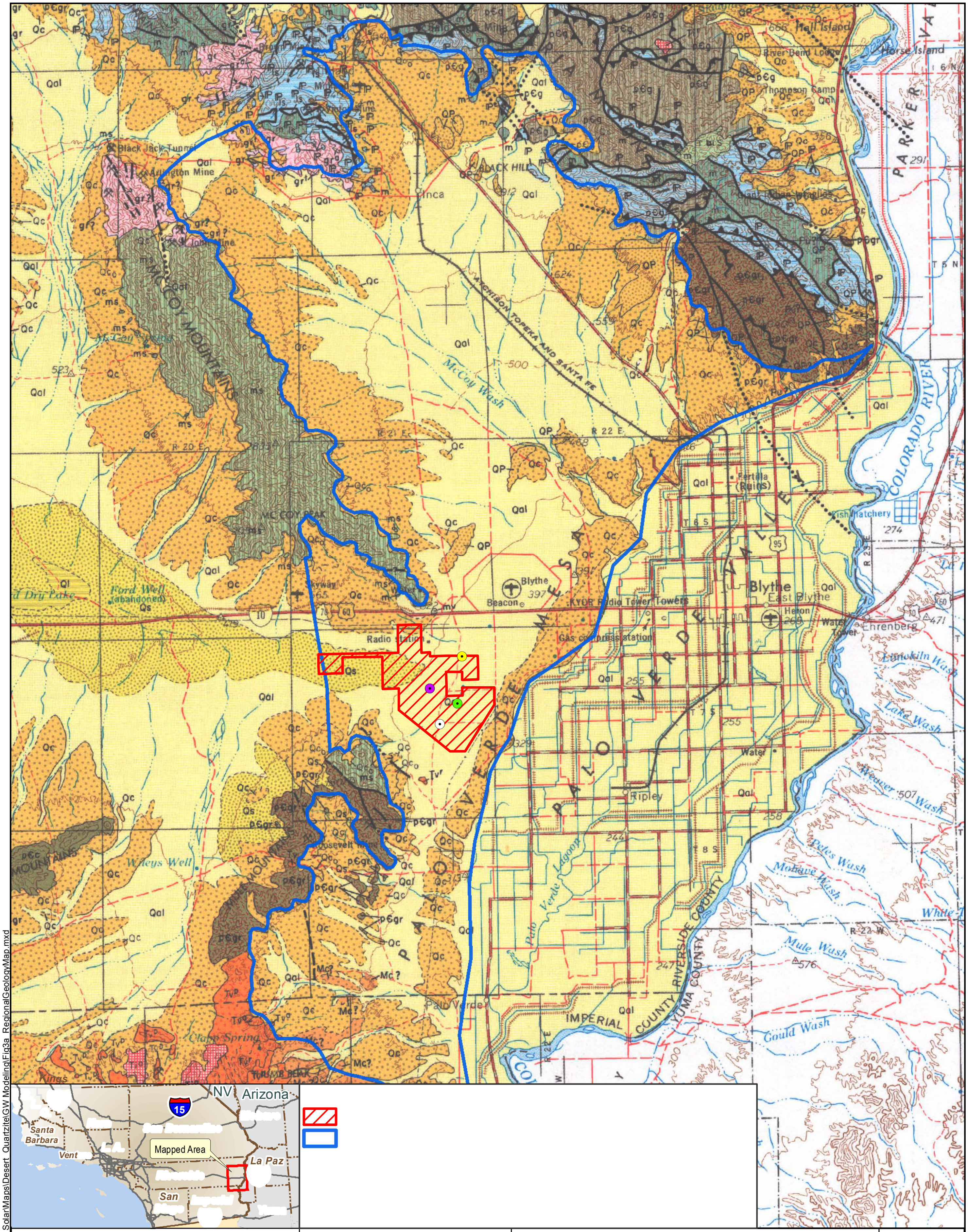
McCOY MOUNTAINS
MC COY PEAK
McCoy Wash
ATCHISON TOPEKA AND SANTA FE
PALO VERDE MESA
PALO VERDE VALLEY
PARKER VALLEY
COLORADO RIVER
Blythe
East Blythe
Beacon
KYOR Radio Tower Towers
Gas compress station
Radio Station
Hopson
Ripley
Ehrenberg
Palo Verde
Palo Verde Lagoon
Fertilla (Ruins)
Fish Hatchery
Hall Island
Horse Island
River Bend Lodge
Thompson Camp
Black Jack Tunnel
Arlington Mine
BLACK HILLS
Inca
Ford Well (abandoned)
Dry Lake
Wileys Well
Clapp Spring
MULE MOUNTAINS
RIVERSIDE COUNTY
YUMA COUNTY
IMPERIAL COUNTY
Mule Wash
Gould Wash
Weaver Wash
Lake Wash
Peters Wash
Mohave Wash
Qal
Qc
QP
Qs
pЄgr
ms
Tvr
NV
Arizona
15
Santa Barbara
Vent
La Paz
San
Mapped Area

Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

0 2 4 Miles

1 in = 4 miles

Figure 3a. Regional Geologic Map

2016

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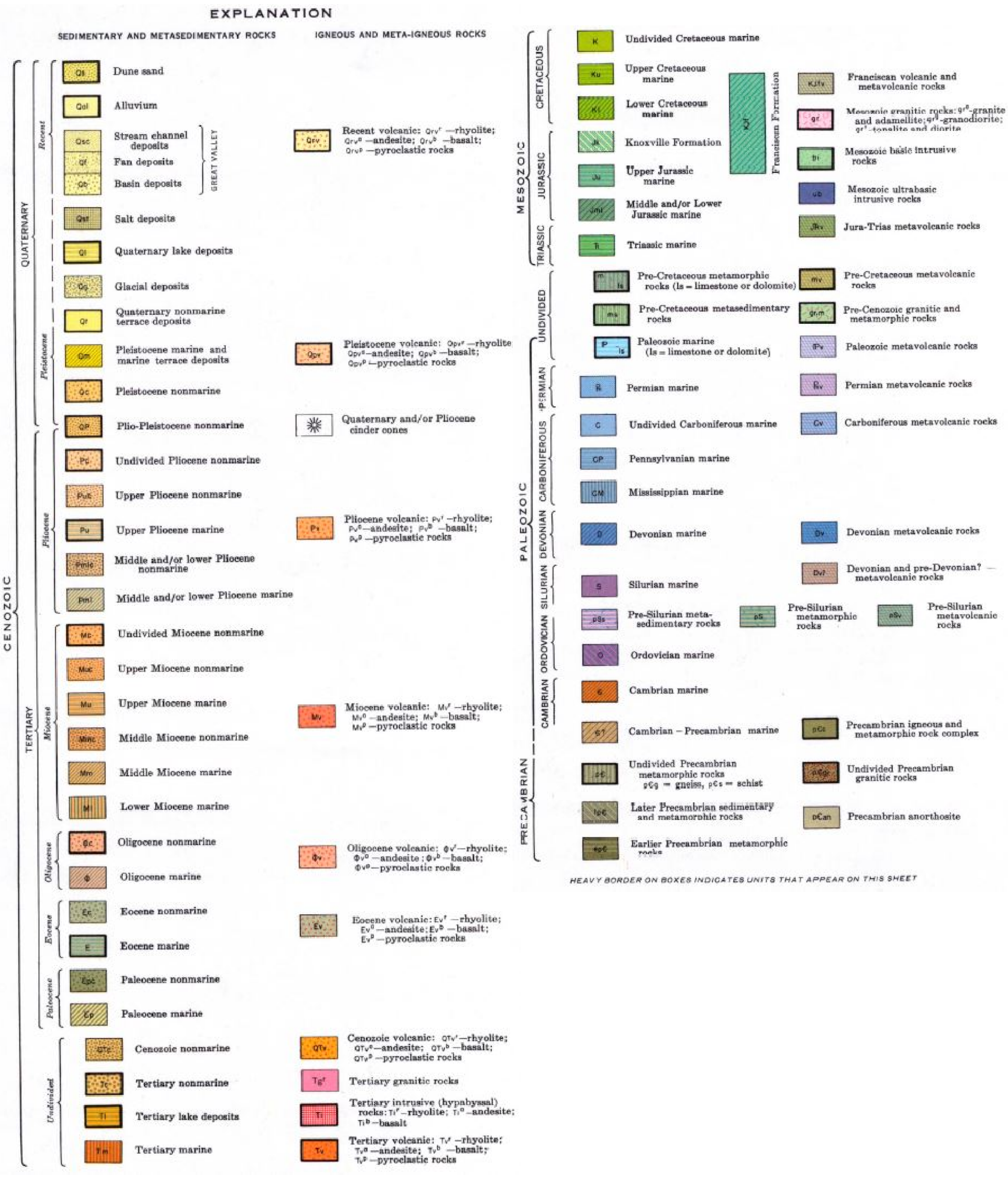


EXPLANATION

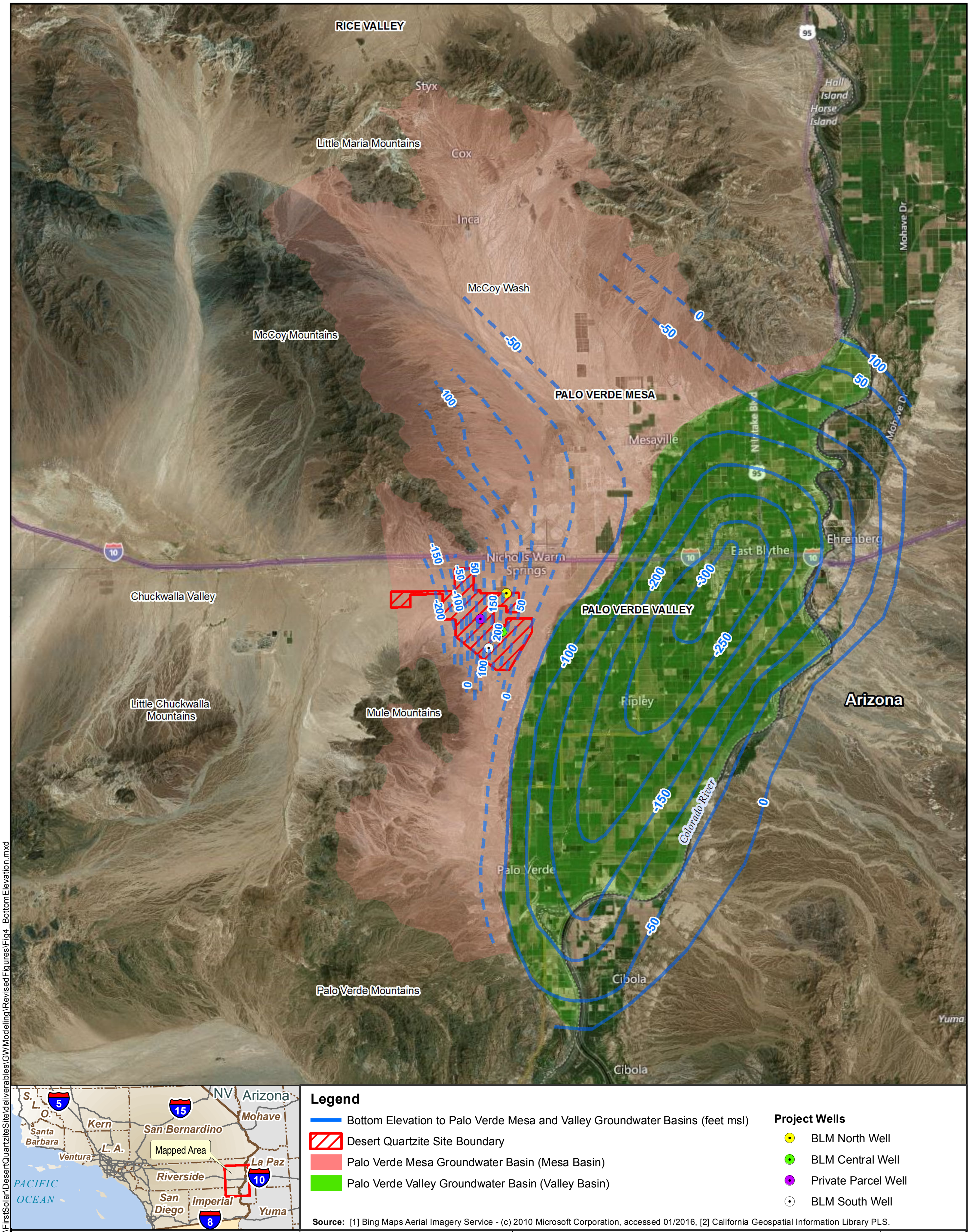
Era	Period	Epoch	Symbol	SEDIMENTARY AND METASEDIMENTARY ROCKS	Symbol	IGNEOUS AND META-IGNEOUS ROCKS
CENOZOIC	QUATERNARY	Recent	Qs	Dune sand		
			Qal	Alluvium		
			Qsc	Stream channel deposits (GREAT VALLEY)	Qrv	Recent volcanic: Qrv^r —rhyolite; Qrv^a —andesite; Qrv^b —basalt; Qrv^p —pyroclastic rocks
			Qf	Fan deposits (GREAT VALLEY)		
			Qb	Basin deposits (GREAT VALLEY)		
			Qst	Salt deposits		
			Ql	Quaternary lake deposits		
			Qg	Glacial deposits		
			Qt	Quaternary nonmarine terrace deposits		
		Pleistocene	Qm	Pleistocene marine and marine terrace deposits	Qpv	Pleistocene volcanic: Qpv^r —rhyolite; Qpv^a—andesite; Qpv^b —basalt; Qpv^p —pyroclastic rocks
			Qc	Pleistocene nonmarine		
			QP	Plio-Pleistocene nonmarine	✳	Quaternary and/or Pliocene cinder cones
	TERTIARY	Pliocene	Pc	Undivided Pliocene nonmarine		
			Puc	Upper Pliocene nonmarine		
			Pu	Upper Pliocene marine	Pv	Pliocene volcanic: Pv^r –rhyolite; Pv^a—andesite; Pv^b —basalt; Pv^p —pyroclastic rocks
			Pmlc	Middle and/or lower Pliocene nonmarine		
			Pml	Middle and/or lower Pliocene marine		
		Miocene	Mc	Undivided Miocene nonmarine		
			Muc	Upper Miocene nonmarine		
			Mu	Upper Miocene marine	Mv	Miocene volcanic: Mv^r —rhyolite; Mv^a —andesite; Mv^b —basalt; Mv^p —pyroclastic rocks
			Mmc	Middle Miocene nonmarine		
			Mm	Middle Miocene marine		
			Ml	Lower Miocene marine		
		Oligocene	Φc	Oligocene nonmarine	Φv	Oligocene volcanic: $Φv^r$—rhyolite; $Φv^a$ —andesite ; $Φv^b$ —basalt; $Φv^p$—pyroclastic rocks
			Φ	Oligocene marine		
		Eocene	Ec	Eocene nonmarine	Ev	Eocene volcanic: Ev^r —rhyolite; Ev^a —andesite; Ev^b —basalt; Ev^p —pyroclastic rocks
			E	Eocene marine		
		Paleocene	Epc	Paleocene nonmarine		
			Ep	Paleocene marine		
		Undivided	QTc	Cenozoic nonmarine	QTv	Cenozoic volcanic: QTv^r—rhyolite; QTv^a—andesite; QTv^b —basalt; QTv^p —pyroclastic rocks
			Tc	Tertiary nonmarine	Tg^r	Tertiary granitic rocks
			Tl	Tertiary lake deposits	Ti	Tertiary intrusive (hypabyssal) rocks: Ti^r –rhyolite; Ti^a –andesite; Ti^b —basalt
			Tm	Tertiary marine	Tv	Tertiary volcanic: Tv^r —rhyolite; Tv^a —andesite; Tv^b —basalt; Tv^p —pyroclastic rocks

Era	Period	Symbol	Sedimentary and metasedimentary rocks	Symbol	Igneous and meta-igneous rocks
MESOZOIC	CRETACEOUS	K	Undivided Cretaceous marine		
		Ku	Upper Cretaceous marine	KJfv	Franciscan volcanic and metavolcanic rocks
		Kl	Lower Cretaceous marine	gr	Mesozoic granitic rocks: gr^g-granite and adamellite; gr^d-granodiorite; gr^t-tonalite and diorite
	CRETACEOUS–JURASSIC	KJf	Franciscan Formation		
	JURASSIC	Jk	Knoxville Formation	bi	Mesozoic basic intrusive rocks
		Ju	Upper Jurassic marine	ub	Mesozoic ultrabasic intrusive rocks
		Jml	Middle and/or Lower Jurassic marine	JTRv	Jura-Trias metavolcanic rocks
	TRIASSIC	TR	Triassic marine		
	UNDIVIDED	m / ls	Pre-Cretaceous metamorphic rocks (ls = limestone or dolomite)	mv	Pre-Cretaceous metavolcanic rocks
		ms	Pre-Cretaceous metasedimentary rocks	gr-m	Pre-Cenozoic granitic and metamorphic rocks
PALEOZOIC		P / ls	Paleozoic marine (ls = limestone or dolomite)	Pv	Paleozoic metavolcanic rocks
	PERMIAN	P	Permian marine	Pv	Permian metavolcanic rocks
	CARBONIFEROUS	C	Undivided Carboniferous marine	Cv	Carboniferous metavolcanic rocks
		CP	Pennsylvanian marine		
		CM	Mississippian marine		
	DEVONIAN	D	Devonian marine	Dv	Devonian metavolcanic rocks
				Dv?	Devonian and pre-Devonian? — metavolcanic rocks
	SILURIAN	S	Silurian marine		
		pSs	Pre-Silurian metasedimentary rocks	pS pSv	Pre-Silurian metamorphic rocks Pre-Silurian metavolcanic rocks
	ORDOVICIAN	O	Ordovician marine		
	CAMBRIAN	€	Cambrian marine		
PRECAMBRIAN		€?	Cambrian – Precambrian marine	p€c	Precambrian igneous and metamorphic rock complex
		p€	Undivided Precambrian metamorphic rocks p€g = gneiss, p€s = schist	p€gr	Undivided Precambrian granitic rocks
		lp€	Later Precambrian sedimentary and metamorphic rocks	p€an	Precambrian anorthosite
		ep€	Earlier Precambrian metamorphic rocks		

HEAVY BORDER ON BOXES INDICATES UNITS THAT APPEAR ON THIS SHEET

Q:\PROJECTS\First Solar\Maps\Desert Quartzite\GW Modeling\Fig3b RegionalGeologyMapLegend.mxd

Desert Quartzite Solar Project **Riverside County, CA** **URS Corporation**	**Source:** [1] Division of Mines and Geology, Geologic Map of California, Salton Sea Sheet, Scale 1:250,000, 1967.	**Figure 3b.** Regional Geologic Map Legend	2016


RICE VALLEY
Styx
Hall Island
Horse Island
Little Maria Mountains
Cox
Inca
McCoy Wash
McCoy Mountains
PALO VERDE MESA
Mesaville
Nicholls Warm Springs
Ehrenberg
East Blythe
Chuckwalla Valley
PALO VERDE VALLEY
Little Chuckwalla Mountains
Mule Mountains
Ripley
Arizona
Colorado River
Palo Verde
Palo Verde Mountains
Cibola
Cibola
Yuma
Mohave Dr
Mohave Dr
Intake Blvd
95
95
10
10
10
10
0
-50
-50
100
100
50
-150
-50
50
-200
-100
150
50
200
100
0
0
-200
-300
-100
-250
-150
0
-50
S. L. O.
Santa Barbara
Kern
Ventura
L. A.
San Bernardino
Riverside
San Diego
Imperial
PACIFIC OCEAN
NV
Arizona
Mohave
La Paz
Yuma
Mapped Area
5
15
10
8

Legend

Bottom Elevation to Palo Verde Mesa and Valley Groundwater Basins (feet msl)

▨ Desert Quartzite Site Boundary

🟥 Palo Verde Mesa Groundwater Basin (Mesa Basin)

🟩 Palo Verde Valley Groundwater Basin (Valley Basin)

Project Wells

- ● BLM North Well
- ● BLM Central Well
- ● Private Parcel Well
- ○ BLM South Well

Source: [1] Bing Maps Aerial Imagery Service - (c) 2010 Microsoft Corporation, accessed 01/2016, [2] California Geospatial Information Library PLS.

Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

N

0 2.5 5 Miles

1 in = 5 miles

Figure 4. Bottom Elevation Map for Palo Verde Mesa and Valley Groundwater Basins

2016

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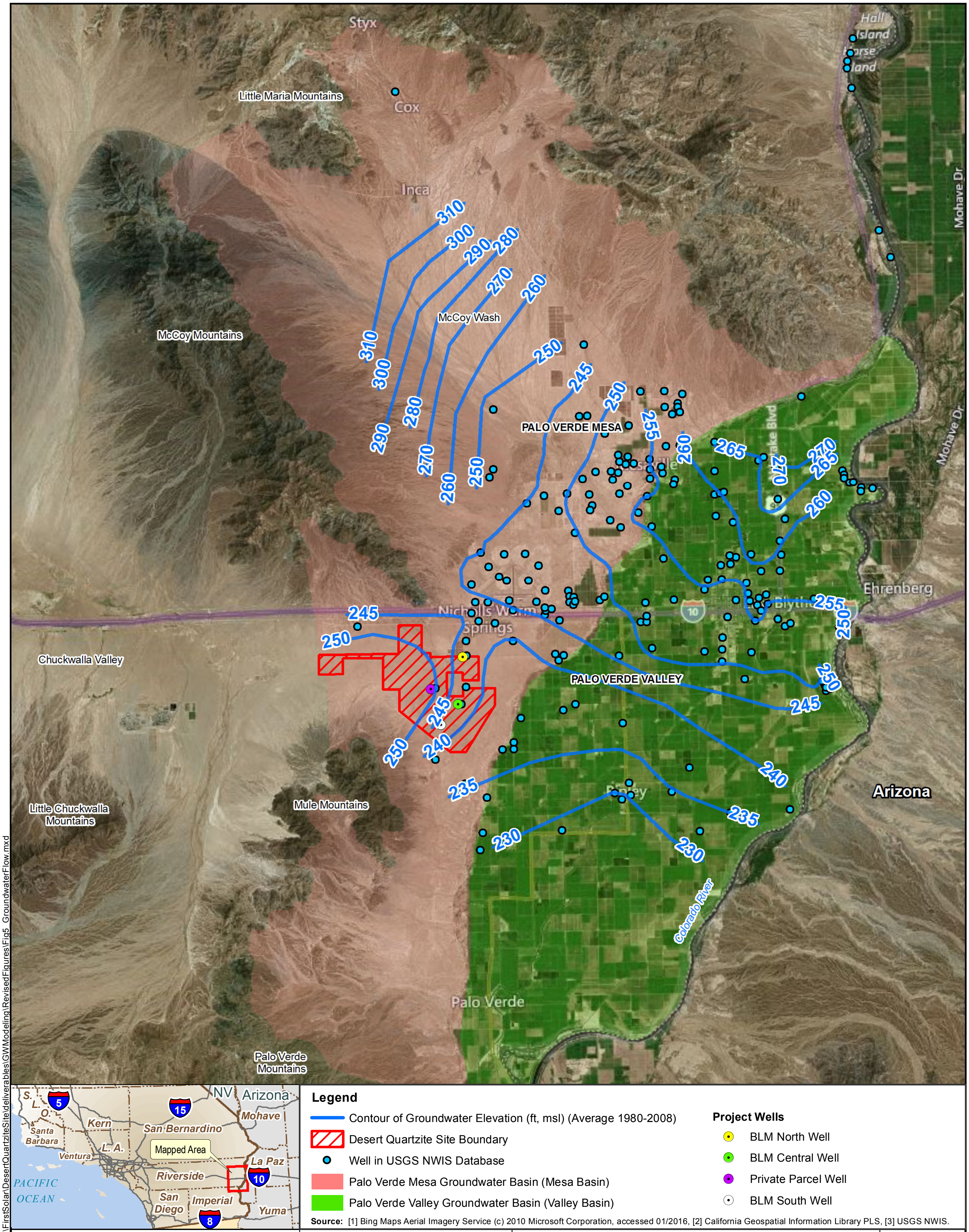
Styx
Hall Island
Horse Island
Little Maria Mountains
Cox
Inca
Mohave Dr
310
300
290
280
270
260
250
245
255
265
McCoy Wash
McCoy Mountains
PALO VERDE MESA
Blythe
Blvd
Ehrenberg
Nicholls Warm Springs
10
Chuckwalla Valley
PALO VERDE VALLEY
240
235
230
Ripley
Arizona
Little Chuckwalla Mountains
Mule Mountains
Colorado River
Palo Verde
Palo Verde Mountains
S. L. O.
Santa Barbara
Kern
Ventura
L. A.
San Bernardino
NV
Arizona
Mohave
Mapped Area
La Paz
Riverside
PACIFIC OCEAN
San Diego
Imperial
Yuma
5
15
10
8

Legend

- Contour of Groundwater Elevation (ft, msl) (Average 1980-2008)
- ▨ Desert Quartzite Site Boundary
- ● Well in USGS NWIS Database
- 🟥 Palo Verde Mesa Groundwater Basin (Mesa Basin)
- 🟩 Palo Verde Valley Groundwater Basin (Valley Basin)

Project Wells

- ● BLM North Well
- ● BLM Central Well
- ● Private Parcel Well
- ⊙ BLM South Well

Source: [1] Bing Maps Aerial Imagery Service (c) 2010 Microsoft Corporation, accessed 01/2016, [2] California Geospatial Information Library PLS, [3] USGS NWIS.

N
0
2
4
Miles
1 in = 4 miles

Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

Figure 5. Groundwater Flow in the Palo Verde Mesa and Valley

2016

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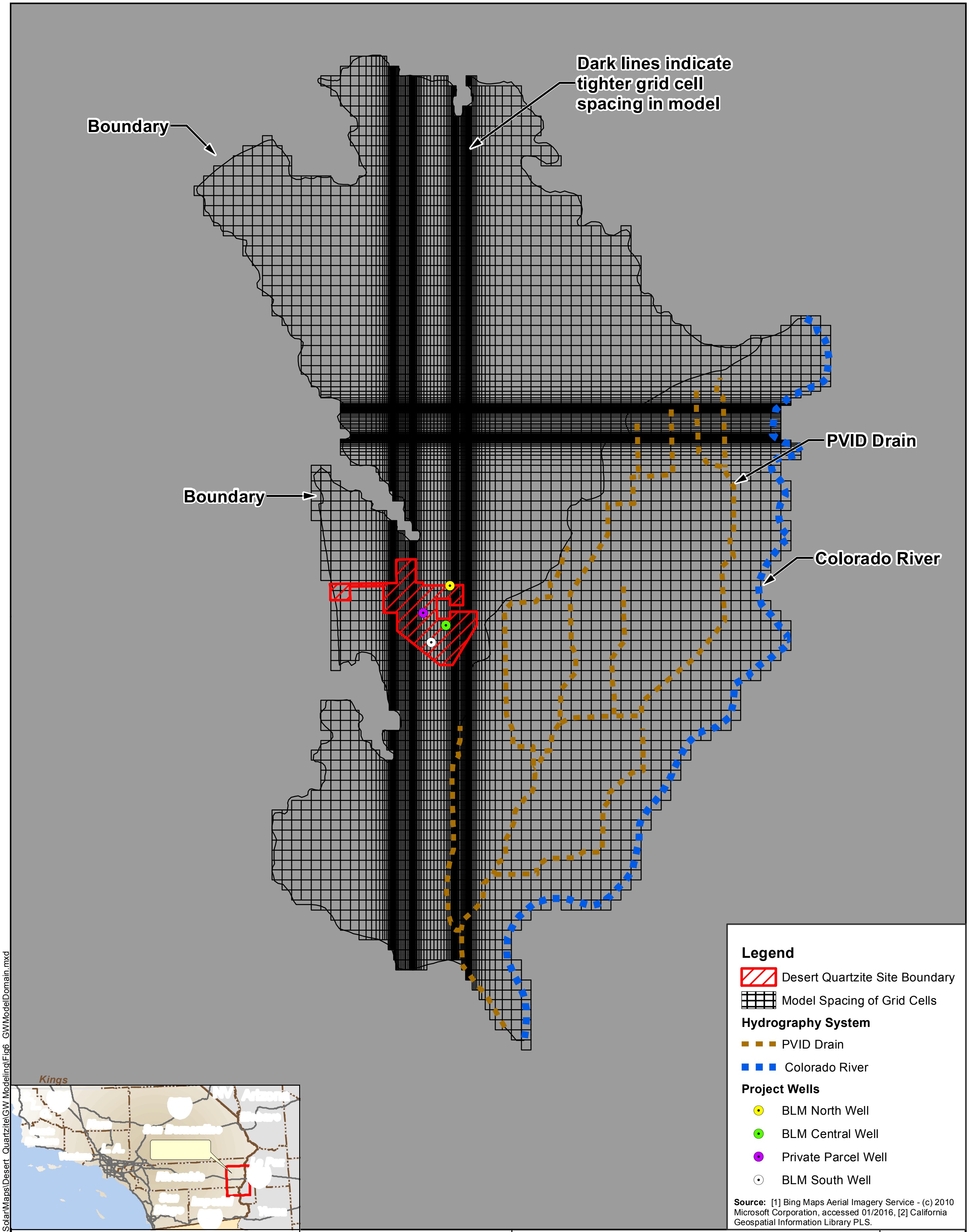
Dark lines indicate tighter grid cell spacing in model
Boundary
Boundary
PVID Drain
Colorado River
Kings
Legend
▨ Desert Quartzite Site Boundary
▦ Model Spacing of Grid Cells
Hydrography System
PVID Drain
Colorado River
Project Wells
● BLM North Well
● BLM Central Well
● Private Parcel Well
○ BLM South Well
N
0
2.5
5
Miles

Source: [1] Bing Maps Aerial Imagery Service - (c) 2010 Microsoft Corporation, accessed 01/2016, [2] California Geospatial Information Library PLS.

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Riverside County, CA

URS Corporation

Figure 6. Groundwater Model Domain

2016

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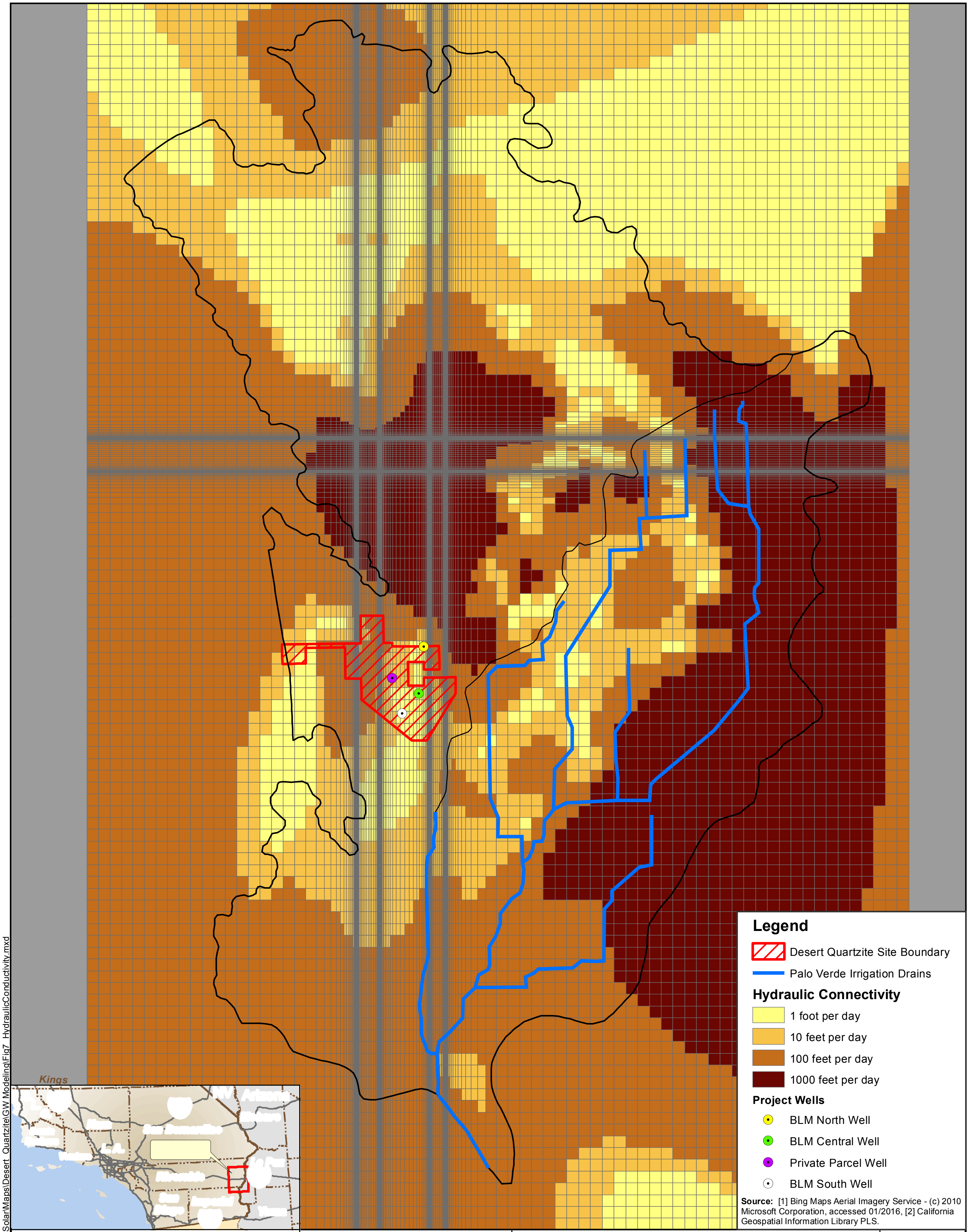
Kings
Legend
Desert Quartzite Site Boundary
Palo Verde Irrigation Drains
Hydraulic Connectivity
1 foot per day
10 feet per day
100 feet per day
1000 feet per day
Project Wells
BLM North Well
BLM Central Well
Private Parcel Well
BLM South Well
N
0
2
4
Miles

Source: [1] Bing Maps Aerial Imagery Service - (c) 2010 Microsoft Corporation, accessed 01/2016, [2] California Geospatial Information Library PLS.

Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

Figure 7. Hydraulic Conductivity Zonation

2016

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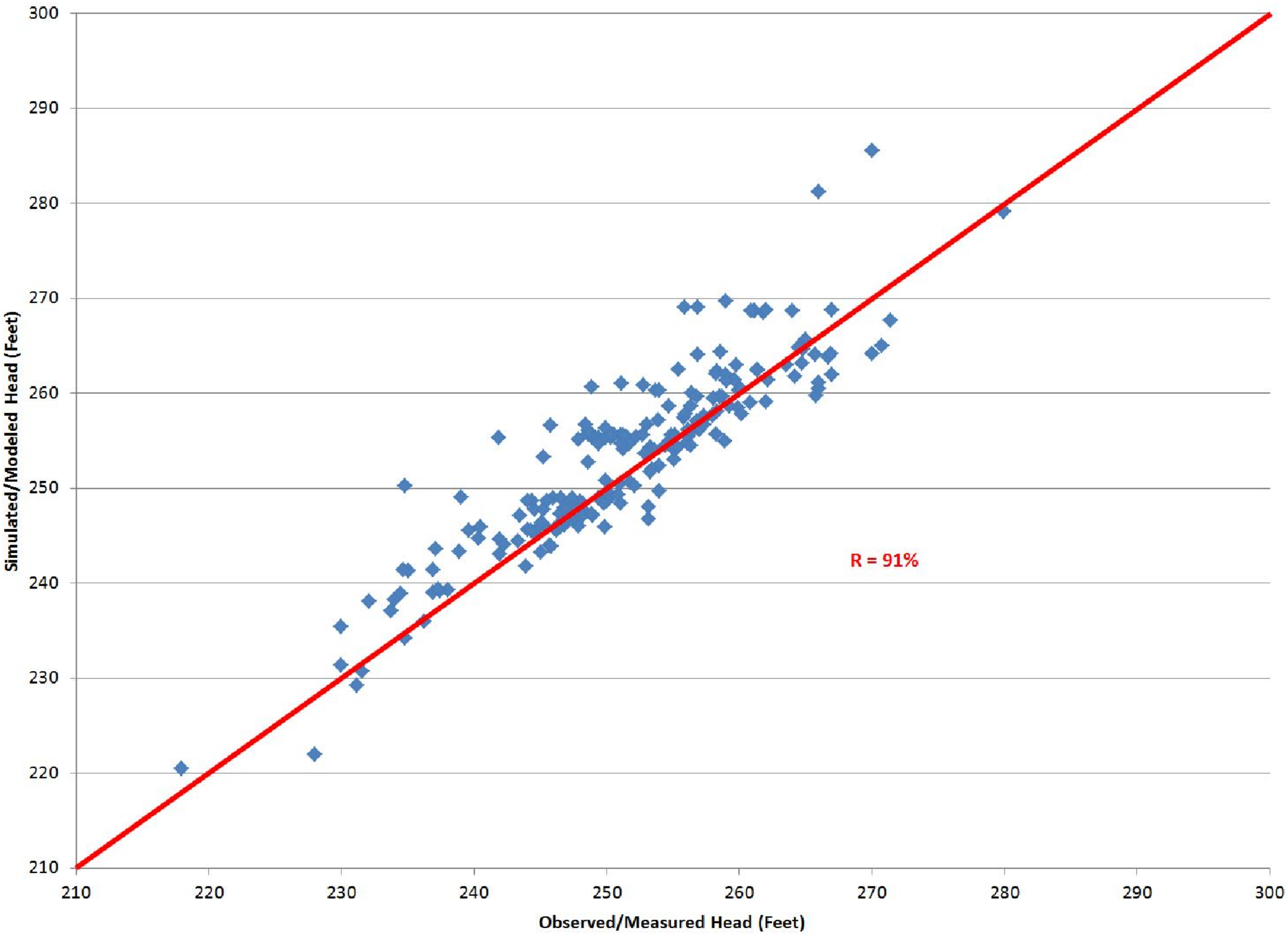
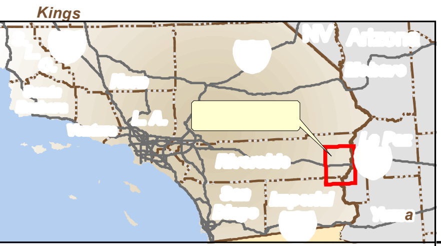
Actual vs. Predicted Water Levels

Head





Q:\PROJECTS\First Solar\Maps\Desert Quartzite\GW Modeling\Fig8_CalibrationChart.mxd

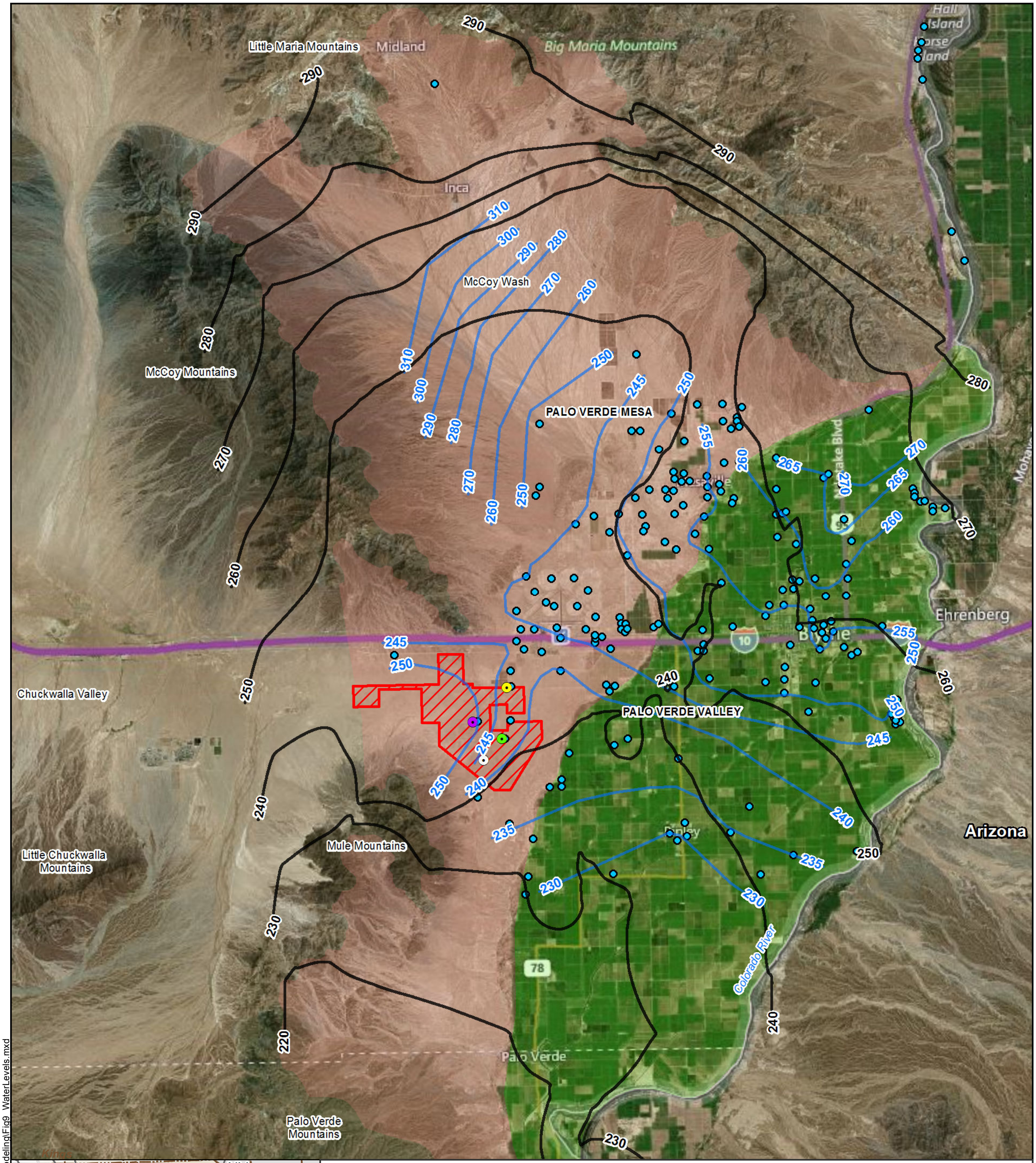
Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

Source: [1] California Geospatial Information Library PLS.

Figure 8. Calibration- Actual vs. Predicted Water Levels

2016



Little Maria Mountains
Midland
Big Maria Mountains
Hall Island
Horse Island
Inca
McCoy Wash
McCoy Mountains
PALO VERDE MESA
Blythe
Ehrenberg
Chuckwalla Valley
PALO VERDE VALLEY
Little Chuckwalla Mountains
Mule Mountains
Ripley
Arizona
Colorado River
Palo Verde
Palo Verde Mountains
10
78
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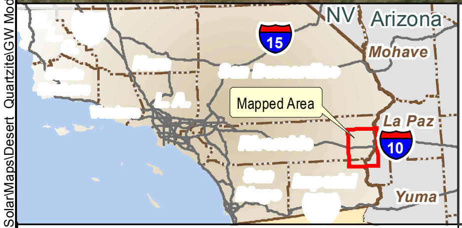
280
270
260
250
240
230
220
310
300
265
255
245
235



NV
Arizona
Mohave
15
Mapped Area
La Paz
10
Yuma

end

—	Model Predicted Water Levels (ft, msl)
—	Contour of Groundwater Elevation (ft, msl) (Average 1980-2008)
▨	Desert Quartzite Site Boundary
🟥	Palo Verde Mesa Groundwater Basin (Mesa Basin)
🟩	Palo Verde Valley Groundwater Basin (Valley Basin)
●	Well in USGS NWIS Database

Project Wells

●	BLM North Well
●	BLM Central Well
●	Private Parcel Well
⊙	BLM South Well

Source: [1] Bing Maps Aerial Imagery Service - (c) 2010 Microsoft Corporation, accessed 01/2016, [2] California Geospatial Information Library PLS, [3] USGS NWIS.

Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

N

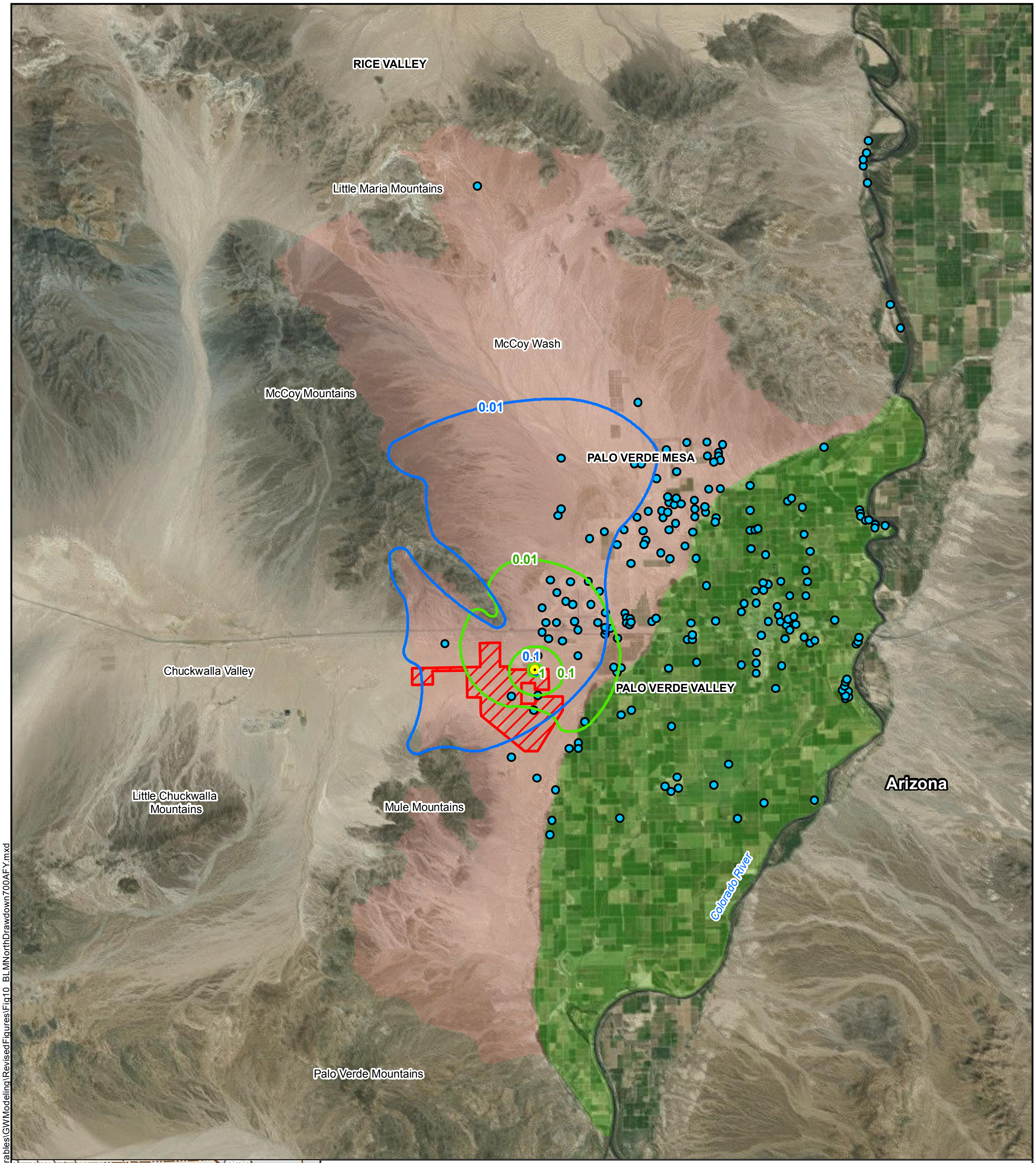
0 2 4 Miles

1 in = 4 miles

Figure 9. Actual vs. Predicted Water Levels (Steady State Conditions 1980-2009)

2016

Q:\PROJECTS\First Solar\Maps\Desert Quartzite\GW Modeling\Fig9 WaterLevels.mxd


RICE VALLEY
Little Maria Mountains
McCoy Wash
McCoy Mountains
0.01
PALO VERDE MESA
0.01
0.1
1
0.1
Chuckwalla Valley
PALO VERDE VALLEY
Arizona
Little Chuckwalla Mountains
Mule Mountains
Colorado River
Palo Verde Mountains

NV
Arizona
S. L. O.
5
15
Mohave
Santa Barbara
Kern
San Bernardino
L. A.
Mapped Area
Ventura
La Paz
Riverside
10
PACIFIC OCEAN
San Diego
Imperial
8
Yuma

Legend

- ⊙ BLM North Well
- Predicted Drawdown - End of Construction
- Predicted Drawdown - End of Operation
- ▨ Desert Quartzite Site Boundary
- 🟥 Palo Verde Mesa Groundwater Basin (Mesa Basin)
- 🟩 Palo Verde Valley Groundwater Basin (Valley Basin)
- ● Well in USGS NWIS Database

Source: [1] Bing Maps Aerial Imagery Service - (c) 2010 Microsoft Corporation, accessed 01/2016, [2] California Geospatial Information Library PLS, [3] USGS NWIS.

Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

N
0 2.5 5 Miles
1 in = 5 miles

Figure 10. BLM North Well: Predicted Drawdown - End of Construction (700 AFY) and Operation

2016

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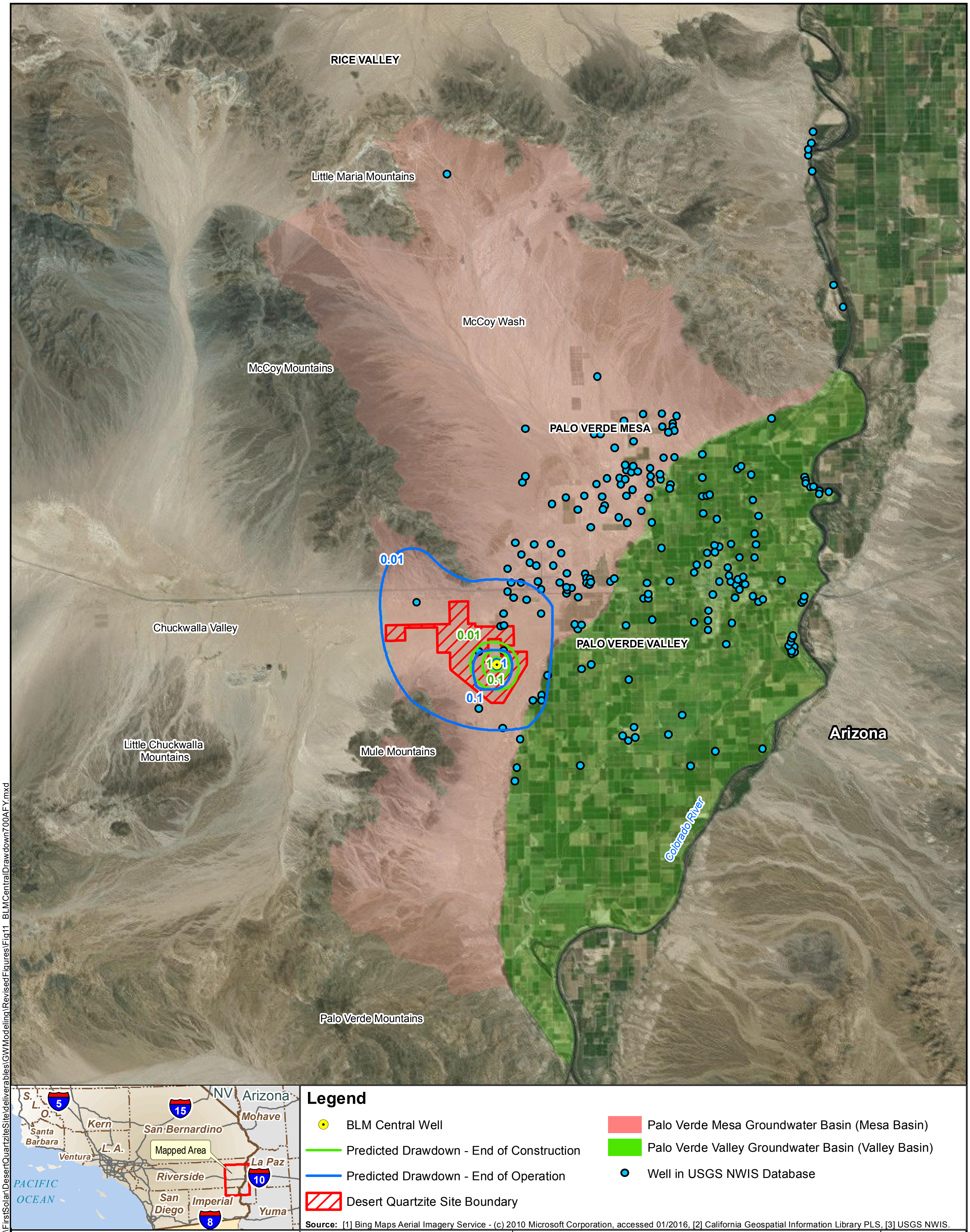
RICE VALLEY
Little Maria Mountains
McCoy Wash
McCoy Mountains
PALO VERDE MESA
0.01
Chuckwalla Valley
0.01
1
0.1
0.1
PALO VERDE VALLEY
Arizona
Little Chuckwalla Mountains
Mule Mountains
Colorado River
Palo Verde Mountains
S. L. O.
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NV
Arizona
Mohave
Santa Barbara
Kern
San Bernardino
L. A.
Mapped Area
Ventura
La Paz
10
Riverside
PACIFIC OCEAN
San Diego
Imperial
Yuma
8

Legend

⊙	BLM Central Well
—	Predicted Drawdown - End of Construction
—	Predicted Drawdown - End of Operation
▨	Desert Quartzite Site Boundary
🟥	Palo Verde Mesa Groundwater Basin (Mesa Basin)
🟩	Palo Verde Valley Groundwater Basin (Valley Basin)
●	Well in USGS NWIS Database

Source: [1] Bing Maps Aerial Imagery Service - (c) 2010 Microsoft Corporation, accessed 01/2016, [2] California Geospatial Information Library PLS, [3] USGS NWIS.

V:\Projects\GIS_Proj\FirstSolar\DesertQuartziteSite\deliverables\GWModeling\RevisedFigures\Fig11_BLMCentralDrawdown700AFY.mxd

Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

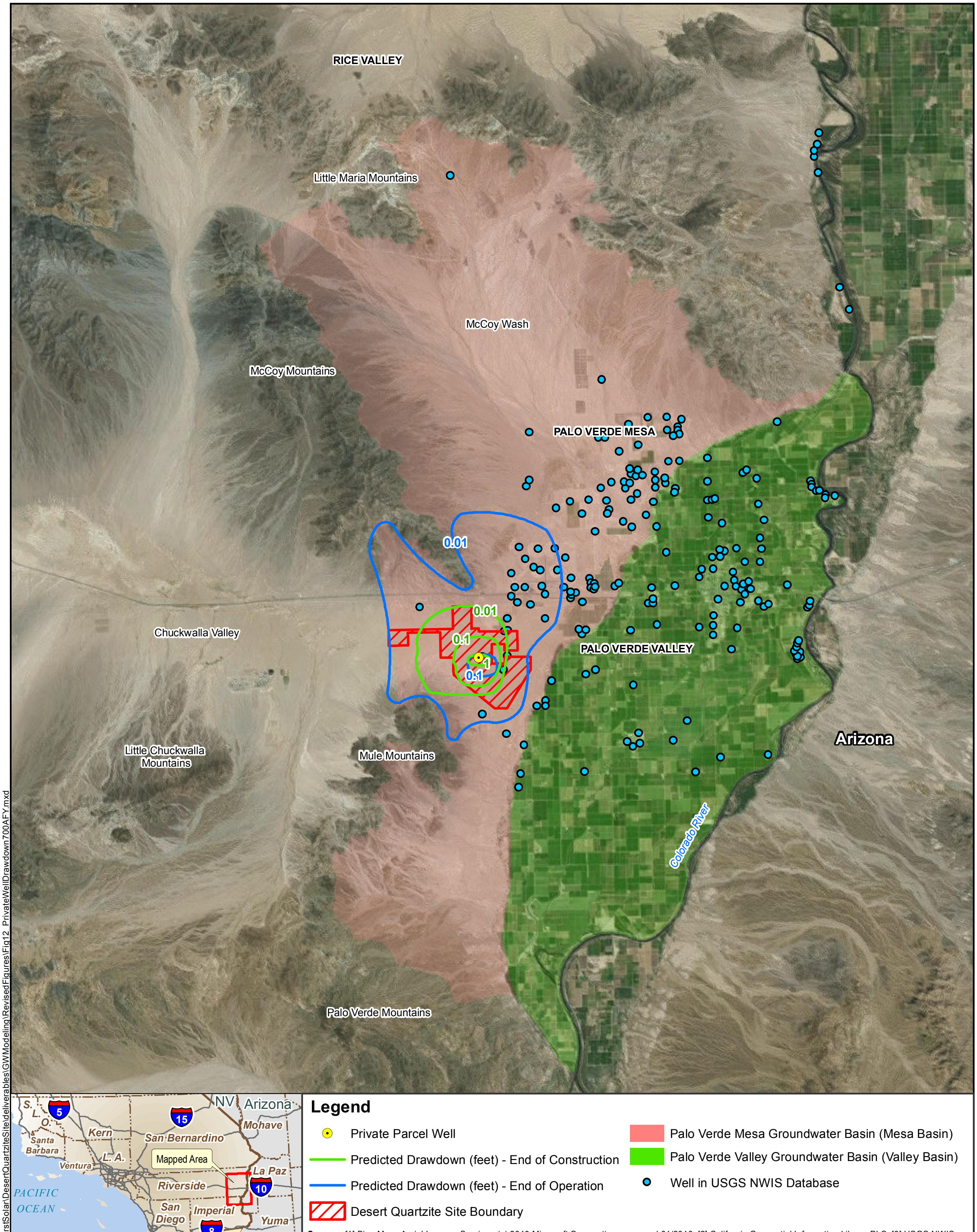
N

0 2.5 5 Miles

1 in = 5 miles

Figure 11. BLM Central Well: Predicted Drawdown - End of Construction (700 AFY) and Operation

2016


RICE VALLEY
Little Maria Mountains
McCoy Wash
McCoy Mountains
PALO VERDE MESA
0.01
0.01
0.1
1
0.1
Chuckwalla Valley
PALO VERDE VALLEY
Little Chuckwalla Mountains
Mule Mountains
Arizona
Colorado River
Palo Verde Mountains
S. L. O.
Santa Barbara
Kern
San Bernardino
NV
Arizona
Mohave
5
15
L. A.
Mapped Area
Ventura
La Paz
Riverside
10
PACIFIC OCEAN
San Diego
Imperial
8
Yuma
Legend
Private Parcel Well
Predicted Drawdown (feet) - End of Construction
Predicted Drawdown (feet) - End of Operation
Desert Quartzite Site Boundary
Palo Verde Mesa Groundwater Basin (Mesa Basin)
Palo Verde Valley Groundwater Basin (Valley Basin)
Well in USGS NWIS Database

Source: [1] Bing Maps Aerial Imagery Service - (c) 2010 Microsoft Corporation, accessed 01/2016, [2] California Geospatial Information Library PLS, [3] USGS NWIS.

Desert Quartzite Solar Project
Riverside County, CA

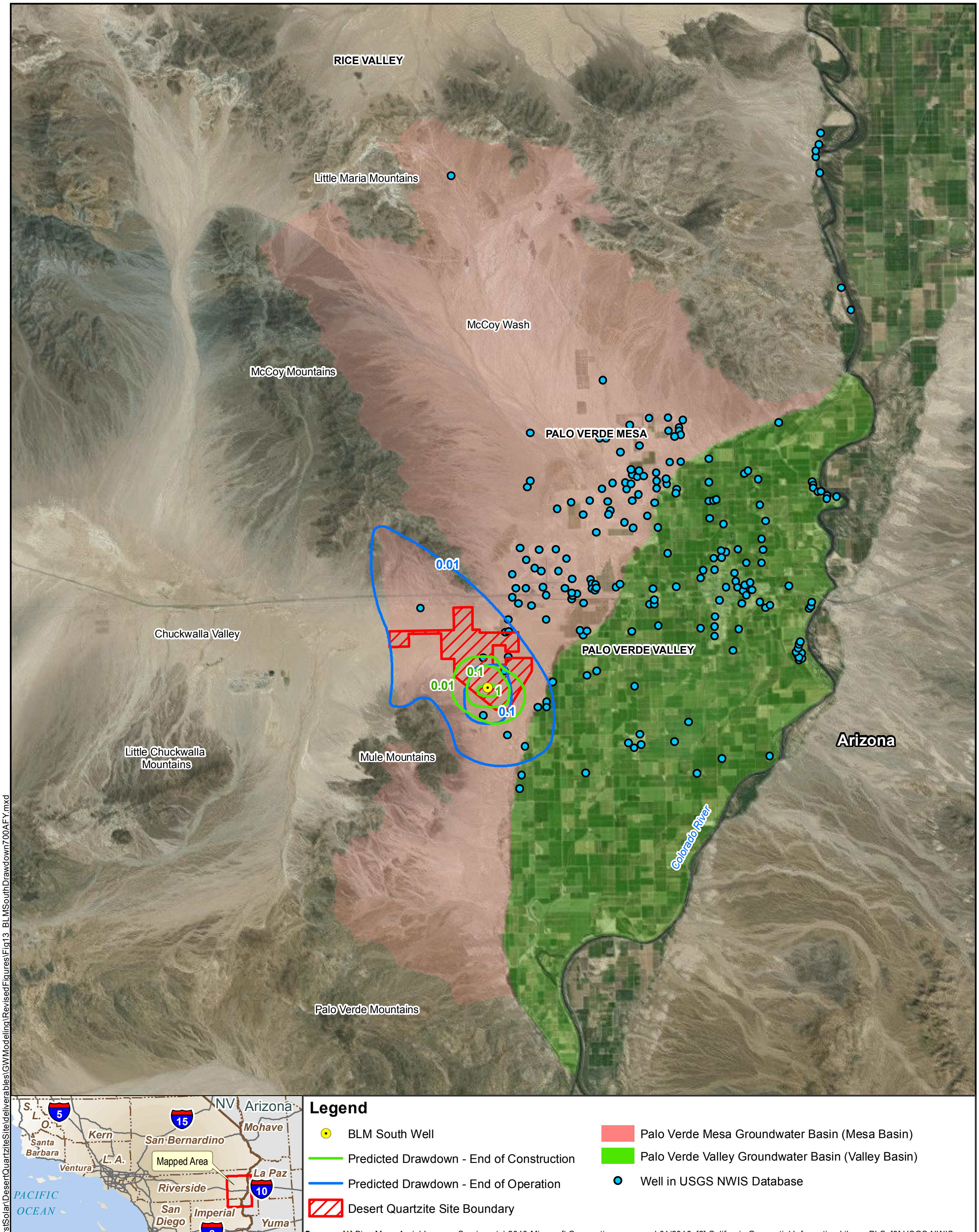
URS Corporation

0 2.5 5
Miles
1 in = 5 miles

Figure 12. Private Parcel Well: Predicted Drawdown - End of Construction (700 AFY) and Operation

2016

V:\Projects\GIS Proj\FirstSolar\DesertQuartziteSite\deliverables\GWModeling\RevisedFigures\Fig12 PrivateWellDrawdown700AFY.mxd


RICE VALLEY
Little Maria Mountains
McCoy Wash
McCoy Mountains
PALO VERDE MESA
0.01
Chuckwalla Valley
PALO VERDE VALLEY
0.1
0.01
1
0.1
Little Chuckwalla Mountains
Mule Mountains
Arizona
Colorado River
Palo Verde Mountains
S. L. O.
5
15
NV
Arizona
Mohave
Santa Barbara
Kern
San Bernardino
L. A.
Mapped Area
Ventura
La Paz
10
Riverside
PACIFIC OCEAN
San Diego
Imperial
Yuma
8
Legend
⊙ BLM South Well
Predicted Drawdown - End of Construction
Predicted Drawdown - End of Operation
▨ Desert Quartzite Site Boundary
🟥 Palo Verde Mesa Groundwater Basin (Mesa Basin)
🟩 Palo Verde Valley Groundwater Basin (Valley Basin)
● Well in USGS NWIS Database

Source: [1] Bing Maps Aerial Imagery Service - (c) 2010 Microsoft Corporation, accessed 01/2016, [2] California Geospatial Information Library PLS, [3] USGS NWIS.

V:\Projects\GIS_Proj\FirstSolar\DesertQuartziteSite\deliverables\GWModeling\RevisedFigures\Fig13_BLMSouthDrawdown700AFY.mxd

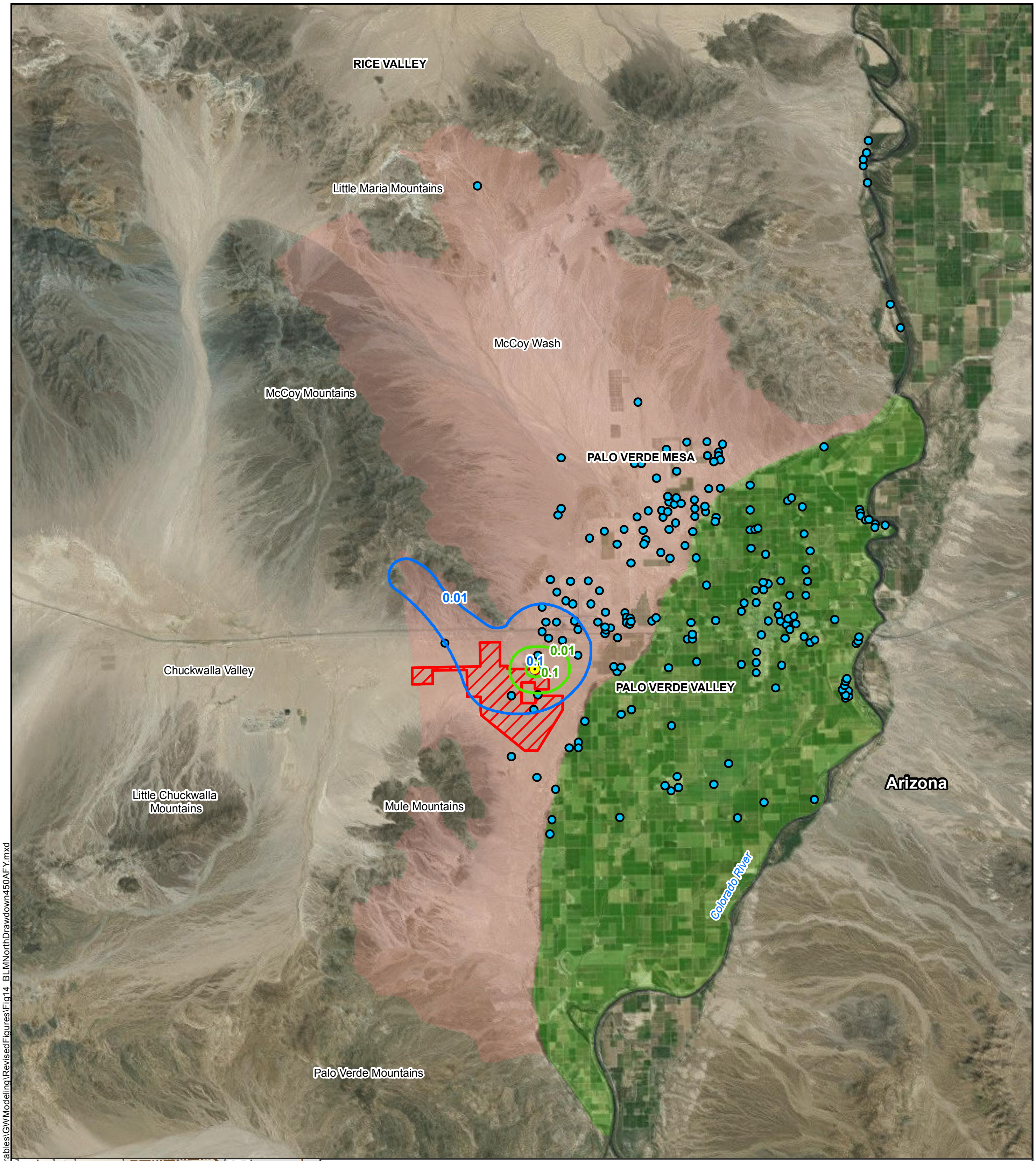
Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

N
0 2.5 5 Miles
1 in = 5 miles

Figure 13. BLM South Well: Predicted Drawdown - End of Construction (700 AFY) and Operation

2016


RICE VALLEY
Little Maria Mountains
McCoy Wash
McCoy Mountains
PALO VERDE MESA
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0.1
Chuckwalla Valley
PALO VERDE VALLEY
Arizona
Little Chuckwalla Mountains
Mule Mountains
Colorado River
Palo Verde Mountains

S. L. O.
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NV
Arizona
Mohave
Kern
San Bernardino
Santa Barbara
L. A.
Mapped Area
Ventura
La Paz
10
Riverside
PACIFIC OCEAN
San Diego
Imperial
8
Yuma

Legend

- ⊙ BLM North Well
- — Predicted Drawdown - End of Construction
- — Predicted Drawdown - End of Operation
- ▨ Desert Quartzite Site Boundary
- 🟥 Palo Verde Mesa Groundwater Basin (Mesa Basin)
- 🟩 Palo Verde Valley Groundwater Basin (Valley Basin)
- ● Well in USGS NWIS Database

Source: [1] Bing Maps Aerial Imagery Service - (c) 2010 Microsoft Corporation, accessed 01/2016, [2] California Geospatial Information Library PLS, [3] USGS NWIS.

Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

N

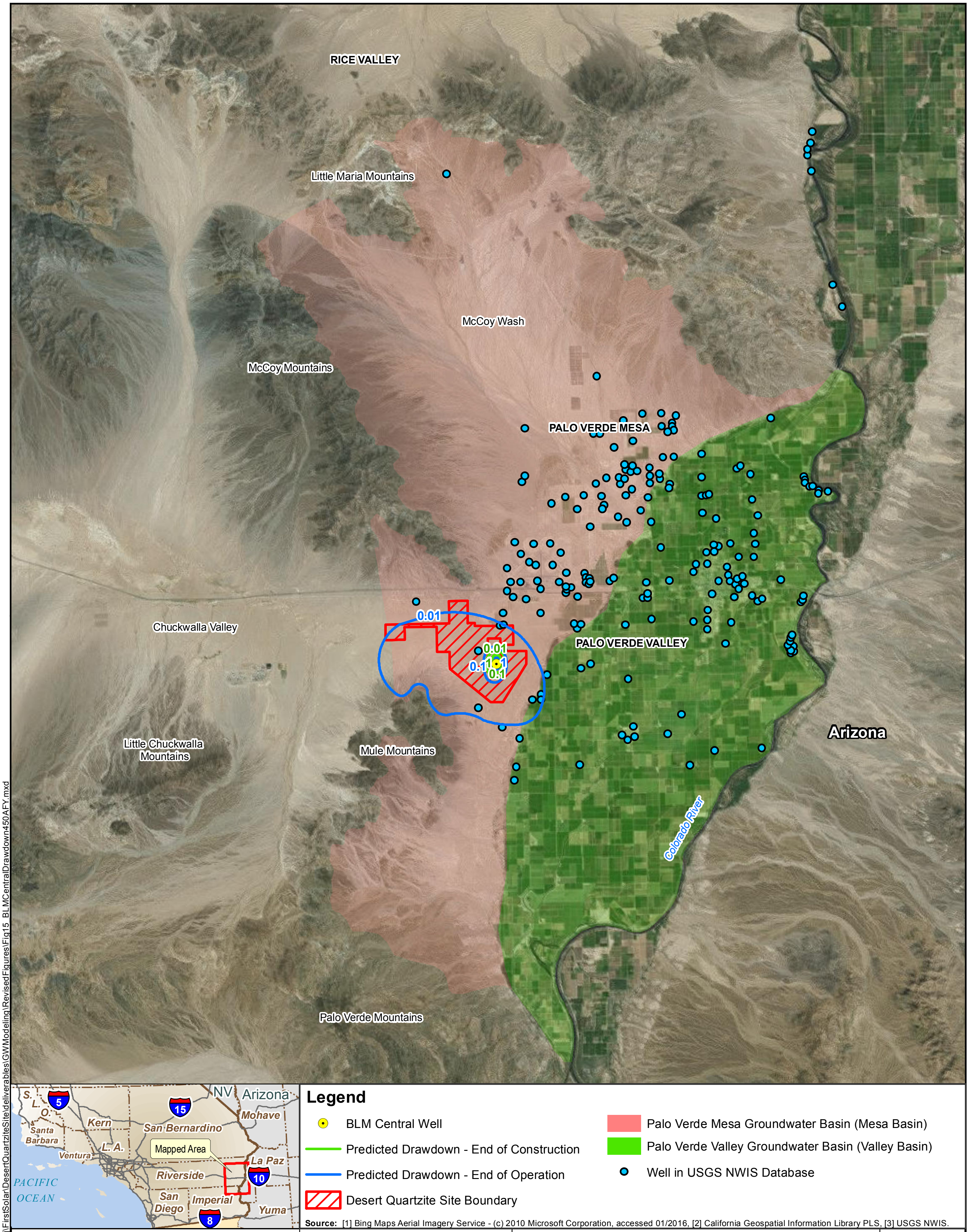
0 2.5 5 Miles

1 in = 5 miles

Figure 14. BLM North Well: Predicted Drawdown - End of Construction (450 AFY) and Operation

2016

V:\Projects\GIS_Proj\FirstSolar\DesertQuartziteSite\deliverables\GWModeling\RevisedFigures\Fig14_BLMNorthDrawdown450AFY.mxd


RICE VALLEY
Little Maria Mountains
McCoy Wash
McCoy Mountains
PALO VERDE MESA
Chuckwalla Valley
0.01
0.01
0.1
1
0.1
PALO VERDE VALLEY
Arizona
Little Chuckwalla Mountains
Mule Mountains
Colorado River
Palo Verde Mountains
S. L. O.
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NV
Arizona
Mohave
Kern
San Bernardino
Santa Barbara
L. A.
Mapped Area
Ventura
La Paz
PACIFIC OCEAN
Riverside
10
San Diego
Imperial
8
Yuma
Legend
⊙ BLM Central Well
Predicted Drawdown - End of Construction
Predicted Drawdown - End of Operation
▨ Desert Quartzite Site Boundary
🟥 Palo Verde Mesa Groundwater Basin (Mesa Basin)
🟩 Palo Verde Valley Groundwater Basin (Valley Basin)
● Well in USGS NWIS Database

Source: [1] Bing Maps Aerial Imagery Service - (c) 2010 Microsoft Corporation, accessed 01/2016, [2] California Geospatial Information Library PLS, [3] USGS NWIS.

V:\Projects\GIS_Proj\FirstSolar\DesertQuartziteSite\deliverables\GWModeling\RevisedFigures\Fig15_BLMCentralDrawdown450AFY.mxd

Desert Quartzite Solar Project
Riverside County, CA

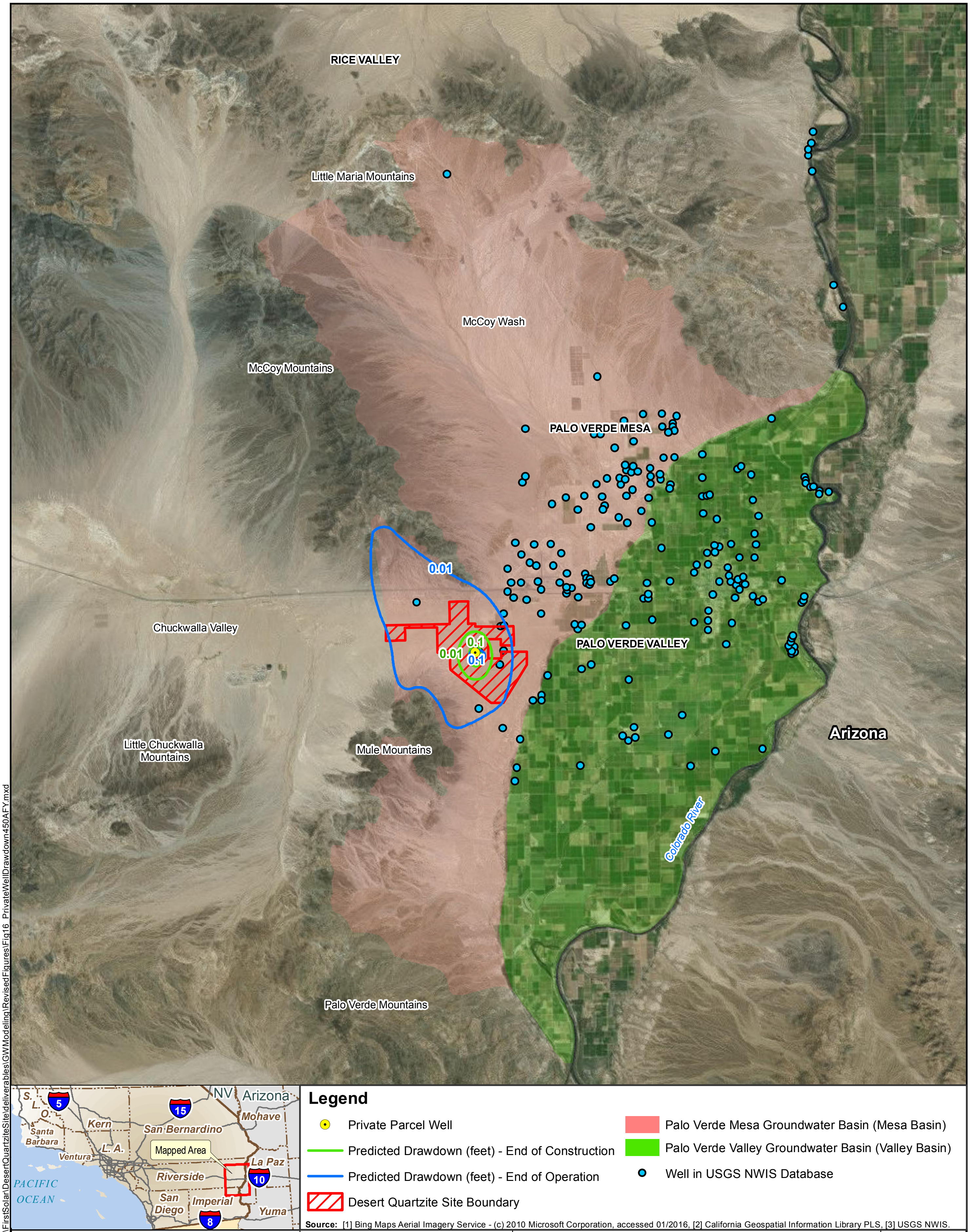
URS Corporation

0 2.5 5 Miles

1 in = 5 miles

Figure 15. BLM Central Well: Predicted Drawdown - End of Construction (450 AFY) and Operation

2016


RICE VALLEY
Little Maria Mountains
McCoy Wash
McCoy Mountains
PALO VERDE MESA
0.01
Chuckwalla Valley
0.1
0.01
0.1
PALO VERDE VALLEY
Arizona
Little Chuckwalla Mountains
Mule Mountains
Colorado River
Palo Verde Mountains
S. L. O.
Santa Barbara
Kern
5
15
NV
Arizona
Mohave
San Bernardino
L. A.
Ventura
Mapped Area
La Paz
10
Riverside
PACIFIC OCEAN
San Diego
Imperial
8
Yuma
Legend
Private Parcel Well
Predicted Drawdown (feet) - End of Construction
Predicted Drawdown (feet) - End of Operation
Desert Quartzite Site Boundary
Palo Verde Mesa Groundwater Basin (Mesa Basin)
Palo Verde Valley Groundwater Basin (Valley Basin)
Well in USGS NWIS Database
N
0 2.5 5 Miles
1 in = 5 miles

Source: [1] Bing Maps Aerial Imagery Service - (c) 2010 Microsoft Corporation, accessed 01/2016, [2] California Geospatial Information Library PLS, [3] USGS NWIS.

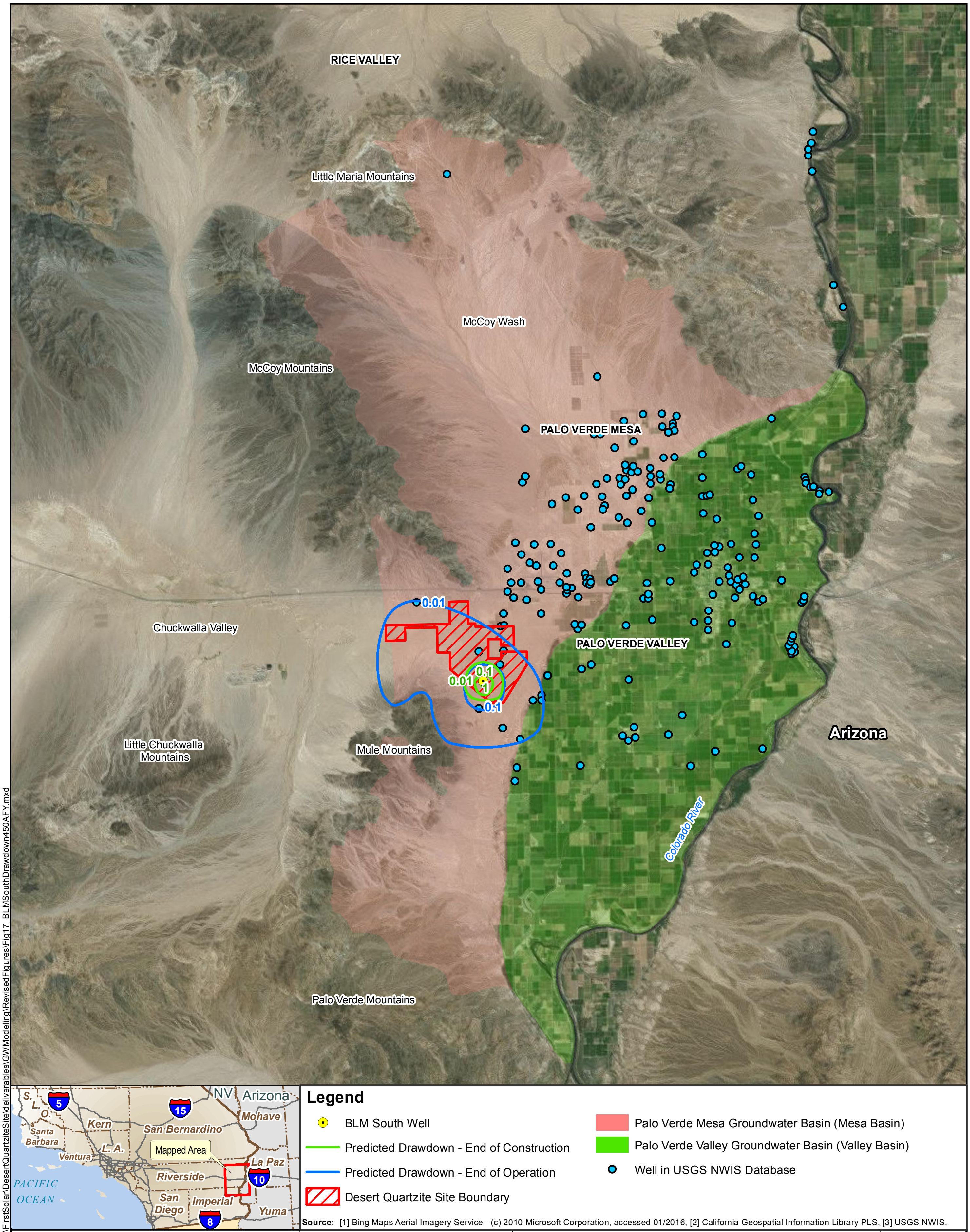
Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

Figure 16. Private Parcel Well: Predicted Drawdown - End of Construction (450 AFY) and Operation

2016

V:\Projects\GIS Proj\FirstSolar\DesertQuartziteSite\deliverables\GWModeling\RevisedFigures\Fig16 PrivateWellDrawdown450AFY.mxd


RICE VALLEY
Little Maria Mountains
McCoy Wash
McCoy Mountains
PALO VERDE MESA
Chuckwalla Valley
0.01
0.1
1
0.01
0.1
PALO VERDE VALLEY
Little Chuckwalla Mountains
Mule Mountains
Arizona
Colorado River
Palo Verde Mountains
S. L. O.
5
15
NV
Arizona
Mohave
Santa Barbara
Kern
San Bernardino
L. A.
Mapped Area
Ventura
La Paz
10
Riverside
PACIFIC OCEAN
San Diego
Imperial
8
Yuma

Legend

- ⊙ BLM South Well
- Predicted Drawdown - End of Construction
- Predicted Drawdown - End of Operation
- ▨ Desert Quartzite Site Boundary
- 🟥 Palo Verde Mesa Groundwater Basin (Mesa Basin)
- 🟩 Palo Verde Valley Groundwater Basin (Valley Basin)
- ● Well in USGS NWIS Database

Source: [1] Bing Maps Aerial Imagery Service - (c) 2010 Microsoft Corporation, accessed 01/2016, [2] California Geospatial Information Library PLS, [3] USGS NWIS.

Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

N

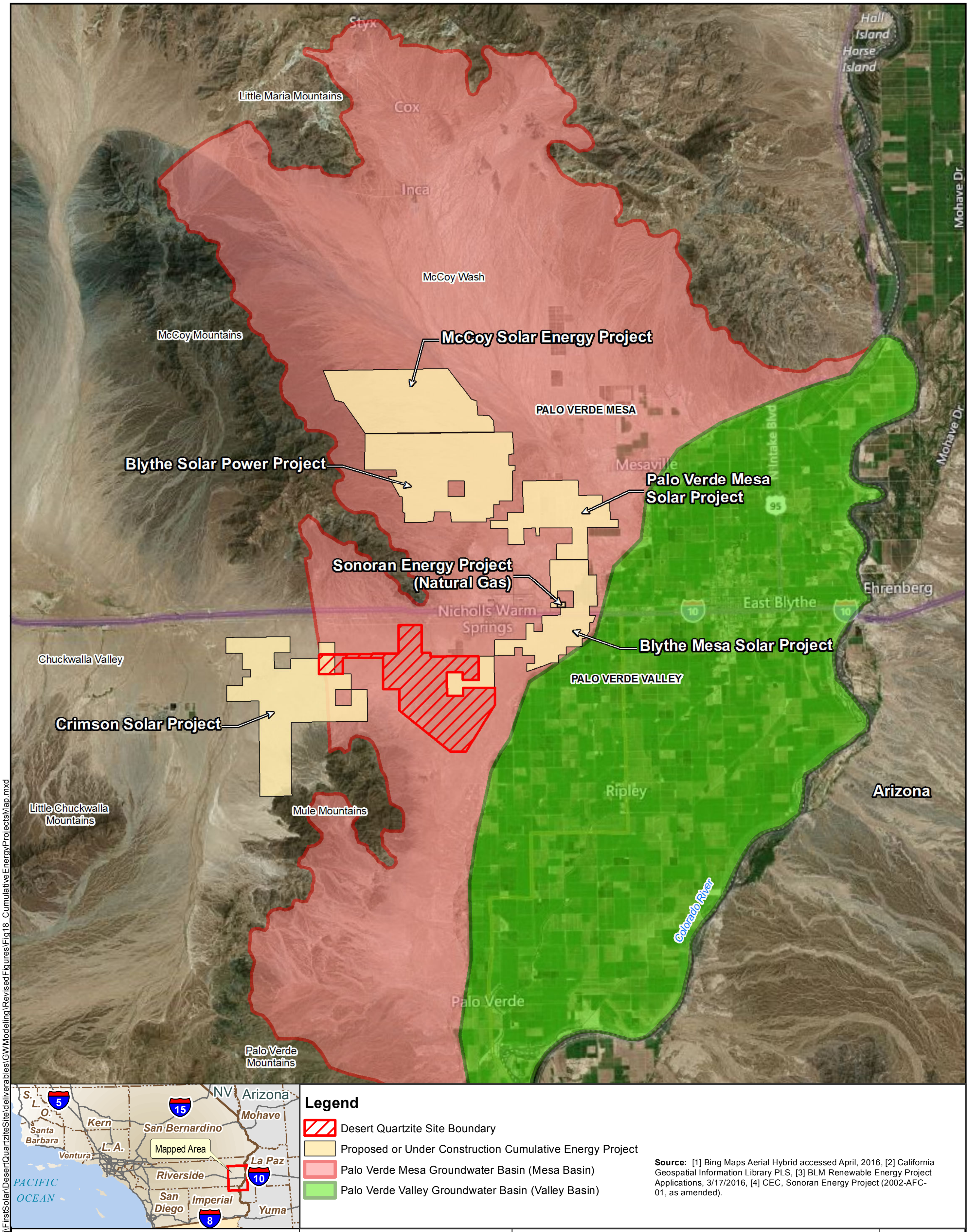
0 2.5 5 Miles

1 in = 5 miles

Figure 17. BLM South Well: Predicted Drawdown - End of Construction (450 AFY) and Operation

2016

V:\Projects\GIS_Proj\FirstSolar\DesertQuartziteSite\deliverables\GWModeling\RevisedFigures\Fig17_BLMSouthDrawdown450AFY.mxd


Styx
Hall Island
Horse Island
Little Maria Mountains
Cox
Inca
Mohave Dr
McCoy Wash
McCoy Mountains
McCoy Solar Energy Project
PALO VERDE MESA
Mohave Dr
Blythe Solar Power Project
Mesaville
Intake Blvd
Palo Verde Mesa Solar Project
95
Sonoran Energy Project (Natural Gas)
Ehrenberg
10
East Blythe
10
Nicholls Warm Springs
Blythe Mesa Solar Project
Chuckwalla Valley
PALO VERDE VALLEY
Crimson Solar Project
Ripley
Arizona
Little Chuckwalla Mountains
Mule Mountains
Colorado River
Palo Verde
Palo Verde Mountains
S. L. O.
5
15
NV
Arizona
Mohave
Kern
San Bernardino
Santa Barbara
L. A.
Mapped Area
Ventura
La Paz
10
Riverside
PACIFIC OCEAN
San Diego
Imperial
8
Yuma

Legend

- ▨ Desert Quartzite Site Boundary
- 🟨 Proposed or Under Construction Cumulative Energy Project
- 🟥 Palo Verde Mesa Groundwater Basin (Mesa Basin)
- 🟩 Palo Verde Valley Groundwater Basin (Valley Basin)

Source: [1] Bing Maps Aerial Hybrid accessed April, 2016, [2] California Geospatial Information Library PLS, [3] BLM Renewable Energy Project Applications, 3/17/2016, [4] CEC, Sonoran Energy Project (2002-AFC-01, as amended).

Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

N

0 2 4 Miles

1 in = 4 miles

Figure 18. Cumulative Energy Projects Map

2016

V:\Projects\GIS_Proj\FirstSolar\DesertQuartziteSite\deliverables\GWModeling\RevisedFigures\Fig18_CumulativeEnergyProjectsMap.mxd

APPENDIX A
TABLES

This appendix presents the following tables:

- Table 1 – Palo Verde Water Balance Table
- Table 2A – Cumulative Assessment of Proposed Energy Project Groundwater Use, Palo Verde Mesa, Riverside County, California (Desert Quartzite 700 AFY Construction Scenario)
- Table 2B – Cumulative Assessment of Proposed Energy Project Groundwater Use, Palo Verde Mesa, Riverside County, California (Desert Quartzite 450 AFY Construction Scenario)
- Table 3A – Mass Balance Non-Pumping and Pumping Condition (700 AFY)
- Table 3B – Mass Balance Non-Pumping and Pumping Condition (450 AFY)

Table 1 presents a tabular water balance summary for the Palo Verde Valley geographic area, which includes the Palo Verde Mesa and Valley sub-basins. The tabular summary presented herein was prepared for the McCoy Solar Energy Project and the groundwater data is considered in the groundwater modeling performed by URS for the proposed Desert Quartzite Solar Project. The tabular summary is an excerpt from Appendix G of the *Assessment of Proposed Groundwater Use, Results of Numerical Groundwater Modeling, McCoy Solar Energy Project, Palo Verde Mesa, Riverside County, California* (AECOM 2011).

Tables 2A, 2B, 3A, and 3B consider data developed for the Desert Quartzite Solar Project.

TABLE 1
PALO VERDE VALLEY WATER BALANCE
PALO VERDE GRONDWATER MODEL
McCOY SOLAR ENERGY PROJECT
RIVERSIDE COUNTY, CALIFORINA

RECHARGE AND DISCHARGE				BASIS FOR ESTIMATE	WATER BALANCE ESTIMATES REPORTED BY OTHERS (acre-feet per year)		
					Metzger, and others, 1973 USGS Professional Paper 486-G[1]	Owen-Joyce, 1984 USGS 84-4236[2]	Owen-Joyce, 1987 USGS 87-4078[2]
RECHARGE (INFLOW)			**acre-feet per year**				
UNDERFLOW from the CHUCKWALLA		0.23%	**1,000**	Estimate after WorleyParsons (2010), "Response to Cure, Water Resources Data Request 1-9, Application for Certification - Genesis Solar Power Project (09-AFC-8), April 2010.	**400**	**400**	**--**
UNDERFLOW from PARKER VALLEY		0.82%	**3,500**	Underflow calculated using transmissivity of 26,000 ft^2/d (from Leake, 2008), gradient of 0.0003 ft/ft, a 19,000-foot width, and 600-foot depth (from Metzger et.al.,1973) for the saturated section.	**3,000**	**--**	**--**
PERCOLATION[3]							
	AGRICULTURE RETURN - MESA	0.82%	**3,500**	There are a total of approximately 2,683 acres of irrigated agricultural land on the Mesa (PVID February 2010). Of the 2,683 acres, approximately 1,862 acres are irrigated with surface water from PVID and the remaining 724 acres are irrigated with groundwater. Agricultural return on the Mesa was calculated for the 2,683 acres using the DWR Water Use Estimates (2001) for water use (4.5-5.85 acre-feet/acre) and crop efficiency (70%-75%). The return was the difference between the total applied water less the consumptive use as derived by the efficiency estimates.	**--**	**9,500**	**9,500**
	AGRICULTURE RETURN - VALLEY	15.71%	**67,000**	The estimate is based on the average of PVID diversions to the Valley (1993-2008) (743,000 acre-feet) less the average total spill return (136,000 acre-feet) over the same period,less the seepage (125,000) and evaporation loss (5,000) and less average consumptive use estimates for the PVID (420,000) since 1993.	**0**	**0**	**0**
	POTW RETURN	0.18%	**750**	Estimate of return from the Blythe POTW based on inflormation provided on the daily flow to evaporation/percolration ponds (City of Blythe website), an assumption that the total pond area is aobut 120 acres (estimate dervied from photo review) and an annual evaporation rate of 71 inches.	**--**	**--**	**--**
	MOUNTAIN FRONT	1.17%	**5,000**	Estimate derived using the average annual isoheytal contours shown on Figure 6 from Hely and Peck (1964), wherein the average annual precipitation was overlayed onto the topography of the Palo Verde Valley to provide an estimate of total precipitation in acre-feet for the Basin under an assumption that 5% of the total estimate from precipitation would return as deep percolation to the groundwater basin.	**2,000**	**2,000**	
	IRRIGATION CANAL LEAKAGE (LESS EVAPORATION)	28.13%	**120,000**	After Bookman Edmondson (1976) and Owen-Joyce (1984), 125,000 afy (Canal Leakage) - 5,000 (Evaporation).	**--**	**120,000**	**120,000**
RIVER DISCHARGE TO GROUNDWATER (LOSING CONDITION)		52.94%	**225,850**	Estimate based on the difference between the measured values of total discharge less the estimate of agricultural return and canal leakage (inflow). The estimate was made under the assumption that groundwater levels have not changed significantly and as such there must be a balance between inflow and outflow in the Palo Verde Valley.	**361,000**	**3,100**	
BEDROCK		**0.6**	**0**	Although recharge from the bedrock is possible there is insufficient well data to determine flux into the Valley or Mesa Groundwawer Basins.	**--**	**--**	**--**
TOTAL (INFLOW)			**426,600**		**366,400**	**135,000**	**129,500**
DISCHARGE (OUTFLOW)			**acre-feet per year**				
UNDERFLOW OUT of the PALO VERDE and CIBOLA VALLEY AQUIFER			**0**	After Metzger et al (1973).	**0**	**0**	**--**
GROUNDWATER PUMPING							
	AGRICULTURE - MESA	0.84%	**3,600**	To determine agricultural diversions on the PV Mesa, the "Estimated Water Use" values from DWR (2001) were applied to a total of 724 acres of agricultural land that uses groundwater for irrigation. There are approximately 364 acres of agricultural land inside the PVID boundary that use private wells and approximately 360 acres of agricultural land outside of the PVID boundaries that use groundwater for irrigation.	**--**	**--**	**--**
	MUNICIPAL and DOMESTIC	1.76%	**7,500**	Within the City Limits as per the Department of Public Works Department, the City of Blythe pumps the Mesa Ranch Well #3 for domestic use (230 afy) and PVC Well #2 for municipal use at the Palo Verde College (260 AFY), Main System (3700 AFY) and Mesa Well #2 for the Golf Course (560 AFY). The County of Riverside operates one well (Airport Well #7) at the Blythe Airport that serves the Mesa Verde Community (47 afy). This estimate also includes pumping for the Blythe Energy Plant I (3,300 afy). It does not include pumping for BEP II as this well is not yet in operation. Information after City of Blythe Department of Public Works, Kevin Nelson, February 2010.	**--**	**2,000 (1981)**	**--**
UNMEASURED RETURN (GAINING CONDITION)		11.72%	**50,000**	Average unmeasured return after the USBR, Lower Colorado River Accounting and Water Use Report - Arizona, California, and Nevada - Calendar Year 2003-2009.		**23,900**	**2,500-31,700**
CONSUMPTIVE USE - NATIVE VEGETATION		1.99%	**8,500**	Estimate derived from distrubution of riparian vegetation within the PVID area (Figure 3-5 "Land Cover Types in Reach 4", Lower Colorado River Multi-Species Conservation Plan: CDFG 2081-2005-008-06), and the estimate of consumptive use and evaporation loss as provided for these areas and summarized in Table-1 "Agricultural and Riparian Vegetation ET, and Evaporation by Water User, Lower Colorado River, Hoover Dam ot Mexico", Lower Colorado River Accounting System, Evapotranspiration Calculations, 2003-2009.	**136,000**	**--**	**--**
GROUNDWATER DISCHARGE		83.68%	**357,000**	Average Outfall Drain Return for 1993-2008.	**--**	**419,500**	**--**
TOTAL (OUTFLOW)			**426,600**		**-86,000**	**--**	**--**

NOTES **WATER BALANCE** **0**

1 The consumptive use non-native vegetation estimate provided by Metzger and others includes areas outside the Palo Verde Valley.

2 Owen-Joyce (1984) estimated the inflow to the Palo Verde Mesa (Mesa Basin) at 9,500 afy and correspondingly estimated the outflow to the Palo Verde Valley (Valley Basin) at 4,700 afy.

3 Precipitation recharge onto the Palo Verde Mesa floor assumed to be negligible. It is assumed that all water transpires or evaporates as it falls onto the valley floor. There is no return to the groundwater from direct precipitation.

TABLE 2A
CUMULATIVE ASSESSMENT OF PROPOSED ENERGY PROJECT GROUNDWATER USE, PALO VERDE MESA, RIVERSIDE COUNTY, CALIFORNIA
(DESERT QUARTZITE 700 AFY CONSTRUCTION SCENARIO)

PROJECT[1]	PROPONENT	BLM SERIAL ID/CEC DOCKET #	TECHNOLOGY	SOURCE	PHASE	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2050	COMMENTS
Desert Quartzite Solar Project	Desert Quartzite, LLC (First Solar)	CACA 49377	Photovoltaic (300 MW)	On-site groundwater (and/or surface water trucked in from an offsite source)	Construction (2 scenarios; not additive)	--	700	700	--	--	--	--	--	--	--	--	--	--	**--**	Construction planned to occur over 25 to 48 months; 25-month scenario assumed to require 1,400 AF (700 AFY average) and 48-month scenario assumed to require 1,800 AF (450 AFY average). For purposes of the cumulative water assessment herein, all water assumed to be supplied by new on-site groundwater well(s) installed in the Palo Verde Mesa Groundwater Basin. In addition, for the purposes of calculating cumulative water use herein, the 25-month construction scenario water usage estimate is used instead of the 48-month construction scenario. Refer to Table 2B for the 48-month construction scenario assessment.
					Operation (2 scenarios; not additive)	--	--	--	38	38	38	38	38	38	38	38	38	38	**38**	
Blythe Solar Power Project	NextEra (formerly Solar Millennium LLC)	CACA 48811/2009-AFC-06C	Photovoltaic (485 MW)	Groundwater	Construction	620	--	--	--	--	--	--	--	--	--	--	--	--	**--**	Construction started in March 2015 and is planned to be completed in August 2016 (according to CEC, Energy Facility Status, March 28, 2016). The modified project is now limited to 40 AFY of groundwater extraction during the operational phase as per CEC Condition SOIL & WATER-4. The listed construction water need of 620 AF in 2016 is assumed worst case based on previous estimates.
					Operation	40	40	40	40	40	40	40	40	40	40	40	40	40	**40**	
McCoy Solar Energy Project	NextEra LLC	CACA 48728	Photovoltaic (up to 750 MW)	Groundwater	Construction	250	--	--	--	--	--		--	--	--	--	--	--	**--**	Construction water use is based on assumed 3-year construction period utilizing 750 AF and calculated average of 250 AFY. Construction planned to be completed in August 2016.
					Operation	30	30	30	30	30	30	30	30	30	30	30	30	30	**30**	
Blythe Mesa Solar Project	Renewable Resources Group	CACA 53213	Photovoltaic (up to 750 MW)	Surface Water and Groundwater (only groundwater portion is shown)	Construction	--	--	--	--	--	--	--	--	--	--	--	--	--	**--**	The Blythe Mesa Solar Project proposes to use 1,354 AF of surface water (451 AFY) over the planned 3-year construction period followed by limited groundwater extraction and potable demand during the operational phase (Power Engineers, Water Supply Assessment [WSA] for Blythe Mesa Solar Project, February 2013). The surface water is to be provided by the PVID and the potable water is to be supplied by Riverside County Community Service Area #122. The project would involve fallowing a substantial acreage of irrigated agricultural land with water savings well in excess of the Project's water needs. Operational phase groundwater needs are estimated at less than 1 AFY. Operation start date as per 2013 WSA.
					Operation	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	**<1**	
Sonoran Energy Project (formerly Blythe Energy Project Phase II)	AltaGas Sonoran Energy, Inc. (formerly Blythe Energy, LLC)	2002-AFC-01	Combined/ Cycle (569 MW)	Groundwater	Construction	--	60	60	--	--	--	--	--	--	--	--	--	--	**--**	Petition to Amend CEC License was filed by applicant on August 7, 2015. As of March 2016, the applicant is still in the process of responding to CEC Data Requests. The construction start and end dates are currently not known but have been assumed as shown in the table. The Project includes a voluntary Water Conservation Offset Program involving proposed lining of Palo Verde Irrigation District canals to offset water use to mitigate groundwater usage.
					Operation	--	--	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	**3000**	
Crimson Solar Project	Sonoran West Holdings (subsidiary Recurrent Energy)	CACA 51967	Photovoltaic (450 MW)	Groundwater or Trucked-In Water (groundwater assumed)	Construction	--	1000	1000	1000	--	--	--	--	--	--	--	--	--	**--**	Only the easternmost portion of the Crimson Project site overlies the Palo Verde Mesa Groundwater Basin. The draft POD for the project (personal communication with Noel Ludwig, BLM [Ludwig 2016]) indicates that water demand would be met be either on-site groundwater, off-site groundwater, or water trucked in to the site. For the purposes of this worst-case assessment, it is assumed water would be supplied by groundwater well(s) installed within the boundaries of the Palo Verde Mesa Groundwater Basin.
					Operation	--	--	--	--	22	22	22	22	22	22	22	22	22	**22**	
Palo Verde Mesa Solar Project	Renewable Resources Group, Inc.	--	Photovoltaic (up to 486 MW)	Surface Water	Construction	--	0	0	0	--	--	--	--	--	--	--	--	--	**--**	The Water Supply Assessment prepared for the project (Power Engineers 2012) assumed a 3-year construction phase utilizing 500 AFY of surface water followed by a water use of 302 AFY for the operational phase. All water is to be provided by the PVID and no groundwater would be utilized. The project would involve conversion of agricultural land that has historically been irrigated with about 3,403 AFY that will no longer occur once the project is implemented (i.e., will result in a net reduction in water use). Based on information provided by the Riverside County Planning Department (Brady 2016), it is assumed that construction would begin in 2017.
					Operation	--	--	--	--	0	0	0	0	0	0	0	0	0	**0**	
Total Water Use - Energy Projects (AF)[2]						**941**	**1,831**	**4,831**	**4,109**	**3,131**	**3,131**	**3,131**	**3,131**	**3,131**	**3,131**	**3,131**	**3,131**	**3,131**	**3,131**	
Cumulative Change (AF)[3]						**941**	**2,772**	**7,603**	**11,712**	**14,843**	**17,974**	**21,105**	**24,236**	**27,367**	**30,498**	**33,629**	**36,760**	**39,891**	**108,773**	
Basin-wide Change in Regional Water Level (assuming no recharge and a storage coefficient of 0.20)(inches)[4]						**0**	**-1**	**-2**	**-3**	**-4**	**-5**	**-6**	**-6**	**-7**	**-8**	**-9**	**-10**	**-11**	**-29**	
Percentage of Proposed Energy Project Cumulative Water Use Compared to Estimated Total Storage (6.84M AF)						**0.014%**	**0.04%**	**0.11%**	**0.17%**	**0.22%**	**0.26%**	**0.31%**	**0.35%**	**0.40%**	**0.45%**	**0.49%**	**0.54%**	**0.58%**	**1.59%**	
Percent Desert Quartzite Solar Project Usage Compared to Yearly Total Energy Project Usage						**0%**	**38%**	**14%**	**0.9%**	**1.2%**	**1.2%**	**1.2%**	**1.2%**	**1.2%**	**1.2%**	**1.2%**	**1.2%**	**1.2%**	**1.2%**	

NOTES

1 Project updates were provided through research of the following:

Bureau of Land Management (BLM), California, 2015 (last update August 24, 2015). Approved Renewable Energy Projects, Solar Projects on BLM Public Lands. Accessed at: http://www.blm.gov/ca/st/en/prog/energy/approved_projects.
BLM, 2015 (last update October 1, 2015). Pending Renewable Energy Applications, Applications Undergoing Environmental Review. Accessed at: http;//www.blm.gov.ca/st/en/prog/energy/pendingapps.html.
BLM, 2015 (last update June 3, 2015). California Desert BLM District Offices, Renewable Energy Projects and Utility Corridors Map. California Desert District.
California Energy Commission, 2016. Status of all Projects. Accessed March 28, 2016 at: http://www.energy.ca.gov/siting cases/all_projects.html.
California Public Utilities Commission, 2016. Energy. Accessed March 28, 2016 at: http://www.cpuc.ca.gov/PUC/energy/
Ludwig, 2016. BLM District Hydrologist. Personal communication with R. Ray (URS). April 4.

2 Sum of renewable project water use by year based on current information through the references cited above through April 4, 2016.

3 Cumulative change is a sum adding the prior years water use to the current water year for each year beginning in 2016 and ending in 2050.

4 Estimated change in the regional water level following the equation shown below (Fetter 1988). Negative values indicate a decline in water levels. It is important to note that this analysis does not take into account recharge to the groundwater basin (i.e., conservative).

DEFINITIONS

AFY	acre feet per year
AF	acre feet - (325,851 gallons)
BLM	Bureau of Land Management
CEC	California Energy Commission
LLC	Limited Liability Corporation
MW	Megawatts
POD	Plan of Development
PVID	Palo Verde Irrigation District
--	Not applicable

ESTIMATE OF BASINWIDE WATER LEVEL CHANGE

V = A*S*dh

V - volume of water released or taken into storage (acre-feet)
A - area of the aquifer (acres)   (226,000 acres)
S- aquifer storage coefficient   (assumed to be 0.2)
dh - change in water level (inches)

TABLE 2B
CUMULATIVE ASSESSMENT OF PROPOSED ENERGY PROJECT GROUNDWATER USE, PALO VERDE MESA, RIVERSIDE COUNTY, CALIFORNIA
(DESERT QUARTZITE 450 AFY CONSTRUCTION SCENARIO)

PROJECT[1]	PROPONENT	BLM SERIAL ID/CEC DOCKET #	TECHNOLOGY	SOURCE	PHASE	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2050	COMMENTS
Desert Quartzite Solar Project	Desert Quartzite, LLC (First Solar)	CACA 49377	Photovoltaic (300 MW)	On-site groundwater (and/or surface water trucked in from an offsite source)	Construction (2 scenarios; not additive)	--	450	450	450	450	--	--	--	--	--	--	--	--	**--**	Construction planned to occur over 25 to 48 months; 25-month scenario assumed to require 1,400 AF (700 AFY average) and 48-month scenario assumed to require 1,800 AF (450 AFY average). For purposes of the cumulative water assessment herein, all water assumed to be supplied by new on-site groundwater well(s) installed in the Palo Verde Mesa Groundwater Basin. In addition, for the purposes of calculating cumulative water use herein, the 48-month construction scenario water usage estimate is used instead of the 25-month construction scenario. Refer to Table 2A for the 25-month construction scenario assessment.
					Operation (2 scenarios; not additive)	--	--	--	--	--	38	38	38	38	38	38	38	38	**38**	
Blythe Solar Power Project	NextEra (formerly Solar Millennium LLC)	CACA 48811/2009-AFC-06C	Photovoltaic (485 MW)	Groundwater	Construction	620	--	--	--	--	--	--	--	--	--	--	--	--	**--**	Construction started in March 2015 and is planned to be completed in August 2016 (according to CEC, Energy Facility Status, March 28, 2016). The modified project is now limited to 40 AFY of groundwater extraction during the operational phase as per CEC Condition SOIL & WATER-4. The listed construction water need of 620 AF in 2016 is assumed worst case based on previous estimates.
					Operation	40	40	40	40	40	40	40	40	40	40	40	40	40	**40**	
McCoy Solar Energy Project	NextEra LLC	CACA 48728	Photovoltaic (up to 750 MW)	Groundwater	Construction	250	--	--	--	--	--		--	--	--	--	--	--	**--**	Construction water use is based on assumed 3-year construction period utilizing 750 AF and calculated average of 250 AFY. Construction planned to be completed in August 2016.
					Operation	30	30	30	30	30	30	30	30	30	30	30	30	30	**30**	
Blythe Mesa Solar Project	Renewable Resources Group	CACA 53213	Photovoltaic (up to 750 MW)	Surface Water and Groundwater (only groundwater portion is shown)	Construction	--	--	--	--	--	--	--	--	--	--	--	--	--	**--**	The Blythe Mesa Solar Project proposes to use 1,354 AF of surface water (451 AFY) over the planned 3-year construction period followed by limited groundwater extraction and potable demand during the operational phase (Power Engineers, Water Supply Assessment [WSA] for Blythe Mesa Solar Project, February 2013). The surface water is to be provided by the PVID and the potable water is to be supplied by Riverside County Community Service Area #122. The project would involve fallowing a substantial acreage of irrigated agricultural land with water savings well in excess of the Project's water needs. Operational phase groundwater needs are estimated at less than 1 AFY. Operation start date as per 2013 WSA.
					Operation	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	**<1**	
Sonoran Energy Project (formerly Blythe Energy Project Phase II)	AltaGas Sonoran Energy, Inc. (formerly Blythe Energy, LLC)	2002-AFC-01	Combined/ Cycle (569 MW)	Groundwater	Construction	--	60	60	--	--	--	--	--	--	--	--	--	--	**--**	Petition to Amend CEC License was filed by applicant on August 7, 2015. As of March 2016, the applicant is still in the process of responding to CEC Data Requests. The construction start and end dates are currently not known but have been assumed as shown in the table. The Project includes a voluntary Water Conservation Offset Program involving proposed lining of Palo Verde Irrigation District canals to offset water use to mitigate groundwater usage.
					Operation	--	--	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	**3000**	
Crimson Solar Project	Sonoran West Holdings (subsidiary Recurrent Energy)	CACA 51967	Photovoltaic (450 MW)	Groundwater or Trucked-In Water (groundwater assumed)	Construction	--	1000	1000	1000	--	--	--	--	--	--	--	--	--	**--**	Only the easternmost portion of the Crimson Project site overlies the Palo Verde Mesa Groundwater Basin. The draft POD for the project (personal communication with Noel Ludwig, BLM [Ludwig 2016]) indicates that water demand would be met be either on-site groundwater, off-site groundwater, or water trucked in to the site. For the purposes of this worst-case assessment, it is assumed water would be supplied by groundwater well(s) installed within the boundaries of the Palo Verde Mesa Groundwater Basin.
					Operation	--	--	--	--	22	22	22	22	22	22	22	22	22	**22**	
Palo Verde Mesa Solar Project	Renewable Resources Group, Inc.	--	Photovoltaic (up to 486 MW)	Surface Water	Construction	--	0	0	0	--	--	--	--	--	--	--	--	--	**--**	The Water Supply Assessment prepared for the project (Power Engineers 2012) assumed a 3-year construction phase utilizing 500 AFY of surface water followed by a water use of 302 AFY for the operational phase. All water is to be provided by the PVID and no groundwater would be utilized. The project would involve conversion of agricultural land that has historically been irrigated with about 3,403 AFY that will no longer occur once the project is implemented (i.e., will result in a net reduction in water use). Based on information provided by the Riverside County Planning Department (Brady 2016), it is assumed that construction would begin in 2017.
					Operation	--	--	--	--	0	0	0	0	0	0	0	0	0	**0**	
Total Water Use - Energy Projects (AF)[2]						**941**	**1,581**	**4,581**	**4,521**	**3,543**	**3,131**	**3,131**	**3,131**	**3,131**	**3,131**	**3,131**	**3,131**	**3,131**	**3,131**	
Cumulative Change (AF)[3]						**941**	**2,522**	**7,103**	**11,624**	**15,167**	**18,298**	**21,429**	**24,560**	**27,691**	**30,822**	**33,953**	**37,084**	**40,215**	**109,097**	
Basin-wide Change in Regional Water Level (assuming no recharge and a storage coefficient of 0.20)(inches)[4]						**0**	**-1**	**-2**	**-3**	**-4**	**-5**	**-6**	**-7**	**-7**	**-8**	**-9**	**-10**	**-11**	**-29**	
Percentage of Proposed Energy Project Cumulative Water Use Compared to Estimated Total Storage (6.84M AF)						**0.014%**	**0.04%**	**0.10%**	**0.17%**	**0.22%**	**0.27%**	**0.31%**	**0.36%**	**0.40%**	**0.45%**	**0.50%**	**0.54%**	**0.59%**	**1.59%**	
Percent Desert Quartzite Solar Project Usage Compared to Yearly Total Energy Project Usage						**0%**	**28%**	**10%**	**10%**	**13%**	**1.2%**	**1.2%**	**1.2%**	**1.2%**	**1.2%**	**1.2%**	**1.2%**	**1.2%**	**1.2%**	

NOTES

1 Project updates were provided through research of the following:
Bureau of Land Management (BLM), California, 2015 (last update August 24, 2015). Approved Renewable Energy Projects, Solar Projects on BLM Public Lands. Accessed at: http://www.blm.gov/ca/st/en/prog/energy/approved_projects.
BLM, 2015 (last update October 1, 2015). Pending Renewable Energy Applications, Applications Undergoing Environmental Review. Accessed at: http;//www.blm.gov.ca/st/en/prog/energy/pendingapps.html.
BLM, 2015 (last update June 3, 2015). California Desert BLM District Offices, Renewable Energy Projects and Utility Corridors Map. California Desert District.
California Energy Commission, 2016. Status of all Projects. Accessed March 28, 2016 at: http://www.energy.ca.gov/siting cases/all_projects.html.
California Public Utilities Commission, 2016. Energy. Accessed March 28, 2016 at: http://www.cpuc.ca.gov/PUC/energy/
Ludwig, 2016. BLM District Hydrologist. Personal communication with R. Ray (URS). April 4.

2 Sum of renewable project water use by year based on current information through the references cited above through April 4, 2016.

3 Cumulative change is a sum adding the prior years water use to the current water year for each year beginning in 2016 and ending in 2050.

4 Estimated change in the regional water level following the equation shown below (Fetter 1988). Negative values indicate a decline in water levels. It is important to note that this analysis does not take into account recharge to the groundwater basin (i.e., conservative).

DEFINITIONS

AFY	acre feet per year
AF	acre feet - (325,851 gallons)
BLM	Bureau of Land Management
CEC	California Energy Commission
LLC	Limited Liability Corporation
MW	Megawatts
POD	Plan of Development
PVID	Palo Verde Irrigation District
--	Not applicable

ESTIMATE OF BASINWIDE WATER LEVEL CHANGE

V = A*S*dh

V - volume of water released or taken into storage (acre-feet)
A - area of the aquifer (acres) (226,000 acres)
S- aquifer storage coefficient (assumed to be 0.2)
dh - change in water level (inches)

TABLE - 3A
Mass Balance Non-Pumping and Pumping Condition
700 AFY Construction 38 AFY Operation Water Use
Desert Quartzite Project
Riverside County, California

WATER BALANCE		No Pumping		Desert Quartzite Construction Pumping		Desert Quartzite Operation Pumping	
				CUMULATIVE AT THE END OF CONSTRUCTION		CUMULATIVE AT THE END OF OPERATION	
		ft^3	AF	ft^3	AF	ft^3	AF
Recharge (into the system)	**Storage**	15,727	0	219,611,195	5,042	256,349,557	5,885
	Inflow	68,757,605	1,578	206,272,815	4,735	2,269,000,962	52,089
	River	8,337,237,173	191,397	25,011,712,259	574,190	275,128,871,080	6,316,090
	Recharge	8,546,120,779	196,192	25,638,362,338	588,576	282,021,985,713	6,474,334
	sub-total	16,952,131,284	389,167	51,075,958,607	1,172,543	559,676,207,312	12,848,398
Dishcarge (out of the system)	**Storage**			24,993	0.6	2,951,119	67.7
	Outflow	45,867,360	1,053	357,242,655	8,201	2,269,000,962	52,089
	Drain	16,906,261,277	*388,114*	50,718,768,139	*1,164,343*	557,885,848,252	*12,807,297*
	River	0		0			
	sub-total	16,952,128,637	389,167	51,076,035,786	1,172,544	560,157,800,333	12,859,454
Mass Balance	**discrepany**	0.000000	0.000000	-0.000002	-0.000002	-0.000860	-0.000860

CUMULATIVE CHANGE IN DRAIN FLOW

Conditions	ft^3	af	cumulative change, af
no pumping	16,906,261,277	388,114	0
end of construction	50,718,768,139	1,164,343	-0.36
end of operation	557,885,848,252	12,807,297	-476.90

NOTES

1. inflow - western valley (988 AFY) and northern gap (595 AFY)
2. outflow - Desert Quartzite (700 AFY for 2 years then 38 AFY for 30 years) and southern gap (1056 AFY)
3. percent discrepany (mass balance) is calculated by (in-out)/in
4. negative values indicates loss from the drain

TABLE - 3B
Mass Balance Non-Pumping and Pumping Condition
450 AFY Construction 38 AFY Operation Water Use
Desert Quartzite Project
Riverside County, California

WATER BALANCE		No Pumping		**Desert Quartzite Construction Pumping**		**Desert Quartzite Operation Pumping**	
				CUMULATIVE AT THE END OF CONSTRUCTION		**CUMULATIVE AT THE END OF OPERATION**	
		ft^3	AF	ft^3	AF	ft^3	AF
Recharge (into the system)	**Storage**	15,727	0	117,216,026	2,691	155,899,641	3,579
	Inflow	68,757,605	1,578	412,545,629	9,471	2,406,516,172	55,246
	River	8,337,237,173	191,397	50,023,425,646	1,148,380	291,803,349,412	6,698,883
	Recharge	8,546,120,779	196,192	51,276,724,675	1,177,152	299,114,227,272	6,866,718
	sub-total	16,952,131,284	389,167	101,829,911,977	2,337,693	593,479,992,497	13,624,426
Dishcarge (out of the system)	**Storage**	30,824	1	10,984	0.3	3,429,489	78.7
	Outflow	45,867,360	1,053	392,807,160	9,018	1,664,378,100	38,209
	Drain	16,906,261,277	388,114	101,437,224,805	*2,328,678*	591,696,485,037	*13,583,482*
	River	0	0	0		0	
	sub-total	16,952,159,461	389,168	101,830,042,949	2,337,696	593,364,292,625	13,621,770
Mass Balance	**discrepany**	-0.000002	-0.000002	-0.000001	-0.000001	0.000195	0.000195

CUMULATIVE CHANGE IN DRAIN FLOW

Conditions	**ft^3**	**af**	**cumulative change, af**
no pumping	16,906,261,277	388,114	0
end of construction	101,437,224,805	2,328,678	-7.87
end of operation	591,696,485,037	13,583,482	-520.19

NOTES

1. inflow - western valley (988 AFY) and northern gap (595 AFY)
2. outflow - Desert Quartzite (450 AFY for 4 years then 38 AFY for 30 years) and southern gap (1056 AFY)
3. percent discrepany (mass balance) is calculated by (in-out)/in
4. negative values indicates loss from the drain

APPENDIX B
GROUNDWATER WELLS AND WATER LEVEL DATABASE (USGS)

This appendix presents a tabular summary of groundwater wells and historical water levels applicable to the Palo Verde Mesa and Valley Groundwater Basins based on U.S. Geological Survey (USGS), National Water Information System (NWIS) data (USGS 2009). The tabular summary presented herein was prepared for the McCoy Solar Energy Project and the groundwater data is considered in the groundwater modeling performed by URS for the proposed Desert Quartzite Solar Project. The tabular summary is an excerpt from Appendix G of the *Assessment of Proposed Groundwater Use, Results of Numerical Groundwater Modeling, McCoy Solar Energy Project, Palo Verde Mesa, Riverside County, California* (AECOM 2011).

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
02S/20E-16P01S	002S020E16P001S	33.99529296	-114.8869146	879.00	304					10/1/1917	297.00	582.00	582.00
02S/20E-28H01S	002S020E28H001S	33.97158514	-114.8761918	903.60						3/20/1992	308.92	594.68	590.96
02S/20E-28H01S	002S020E28H001S	33.97158514	-114.8761918	903.60						3/9/2001	316.36	587.24	590.96
02S/20E-36F02S	002S020E36F002S	33.95723839	-114.8355236	817.00						3/16/1992	203.01	613.99	613.99
02S/23E-36H02S	002S023E36H002S	33.96232278	-114.5129849	315.00	72					5/4/1995	10.76	304.24	304.24
02S/24E-31C01S	002S024E31C001S	33.9638228	-114.5008734	320.00						1/13/1995	17.54	302.46	302.46
02S/24E-31C02S	002S024E31C002S	33.96129506	-114.5027345	320.00	72					5/4/1995	12.23	307.77	307.77
02S/24E-31D01S	002S024E31D001S	33.96382278	-114.505568	320.00	72					5/4/1995	11.34	308.66	308.66
03S/20E-13J01S	003S020E13J001S	33.90973935	-114.8280228	882.00	585					3/28/1905	355.00	527.00	527.00
03S/21E-18D01S	003S021E18D001S	33.917517	-114.8180226	885.00						3/29/1962	284.99	600.01	599.48
03S/21E-18D01S	003S021E18D001S	33.917517	-114.8180226	885.00						4/24/1979	285.63	599.37	599.48
03S/21E-18D01S	003S021E18D001S	33.917517	-114.8180226	885.00						7/27/1979	285.53	599.47	599.48
03S/21E-18D01S	003S021E18D001S	33.917517	-114.8180226	885.00						7/24/1980	285.63	599.37	599.48
03S/21E-18D01S	003S021E18D001S	33.917517	-114.8180226	885.00						1/22/1981	285.75	599.25	599.48
03S/21E-18D01S	003S021E18D001S	33.917517	-114.8180226	885.00						8/28/1981	285.53	599.47	599.48
03S/21E-18D01S	003S021E18D001S	33.917517	-114.8180226	885.00						3/4/1982	285.52	599.48	599.48
03S/21E-18D01S	003S021E18D001S	33.917517	-114.8180226	885.00						12/9/1982	285.46	599.54	599.48
03S/21E-18D01S	003S021E18D001S	33.917517	-114.8180226	885.00						10/20/1983	285.65	599.35	599.48
03S/21E-18D01S	003S021E18D001S	33.917517	-114.8180226	885.00						4/18/1984	285.55	599.45	599.48
03S/23E-14B01S	003S023E14B001S	33.92290675	-114.5334298	320.00	160					5/4/1995	16.36	303.64	303.64
03S/23E-14B02S	003S023E14B002S	33.92337897	-114.5320408	315.00	200					5/4/1995	15.68	299.32	299.32
03S/23E-25D12S	003S023E25D012S	33.89262954	-114.5254849	318.00	64.3					2/8/1996	15.15	302.85	302.85
03S/23E-35R01S	003S023E35R001S	33.8664911	-114.529207	310.00						1/11/1995	24.25	285.75	285.75
03S/23E-35R03S	003S023E35R003S	33.86657444	-114.5289848	305.00						1/11/1995	18.49	286.51	286.51
04S/21E-09B01S	004S021E09B001S	33.8478324	-114.7794456	874.70	1088					7/29/1971	546.60	328.10	327.94
04S/21E-09B01S	004S021E09B001S	33.8478324	-114.7794456	874.70	1088					9/25/1990	545.50	329.20	327.94
04S/21E-09B01S	004S021E09B001S	33.8478324	-114.7794456	874.70	1088					3/10/1992	547.10	327.60	327.94
04S/21E-09B01S	004S021E09B001S	33.8478324	-114.7794456	874.70	1088					4/24/2000	547.07	327.63	327.94

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
04S/21E-09B01S	**004S021E09B001S**	**33.8478324**	**-114.7794456**	874.70	1088					3/25/2010	547.52	327.18	327.94
04S/23E-02H01S	**004S023E02H001S**	**33.8603801**	**-114.5300403**	310.00						1/11/1995	25.50	284.50	284.50
04S/23E-02K01S	**004S023E02K001S**	**33.8561024**	**-114.5321793**	310.00	43.2					2/7/1996	28.34	281.66	281.66
04S/23E-02Q01S	**004S023E02Q001S**	**33.85307467**	**-114.5319015**	325.00						5/5/1995	16.82	308.18	308.18
04S/23E-11H01S	**004S023E11H001S**	**33.8439637**	**-114.529568**	300.00						5/5/1995	12.90	287.10	287.10
04S/23E-36Q03S	**004S023E36Q003S**	**33.77929825**	**-114.514567**	295.00	60					5/4/1995	10.50	284.50	284.50
05S/22E-21H01S	**005S022E21H001S**	**33.72918787**	**-114.6791272**	515.55						9/18/1990	265.96	249.59	249.81
05S/22E-21H01S	**005S022E21H001S**	**33.72918787**	**-114.6791272**	515.55						3/21/1992	265.53	250.02	249.81
05S/22E-25L01S	**005S022E25L001S**	**33.7076885**	**-114.63412**	455.00						3/22/1992	197.44	257.56	257.72
05S/22E-25L01S	**005S022E25L001S**	**33.7076885**	**-114.63412**	455.00						5/12/1993	198.50	256.50	257.72
05S/22E-25L01S	**005S022E25L001S**	**33.7076885**	**-114.63412**	455.00						12/9/1999	195.90	259.10	257.72
05S/22E-26M01S	**005S022E26M001S**	**33.71113**	**-114.65663**	460.00	790	745	-285	780	-320	9/1/1971	181.00	279.00	279.00
05S/22E-26Q01S	**005S022E26Q001S**	**33.7076357**	**-114.6475121**	449.60						6/13/1992	199.67	249.93	249.93
05S/22E-27R01S	**005S022E27R001S**	**33.70395246**	**-114.6603847**	442.30						9/17/1990	207.46	234.84	234.84
05S/22E-28Q01S	**005S022E28Q001S**	**33.70446629**	**-114.6827382**	455.00	300					2/13/1962	195.35	259.65	258.14
05S/22E-28Q01S	**005S022E28Q001S**	**33.70446629**	**-114.6827382**	455.00	300					5/24/1962	196.53	258.47	258.14
05S/22E-28Q01S	**005S022E28Q001S**	**33.70446629**	**-114.6827382**	455.00	300					6/20/1962	196.66	258.34	258.14
05S/22E-28Q01S	**005S022E28Q001S**	**33.70446629**	**-114.6827382**	455.00	300					7/19/1962	196.77	258.23	258.14
05S/22E-28Q01S	**005S022E28Q001S**	**33.70446629**	**-114.6827382**	455.00	300					8/16/1962	197.16	257.84	258.14
05S/22E-28Q01S	**005S022E28Q001S**	**33.70446629**	**-114.6827382**	455.00	300					9/13/1962	196.98	258.02	258.14
05S/22E-28Q01S	**005S022E28Q001S**	**33.70446629**	**-114.6827382**	455.00	300					10/11/1962	197.15	257.85	258.14
05S/22E-28Q01S	**005S022E28Q001S**	**33.70446629**	**-114.6827382**	455.00	300					11/8/1962	197.18	257.82	258.14
05S/22E-28Q01S	**005S022E28Q001S**	**33.70446629**	**-114.6827382**	455.00	300					12/13/1962	197.06	257.94	258.14
05S/22E-28Q01S	**005S022E28Q001S**	**33.70446629**	**-114.6827382**	455.00	300					1/9/1963	197.19	257.81	258.14
05S/22E-28Q01S	**005S022E28Q001S**	**33.70446629**	**-114.6827382**	455.00	300					10/19/1966	197.47	257.53	258.14
05S/22E-31E01S	**005S022E31E001S**	**33.70002466**	**-114.729109**	475.83	484	291	184.83	467	8.83	7/26/1965	222.00	253.83	253.04
05S/22E-31E01S	**005S022E31E001S**	**33.70002466**	**-114.729109**	475.83	484	291	184.83	467	8.83	2/8/1966	218.50	257.33	253.04
05S/22E-31E01S	**005S022E31E001S**	**33.70002466**	**-114.729109**	475.83	484	291	184.83	467	8.83	10/19/1966	218.42	257.41	253.04

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
05S/22E-31E01S	**005S022E31E001S**	**33.70002466**	**-114.729109**	475.83	484	291	184.83	467	8.83	8/4/1971	220.69	255.14	253.04
05S/22E-31E01S	**005S022E31E001S**	**33.70002466**	**-114.729109**	475.83	484	291	184.83	467	8.83	9/26/1990	227.50	248.33	253.04
05S/22E-31E01S	**005S022E31E001S**	**33.70002466**	**-114.729109**	475.83	484	291	184.83	467	8.83	2/14/1992	227.62	248.21	253.04
05S/22E-31E01S	**005S022E31E001S**	**33.70002466**	**-114.729109**	475.83	484	291	184.83	467	8.83	3/30/2000	224.78	251.05	253.04
05S/22E-33J02S	**005S022E33J002S**	**33.69641095**	**-114.6813491**	437.19	300					3/1/1968	183.00	254.19	246.32
05S/22E-33J02S	**005S022E33J002S**	**33.69641095**	**-114.6813491**	437.19	300					9/8/1971	190.15	247.04	246.32
05S/22E-33J02S	**005S022E33J002S**	**33.69641095**	**-114.6813491**	437.19	300					9/9/1971	189.35	247.84	246.32
05S/22E-33J02S	**005S022E33J002S**	**33.69641095**	**-114.6813491**	437.19	300					9/15/1990	199.09	238.10	246.32
05S/22E-33J02S	**005S022E33J002S**	**33.69641095**	**-114.6813491**	437.19	300					3/21/1992	192.74	244.45	246.32
05S/22E-33J04S	**005S022E33J004S**	**33.69643874**	**-114.6775907**	438.70						9/15/1990	194.62	244.08	244.08
05S/22E-34P01S	**005S022E34P001S**	**33.6892195**	**-114.6682348**	418.79						9/15/1990	172.56	246.23	247.56
05S/22E-34P01S	**005S022E34P001S**	**33.6892195**	**-114.6682348**	418.79						3/21/1992	169.90	248.89	247.56
05S/22E-35A01S	**005S022E35A001S**	**33.70419**	**-114.6444**	439.30	450	200	239.3	450	-10.7	9/1/1971	191.00	248.30	248.30
05S/22E-35D01S	**005S022E35D001S**	**33.70418857**	**-114.6557929**	440.00	293					9/1/1971	183.00	257.00	257.00
05S/22E-35P01S	**005S022E35P001S**	**33.69229166**	**-114.6544983**	415.10	410					5/28/1985	168.00	247.10	251.13
05S/22E-35P01S	**005S022E35P001S**	**33.69229166**	**-114.6544983**	415.10	410					9/15/1990	165.18	249.92	251.13
05S/22E-35P01S	**005S022E35P001S**	**33.69229166**	**-114.6544983**	415.10	410					3/28/2006	158.74	256.36	251.13
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					3/12/1992	174.00	258.40	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					3/25/1993	173.78	258.62	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					4/22/1993	173.72	258.68	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					7/19/1993	174.23	258.17	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					12/8/1993	172.84	259.56	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					3/9/1994	173.55	258.85	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					5/3/1994	173.96	258.44	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					7/18/1994	174.56	257.84	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					12/28/1994	171.68	260.72	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					3/20/1995	172.12	260.28	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					5/15/1995	172.41	259.99	260.43

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					7/27/1995	173.12	259.28	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					11/8/1995	171.27	261.13	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					3/6/1996	171.41	260.99	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					5/13/1996	171.64	260.76	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					8/12/1996	171.63	260.77	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					11/14/1996	171.19	261.21	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					3/24/1997	171.26	261.14	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					6/11/1997	170.94	261.46	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					9/10/1997	171.56	260.84	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					12/15/1997	170.92	261.48	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					3/30/1998	170.70	261.70	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					6/22/1998	170.54	261.86	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					9/29/1998	171.17	261.23	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					12/21/1998	171.40	261.00	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					3/24/1999	170.79	261.61	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					6/28/1999	170.69	261.71	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					9/27/1999	171.06	261.34	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					12/8/1999	170.97	261.43	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					3/27/2000	171.02	261.38	260.43
05S/22E-36A01S	**005S022E36A001S**	**33.7009137**	**-114.6267253**	432.40	209.5					6/13/2000	170.99	261.41	260.43
05S/22E-36G01S	**005S022E36G001S**	**33.7005776**	**-114.6330144**	425.00	360					9/1/1971	174.00	251.00	251.00
05S/22E-36G02S	**005S022E36G002S**	**33.7005387**	**-114.6337088**	428.20						12/9/1999	170.14	258.06	258.06
05S/22E-36G03S	**005S022E36G003S**	**33.6969888**	**-114.6293364**	416.60	193					2/16/1992	158.00	258.60	258.47
05S/22E-36G03S	**005S022E36G003S**	**33.6969888**	**-114.6293364**	416.60	193					11/8/1995	158.32	258.28	258.47
05S/22E-36G03S	**005S022E36G003S**	**33.6969888**	**-114.6293364**	416.60	193					6/13/2000	158.08	258.52	258.47
05S/22E-36H02S	**005S022E36H002S**	**33.6977388**	**-114.6251447**	418.70						3/29/2006	159.04	259.66	259.66
05S/22E-36H03S	**005S022E36H003S**	**33.69967208**	**-114.626578**	425.20						12/9/1999	166.24	258.96	258.96
05S/23E-25K01S	**005S023E25K001S**	**33.7127997**	**-114.5274558**	286.00						6/1/1971	4.00	282.00	282.00

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
05S/23E-25L01S	005S023E25L001S	33.7116886	-114.5302336	285.00						6/1/1971	4.00	281.00	281.00
05S/23E-25M01S	005S023E25M001S	33.71029975	-114.5355115	284.00						6/1/1971	4.00	280.00	280.00
05S/23E-26J01S	005S023E26J001S	33.71002197	-114.5385672	284.00						6/1/1971	4.00	280.00	280.00
05S/23E-26J02S	005S023E26J002S	33.71029973	-114.5421784	285.00						6/1/1971	7.00	278.00	278.00
05S/23E-26L01S	005S023E26L001S	33.7102997	-114.5471786	283.00						6/1/1971	4.00	279.00	279.00
05S/23E-26N01S	005S023E26N001S	33.707522	-114.554401	282.00						6/1/1971	6.00	276.00	276.00
05S/23E-26P01S	005S023E26P001S	33.70918863	-114.5510676	282.00						7/1/1971	5.00	277.00	277.00
05S/23E-26Q01S	005S023E26Q001S	33.7058554	-114.5460674	284.00						6/1/1971	3.00	281.00	281.00
05S/23E-27R01S	005S023E27R001S	33.7064109	-114.5557899	282.00						6/1/1971	6.00	276.00	276.00
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					10/31/1987	188.50	249.00	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					11/3/1987	180.30	257.20	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					8/13/1990	180.45	257.05	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					8/28/1990	180.28	257.22	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					9/24/1990	180.50	257.00	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					10/19/1990	180.23	257.27	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					11/26/1990	179.85	257.65	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					12/28/1990	179.91	257.59	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					1/16/1991	179.58	257.92	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					2/26/1991	179.85	257.65	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					4/4/1991	180.04	257.46	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					5/8/1991	180.23	257.27	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					6/4/1991	180.28	257.22	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					7/23/1991	180.99	256.51	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					8/29/1991	181.15	256.35	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					9/26/1991	180.84	256.66	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					10/18/1991	180.72	256.78	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					11/22/1991	180.35	257.15	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					12/12/1991	179.94	257.56	257.48

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					1/7/1992	180.00	257.50	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					3/22/1992	179.88	257.62	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					3/23/1992	179.93	257.57	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					5/11/1992	180.32	257.18	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					8/12/1992	181.17	256.33	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					3/25/1993	179.95	257.55	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					4/22/1993	180.08	257.42	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					7/19/1993	180.89	256.61	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					12/8/1993	180.10	257.40	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					3/9/1994	179.88	257.62	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					5/3/1994	180.45	257.05	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					7/18/1994	180.85	256.65	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					12/28/1994	179.75	257.75	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					3/20/1995	179.49	258.01	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					5/15/1995	179.50	258.00	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					7/27/1995	179.56	257.94	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					11/8/1995	179.41	258.09	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					3/6/1996	179.35	258.15	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					5/13/1996	179.50	258.00	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					8/12/1996	179.87	257.63	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					11/14/1996	179.81	257.69	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					3/24/1997	179.77	257.73	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					6/11/1997	179.62	257.88	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					9/10/1997	179.97	257.53	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					12/15/1997	179.60	257.90	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					3/30/1998	179.58	257.92	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					6/22/1998	178.49	259.01	257.48
05S/23E-31D01S	**005S023E31D001S**	**33.70576359**	**-114.6242558**	437.50	207					8/24/1998	178.87	258.63	257.48

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					12/21/1998	178.85	258.65	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					3/24/1999	178.65	258.85	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					6/28/1999	178.59	258.91	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					9/27/1999	178.92	258.58	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					12/8/1999	178.86	258.64	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					3/27/2000	178.80	258.70	257.48
05S/23E-31D01S	005S023E31D001S	33.70576359	-114.6242558	437.50	207					6/13/2000	178.91	258.59	257.48
05S/23E-33J01S	005S023E33J001S	33.6975222	-114.5757904	277.00						6/1/1971	5.00	272.00	272.00
05S/23E-33R01S	005S023E33R001S	33.69418898	-114.5755126	278.00						6/1/1971	7.00	271.00	271.00
05S/23E-34A01S	005S023E34A001S	33.7027999	-114.5577343	280.00						6/1/1971	6.00	274.00	274.00
05S/23E-34A02S	005S023E34A002S	33.7036332	-114.5582899	279.00						6/1/1971	6.00	273.00	273.00
05S/23E-34A03S	005S023E34A003S	33.70402209	-114.5584566	280.00						6/13/1997	8.62	271.38	271.38
05S/23E-34C01S	005S023E34C001S	33.70196657	-114.5652346	281.00						6/1/1971	8.00	273.00	273.00
05S/23E-34E01S	005S023E34E001S	33.6986333	-114.572457	278.00						6/1/1971	5.00	273.00	273.00
05S/23E-34E02S	005S023E34E002S	33.69974439	-114.572457	278.00						6/1/1971	5.00	273.00	273.00
05S/23E-34E03S	005S023E34E003S	33.7005777	-114.572457	279.00						6/1/1971	7.00	272.00	272.00
05S/23E-34H01S	005S023E34H001S	33.70196658	-114.5596788	278.00						6/1/1971	4.00	274.00	274.00
05S/23E-34J01S	005S023E34J001S	33.69641117	-114.5569009	280.00						6/1/1971	5.00	275.00	275.00
05S/23E-34K01S	005S023E34K001S	33.69835556	-114.5627344	279.00						6/1/1971	4.00	275.00	275.00
05S/23E-34M01S	005S023E34M001S	33.69446675	-114.5721791	278.00						6/1/1971	6.00	272.00	272.00
05S/23E-34M02S	005S023E34M002S	33.6958556	-114.5721791	278.00						6/1/1971	5.00	273.00	273.00
05S/23E-34M03S	005S023E34M003S	33.69724446	-114.5721792	278.00						6/1/1971	6.00	272.00	272.00
05S/23E-34N01S	005S023E34N001S	33.6911335	-114.572179	278.00						6/1/1971	4.00	274.00	274.00
05S/23E-34Q03S	005S023E34Q003S	33.69446677	-114.5627344	279.00						6/1/1971	6.00	273.00	273.00
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					1/23/1948	3.50	280.46	276.40
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					9/3/1948	6.03	277.93	276.40
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					1/3/1949	5.91	278.05	276.40
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					5/23/1950	7.31	276.65	276.40

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					8/3/1950	7.31	276.65	276.40
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					1/22/1951	7.90	276.06	276.40
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					9/10/1951	8.00	275.96	276.40
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					1/22/1952	7.97	275.99	276.40
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					1/28/1953	8.22	275.74	276.40
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					10/29/1953	9.02	274.94	276.40
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					3/26/1954	8.52	275.44	276.40
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					9/27/1954	7.92	276.04	276.40
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					2/21/1955	7.52	276.44	276.40
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					9/26/1955	8.12	275.84	276.40
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					2/24/1956	8.82	275.14	276.40
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					10/2/1956	7.62	276.34	276.40
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					1/4/1957	8.42	275.54	276.40
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					9/17/1957	7.42	276.54	276.40
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					1/22/1958	7.47	276.49	276.40
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					9/24/1958	7.75	276.21	276.40
05S/23E-35A01S	005S023E35A001S	33.70529987	-114.5388449	283.96	12					1/3/1959	7.95	276.01	276.40
05S/23E-35A02S	005S023E35A002S	33.7027999	-114.5419005	284.97	8					1/23/1948	6.63	278.34	278.18
05S/23E-35A02S	005S023E35A002S	33.7027999	-114.5419005	284.97	8					9/3/1948	6.95	278.02	278.18
05S/23E-35N01S	005S023E35N001S	33.6914113	-114.554123	282.00						6/1/1971	7.00	275.00	275.00
05S/23E-35R01S	005S023E35R001S	33.6914113	-114.5405115	281.00						6/1/1971	6.00	275.00	275.00
05S/24E-06Q02S	005S024E06Q002S	33.76646516	-114.5080946	290.00	22.7					5/25/1995	9.02	280.98	280.98
05S/24E-30D01S	005S024E30D001S	33.71724405	-114.5171777	290.00						7/14/1971	3.00	287.00	287.00
05S/24E-31D01S	005S024E31D001S	33.7061332	-114.5163442	284.00						6/1/1971	5.00	279.00	279.00
05S/24E-31M01S	005S024E31M001S	33.69530016	-114.5199553	286.00						6/1/1971	9.00	277.00	277.00
06S/21E-24K01S	006S021E24K001S	33.63560414	-114.7362806	410.50						9/26/1990	165.60	244.90	245.22
06S/21E-24K01S	006S021E24K001S	33.63560414	-114.7362806	410.50						3/7/1997	163.18	247.32	245.22
06S/21E-24K01S	006S021E24K001S	33.63560414	-114.7362806	410.50						9/16/1999	167.05	243.45	245.22

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/21E-25A02S	006S021E25A002S	33.62945986	-114.731847	397.10	317					3/6/1980	146.00	251.10	247.59
06S/21E-25A02S	006S021E25A002S	33.62945986	-114.731847	397.10	317					9/26/1990	152.30	244.80	247.59
06S/21E-25A02S	006S021E25A002S	33.62945986	-114.731847	397.10	317					3/7/1997	149.79	247.31	247.59
06S/21E-25A02S	006S021E25A002S	33.62945986	-114.731847	397.10	317					9/16/1999	149.96	247.14	247.59
06S/21E-25F01S	006S021E25F001S	33.62825155	-114.7404028	411.70						9/26/1990	167.05	244.65	246.43
06S/21E-25F01S	006S021E25F001S	33.62825155	-114.7404028	411.70						3/7/1997	164.83	246.87	246.43
06S/21E-25F01S	006S021E25F001S	33.62825155	-114.7404028	411.70						9/16/1999	163.94	247.76	246.43
06S/21E-25L01S	006S021E25L001S	33.6209795	-114.7404166	400.20						9/21/1990	148.24	251.96	246.08
06S/21E-25L01S	006S021E25L001S	33.6209795	-114.7404166	400.20						3/7/1997	161.07	239.13	246.08
06S/21E-25L01S	006S021E25L001S	33.6209795	-114.7404166	400.20						9/16/1999	153.72	246.48	246.08
06S/21E-25L01S	006S021E25L001S	33.6209795	-114.7404166	400.20						3/30/2006	153.45	246.75	246.08
06S/21E-36F01S	006S021E36F001S	33.61373527	-114.7404026	391.70	319					3/30/1979	147.00	244.70	242.63
06S/21E-36F01S	006S021E36F001S	33.61373527	-114.7404026	391.70	319					9/21/1990	155.98	235.72	242.63
06S/21E-36F01S	006S021E36F001S	33.61373527	-114.7404026	391.70	319					3/7/1997	146.77	244.93	242.63
06S/21E-36F01S	006S021E36F001S	33.61373527	-114.7404026	391.70	319					9/16/1999	146.52	245.18	242.63
06S/21E-36G01S	006S021E36G001S	33.61294364	-114.7316857	391.60						9/24/1990	147.95	243.65	245.04
06S/21E-36G01S	006S021E36G001S	33.61294364	-114.7316857	391.60						3/30/2006	145.17	246.43	245.04
06S/21E-36M01S	006S021E36M001S	33.6094687	-114.7444055	393.00	186					10/24/1927	133.00	260.00	260.00
06S/21E-36M03S	006S021E36M003S	33.60780209	-114.7416276	392.00						9/28/1990	146.68	245.32	245.32
06S/21E-36R01S	006S021E36R001S	33.60318	-114.7288	389.09	636	520	-130.91	620	-230.91	5/1/1946	138.00	251.09	245.66
06S/21E-36R01S	006S021E36R001S	33.60318	-114.7288	389.09	636	520	-130.91	620	-230.91	9/27/1990	146.64	242.45	245.66
06S/21E-36R01S	006S021E36R001S	33.60318	-114.7288	389.09	636	520	-130.91	620	-230.91	2/23/2000	144.62	244.47	245.66
06S/21E-36R01S	006S021E36R001S	33.60318	-114.7288	389.09	636	520	-130.91	620	-230.91	3/29/2000	144.47	244.62	245.66
06S/22E-01F01S	006S022E01F001S	33.68261	-114.63353	406.54	350	150	256.54	350	56.54	10/6/1966	145.00	261.54	255.75
06S/22E-01F01S	006S022E01F001S	33.68261	-114.63353	406.54	350	150	256.54	350	56.54	7/1/1971	157.00	249.54	255.75
06S/22E-01F01S	006S022E01F001S	33.68261	-114.63353	406.54	350	150	256.54	350	56.54	7/22/1971	157.91	248.63	255.75
06S/22E-01F01S	006S022E01F001S	33.68261	-114.63353	406.54	350	150	256.54	350	56.54	3/27/1984	149.64	256.90	255.75
06S/22E-01F01S	006S022E01F001S	33.68261	-114.63353	406.54	350	150	256.54	350	56.54	9/17/1990	149.09	257.45	255.75

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/22E-01F01S	**006S022E01F001S**	**33.68261**	**-114.63353**	406.54	350	150	256.54	350	56.54	3/23/1992	148.77	257.77	255.75
06S/22E-01F01S	**006S022E01F001S**	**33.68261**	**-114.63353**	406.54	350	150	256.54	350	56.54	2/17/2000	148.15	258.39	255.75
06S/22E-01H01S	**006S022E01H001S**	**33.68322**	**-114.62538**	404.16	320	180	224.16	320	84.16	3/25/1959	141.67	262.49	260.56
06S/22E-01H01S	**006S022E01H001S**	**33.68322**	**-114.62538**	404.16	320	180	224.16	320	84.16	2/13/1962	142.43	261.73	260.56
06S/22E-01H01S	**006S022E01H001S**	**33.68322**	**-114.62538**	404.16	320	180	224.16	320	84.16	3/23/1992	145.37	258.79	260.56
06S/22E-01H01S	**006S022E01H001S**	**33.68322**	**-114.62538**	404.16	320	180	224.16	320	84.16	2/17/2000	144.92	259.24	260.56
06S/22E-01R01S	**006S022E01R001S**	**33.67557826**	**-114.6246805**	269.00						6/1/1971	10.00	259.00	259.00
06S/22E-02J01S	**006S022E02J001S**	**33.67901147**	**-114.6461367**	404.72	452					5/14/1951	144.50	260.22	259.23
06S/22E-02J01S	**006S022E02J001S**	**33.67901147**	**-114.6461367**	404.72	452	406	-1.28	514	-109.28	10/19/1966	143.35	261.37	259.23
06S/22E-02J01S	**006S022E02J001S**	**33.67901147**	**-114.6461367**	404.72	452	406	-1.28	514	-109.28	7/1/1971	147.00	257.72	259.23
06S/22E-02J01S	**006S022E02J001S**	**33.67901147**	**-114.6461367**	404.72	452	406	-1.28	514	-109.28	7/21/1971	147.13	257.59	259.23
06S/22E-02N01S	**006S022E02N001S**	**33.67505878**	**-114.6551564**	404.50						9/14/1990	156.04	248.46	251.89
06S/22E-02N01S	**006S022E02N001S**	**33.67505878**	**-114.6551564**	404.50						3/19/2002	149.18	255.32	251.89
06S/22E-02P01S	**006S022E02P001S**	**33.67534**	**-114.65138**	400.85	250	150	250.85	250	150.85	2/6/1964	137.50	263.35	255.56
06S/22E-02P01S	**006S022E02P001S**	**33.67534**	**-114.65138**	400.85	250	150	250.85	250	150.85	8/1/1971	146.00	254.85	255.56
06S/22E-02P01S	**006S022E02P001S**	**33.67534**	**-114.65138**	400.85	250	150	250.85	250	150.85	8/19/1971	146.20	254.65	255.56
06S/22E-02P01S	**006S022E02P001S**	**33.67534**	**-114.65138**	400.85	250	150	250.85	250	150.85	9/14/1990	151.47	249.38	255.56
06S/22E-02P02S	**006S022E02P002S**	**33.67796148**	**-114.6545925**	405.92	350					8/20/1968	149.00	256.92	255.09
06S/22E-02P02S	**006S022E02P002S**	**33.67796148**	**-114.6545925**	405.92	350					8/1/1971	150.00	255.92	255.09
06S/22E-02P02S	**006S022E02P002S**	**33.67796148**	**-114.6545925**	405.92	350					8/19/1971	148.27	257.65	255.09
06S/22E-02P02S	**006S022E02P002S**	**33.67796148**	**-114.6545925**	405.92	350					9/14/1990	154.60	251.32	255.09
06S/22E-02P02S	**006S022E02P002S**	**33.67796148**	**-114.6545925**	405.92	350					3/23/1992	152.26	253.66	255.09
06S/22E-02R01S	**006S022E02R001S**	**33.67659**	**-114.64237**	404.26	514	406	-1.74	514	-109.74	2/10/1966	142.45	261.81	257.52
06S/22E-02R01S	**006S022E02R001S**	**33.67659**	**-114.64237**	404.26	514	406	-1.74	514	-109.74	8/1/1971	146.00	258.26	257.52
06S/22E-02R01S	**006S022E02R001S**	**33.67659**	**-114.64237**	404.26	514	406	-1.74	514	-109.74	8/19/1971	145.51	258.75	257.52
06S/22E-02R01S	**006S022E02R001S**	**33.67659**	**-114.64237**	404.26	514	406	-1.74	514	-109.74	9/17/1990	150.02	254.24	257.52
06S/22E-02R01S	**006S022E02R001S**	**33.67659**	**-114.64237**	404.26	514	406	-1.74	514	-109.74	3/23/1992	148.96	255.30	257.52
06S/22E-02R01S	**006S022E02R001S**	**33.67659**	**-114.64237**	404.26	514	406	-1.74	514	-109.74	3/14/2000	147.48	256.78	257.52

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/22E-03B01S	006S022E03B001S	33.68903339	-114.6676125	420.00	414					1/20/1964	161.00	259.00	250.83
06S/22E-03B01S	006S022E03B001S	33.68903339	-114.6676125	420.00	414					8/18/1971	165.14	254.86	250.83
06S/22E-03B01S	006S022E03B001S	33.68903339	-114.6676125	420.00	414					7/24/1980	170.44	249.56	250.83
06S/22E-03B01S	006S022E03B001S	33.68903339	-114.6676125	420.00	414					1/23/1981	170.16	249.84	250.83
06S/22E-03B01S	006S022E03B001S	33.68903339	-114.6676125	420.00	414					8/28/1981	170.91	249.09	250.83
06S/22E-03B01S	006S022E03B001S	33.68903339	-114.6676125	420.00	414					3/4/1982	170.10	249.90	250.83
06S/22E-03B01S	006S022E03B001S	33.68903339	-114.6676125	420.00	414					12/10/1982	171.13	248.87	250.83
06S/22E-03B01S	006S022E03B001S	33.68903339	-114.6676125	420.00	414					9/20/1983	171.16	248.84	250.83
06S/22E-03B01S	006S022E03B001S	33.68903339	-114.6676125	420.00	414					9/18/1984	171.70	248.30	250.83
06S/22E-03B01S	006S022E03B001S	33.68903339	-114.6676125	420.00	414					2/28/1985	170.78	249.22	250.83
06S/22E-03B01S	006S022E03B001S	33.68903339	-114.6676125	420.00	414					6/12/1985	171.48	248.52	250.83
06S/22E-03B01S	006S022E03B001S	33.68903339	-114.6676125	420.00	414					4/5/2000	166.05	253.95	250.83
06S/22E-03J01S	006S022E03J001S	33.6803003	-114.6602372	406.00	83					7/22/1971	68.10	337.90	337.90
06S/22E-03P01S	006S022E03P001S	33.6753004	-114.6682929	401.00	400					5/5/1905	134.00	267.00	267.00
06S/22E-03R01S	006S022E03R001S	33.67558	-114.65968	403.00	355	180	223	355	48	7/24/1980	157.80	245.20	245.20
06S/22E-03R02S	006S022E03R002S	33.67882	-114.65956	406.76	350	170	236.76	350	56.76	5/17/1966	143.00	263.76	250.03
06S/22E-03R02S	006S022E03R002S	33.67882	-114.65956	406.76	350	170	236.76	350	56.76	10/6/1966	146.90	259.86	250.03
06S/22E-03R02S	006S022E03R002S	33.67882	-114.65956	406.76	350	170	236.76	350	56.76	8/18/1971	171.56	235.20	250.03
06S/22E-03R02S	006S022E03R002S	33.67882	-114.65956	406.76	350	170	236.76	350	56.76	7/24/1980	158.69	248.07	250.03
06S/22E-03R02S	006S022E03R002S	33.67882	-114.65956	406.76	350	170	236.76	350	56.76	1/23/1981	156.39	250.37	250.03
06S/22E-03R02S	006S022E03R002S	33.67882	-114.65956	406.76	350	170	236.76	350	56.76	8/28/1981	167.40	239.36	250.03
06S/22E-03R02S	006S022E03R002S	33.67882	-114.65956	406.76	350	170	236.76	350	56.76	3/4/1982	157.36	249.40	250.03
06S/22E-03R02S	006S022E03R002S	33.67882	-114.65956	406.76	350	170	236.76	350	56.76	12/10/1982	157.48	249.28	250.03
06S/22E-03R02S	006S022E03R002S	33.67882	-114.65956	406.76	350	170	236.76	350	56.76	9/20/1983	158.56	248.20	250.03
06S/22E-03R02S	006S022E03R002S	33.67882	-114.65956	406.76	350	170	236.76	350	56.76	9/18/1984	158.98	247.78	250.03
06S/22E-03R02S	006S022E03R002S	33.67882	-114.65956	406.76	350	170	236.76	350	56.76	6/12/1985	157.82	248.94	250.03
06S/22E-03R02S	006S022E03R002S	33.67882	-114.65956	406.76	350	170	236.76	350	56.76	1/15/2002	151.68	255.08	250.03
06S/22E-03R02S	006S022E03R002S	33.67882	-114.65956	406.76	350	170	236.76	350	56.76	1/15/2002	151.71	255.05	250.03

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/22E-08L01S	006S022E08L001S	33.66808	-114.66885	408.00	300	180	228	300	108	7/1/1971	160.00	248.00	248.00
06S/22E-09G01S	006S022E09G001S	33.6680728	-114.679782	380.30						9/22/1990	136.58	243.72	248.54
06S/22E-09G01S	006S022E09G001S	33.6680728	-114.679782	380.30						3/30/2006	126.95	253.35	248.54
06S/22E-09L01S	006S022E09L001S	33.667778	-114.683889	402.00	332					3/30/2006	148.74	253.26	253.26
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	6/12/1968	146.15	253.49	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	7/1/1971	155.00	244.64	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	7/28/1971	154.93	244.71	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	3/29/1984	157.76	241.88	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	9/21/1990	154.01	245.63	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	2/14/1992	151.03	248.61	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	2/15/2000	147.60	252.04	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	12/14/2000	147.59	252.05	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	11/6/2001	147.57	252.07	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	4/16/2002	147.40	252.24	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	10/2/2002	147.97	251.67	251.56
06S/22E-09P01S	006S022E09P001S	33.66108687	-114.6883017	399.60	252					2/21/2003	147.45	252.15	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	6/3/2003	147.17	252.47	251.56
06S/22E-09P01S	006S022E09P001S	33.66108687	-114.6883017	399.60	252					7/15/2003	147.24	252.36	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	11/4/2003	147.22	252.42	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	3/2/2004	147.02	252.62	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	8/4/2004	146.99	252.65	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	12/8/2004	147.20	252.44	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	4/15/2005	147.18	252.46	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	8/31/2005	147.26	252.38	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	1/27/2006	147.36	252.28	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	3/30/2006	146.64	253.00	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	5/5/2006	147.44	252.20	251.56
06S/22E-09P01S	006S022E09P001S	33.66109	-114.6883	399.64	252	230	169.64	250	149.64	8/10/2006	147.41	252.23	251.56

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	**STATE WELL NUMBER (USGS)**	**LATITUDE**	**LONGTUDE**	**Ground Surface Elevation**	**Total Depth**	**Depth to Top of Sample Interval**	**Elevation of the Top of Sample Interval**	**Depth to Bottom of Sample Interval**	**Elevation of the Bottom of Sample Interval**	**Depth to Groundwater**		**Groundwater Surface Elevation**	**Average Water Level**
		NAD83	**NAD83**	**feet-msl**	**feet-bgs**	**feet-bgs**	**feet-msl**	**feet-bgs**	**feet-msl**	**Date**	**feet-bgs**	**feet-msl**	**feet-msl**
06S/22E-09P01S	**006S022E09P001S**	**33.66109**	**-114.6883**	399.64	252	230	169.64	250	149.64	8/10/2006	147.42	252.22	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66109**	**-114.6883**	399.64	252	230	169.64	250	149.64	12/8/2006	147.53	252.11	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66109**	**-114.6883**	399.64	252	230	169.64	250	149.64	2/7/2007	147.52	252.12	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66109**	**-114.6883**	399.64	252	230	169.64	250	149.64	2/7/2007	147.53	252.11	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66109**	**-114.6883**	399.64	252	230	169.64	250	149.64	5/17/2007	147.52	252.12	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66109**	**-114.6883**	399.64	252	230	169.64	250	149.64	5/17/2007	147.53	252.11	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66109**	**-114.6883**	399.64	252	230	169.64	250	149.64	9/5/2007	147.44	252.20	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66109**	**-114.6883**	399.64	252	230	169.64	250	149.64	12/13/2007	147.50	252.14	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66109**	**-114.6883**	399.64	252	230	169.64	250	149.64	3/18/2008	147.48	252.16	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66109**	**-114.6883**	399.64	252	230	169.64	250	149.64	6/25/2008	147.43	252.21	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66109**	**-114.6883**	399.64	252	230	169.64	250	149.64	6/25/2008	147.45	252.19	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66109**	**-114.6883**	399.64	252	230	169.64	250	149.64	9/23/2008	147.39	252.25	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66109**	**-114.6883**	399.64	252	230	169.64	250	149.64	9/23/2008	147.41	252.23	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66109**	**-114.6883**	399.64	252	230	169.64	250	149.64	1/13/2009	147.49	252.15	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66108687**	**-114.6883017**	399.60	252					4/15/2009	147.46	252.14	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66108687**	**-114.6883017**	399.60	252					7/30/2009	147.30	252.30	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66108687**	**-114.6883017**	399.60	252					7/31/2009	147.32	252.28	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66108687**	**-114.6883017**	399.60	252					10/28/2009	147.28	252.32	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66108687**	**-114.6883017**	399.60	252					1/20/2010	147.18	252.42	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66108687**	**-114.6883017**	399.60	252					3/24/2010	147.39	252.21	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66108687**	**-114.6883017**	399.60	252					4/21/2010	147.24	252.36	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66108687**	**-114.6883017**	399.60	252					7/21/2010	147.25	252.35	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66108687**	**-114.6883017**	399.60	252					11/3/2010	147.27	252.33	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66108687**	**-114.6883017**	399.60	252					1/12/2011	147.29	252.31	251.56
06S/22E-09P01S	**006S022E09P001S**	**33.66108687**	**-114.6883017**	399.60	252					4/27/2011	147.21	252.39	251.56
06S/22E-10E01S	**006S022E10E001S**	**33.67148107**	**-114.6726263**	400.60	362					2/8/1980	152.00	248.60	248.60
06S/22E-10H01S	**006S022E10H001S**	**33.67146**	**-114.66311**	404.21	304	174	230.21	304	100.21	8/1/1971	150.00	254.21	253.53
06S/22E-10H01S	**006S022E10H001S**	**33.67146**	**-114.66311**	404.21	304	174	230.21	304	100.21	9/15/1990	154.90	249.31	253.53

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/22E-10H01S	006S022E10H001S	33.67146	-114.66311	404.21	304	174	230.21	304	100.21	2/16/2000	149.70	254.51	253.53
06S/22E-10H01S	006S022E10H001S	33.67146	-114.66311	404.21	304	174	230.21	304	100.21	2/16/2000	149.73	254.48	253.53
06S/22E-10H01S	006S022E10H001S	33.67146	-114.66311	404.21	304	174	230.21	304	100.21	1/15/2002	149.08	255.13	253.53
06S/22E-10H02S	006S022E10H002S	33.66792006	-114.6634288	404.40	358					2/15/1980	142.00	262.40	256.59
06S/22E-10H02S	006S022E10H002S	33.66792006	-114.6634288	404.40	358					2/16/2000	149.93	254.47	256.59
06S/22E-10H02S	006S022E10H002S	33.66792006	-114.6634288	404.40	358					3/28/2006	149.76	254.64	256.59
06S/22E-10H02S	006S022E10H002S	33.66792006	-114.6634288	404.40	358					3/30/2006	149.54	254.86	256.59
06S/22E-10H03S	006S022E10H003S	33.67127276	-114.6601565	403.90	297					4/30/1997	150.00	253.90	254.45
06S/22E-10H03S	006S022E10H003S	33.67127276	-114.6601565	403.90	297					3/30/2006	148.91	254.99	254.45
06S/22E-11H01S	006S022E11H001S	33.66801	-114.64214	407.97	235	165	242.97	235	172.97	9/30/1955	147.00	260.97	256.33
06S/22E-11H01S	006S022E11H001S	33.66801	-114.64214	407.97	235	165	242.97	235	172.97	3/28/1984	155.10	252.87	256.33
06S/22E-11H01S	006S022E11H001S	33.66801	-114.64214	407.97	235	165	242.97	235	172.97	3/23/1992	152.66	255.31	256.33
06S/22E-11H01S	006S022E11H001S	33.66801	-114.64214	407.97	235	165	242.97	235	172.97	4/4/2000	151.81	256.16	256.33
06S/22E-11H03S	006S022E11H003S	33.6721061	-114.6420115	408.40						9/14/1990	155.65	252.75	252.75
06S/22E-11N01S	006S022E11N001S	33.66423129	-114.6548701	404.20	480					8/1/1971	150.00	254.20	252.95
06S/22E-11N01S	006S022E11N001S	33.66423129	-114.6548701	404.20	480					8/18/1971	148.27	255.93	252.95
06S/22E-11N01S	006S022E11N001S	33.66423129	-114.6548701	404.20	480					9/15/1990	153.70	250.50	252.95
06S/22E-11N01S	006S022E11N001S	33.66423129	-114.6548701	404.20	480					3/28/1992	153.02	251.18	252.95
06S/22E-11N02S	006S022E11N002S	33.66058	-114.65829	400.00	246.5	160	240	320	80	7/26/1979	149.27	250.73	250.73
06S/22E-11R01S	006S022E11R001S	33.6608564	-114.641903	276.00	77	75	201	77	199	3/21/1967	18.26	257.74	258.29
06S/22E-11R01S	006S022E11R001S	33.6608564	-114.641903	276.00	77	75	201	77	199	6/1/1967	16.63	259.37	258.29
06S/22E-11R01S	006S022E11R001S	33.6608564	-114.641903	276.00	77	75	201	77	199	6/10/1968	17.00	259.00	258.29
06S/22E-11R01S	006S022E11R001S	33.6608564	-114.641903	276.00	77	75	201	77	199	7/7/1971	18.94	257.06	258.29
06S/22E-11R02S	006S022E11R002S	33.6608564	-114.641903	276.00	21	18	258	21	255	3/21/1967	16.40	259.60	258.70
06S/22E-11R02S	006S022E11R002S	33.6608564	-114.641903	276.00	21	18	258	21	255	6/10/1968	16.75	259.25	258.70
06S/22E-11R02S	006S022E11R002S	33.6608564	-114.641903	276.00	21	18	258	21	255	7/7/1971	18.76	257.24	258.70
06S/22E-12A01S	006S022E12A001S	33.6750227	-114.6274583	269.00						6/1/1971	10.00	259.00	259.00
06S/22E-12C01S	006S022E12C001S	33.67298109	-114.6353252	408.62	476					5/29/1969	145.00	263.62	259.09

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/22E-12C01S	**006S022E12C001S**	**33.67298109**	**-114.6353252**	408.62	476					8/19/1971	149.64	258.98	259.09
06S/22E-12C01S	**006S022E12C001S**	**33.67298109**	**-114.6353252**	408.62	476					9/15/1990	152.20	256.42	259.09
06S/22E-12C01S	**006S022E12C001S**	**33.67298109**	**-114.6353252**	408.62	476					11/18/1999	151.30	257.32	259.09
06S/22E-12E01S	**006S022E12E001S**	**33.6691673**	**-114.6381058**	410.54	230	160	250.54	220	190.54	10/19/1944	150.00	260.54	250.39
06S/22E-12E01S	**006S022E12E001S**	**33.6691673**	**-114.6381058**	410.54	230	160	250.54	220	190.54	8/19/1971	170.30	240.24	250.39
06S/22E-12F01S	**006S022E12F001S**	**33.67055338**	**-114.6352502**	409.64	252					2/9/1962	136.00	273.64	264.89
06S/22E-12F01S	**006S022E12F001S**	**33.67055338**	**-114.6352502**	409.64	252					9/15/1990	153.50	256.14	264.89
06S/22E-12J01S	**006S022E12J001S**	**33.66650349**	**-114.628686**	294.90	60					5/31/1905	34.00	260.90	258.97
06S/22E-12J01S	**006S022E12J001S**	**33.66650349**	**-114.628686**	294.90	60					3/30/2006	37.87	257.03	258.97
06S/22E-12J02S	**006S022E12J002S**	**33.6649202**	**-114.6286638**	271.10	60					6/5/2000	14.14	256.96	256.74
06S/22E-12J02S	**006S022E12J002S**	**33.6649202**	**-114.6286638**	271.10	60					3/30/2006	14.58	256.52	256.74
06S/22E-12L01S	**006S022E12L001S**	**33.66613405**	**-114.6332917**	270.00						7/1/1971	12.00	258.00	258.00
06S/22E-12L02S	**006S022E12L002S**	**33.66673403**	**-114.633575**	279.57	442					1/22/1961	18.00	261.57	261.57
06S/22E-12M01S	**006S022E12M001S**	**33.6664118**	**-114.6405142**	268.00						7/1/1971	11.00	257.00	257.00
06S/22E-12N01S	**006S022E12N001S**	**33.6608564**	**-114.6413475**	275.00						7/1/1971	17.00	258.00	258.00
06S/22E-13N01S	**006S022E13N001S**	**33.6464123**	**-114.6407917**	276.00						7/1/1971	19.00	257.00	257.00
06S/22E-13Q01S	**006S022E13Q001S**	**33.59641365**	**-114.6321798**	268.00	116	114	154	116	152	3/23/1967	7.96	260.04	260.02
06S/22E-13Q01S	**006S022E13Q001S**	**33.59641365**	**-114.6321798**	268.00	116	114	154	116	152	7/1/1971	8.00	260.00	260.02
06S/22E-13Q02S	**006S022E13Q002S**	**33.64641234**	**-114.6321804**	268.00	22	20	248	22	246	3/23/1967	7.72	260.28	260.14
06S/22E-13Q02S	**006S022E13Q002S**	**33.64641234**	**-114.6321804**	268.00	22	20	248	22	246	7/1/1971	8.00	260.00	260.14
06S/22E-14A02S	**006S022E14A002S**	**33.6603786**	**-114.6438559**	281.70	400					4/6/2006	26.55	255.15	255.14
06S/22E-14A02S	**006S022E14A002S**	**33.6603786**	**-114.6438559**	281.70	400					4/7/2006	26.57	255.13	255.14
06S/22E-14D01S	**006S022E14D001S**	**33.66029527**	**-114.6583563**	400.60						9/15/1990	148.66	251.94	253.21
06S/22E-14D01S	**006S022E14D001S**	**33.66029527**	**-114.6583563**	400.60						3/14/2000	146.12	254.48	253.21
06S/22E-14L01S	**006S022E14L001S**	**33.65189**	**-114.64971**	292.60	94	90	202.6	94	198.6	3/31/1967	32.92	259.68	258.36
06S/22E-14L01S	**006S022E14L001S**	**33.65189**	**-114.64971**	292.60	94	90	202.6	94	198.6	6/1/1967	32.85	259.75	258.36
06S/22E-14L01S	**006S022E14L001S**	**33.65189**	**-114.64971**	292.60	94	90	202.6	94	198.6	6/10/1968	33.18	259.42	258.36
06S/22E-14L01S	**006S022E14L001S**	**33.65189**	**-114.64971**	292.60	94	90	202.6	94	198.6	8/1/1971	35.00	257.60	258.36

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/22E-14L01S	**006S022E14L001S**	**33.65189**	**-114.64971**	292.60	94	90	202.6	94	198.6	8/4/1971	35.00	257.60	258.36
06S/22E-14L01S	**006S022E14L001S**	**33.65189**	**-114.64971**	292.60	94	90	202.6	94	198.6	5/11/2000	36.48	256.12	258.36
06S/22E-14L02S	**006S022E14L002S**	**33.6519677**	**-114.649681**	293.00	34	30	263	34	259	3/31/1967	32.24	260.76	260.67
06S/22E-14L02S	**006S022E14L002S**	**33.6519677**	**-114.649681**	293.00	34	30	263	34	259	6/1/1967	32.21	260.79	260.67
06S/22E-14L02S	**006S022E14L002S**	**33.6519677**	**-114.649681**	293.00	34	30	263	34	259	6/10/1968	32.55	260.45	260.67
06S/22E-15E01S	**006S022E15E001S**	**33.65535927**	**-114.6745456**	394.89						6/28/1967	140.00	254.89	253.99
06S/22E-15E01S	**006S022E15E001S**	**33.65535927**	**-114.6745456**	394.89						1/27/2000	141.81	253.08	253.99
06S/22E-15M01S	**006S022E15M001S**	**33.65328**	**-114.67508**	396.60	315	171	225.6	315	81.6	2/15/1955	136.00	260.60	256.33
06S/22E-15M01S	**006S022E15M001S**	**33.65328**	**-114.67508**	396.60	315	171	225.6	315	81.6	2/6/1962	139.13	257.47	256.33
06S/22E-15M01S	**006S022E15M001S**	**33.65328**	**-114.67508**	396.60	315	171	225.6	315	81.6	6/10/1963	139.80	256.80	256.33
06S/22E-15M01S	**006S022E15M001S**	**33.65328**	**-114.67508**	396.60	315	171	225.6	315	81.6	6/11/1963	139.74	256.86	256.33
06S/22E-15M01S	**006S022E15M001S**	**33.65328**	**-114.67508**	396.60	315	171	225.6	315	81.6	6/12/1963	140.24	256.36	256.33
06S/22E-15M01S	**006S022E15M001S**	**33.65328**	**-114.67508**	396.60	315	171	225.6	315	81.6	4/3/2000	143.49	253.11	256.33
06S/22E-15M01S	**006S022E15M001S**	**33.65328**	**-114.67508**	396.60	315	171	225.6	315	81.6	4/3/2000	143.50	253.10	256.33
06S/22E-15Q01S	**006S022E15Q001S**	**33.64949555**	**-114.6645897**	372.54	585	346	26.54	572	-199.46	9/12/1963	113.00	259.54	248.47
06S/22E-15Q01S	**006S022E15Q001S**	**33.64949555**	**-114.6645897**	372.54	585	346	26.54	572	-199.46	9/17/1963	115.25	257.29	248.47
06S/22E-15Q01S	**006S022E15Q001S**	**33.64949555**	**-114.6645897**	372.54	585	346	26.54	572	-199.46	6/28/1967	132.00	240.54	248.47
06S/22E-15Q01S	**006S022E15Q001S**	**33.64949555**	**-114.6645897**	372.54	585	346	26.54	572	-199.46	7/23/1971	141.62	230.92	248.47
06S/22E-15Q01S	**006S022E15Q001S**	**33.64949555**	**-114.6645897**	372.54	585	346	26.54	572	-199.46	9/22/1990	121.25	251.29	248.47
06S/22E-15Q01S	**006S022E15Q001S**	**33.64949555**	**-114.6645897**	372.54	585	346	26.54	572	-199.46	2/19/1992	121.31	251.23	248.47
06S/22E-16A01S	**006S022E16A001S**	**33.660698**	**-114.6756235**	366.67	364	170	196.67	359	7.67	3/29/1966	124.00	242.67	236.73
06S/22E-16A01S	**006S022E16A001S**	**33.660698**	**-114.6756235**	366.67	364	170	196.67	359	7.67	4/4/1966	124.00	242.67	236.73
06S/22E-16A01S	**006S022E16A001S**	**33.660698**	**-114.6756235**	366.67	364	170	196.67	359	7.67	7/22/1971	180.96	185.71	236.73
06S/22E-16A01S	**006S022E16A001S**	**33.660698**	**-114.6756235**	366.67	364	170	196.67	359	7.67	9/22/1990	118.97	247.70	236.73
06S/22E-16A01S	**006S022E16A001S**	**33.660698**	**-114.6756235**	366.67	364	170	196.67	359	7.67	2/15/1992	117.92	248.75	236.73
06S/22E-16A01S	**006S022E16A001S**	**33.660698**	**-114.6756235**	366.67	364	170	196.67	359	7.67	1/27/2000	113.78	252.89	236.73
06S/22E-16E01S	**006S022E16E001S**	**33.65373706**	**-114.6925517**	396.00	345					10/11/1968	145.00	251.00	236.03
06S/22E-16E01S	**006S022E16E001S**	**33.65373706**	**-114.6925517**	396.00	345					7/28/1971	184.40	211.60	236.03

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/22E-16E01S	006S022E16E001S	33.65373706	-114.6925517	396.00	345					9/19/1990	150.51	245.49	236.03
06S/22E-16G01S	006S022E16G001S	33.6536343	-114.6819042	400.00						7/1/1971	156.00	244.00	244.00
06S/22E-16P01S	006S022E16P001S	33.64645115	-114.6841819	389.71	306					10/11/1968	131.00	258.71	244.14
06S/22E-16P01S	006S022E16P001S	33.64645115	-114.6841819	389.71	306					7/23/1971	160.14	229.57	244.14
06S/22E-17B01S	006S022E17B001S	33.6606313	-114.7013604	399.64	302	181	218.64	302	97.64	5/26/1966	149.00	250.64	248.79
06S/22E-17B01S	006S022E17B001S	33.6606313	-114.7013604	399.64	302	181	218.64	302	97.64	8/22/1966	149.00	250.64	248.79
06S/22E-17B01S	006S022E17B001S	33.6606313	-114.7013604	399.64	302	181	218.64	302	97.64	9/20/1990	152.64	247.00	248.79
06S/22E-17B01S	006S022E17B001S	33.6606313	-114.7013604	399.64	302	181	218.64	302	97.64	2/15/1992	152.76	246.88	248.79
06S/22E-17L02S	006S022E17L002S	33.6533565	-114.7021825	397.00	323	171	226	323	74	7/1/1971	156.00	241.00	245.60
06S/22E-17L02S	006S022E17L002S	33.6533565	-114.7021825	397.00	323					3/30/2006	146.81	250.19	245.60
06S/22E-18A01S	006S022E18A001S	33.6574119	-114.7102356	406.88	298	168	238.88	298	108.88	6/2/1966	155.00	251.88	246.28
06S/22E-18A01S	006S022E18A001S	33.6574119	-114.7102356	406.88	298	168	238.88	298	108.88	7/1/1971	163.00	243.88	246.28
06S/22E-18A01S	006S022E18A001S	33.6574119	-114.7102356	406.88	298	168	238.88	298	108.88	7/28/1971	162.78	244.10	246.28
06S/22E-18A01S	006S022E18A001S	33.6574119	-114.7102356	406.88	298	168	238.88	298	108.88	9/20/1990	161.61	245.27	246.28
06S/22E-19N02S	006S022E19N002S	33.63448474	-114.7234746	397.00	300					8/26/1977	150.00	247.00	247.64
06S/22E-19N02S	006S022E19N002S	33.63448474	-114.7234746	397.00	300					9/15/1999	148.72	248.28	247.64
06S/22E-19N03S	006S022E19N003S	33.63451807	-114.7233885	397.20	394					2/29/1980	147.00	250.20	248.45
06S/22E-19N03S	006S022E19N003S	33.63451807	-114.7233885	397.20	394					9/23/1990	151.55	245.65	248.45
06S/22E-19N03S	006S022E19N003S	33.63451807	-114.7233885	397.20	394					3/7/1997	148.97	248.23	248.45
06S/22E-19N03S	006S022E19N003S	33.63451807	-114.7233885	397.20	394					9/15/1999	148.46	248.74	248.45
06S/22E-19N03S	006S022E19N003S	33.63451807	-114.7233885	397.20	394					4/4/2006	148.28	248.92	248.45
06S/22E-19N03S	006S022E19N003S	33.63451807	-114.7233885	397.20	394					4/5/2006	148.27	248.93	248.45
06S/22E-19R01S	006S022E19R001S	33.6344403	-114.7124548	395.60	300					9/17/1977	150.00	245.60	247.78
06S/22E-19R01S	006S022E19R001S	33.6344403	-114.7124548	395.60	300					9/23/1990	149.79	245.81	247.78
06S/22E-19R01S	006S022E19R001S	33.6344403	-114.7124548	395.60	300					3/7/1997	147.06	248.54	247.78
06S/22E-19R01S	006S022E19R001S	33.6344403	-114.7124548	395.60	300					9/15/1999	146.68	248.92	247.78
06S/22E-19R01S	006S022E19R001S	33.6344403	-114.7124548	395.60	300					4/4/2006	146.65	248.95	247.78
06S/22E-19R01S	006S022E19R001S	33.6344403	-114.7124548	395.60	300					4/5/2006	146.75	248.85	247.78

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/22E-20A01S	006S022E20A001S	33.64613448	-114.6930155	395.79	250	230	165.79	250	145.79	7/1/1971	148.00	247.79	247.79
06S/22E-21B01S	006S022E21B001S	33.64343179	-114.6837652	373.90	378	192	181.9	372	1.9	4/28/1966	117.00	256.90	253.96
06S/22E-21B01S	006S022E21B001S	33.64343179	-114.6837652	373.90	378	192	181.9	372	1.9	8/23/1966	120.70	253.20	253.96
06S/22E-21B01S	006S022E21B001S	33.64343179	-114.6837652	373.90	378	192	181.9	372	1.9	1/25/2000	122.12	251.78	253.96
06S/22E-21K01S	006S022E21K001S	33.63552644	-114.6832262	375.30	323	182	193.3	323	52.3	5/11/1966	126.00	249.30	239.65
06S/22E-21K01S	006S022E21K001S	33.63552644	-114.6832262	375.30	323	182	193.3	323	52.3	8/24/1966	121.30	254.00	239.65
06S/22E-21K01S	006S022E21K001S	33.63552644	-114.6832262	375.30	323	182	193.3	323	52.3	7/28/1971	159.64	215.66	239.65
06S/22E-22A01S	006S022E22A001S	33.64603176	-114.6589617	364.90	305					12/5/1972	109.00	255.90	253.92
06S/22E-22A01S	006S022E22A001S	33.64603176	-114.6589617	364.90	305					9/22/1990	111.39	253.51	253.92
06S/22E-22A01S	006S022E22A001S	33.64603176	-114.6589617	364.90	305					2/19/1992	112.10	252.80	253.92
06S/22E-22A01S	006S022E22A001S	33.64603176	-114.6589617	364.90	305					1/27/2000	110.93	253.97	253.92
06S/22E-22A01S	006S022E22A001S	33.64603176	-114.6589617	364.90	305					3/30/2006	111.50	253.40	253.92
06S/22E-23L01S	006S022E23L001S	33.63557927	-114.6496808	268.00						7/1/1971	15.00	253.00	253.00
06S/22E-24D01S	006S022E24D001S	33.64598734	-114.6412612	277.60	25.31					5/11/2000	21.84	255.76	255.23
06S/22E-24D01S	006S022E24D001S	33.64598734	-114.6412612	277.60	25.31					1/1/2000	22.20	255.40	255.23
06S/22E-24D01S	006S022E24D001S	33.64598734	-114.6412612	277.60	25.31					3/1/2000	22.48	255.12	255.23
06S/22E-24D01S	006S022E24D001S	33.64598734	-114.6412612	277.60	25.31					4/1/2000	22.28	255.32	255.23
06S/22E-24D01S	006S022E24D001S	33.64598734	-114.6412612	277.60	25.31					5/1/2000	22.82	254.78	255.23
06S/22E-24D01S	006S022E24D001S	33.64598734	-114.6412612	277.60	25.31					6/1/2000	21.93	255.67	255.23
06S/22E-24D01S	006S022E24D001S	33.64598734	-114.6412612	277.60	25.31					8/1/2000	21.95	255.65	255.23
06S/22E-24D01S	006S022E24D001S	33.64598734	-114.6412612	277.60	25.31					9/1/2000	21.90	255.70	255.23
06S/22E-24D01S	006S022E24D001S	33.64598734	-114.6412612	277.60	25.31					10/1/2000	21.73	255.87	255.23
06S/22E-24D01S	006S022E24D001S	33.64598734	-114.6412612	277.60	25.31					1/1/2006	22.55	255.05	255.23
06S/22E-24D01S	006S022E24D001S	33.64598734	-114.6412612	277.60	25.31					2/1/2006	22.86	254.74	255.23
06S/22E-24D01S	006S022E24D001S	33.64598734	-114.6412612	277.60	25.31					3/1/2006	22.95	254.65	255.23
06S/22E-24D01S	006S022E24D001S	33.64598734	-114.6412612	277.60	25.31					4/1/2006	22.93	254.67	255.23
06S/22E-24D01S	006S022E24D001S	33.64598734	-114.6412612	277.60	25.31					5/1/2006	22.77	254.83	255.23
06S/22E-25C01S	006S022E25C001S	33.6313294	-114.6350136	265.00	62					4/16/1998	14.00	251.00	251.00

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/22E-26B01S	**006S022E26B001S**	**33.62835724**	**-114.6455139**	262.00						7/1/1971	10.00	252.00	252.00
06S/22E-26B02S	**006S022E26B002S**	**33.63169049**	**-114.6455139**	263.00						7/1/1971	8.00	255.00	255.00
06S/22E-26E01S	**006S022E26E001S**	**33.62669**	**-114.65774**	270.00	64	62	208	64	206	3/28/1967	15.58	254.42	253.21
06S/22E-26E01S	**006S022E26E001S**	**33.62669**	**-114.65774**	270.00	64	62	208	64	206	7/1/1971	18.00	252.00	253.21
06S/22E-26E02S	**006S022E26E002S**	**33.62669**	**-114.65774**	270.00	21	19	251	21	249	3/28/1967	15.20	254.80	253.90
06S/22E-26E02S	**006S022E26E002S**	**33.62669**	**-114.65774**	270.00	21	19	251	21	249	7/1/1971	17.00	253.00	253.90
06S/22E-26E03S	**006S022E26E003S**	**33.6247462**	**-114.6577364**	262.00						7/1/1971	10.00	252.00	252.00
06S/22E-26G01S	**006S022E26G001S**	**33.6247462**	**-114.6446805**	260.00	79	77	183	79	181	3/28/1967	9.03	250.97	250.99
06S/22E-26G01S	**006S022E26G001S**	**33.6247462**	**-114.6446805**	260.00	79	77	183	79	181	7/1/1971	9.00	251.00	250.99
06S/22E-26G02S	**006S022E26G002S**	**33.6247462**	**-114.6446805**	260.00	21	19	241	21	239	3/28/1967	8.50	251.50	251.25
06S/22E-26G02S	**006S022E26G002S**	**33.6247462**	**-114.6446805**	260.00	21	19	241	21	239	7/1/1971	9.00	251.00	251.25
06S/22E-26G03S	**006S022E26G003S**	**33.6247462**	**-114.6446805**	263.00						7/1/1971	10.00	253.00	253.00
06S/22E-26Q01S	**006S022E26Q001S**	**33.61974635**	**-114.6494028**	261.00						7/1/1971	8.00	253.00	253.00
06S/22E-27H01S	**006S022E27H001S**	**33.6247462**	**-114.662181**	264.00						7/1/1971	12.00	252.00	252.00
06S/22E-27R01S	**006S022E27R001S**	**33.61752417**	**-114.6596808**	257.00						7/1/1971	7.00	250.00	250.00
06S/22E-27R02S	**006S022E27R002S**	**33.61752417**	**-114.6619031**	259.00						7/1/1971	9.00	250.00	250.00
06S/22E-28H01S	**006S022E28H001S**	**33.62696834**	**-114.680237**	355.00	300					9/1/1971	107.00	248.00	248.00
06S/22E-29C01S	**006S022E29C001S**	**33.62886825**	**-114.7048573**	393.60						9/24/1990	147.81	245.79	247.40
06S/22E-29C01S	**006S022E29C001S**	**33.62886825**	**-114.7048573**	393.60						2/15/1992	146.99	246.61	247.40
06S/22E-29C01S	**006S022E29C001S**	**33.62886825**	**-114.7048573**	393.60						9/15/1999	144.75	248.85	247.40
06S/22E-29C01S	**006S022E29C001S**	**33.62886825**	**-114.7048573**	393.60						4/5/2006	145.24	248.36	247.40
06S/22E-29D01S	**006S022E29D001S**	**33.6314126**	**-114.7055157**	394.20	193	173	221.2	193	201.2	7/1/1971	145.00	249.20	249.11
06S/22E-29D01S	**006S022E29D001S**	**33.6314126**	**-114.7055157**	394.20	193	173	221.2	193	201.2	7/15/1971	145.18	249.02	249.11
06S/22E-29G01S	**006S022E29G001S**	**33.62697**	**-114.69857**	392.50	350	202	190.5	350	42.5	7/1/1971	142.00	250.50	250.50
06S/22E-29G02S	**006S022E29G002S**	**33.62569334**	**-114.6982793**	391.90						9/23/1990	144.96	246.94	248.35
06S/22E-29G02S	**006S022E29G002S**	**33.62569334**	**-114.6982793**	391.90						9/15/1999	142.15	249.75	248.35
06S/22E-29J01S	**006S022E29J001S**	**33.6230795**	**-114.6952375**	390.00	243					8/1/1943	137.50	252.50	254.18
06S/22E-29J01S	**006S022E29J001S**	**33.6230795**	**-114.6952375**	390.00	243					6/9/1961	134.96	255.04	254.18

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/22E-29J01S	006S022E29J001S	33.6230795	-114.6952375	390.00	243					11/16/1966	133.02	256.98	254.18
06S/22E-29J01S	006S022E29J001S	33.6230795	-114.6952375	390.00	243					7/14/1971	137.82	252.18	254.18
06S/22E-29M01S	006S022E29M001S	33.6223073	-114.7099574	393.60	304					3/23/1979	144.00	249.60	247.59
06S/22E-29M01S	006S022E29M001S	33.6223073	-114.7099574	393.60	304					9/24/1990	148.33	245.27	247.59
06S/22E-29M01S	006S022E29M001S	33.6223073	-114.7099574	393.60	304					3/7/1997	146.18	247.42	247.59
06S/22E-29M01S	006S022E29M001S	33.6223073	-114.7099574	393.60	304					9/15/1999	145.65	247.95	247.59
06S/22E-29M01S	006S022E29M001S	33.6223073	-114.7099574	393.60	304					4/4/2006	145.86	247.74	247.59
06S/22E-29M01S	006S022E29M001S	33.6223073	-114.7099574	393.60	304					4/5/2006	146.02	247.58	247.59
06S/22E-29Q01S	006S022E29Q001S	33.6174491	-114.7004904	390.60	306					3/19/1979	141.00	249.60	247.64
06S/22E-29Q01S	006S022E29Q001S	33.6174491	-114.7004904	390.60	306					9/23/1990	144.28	246.32	247.64
06S/22E-29Q01S	006S022E29Q001S	33.6174491	-114.7004904	390.60	306					2/15/1992	144.54	246.06	247.64
06S/22E-29Q01S	006S022E29Q001S	33.6174491	-114.7004904	390.60	306					3/7/1997	142.62	247.98	247.64
06S/22E-29Q01S	006S022E29Q001S	33.6174491	-114.7004904	390.60	306					9/14/1999	142.11	248.49	247.64
06S/22E-29Q01S	006S022E29Q001S	33.6174491	-114.7004904	390.60	306					4/4/2006	143.03	247.57	247.64
06S/22E-29Q01S	006S022E29Q001S	33.6174491	-114.7004904	390.60	306					4/5/2006	143.16	247.44	247.64
06S/22E-30L01S	006S022E30L001S	33.62228785	-114.722005	394.50						3/7/1997	148.08	246.42	246.75
06S/22E-30L01S	006S022E30L001S	33.62228785	-114.722005	394.50						9/16/1999	147.43	247.07	246.75
06S/22E-30M01S	006S022E30M001S	33.62382947	-114.725944	394.70						9/26/1990	150.00	244.70	245.73
06S/22E-30M01S	006S022E30M001S	33.62382947	-114.725944	394.70						3/7/1997	147.75	246.95	245.73
06S/22E-30M01S	006S022E30M001S	33.62382947	-114.725944	394.70						9/16/1999	150.44	244.26	245.73
06S/22E-30M01S	006S022E30M001S	33.62382947	-114.725944	394.70						3/30/2006	147.70	247.00	245.73
06S/22E-31F01S	006S022E31F001S	33.61305476	-114.7206992	389.30						9/24/1990	155.31	233.99	240.95
06S/22E-31F01S	006S022E31F001S	33.61305476	-114.7206992	389.30						8/27/1999	141.40	247.90	240.95
06S/22E-31K01S	006S022E31K001S	33.60919098	-114.7182936	387.70						7/1/1971	140.00	247.70	246.04
06S/22E-31K01S	006S022E31K001S	33.60919098	-114.7182936	387.70						7/15/1971	139.56	248.14	246.04
06S/22E-31K01S	006S022E31K001S	33.60919098	-114.7182936	387.70						9/21/1990	143.95	243.75	246.04
06S/22E-31K01S	006S022E31K001S	33.60919098	-114.7182936	387.70						3/28/1992	143.34	244.36	246.04
06S/22E-31K01S	006S022E31K001S	33.60919098	-114.7182936	387.70						2/15/2000	141.45	246.25	246.04

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/22E-32F01S	006S022E32F001S	33.61307978	-114.704682	388.50	230	195	193.5	230	158.5	7/1/1971	139.00	249.50	249.50
06S/22E-32F02S	006S022E32F002S	33.61258535	-114.7056738	388.60	300					12/28/1973	137.00	251.60	248.46
06S/22E-32F02S	006S022E32F002S	33.61258535	-114.7056738	388.60	300					11/19/1999	141.28	247.32	248.46
06S/22E-32F02S	006S022E32F002S	33.61258535	-114.7056738	388.60	300					3/29/2006	142.13	246.47	248.46
06S/22E-32F03S	006S022E32F003S	33.61230758	-114.7051904	387.50	500	140	247.5	280	107.5	3/25/2002	147.00	240.50	240.50
06S/22E-32K01S	006S022E32K001S	33.60752438	-114.700793	362.80	464	112	250.8	464	-101.2	10/27/1953	112.00	250.80	246.98
06S/22E-32K01S	006S022E32K001S	33.60752438	-114.700793	362.80	464	112	250.8	464	-101.2	5/23/1961	117.00	245.80	246.98
06S/22E-32K01S	006S022E32K001S	33.60752438	-114.700793	362.80	464	112	250.8	464	-101.2	9/21/1990	118.46	244.34	246.98
06S/22E-32K02S	006S022E32K002S	33.609191	-114.700793	371.80						4/12/1971	124.00	247.80	246.37
06S/22E-32K02S	006S022E32K002S	33.609191	-114.700793	371.80						8/1/1972	125.80	246.00	246.37
06S/22E-32K02S	006S022E32K002S	33.609191	-114.700793	371.80						9/21/1990	127.02	244.78	246.37
06S/22E-32K02S	006S022E32K002S	33.609191	-114.700793	371.80						1/26/2000	124.89	246.91	246.37
06S/22E-32K03S	006S022E32K003S	33.60846324	-114.7003653	365.50						9/21/1990	121.07	244.43	245.51
06S/22E-32K03S	006S022E32K003S	33.60846324	-114.7003653	365.50						3/30/2006	118.91	246.59	245.51
06S/22E-32K04S	006S022E32K004S	33.6091132	-114.6970457	329.70						9/22/1990	84.92	244.78	246.08
06S/22E-32K04S	006S022E32K004S	33.6091132	-114.6970457	329.70						9/23/1990	84.82	244.88	246.08
06S/22E-32K04S	006S022E32K004S	33.6091132	-114.6970457	329.70						1/24/2000	82.56	247.14	246.08
06S/22E-32K04S	006S022E32K004S	33.6091132	-114.6970457	329.70						1/26/2000	82.63	247.07	246.08
06S/22E-32K04S	006S022E32K004S	33.6091132	-114.6970457	329.70						3/30/2006	83.19	246.51	246.08
06S/22E-32R01S	006S022E32R001S	33.60423559	-114.6929594	334.20	560					4/30/1905	84.00	250.20	251.23
06S/22E-32R01S	006S022E32R001S	33.60423559	-114.6929594	334.20	560	120	214.2	488	-153.8	5/23/1961	82.70	251.50	251.23
06S/22E-32R01S	006S022E32R001S	33.60423559	-114.6929594	334.20	560	120	214.2	488	-153.8	8/24/1961	82.17	252.03	251.23
06S/22E-32R01S	006S022E32R001S	33.60423559	-114.6929594	334.20	560	120	214.2	488	-153.8	9/21/1961	81.96	252.24	251.23
06S/22E-32R01S	006S022E32R001S	33.60423559	-114.6929594	334.20	560	120	214.2	488	-153.8	10/18/1961	82.16	252.04	251.23
06S/22E-32R01S	006S022E32R001S	33.60423559	-114.6929594	334.20	560	120	214.2	488	-153.8	11/21/1961	82.67	251.53	251.23
06S/22E-32R01S	006S022E32R001S	33.60423559	-114.6929594	334.20	560	120	214.2	488	-153.8	12/20/1961	83.04	251.16	251.23
06S/22E-32R01S	006S022E32R001S	33.60423559	-114.6929594	334.20	560	120	214.2	488	-153.8	1/22/1962	83.40	250.80	251.23
06S/22E-32R01S	006S022E32R001S	33.60423559	-114.6929594	334.20	560	120	214.2	488	-153.8	2/19/1962	83.35	250.85	251.23

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	3/26/1962	83.15	251.05	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	4/24/1962	82.85	251.35	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	5/24/1962	82.73	251.47	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	6/20/1962	82.56	251.64	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	7/19/1962	82.57	251.63	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	8/16/1962	82.62	251.58	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	9/17/1962	82.35	251.85	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	10/11/1962	82.52	251.68	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	11/8/1962	82.71	251.49	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	12/13/1962	83.00	251.20	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	1/10/1963	83.06	251.14	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	2/4/1963	83.29	250.91	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	3/4/1963	83.24	250.96	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	4/1/1963	82.94	251.26	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	5/6/1963	82.54	251.66	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	6/3/1963	82.15	252.05	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	7/11/1963	82.00	252.20	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	8/6/1963	81.85	252.35	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	9/9/1963	81.58	252.62	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	10/29/1963	81.46	252.74	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	11/27/1963	81.78	252.42	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	12/31/1963	82.47	251.73	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	2/7/1964	82.91	251.29	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	3/10/1964	82.66	251.54	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	4/15/1964	82.15	252.05	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	5/12/1964	81.97	252.23	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	6/18/1964	81.36	252.84	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	7/21/1964	81.30	252.90	251.23

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	8/19/1964	81.04	253.16	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	9/17/1964	80.93	253.27	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	10/21/1964	81.21	252.99	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	12/2/1964	81.29	252.91	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	7/15/1971	84.85	249.35	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	9/22/1990	89.32	244.88	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	2/15/1992	89.34	244.86	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	2/15/2000	87.51	246.69	251.23
06S/22E-32R01S	**006S022E32R001S**	**33.60423559**	**-114.6929594**	334.20	560	120	214.2	488	-153.8	3/31/2006	88.08	246.12	251.23
06S/22E-33C01S	**006S022E33C001S**	**33.61527975**	**-114.687851**	335.40						5/28/2003	85.98	249.42	249.42
06S/22E-33C03S	**006S022E33C003S**	**33.6144881**	**-114.6839204**	335.70	117.1					5/28/2003	86.31	249.39	249.39
06S/22E-33C04S	**006S022E33C004S**	**33.6169547**	**-114.6878705**	338.20	108.4					3/29/2006	89.90	248.30	247.13
06S/22E-33C04S	**006S022E33C004S**	**33.6169547**	**-114.6878705**	338.20	108.4					5/16/2006	92.24	245.96	247.13
06S/22E-33C05S	**006S022E33C005S**	**33.6170158**	**-114.6871566**	337.10	124.5					3/29/2006	88.81	248.29	247.47
06S/22E-33C05S	**006S022E33C005S**	**33.6170158**	**-114.6871566**	337.10	124.5					5/16/2006	90.46	246.64	247.47
06S/22E-33C06S	**006S022E33C006S**	**33.6145492**	**-114.6865983**	337.80						3/29/2006	89.82	247.98	247.68
06S/22E-33C06S	**006S022E33C006S**	**33.6145492**	**-114.6865983**	337.80						5/16/2006	90.42	247.38	247.68
06S/22E-33F01S	**006S022E33F001S**	**33.6111215**	**-114.6848565**	334.90						9/26/1990	88.52	246.38	246.98
06S/22E-33F01S	**006S022E33F001S**	**33.6111215**	**-114.6848565**	334.90						3/28/1992	88.56	246.34	246.98
06S/22E-33F01S	**006S022E33F001S**	**33.6111215**	**-114.6848565**	334.90						1/26/2000	86.68	248.22	246.98
06S/22E-33F02S	**006S022E33F002S**	**33.61174929**	**-114.6865788**	336.90	110					5/28/2003	90.99	245.91	246.66
06S/22E-33F02S	**006S022E33F002S**	**33.61174929**	**-114.6865788**	336.90	110					3/29/2006	89.50	247.40	246.66
06S/22E-33F03S	**006S022E33F003S**	**33.6119104**	**-114.6841259**	336.20	110					5/28/2003	86.83	249.37	248.32
06S/22E-33F03S	**006S022E33F003S**	**33.6119104**	**-114.6841259**	336.20	110					3/29/2006	88.93	247.27	248.32
06S/22E-34C01S	**006S022E34C001S**	**33.61464646**	**-114.6675171**	338.00	122					9/24/1990	89.26	248.74	249.18
06S/22E-34C01S	**006S022E34C001S**	**33.61464646**	**-114.6675171**	338.00	122					1/24/2000	88.38	249.62	249.18
06S/22E-34F01S	**006S022E34F001S**	**33.6130798**	**-114.6699589**	336.00						9/24/1990	91.00	245.00	244.81
06S/22E-34F01S	**006S022E34F001S**	**33.6130798**	**-114.6699589**	336.00						3/29/1992	91.38	244.62	244.81

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	**STATE WELL NUMBER (USGS)**	**LATITUDE**	**LONGTUDE**	**Ground Surface Elevation**	**Total Depth**	**Depth to Top of Sample Interval**	**Elevation of the Top of Sample Interval**	**Depth to Bottom of Sample Interval**	**Elevation of the Bottom of Sample Interval**	**Depth to Groundwater**		**Groundwater Surface Elevation**	**Average Water Level**
		NAD83	**NAD83**	**feet-msl**	**feet-bgs**	**feet-bgs**	**feet-msl**	**feet-bgs**	**feet-msl**	**Date**	**feet-bgs**	**feet-msl**	**feet-msl**
06S/22E-34G01S	**006S022E34G001S**	**33.6103021**	**-114.6646809**	258.15	14					7/13/1971	9.90	248.25	248.25
06S/22E-34L01S	**006S022E34L001S**	**33.6083577**	**-114.6677365**	330.00	360	350	-20	360	-30	8/1/1972	93.00	237.00	237.00
06S/22E-34N01S	**006S022E34N001S**	**33.6028023**	**-114.6713477**	255.00						7/1/1971	7.00	248.00	248.00
06S/22E-34R02S	**006S022E34R002S**	**33.60363565**	**-114.6577362**	257.00						7/1/1971	9.00	248.00	248.00
06S/22E-35H02S	**006S022E35H002S**	**33.61110769**	**-114.6447359**	263.00	265					8/8/1984	10.33	252.67	252.92
06S/22E-35H02S	**006S022E35H002S**	**33.61110769**	**-114.6447359**	263.00	265					1/26/2000	9.83	253.17	252.92
06S/22E-35M01S	**006S022E35M001S**	**33.60919106**	**-114.6535694**	260.00	310	295	-35	310	-50	2/7/1962	7.00	253.00	253.00
06S/22E-35Q07S	**006S022E35Q007S**	**33.60291346**	**-114.6470969**	260.00	24.86					10/4/2000	10.11	249.89	249.89
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	10/31/1947	6.00	251.00	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	5/25/1961	6.96	250.04	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	7/6/1961	6.19	250.81	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	7/28/1961	6.30	250.70	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	8/24/1961	7.27	249.73	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	9/25/1961	7.16	249.84	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	10/18/1961	7.30	249.70	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	11/21/1961	7.24	249.76	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	12/20/1961	7.42	249.58	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	1/22/1962	7.96	249.04	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	2/15/1962	17.86	239.14	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	3/26/1962	6.81	250.19	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	4/23/1962	7.85	249.15	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	5/24/1962	6.62	250.38	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	6/21/1962	6.50	250.50	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	7/19/1962	7.90	249.10	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	8/16/1962	7.37	249.63	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	9/20/1962	6.66	250.34	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	10/11/1962	6.80	250.20	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	11/8/1962	6.97	250.03	249.39

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	12/13/1962	6.93	250.07	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	1/11/1963	7.82	249.18	249.39
06S/22E-35R01S	**006S022E35R001S**	**33.6040523**	**-114.6442358**	257.00	326	302	-45	326	-69	8/2/1972	9.20	247.80	249.39
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	11/18/1947	6.00	254.00	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	2/8/1957	7.42	252.58	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	5/25/1961	6.25	253.75	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	7/6/1961	5.98	254.02	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	7/28/1961	6.00	254.00	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	8/24/1961	7.24	252.76	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	9/25/1961	20.46	239.54	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	10/18/1961	8.07	251.93	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	11/21/1961	6.38	253.62	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	12/20/1961	6.65	253.35	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	1/22/1962	7.25	252.75	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	2/19/1962	7.60	252.40	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	3/26/1962	13.94	246.06	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	4/23/1962	9.98	250.02	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	5/25/1962	5.94	254.06	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	6/21/1962	12.89	247.11	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	7/19/1962	6.76	253.24	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	8/16/1962	21.00	239.00	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	9/20/1962	5.91	254.09	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	10/11/1962	6.02	253.98	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	10/23/1962	6.70	253.30	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	11/8/1962	6.26	253.74	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	12/13/1962	6.23	253.77	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	1/11/1963	7.20	252.80	251.53
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	8/1/1972	8.00	252.00	251.53

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/22E-35R02S	**006S022E35R002S**	**33.60294124**	**-114.6442635**	260.00	328	302	-42	326	-66	8/2/1972	8.10	251.90	251.53
06S/22E-35R05S	**006S022E35R005S**	**33.6050523**	**-114.6437913**	260.00	22.9					10/4/2000	9.15	250.85	250.85
06S/22E-35R06S	**006S022E35R006S**	**33.60355234**	**-114.644208**	260.00	19.17					10/4/2000	9.69	250.31	250.31
06S/22E-35R07S	**006S022E35R007S**	**33.603719**	**-114.6445413**	260.00	19.38					10/4/2000	9.95	250.05	250.05
06S/22E-36G18S	**006S022E36G018S**	**33.61260768**	**-114.6287632**	264.00						3/23/2004	10.69	253.31	253.31
06S/22E-36R01S	**006S022E36R001S**	**33.60280238**	**-114.6238463**	260.90	9					7/20/1971	5.66	255.24	255.24
06S/23E-03R01S	**006S023E03R001S**	**33.67668946**	**-114.5549562**	274.00						6/1/1971	6.00	268.00	268.00
06S/23E-04D01S	**006S023E04D001S**	**33.69030016**	**-114.5888463**	278.00						6/1/1971	8.00	270.00	270.00
06S/23E-04N01S	**006S023E04N001S**	**33.67613387**	**-114.5885683**	276.00						6/1/1971	6.00	270.00	270.00
06S/23E-04Q05S	**006S023E04Q005S**	**33.67652276**	**-114.5792347**	275.00						1/13/2005	10.57	264.43	264.43
06S/23E-05A01S	**006S023E05A001S**	**33.68863354**	**-114.5896796**	277.00						6/1/1971	7.00	270.00	270.00
06S/23E-05E01S	**006S023E05E001S**	**33.6866891**	**-114.6069023**	282.00						6/1/1971	16.00	266.00	266.00
06S/23E-05E03S	**006S023E05E003S**	**33.68338365**	**-114.6057633**	278.00						2/23/2000	11.06	266.94	266.94
06S/23E-05E04S	**006S023E05E004S**	**33.6834114**	**-114.60668**	278.00	62					4/19/1998	12.00	266.00	265.89
06S/23E-05E04S	**006S023E05E004S**	**33.6834114**	**-114.60668**	278.00	62					2/23/2000	12.23	265.77	265.89
06S/23E-05H01S	**006S023E05H001S**	**33.68668914**	**-114.5899574**	276.00						6/1/1971	5.00	271.00	271.00
06S/23E-05H02S	**006S023E05H002S**	**33.68668914**	**-114.5938464**	274.00						6/1/1971	7.00	267.00	267.00
06S/23E-05K01S	**006S023E05K001S**	**33.68280035**	**-114.5938463**	274.00						6/1/1971	7.00	267.00	267.00
06S/23E-05M01S	**006S023E05M001S**	**33.68280033**	**-114.603291**	272.00						6/1/1971	8.00	264.00	264.00
06S/23E-05N01S	**006S023E05N001S**	**33.67585606**	**-114.6069022**	270.00						6/1/1971	6.00	264.00	264.00
06S/23E-05P01S	**006S023E05P001S**	**33.67585607**	**-114.6027354**	271.00						7/1/1971	8.00	263.00	263.00
06S/23E-06M01S	**006S023E06M001S**	**33.68113367**	**-114.6244028**	269.00						6/1/1971	9.00	260.00	260.00
06S/23E-08B01S	**006S023E08B001S**	**33.67585609**	**-114.5938462**	273.00						7/1/1971	8.00	265.00	265.00
06S/23E-08E03S	**006S023E08E003S**	**33.67110619**	**-114.6063188**	273.00	61					4/28/1998	12.00	261.00	263.16
06S/23E-08E03S	**006S023E08E003S**	**33.67110619**	**-114.6063188**	273.00	61					2/24/2000	8.76	264.24	263.16
06S/23E-08E03S	**006S023E08E003S**	**33.67110619**	**-114.6063188**	273.00	61					4/7/2000	8.77	264.23	263.16
06S/23E-08H01S	**006S023E08H001S**	**33.6689118**	**-114.5932906**	275.00						6/1/1971	11.00	264.00	264.00
06S/23E-08L01S	**006S023E08L001S**	**33.66835627**	**-114.6021797**	271.00						7/1/1971	9.00	262.00	262.00

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	**STATE WELL NUMBER (USGS)**	**LATITUDE**	**LONGTUDE**	**Ground Surface Elevation**	**Total Depth**	**Depth to Top of Sample Interval**	**Elevation of the Top of Sample Interval**	**Depth to Bottom of Sample Interval**	**Elevation of the Bottom of Sample Interval**	**Depth to Groundwater**		**Groundwater Surface Elevation**	**Average Water Level**
		NAD83	**NAD83**	**feet-msl**	**feet-bgs**	**feet-bgs**	**feet-msl**	**feet-bgs**	**feet-msl**	**Date**	**feet-bgs**	**feet-msl**	**feet-msl**
06S/23E-08R01S	**006S023E08R001S**	**33.66168979**	**-114.5896793**	271.00						6/1/1971	9.00	262.00	262.00
06S/23E-09A01S	**006S023E09A001S**	**33.6758561**	**-114.5721789**	277.00						6/1/1971	8.00	269.00	269.00
06S/23E-09C01S	**006S023E09C001S**	**33.67563667**	**-114.5812903**	276.00						2/17/2005	11.20	264.80	264.80
06S/23E-10E01S	**006S023E10E001S**	**33.67252288**	**-114.5718733**	281.00						4/14/2004	10.25	270.75	270.75
06S/23E-10N01S	**006S023E10N001S**	**33.66224536**	**-114.5713454**	274.00						6/1/1971	10.00	264.00	264.00
06S/23E-11N01S	**006S023E11N001S**	**33.66224539**	**-114.5532893**	277.00						6/1/1971	10.00	267.00	267.00
06S/23E-11R01S	**006S023E11R001S**	**33.66252319**	**-114.5391222**	274.00						6/1/1971	6.00	268.00	268.00
06S/23E-12M01S	**006S023E12M001S**	**33.6696341**	**-114.5343444**	280.00						2/1/2000	18.94	261.06	261.06
06S/23E-12M07S	**006S023E12M007S**	**33.66860637**	**-114.5339277**	280.00						2/1/2000	19.05	260.95	260.95
06S/23E-12M10S	**006S023E12M010S**	**33.66810639**	**-114.5338443**	280.00	62					4/21/1998	17.00	263.00	262.11
06S/23E-12M10S	**006S023E12M010S**	**33.66810639**	**-114.5338443**	280.00	62					2/2/2000	18.78	261.22	262.11
06S/23E-12M12S	**006S023E12M012S**	**33.66741196**	**-114.534261**	280.00						2/4/2000	18.21	261.79	261.79
06S/23E-12M27S	**006S023E12M027S**	**33.66946746**	**-114.5335666**	280.00	47					5/25/2000	18.02	261.98	261.98
06S/23E-12M32S	**006S023E12M032S**	**33.66980079**	**-114.534511**	280.00	220					3/30/2000	19.11	260.89	260.89
06S/23E-12P14S	**006S023E12P014S**	**33.66427316**	**-114.5308998**	278.00	62					5/19/1999	14.00	264.00	264.00
06S/23E-12P41S	**006S023E12P041S**	**33.66441204**	**-114.5298442**	277.00	25					6/2/1997	10.00	267.00	267.00
06S/23E-13B01S	**006S023E13B001S**	**33.66182878**	**-114.5248162**	275.00						11/18/1999	18.11	256.89	256.89
06S/23E-13B02S	**006S023E13B002S**	**33.6608288**	**-114.5250662**	275.00	492					2/5/1997	17.00	258.00	256.97
06S/23E-13B02S	**006S023E13B002S**	**33.6608288**	**-114.5250662**	275.00	492					11/18/1999	19.06	255.94	256.97
06S/23E-14R01S	**006S023E14R001S**	**33.6480791**	**-114.536622**	272.00						7/1/1971	6.00	266.00	266.00
06S/23E-15D02S	**006S023E15D002S**	**33.6581899**	**-114.571012**	277.00						4/28/2004	10.25	266.75	266.75
06S/23E-15N01S	**006S023E15N001S**	**33.64724575**	**-114.5710674**	274.00						7/1/1971	9.00	265.00	265.00
06S/23E-15N03S	**006S023E15N003S**	**33.64869016**	**-114.567234**	275.00						1/25/2005	10.30	264.70	264.70
06S/23E-16E01S	**006S023E16E001S**	**33.65724547**	**-114.588568**	273.00	390					6/10/1966	8.00	265.00	265.00
06S/23E-17C02S	**006S023E17C002S**	**33.6610231**	**-114.6010129**	272.00	63					4/22/1998	5.00	267.00	267.00
06S/23E-17D02S	**006S023E17D002S**	**33.66071757**	**-114.6034852**	271.00	25.15					3/7/2000	10.94	260.06	260.06
06S/23E-17D03S	**006S023E17D003S**	**33.66063424**	**-114.6034575**	271.00	62					4/10/1998	5.00	266.00	266.00
06S/23E-17D04S	**006S023E17D004S**	**33.66099535**	**-114.602763**	271.00	62					4/8/1998	5.00	266.00	266.00

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/23E-17D05S	006S023E17D005S	33.66024536	-114.605902	271.00	62					4/11/1998	10.00	261.00	260.93
06S/23E-17D05S	006S023E17D005S	33.66024536	-114.605902	271.00	62					1/25/2000	10.15	260.85	260.93
06S/23E-17H01S	006S023E17H001S	33.65446775	-114.5932904	271.00						7/1/1971	7.00	264.00	264.00
06S/23E-17M01S	006S023E17M001S	33.65052339	-114.6054018	270.00						11/3/2004	9.80	260.20	260.20
06S/23E-17Q04S	006S023E17Q004S	33.64727349	-114.5964849	270.00	100					4/27/2000	10.06	259.94	259.94
06S/23E-17R01S	006S023E17R001S	33.6472457	-114.5891235	273.00						7/1/1971	9.00	264.00	264.00
06S/23E-18A01S	006S023E18A001S	33.66085645	-114.606902	271.00						8/1/1971	9.00	262.00	262.00
06S/23E-18D01S	006S023E18D001S	33.66057865	-114.6241247	267.00						8/1/1971	8.00	259.00	259.00
06S/23E-19P01S	006S023E19P001S	33.6319683	-114.6191242	268.00						7/1/1971	8.00	260.00	260.00
06S/23E-20D01S	006S023E20D001S	33.6433569	-114.6060684	268.00						7/1/1971	8.00	260.00	260.00
06S/23E-20J01S	006S023E20J001S	33.63946815	-114.5888457	272.00						7/1/1971	7.00	265.00	265.00
06S/23E-20J02S	006S023E20J002S	33.63946814	-114.5907902	272.00						7/1/1971	7.00	265.00	265.00
06S/23E-20J03S	006S023E20J003S	33.63946814	-114.5930124	269.00						7/1/1971	6.00	263.00	263.00
06S/23E-20N01S	006S023E20N001S	33.63224609	-114.6057905	271.00						7/1/1971	8.00	263.00	263.00
06S/23E-20P01S	006S023E20P001S	33.63255165	-114.5974847	270.00	28.25					3/20/1995	10.00	260.00	260.00
06S/23E-20P08S	006S023E20P008S	33.6324683	-114.5984847	273.00	25.2					11/16/2004	7.12	265.88	265.88
06S/23E-20R01S	006S023E20R001S	33.63196834	-114.5888456	271.00						7/1/1971	4.00	267.00	267.00
06S/23E-20R02S	006S023E20R002S	33.61919089	-114.5888454	273.00						7/1/1971	7.00	266.00	266.00
06S/23E-20R03S	006S023E20R003S	33.61919089	-114.5930122	273.00						7/1/1971	8.00	265.00	265.00
06S/23E-21C01S	006S023E21C001S	33.644468	-114.5844011	272.00						7/1/1971	7.00	265.00	265.00
06S/23E-21G01S	006S023E21G001S	33.6397459	-114.5796787	271.00						7/1/1971	3.00	268.00	268.00
06S/23E-21L01S	006S023E21L001S	33.63641268	-114.5821788	270.00						7/1/1971	6.00	264.00	264.00
06S/23E-21N01S	006S023E21N001S	33.63280166	-114.5862899	270.00						5/12/2004	10.20	259.80	259.80
06S/23E-21N02S	006S023E21N002S	33.63313498	-114.5865677	270.00						5/12/2004	6.44	263.56	263.56
06S/23E-22A01S	006S023E22A001S	33.646968	-114.554678	268.00						7/1/1971	3.00	265.00	265.00
06S/23E-22M06S	006S023E22M006S	33.63813488	-114.570484	269.60						4/14/2004	8.19	261.41	261.41
06S/23E-22R01S	006S023E22R001S	33.6328017	-114.555789	268.00						7/1/1971	6.00	262.00	262.00
06S/23E-25D01S	006S023E25D001S	33.63169065	-114.5352329	269.00						7/1/1971	7.00	262.00	262.00

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STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/23E-26R01S	006S023E26R001S	33.61919097	-114.5371772	270.00						7/1/1971	9.00	261.00	261.00
06S/23E-27C01S	006S023E27C001S	33.6325239	-114.5627337	272.00						6/1/1971	9.00	263.00	263.00
06S/23E-27D01S	006S023E27D001S	33.63196837	-114.5679005	270.00	62					4/27/1998	12.00	258.00	258.15
06S/23E-27D01S	006S023E27D001S	33.63196837	-114.5679005	270.00	62					1/27/2000	11.71	258.29	258.15
06S/23E-27E04S	006S023E27E004S	33.6256852	-114.5702727	270.90						4/13/2004	11.81	259.09	259.09
06S/23E-27R01S	006S023E27R001S	33.6186354	-114.5543999	266.00						7/1/1971	7.00	259.00	259.00
06S/23E-28A01S	006S023E28A001S	33.63224614	-114.572734	268.00						7/1/1971	5.00	263.00	263.00
06S/23E-28F02S	006S023E28F002S	33.6253574	-114.5813175	270.00						12/16/2004	11.66	258.34	258.34
06S/23E-28N01S	006S023E28N001S	33.6180798	-114.5860675	271.00						7/1/1971	9.00	262.00	262.00
06S/23E-28N02S	006S023E28N002S	33.62116307	-114.584123	270.00	592					12/20/1975	10.00	260.00	257.22
06S/23E-28N02S	006S023E28N002S	33.62116307	-114.584123	270.00	592					1/27/1997	15.20	254.80	257.22
06S/23E-28N02S	006S023E28N002S	33.62116307	-114.584123	270.00	592					11/18/1999	13.14	256.86	257.22
06S/23E-29B07S	006S023E29B007S	33.6318572	-114.5944013	271.00						11/16/2004	8.78	262.22	262.22
06S/23E-29C04S	006S023E29C004S	33.62874619	-114.5974569	271.00						5/19/2004	12.28	258.72	258.72
06S/23E-29E02S	006S023E29E002S	33.6287184	-114.6034849	270.00	158					8/20/1963	8.00	262.00	259.64
06S/23E-29E02S	006S023E29E002S	33.6287184	-114.6034849	270.00	158					1/11/2000	12.73	257.27	259.64
06S/23E-29N01S	006S023E29N001S	33.62113527	-114.6002347	270.00	266					8/1/1972	10.00	260.00	260.00
06S/23E-29N03S	006S023E29N003S	33.6213019	-114.6022069	270.00	682					9/12/1973	14.00	256.00	254.04
06S/23E-29N03S	006S023E29N003S	33.6213019	-114.6022069	270.00	682					1/28/1997	21.00	249.00	254.04
06S/23E-29N03S	006S023E29N003S	33.6213019	-114.6022069	270.00	682					9/2/1999	16.20	253.80	254.04
06S/23E-29N03S	006S023E29N003S	33.6213019	-114.6022069	270.00	682					11/18/1999	12.64	257.36	254.04
06S/23E-29R01S	006S023E29R001S	33.61946867	-114.5885676	270.00	382	264	6	354	-84	2/7/1961	11.40	258.60	245.38
06S/23E-29R01S	006S023E29R001S	33.61946867	-114.5885676	270.00	382	264	6	354	-84	8/3/1971	37.85	232.15	245.38
06S/23E-30K01S	006S023E30K001S	33.621413	-114.610235	269.00	690					10/4/1977	10.00	259.00	258.99
06S/23E-30K01S	006S023E30K001S	33.621413	-114.610235	269.00	690					6/27/1979	9.45	259.55	258.99
06S/23E-30K01S	006S023E30K001S	33.621413	-114.610235	269.00	690					7/26/1979	9.45	259.55	258.99
06S/23E-30K01S	006S023E30K001S	33.621413	-114.610235	269.00	690					7/23/1980	9.53	259.47	258.99
06S/23E-30K01S	006S023E30K001S	33.621413	-114.610235	269.00	690					1/23/1981	10.62	258.38	258.99

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STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/23E-30K01S	006S023E30K001S	33.621413	-114.610235	269.00	690					9/23/1981	9.37	259.63	258.99
06S/23E-30K01S	006S023E30K001S	33.621413	-114.610235	269.00	690					2/3/1982	10.62	258.38	258.99
06S/23E-30K01S	006S023E30K001S	33.621413	-114.610235	269.00	690					12/9/1982	9.81	259.19	258.99
06S/23E-30K01S	006S023E30K001S	33.621413	-114.610235	269.00	690					9/20/1983	9.77	259.23	258.99
06S/23E-30K01S	006S023E30K001S	33.621413	-114.610235	269.00	690					9/18/1984	9.92	259.08	258.99
06S/23E-30K01S	006S023E30K001S	33.621413	-114.610235	269.00	690					2/27/1985	10.78	258.22	258.99
06S/23E-30K01S	006S023E30K001S	33.621413	-114.610235	269.00	690					6/12/1985	10.75	258.25	258.99
06S/23E-30N01S	006S023E30N001S	33.6175242	-114.6227353	264.00						7/1/1971	7.00	257.00	257.00
06S/23E-31A01S	006S023E31A001S	33.61724648	-114.6060681	267.00						7/1/1971	8.00	259.00	259.00
06S/23E-31B01S	006S023E31B001S	33.6169687	-114.6119016	267.00	554					10/11/1972	6.00	261.00	256.98
06S/23E-31B01S	006S023E31B001S	33.6169687	-114.6119016	267.00	554					9/2/1999	12.20	254.80	256.98
06S/23E-31B01S	006S023E31B001S	33.6169687	-114.6119016	267.00	554					11/18/1999	11.85	255.15	256.98
06S/23E-31J01S	006S023E31J001S	33.6091078	-114.6082348	266.00	390	350	-84	380	-114	2/6/1962	4.50	261.50	261.50
06S/23E-32C02S	006S023E32C002S	33.61605207	-114.597179	269.00	602					3/21/1973	14.00	255.00	255.00
06S/23E-32D01S	006S023E32D001S	33.61724648	-114.6052348	268.00	316	122	146	168	100	7/30/1953	5.00	263.00	261.00
06S/23E-32D01S	006S023E32D001S	33.61724648	-114.6052348	268.00	316	122	146	168	100	2/7/1961	9.00	259.00	261.00
06S/23E-32E01S	006S023E32E001S	33.61280215	-114.6032902	267.00	660	421	-154	505	-238	2/1/1966	7.00	260.00	260.00
06S/23E-32F01S	006S023E32F001S	33.6130799	-114.5977345	268.00	188	128	140	168	100	4/20/1905	11.00	257.00	258.78
06S/23E-32F01S	006S023E32F001S	33.6130799	-114.5977345	268.00	188	128	140	168	100	5/24/1962	8.72	259.28	258.78
06S/23E-32F01S	006S023E32F001S	33.6130799	-114.5977345	268.00	188	128	140	168	100	6/20/1962	8.60	259.40	258.78
06S/23E-32F01S	006S023E32F001S	33.6130799	-114.5977345	268.00	188	128	140	168	100	7/20/1962	9.08	258.92	258.78
06S/23E-32F01S	006S023E32F001S	33.6130799	-114.5977345	268.00	188	128	140	168	100	8/16/1962	9.14	258.86	258.78
06S/23E-32F01S	006S023E32F001S	33.6130799	-114.5977345	268.00	188	128	140	168	100	10/10/1962	8.31	259.69	258.78
06S/23E-32F01S	006S023E32F001S	33.6130799	-114.5977345	268.00	188	128	140	168	100	11/8/1962	8.03	259.97	258.78
06S/23E-32F01S	006S023E32F001S	33.6130799	-114.5977345	268.00	188	128	140	168	100	12/13/1962	8.00	260.00	258.78
06S/23E-32F01S	006S023E32F001S	33.6130799	-114.5977345	268.00	188	128	140	168	100	1/10/1963	8.91	259.09	258.78
06S/23E-32F01S	006S023E32F001S	33.6130799	-114.5977345	268.00	188					8/1/1971	11.00	257.00	258.78
06S/23E-32F01S	006S023E32F001S	33.6130799	-114.5977345	268.00	188	128	140	168	100	8/3/1971	10.68	257.32	258.78

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STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/23E-32F02S	006S023E32F002S	33.61280215	-114.6007901	267.00	252					4/20/1905	12.00	255.00	250.43
06S/23E-32F02S	006S023E32F002S	33.61280215	-114.6007901	267.00	252					8/3/1971	21.15	245.85	250.43
06S/23E-32G01S	006S023E32G001S	33.61196885	-114.594401	270.00	190	112	158	144	126	10/1/1961	8.00	262.00	262.40
06S/23E-32G01S	006S023E32G001S	33.61196885	-114.594401	270.00	190	112	158	144	126	12/15/1961	7.20	262.80	262.40
06S/23E-32G02S	006S023E32G002S	33.61330215	-114.5949289	270.00	590	544	-274	560	-290	12/15/1961	8.09	261.91	261.96
06S/23E-32G02S	006S023E32G002S	33.61330215	-114.5949289	270.00	590	544	-274	560	-290	12/21/1961	8.00	262.00	261.96
06S/23E-32G03S	006S023E32G003S	33.61280216	-114.5949566	268.00	123.5					10/4/1949	10.00	258.00	258.00
06S/23E-32J01S	006S023E32J001S	33.6086356	-114.5902342	270.00	400	342	-72	366	-96	3/1/1958	11.50	258.50	258.50
06S/23E-32L01S	006S023E32L001S	33.60696897	-114.5988456	265.00	176					2/7/1961	8.50	256.50	256.50
06S/23E-32L02S	006S023E32L002S	33.6094689	-114.5985678	267.00						7/1/1971	11.00	256.00	256.00
06S/23E-32L03S	006S023E32L003S	33.6094689	-114.5991234	267.00	127					8/1/1972	11.00	256.00	256.00
06S/23E-32M01S	006S023E32M001S	33.60974668	-114.602179	267.00	300	310	-43	335	-68	2/7/1961	7.30	259.70	259.70
06S/23E-32P01S	006S023E32P001S	33.60421905	-114.5988455	265.00	430	245	20	290	-25	8/3/1971	20.75	244.25	249.08
06S/23E-32P01S	006S023E32P001S	33.60421905	-114.5988455	265.00	430	245	20	290	-25	11/4/1999	11.10	253.90	249.08
06S/23E-33A01S	006S023E33A001S	33.61780207	-114.5713449	267.00						7/1/1971	7.00	260.00	260.00
06S/23E-33D01S	006S023E33D001S	33.6152743	-114.587762	270.00	568					6/21/1974	11.00	259.00	257.22
06S/23E-33D01S	006S023E33D001S	33.6152743	-114.587762	270.00	568					11/17/1999	14.57	255.43	257.22
06S/23E-33E01S	006S023E33E001S	33.61113555	-114.5863452	270.00	368	290	-20	324	-54	8/2/1947	10.70	259.30	246.57
06S/23E-33E01S	006S023E33E001S	33.61113555	-114.5863452	270.00	368	290	-20	324	-54	8/3/1971	36.17	233.83	246.57
06S/23E-33F01S	006S023E33F001S	33.61316328	-114.5813729	270.00	464					5/31/1966	8.00	262.00	257.98
06S/23E-33F01S	006S023E33F001S	33.61316328	-114.5813729	270.00	464					7/26/1972	14.50	255.50	257.98
06S/23E-33F01S	006S023E33F001S	33.61316328	-114.5813729	270.00	464					11/19/1999	13.55	256.45	257.98
06S/23E-33G01S	006S023E33G001S	33.61424937	-114.5772895	270.20	600	500	-229.8	600	-329.8	4/30/1959	8.50	261.70	259.29
06S/23E-33G01S	006S023E33G001S	33.61424937	-114.5772895	270.20	600	500	-229.8	600	-329.8	2/7/1962	9.00	261.20	259.29
06S/23E-33G01S	006S023E33G001S	33.61424937	-114.5772895	270.20	600	500	-229.8	600	-329.8	11/19/1999	12.76	257.44	259.29
06S/23E-33G01S	006S023E33G001S	33.61424937	-114.5772895	270.20	600	500	-229.8	600	-329.8	4/18/2002	13.38	256.82	259.29
06S/23E-33K01S	006S023E33K001S	33.61008004	-114.5766783	267.00	408	351	-84	408	-141	6/22/1960	7.00	260.00	256.22
06S/23E-33K01S	006S023E33K001S	33.61008004	-114.5766783	267.00	408					7/1/1972	12.00	255.00	256.22

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
06S/23E-33K01S	006S023E33K001S	33.61008004	-114.5766783	267.00	408	351	-84	408	-141	7/20/1972	11.80	255.20	256.22
06S/23E-33K01S	006S023E33K001S	33.61008004	-114.5766783	267.00	408	351	-84	408	-141	11/19/1999	12.31	254.69	256.22
06S/23E-33M01S	006S023E33M001S	33.60983003	-114.5825673	270.00	306	70	200	306	-36	1/1/1949	8.00	262.00	258.26
06S/23E-33M01S	006S023E33M001S	33.60983003	-114.5825673	270.00	306	70	200	306	-36	11/19/1999	13.58	256.42	258.26
06S/23E-33M01S	006S023E33M001S	33.60983003	-114.5825673	270.00	306	70	200	306	-36	11/19/1999	13.64	256.36	258.26
06S/23E-33N01S	006S023E33N001S	33.60335797	-114.5871785	265.84	10.9					7/20/1971	10.43	255.41	255.41
06S/23E-34M01S	006S023E34M001S	33.60933007	-114.5680669	265.00	478					9/23/1966	4.50	260.50	260.50
06S/23E-34N01S	006S023E34N001S	33.6041913	-114.5705114	263.00						7/1/1971	7.00	256.00	256.00
06S/23E-35E01S	006S023E35E001S	33.61169114	-114.5510664	265.00	365.5					7/26/1979	9.04	255.96	255.88
06S/23E-35E01S	006S023E35E001S	33.61169114	-114.5510664	265.00	365.5					7/23/1980	8.59	256.41	255.88
06S/23E-35E01S	006S023E35E001S	33.61169114	-114.5510664	265.00	365.5					1/22/1981	9.85	255.15	255.88
06S/23E-35E01S	006S023E35E001S	33.61169114	-114.5510664	265.00	365.5					8/27/1981	8.30	256.70	255.88
06S/23E-35E01S	006S023E35E001S	33.61169114	-114.5510664	265.00	365.5					2/3/1982	10.24	254.76	255.88
06S/23E-35E01S	006S023E35E001S	33.61169114	-114.5510664	265.00	365.5					12/10/1982	9.73	255.27	255.88
06S/23E-35E01S	006S023E35E001S	33.61169114	-114.5510664	265.00	365.5					9/20/1983	7.76	257.24	255.88
06S/23E-35E01S	006S023E35E001S	33.61169114	-114.5510664	265.00	365.5					9/18/1984	7.72	257.28	255.88
06S/23E-35E01S	006S023E35E001S	33.61169114	-114.5510664	265.00	365.5					2/27/1985	9.36	255.64	255.88
06S/23E-35E01S	006S023E35E001S	33.61169114	-114.5510664	265.00	365.5					6/12/1985	8.66	256.34	255.88
06S/23E-35E01S	006S023E35E001S	33.61169114	-114.5510664	265.00	365.5					11/19/1999	11.05	253.95	255.88
06S/23E-35N01S	006S023E35N001S	33.60474687	-114.5510664	267.00						7/1/1971	12.00	255.00	255.00
06S/23E-35R02S	006S023E35R002S	33.6064135	-114.5363437	271.00						7/1/1971	13.00	258.00	258.00
06S/23E-36N01S	006S023E36N001S	33.60585798	-114.5335658	270.00	248					2/6/1962	16.23	253.77	254.89
06S/23E-36N01S	006S023E36N001S	33.60585798	-114.5335658	270.00	248					7/1/1972	14.00	256.00	254.89
06S/24E-18D01S	006S024E18D001S	33.66135658	-114.5179271	275.00	57					5/18/1993	16.00	259.00	259.00
07S/21E-01C01S	007S021E01C001S	33.60530494	-114.7382497	389.00						11/17/1992	145.59	243.41	244.43
07S/21E-01C01S	007S021E01C001S	33.60530494	-114.7382497	389.00						2/16/2000	144.39	244.61	244.43
07S/21E-01C01S	007S021E01C001S	33.60530494	-114.7382497	389.00						3/30/2006	144.24	244.76	244.43
07S/21E-01C01S	007S021E01C001S	33.60530494	-114.7382497	389.00						3/31/2006	144.07	244.93	244.43

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
07S/21E-02J01S	**007S021E02J001S**	**33.5953885**	**-114.7445247**	388.80						9/24/1990	149.25	239.55	242.55
07S/21E-02J01S	**007S021E02J001S**	**33.5953885**	**-114.7445247**	388.80						3/29/2006	144.71	244.09	242.55
07S/21E-02J01S	**007S021E02J001S**	**33.5953885**	**-114.7445247**	388.80						3/30/2006	144.78	244.02	242.55
07S/21E-02R01S	**007S021E02R001S**	**33.58855538**	**-114.7445135**	387.70						9/24/1990	146.22	241.48	242.38
07S/21E-02R01S	**007S021E02R001S**	**33.58855538**	**-114.7445135**	387.70						2/15/2000	144.43	243.27	242.38
07S/21E-05C02S	**007S021E05C002S**	**33.60282708**	**-114.8057073**	504.40						2/10/1992	255.28	249.12	248.27
07S/21E-05C02S	**007S021E05C002S**	**33.60282708**	**-114.8057073**	504.40						2/5/2002	256.18	248.22	248.27
07S/21E-05C02S	**007S021E05C002S**	**33.60282708**	**-114.8057073**	504.40						3/19/2002	256.59	247.81	248.27
07S/21E-05C02S	**007S021E05C002S**	**33.60282708**	**-114.8057073**	504.40						3/29/2006	256.28	248.12	248.27
07S/21E-05C02S	**007S021E05C002S**	**33.60282708**	**-114.8057073**	504.40						3/30/2006	256.34	248.06	248.27
07S/21E-12D01S	**007S021E12D001S**	**33.5883498**	**-114.7442774**	387.58	390					9/3/1965	130.00	257.58	250.18
07S/21E-12D01S	**007S021E12D001S**	**33.5883498**	**-114.7442774**	387.58	390					1/28/1966	139.15	248.43	250.18
07S/21E-12D01S	**007S021E12D001S**	**33.5883498**	**-114.7442774**	387.58	390					10/20/1966	139.46	248.12	250.18
07S/21E-12D01S	**007S021E12D001S**	**33.5883498**	**-114.7442774**	387.58	390					8/1/1972	141.00	246.58	250.18
07S/21E-12N01S	**007S021E12N001S**	**33.5740141**	**-114.7444105**	385.85						12/1/1944	140.00	245.85	243.18
07S/21E-12N01S	**007S021E12N001S**	**33.5740141**	**-114.7444105**	385.85						9/22/1990	145.03	240.82	243.18
07S/21E-12N01S	**007S021E12N001S**	**33.5740141**	**-114.7444105**	385.85						2/16/2000	142.98	242.87	243.18
07S/21E-14A01S	**007S021E14A001S**	**33.57384744**	**-114.7446522**	386.86						6/9/1961	139.66	247.20	247.10
07S/21E-14A01S	**007S021E14A001S**	**33.57384744**	**-114.7446522**	386.86						2/15/1962	139.20	247.66	247.10
07S/21E-14A01S	**007S021E14A001S**	**33.57384744**	**-114.7446522**	386.86						10/20/1966	139.20	247.66	247.10
07S/21E-14A01S	**007S021E14A001S**	**33.57384744**	**-114.7446522**	386.86						7/1/1971	141.00	245.86	247.10
07S/21E-14B01S	**007S021E14B001S**	**33.5739224**	**-114.7492885**	384.80						4/27/1905	140.00	244.80	245.36
07S/21E-14B01S	**007S021E14B001S**	**33.5739224**	**-114.7492885**	384.80						6/9/1961	137.06	247.74	245.36
07S/21E-14B01S	**007S021E14B001S**	**33.5739224**	**-114.7492885**	384.80						2/15/1962	138.00	246.80	245.36
07S/21E-14B01S	**007S021E14B001S**	**33.5739224**	**-114.7492885**	384.80						5/24/1962	139.80	245.00	245.36
07S/21E-14B01S	**007S021E14B001S**	**33.5739224**	**-114.7492885**	384.80						6/20/1962	139.90	244.90	245.36
07S/21E-14B01S	**007S021E14B001S**	**33.5739224**	**-114.7492885**	384.80						7/19/1962	139.81	244.99	245.36
07S/21E-14B01S	**007S021E14B001S**	**33.5739224**	**-114.7492885**	384.80						8/16/1962	139.75	245.05	245.36

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
07S/21E-14B01S	**007S021E14B001S**	**33.5739224**	**-114.7492885**	384.80						9/17/1962	139.70	245.10	245.36
07S/21E-14B01S	**007S021E14B001S**	**33.5739224**	**-114.7492885**	384.80						10/11/1962	139.82	244.98	245.36
07S/21E-14B01S	**007S021E14B001S**	**33.5739224**	**-114.7492885**	384.80						11/8/1962	139.82	244.98	245.36
07S/21E-14B01S	**007S021E14B001S**	**33.5739224**	**-114.7492885**	384.80						12/13/1962	139.84	244.96	245.36
07S/21E-14B01S	**007S021E14B001S**	**33.5739224**	**-114.7492885**	384.80						1/9/1963	139.82	244.98	245.36
07S/21E-14H01S	**007S021E14H001S**	**33.56670874**	**-114.747241**	379.52	900	700	-320.48	900	-520.48	3/1/1966	130.00	249.52	245.90
07S/21E-14H01S	**007S021E14H001S**	**33.56670874**	**-114.747241**	379.52	900	700	-320.48	900	-520.48	10/20/1966	132.90	246.62	245.90
07S/21E-14H01S	**007S021E14H001S**	**33.56670874**	**-114.747241**	379.52	900	700	-320.48	900	-520.48	8/1/1972	134.00	245.52	245.90
07S/21E-14H01S	**007S021E14H001S**	**33.56670874**	**-114.747241**	379.52	900	700	-320.48	900	-520.48	9/22/1990	137.60	241.92	245.90
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						9/23/1990	137.81	252.99	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						3/23/1992	137.73	253.07	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						3/29/2000	137.40	253.40	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						10/4/2000	137.46	253.34	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						12/14/2000	137.60	253.20	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						2/25/2001	139.27	251.53	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						4/17/2001	137.50	253.30	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						7/11/2001	137.53	253.27	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						11/7/2001	137.63	253.17	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						4/3/2002	137.39	253.41	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						10/2/2002	137.33	253.47	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						6/3/2003	137.28	253.52	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						11/5/2003	137.25	253.55	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						3/2/2004	137.41	253.39	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						8/4/2004	137.32	253.48	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						12/8/2004	137.36	253.44	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						4/15/2005	137.42	253.38	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						8/31/2005	137.57	253.23	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						1/27/2006	137.61	253.19	253.21

WELL DATA^1				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						3/30/2006	137.63	253.17	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						3/31/2006	137.63	253.17	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						5/5/2006	137.69	253.11	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						8/10/2006	137.64	253.16	253.21
07S/21E-15A01S	**007S021E15A001S**	**33.57386407**	**-114.7619555**	390.80						12/8/2006	137.61	253.19	253.21
07S/21E-27H01S	**007S021E27H001S**	**33.54123717**	**-114.7621023**	374.70						9/23/1990	135.12	239.58	239.64
07S/21E-27H01S	**007S021E27H001S**	**33.54123717**	**-114.7621023**	374.70						3/23/1992	135.01	239.69	239.64
07S/21E-36D01S	**007S021E36D001S**	**33.53029304**	**-114.7444044**	370.10						9/23/1990	133.34	236.76	236.55
07S/21E-36D01S	**007S021E36D001S**	**33.53029304**	**-114.7444044**	370.10						3/23/1992	133.77	236.33	236.55
07S/21E-36G01S	**007S021E36G001S**	**33.52400989**	**-114.732854**	247.40	16.47					1/1/2000	11.51	235.89	235.66
07S/21E-36G01S	**007S021E36G001S**	**33.52400989**	**-114.732854**	247.40	16.47					3/1/2000	11.67	235.73	235.66
07S/21E-36G01S	**007S021E36G001S**	**33.52400989**	**-114.732854**	247.40	16.47					4/1/2000	11.30	236.10	235.66
07S/21E-36G01S	**007S021E36G001S**	**33.52400989**	**-114.732854**	247.40	16.47					5/1/2000	10.53	236.87	235.66
07S/21E-36G01S	**007S021E36G001S**	**33.52400989**	**-114.732854**	247.40	16.47					6/1/2000	11.36	236.04	235.66
07S/21E-36G01S	**007S021E36G001S**	**33.52400989**	**-114.732854**	247.40	16.47					7/1/2000	10.85	236.55	235.66
07S/21E-36G01S	**007S021E36G001S**	**33.52400989**	**-114.732854**	247.40	16.47					8/1/2000	10.55	236.85	235.66
07S/21E-36G01S	**007S021E36G001S**	**33.52400989**	**-114.732854**	247.40	16.47					9/1/2000	10.92	236.48	235.66
07S/21E-36G01S	**007S021E36G001S**	**33.52400989**	**-114.732854**	247.40	16.47					10/1/2000	11.38	236.02	235.66
07S/21E-36G01S	**007S021E36G001S**	**33.52400989**	**-114.732854**	247.40	16.47					1/1/2006	12.58	234.82	235.66
07S/21E-36G01S	**007S021E36G001S**	**33.52400989**	**-114.732854**	247.40	16.47					2/1/2006	12.71	234.69	235.66
07S/21E-36G01S	**007S021E36G001S**	**33.52400989**	**-114.732854**	247.40	16.47					3/1/2006	12.80	234.60	235.66
07S/21E-36G01S	**007S021E36G001S**	**33.52400989**	**-114.732854**	247.40	16.47					4/1/2006	12.54	234.86	235.66
07S/21E-36G01S	**007S021E36G001S**	**33.52400989**	**-114.732854**	247.40	16.47					5/18/2006	12.85	234.55	235.66
07S/21E-36G01S	**007S021E36G001S**	**33.52400989**	**-114.732854**	247.40	16.47					5/19/2006	12.56	234.84	235.66
07S/21E-36R01S	**007S021E36R001S**	**33.51613788**	**-114.7307927**	239.00						8/1/1971	6.00	233.00	233.00
07S/22E-01D01S	**007S022E01D001S**	**33.60169128**	**-114.6399578**	261.00						7/1/1971	10.00	251.00	251.00
07S/22E-02R01S	**007S022E02R001S**	**33.58835829**	**-114.6405132**	257.00						7/1/1971	8.00	249.00	249.00
07S/22E-02R05S	**007S022E02R005S**	**33.59058046**	**-114.640541**	261.00						5/20/2004	7.54	253.46	253.46

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	**STATE WELL NUMBER (USGS)**	**LATITUDE**	**LONGTUDE**	**Ground Surface Elevation**	**Total Depth**	**Depth to Top of Sample Interval**	**Elevation of the Top of Sample Interval**	**Depth to Bottom of Sample Interval**	**Elevation of the Bottom of Sample Interval**	**Depth to Groundwater**		**Groundwater Surface Elevation**	**Average Water Level**
		NAD83	**NAD83**	**feet-msl**	**feet-bgs**	**feet-bgs**	**feet-msl**	**feet-bgs**	**feet-msl**	**Date**	**feet-bgs**	**feet-msl**	**feet-msl**
07S/22E-03D01S	**007S022E03D001S**	**33.60252**	**-114.67107**	260.00	49	45	215	49	211	3/30/1967	5.41	254.59	253.89
07S/22E-03D01S	**007S022E03D001S**	**33.60252**	**-114.67107**	260.00	49	45	215	49	211	6/1/1967	4.90	255.10	253.89
07S/22E-03D01S	**007S022E03D001S**	**33.60252**	**-114.67107**	260.00	49	45	215	49	211	6/10/1968	7.23	252.77	253.89
07S/22E-03D01S	**007S022E03D001S**	**33.60252**	**-114.67107**	260.00	49	45	215	49	211	8/2/1972	6.90	253.10	253.89
07S/22E-03D02S	**007S022E03D002S**	**33.60252**	**-114.67107**	260.00	20	18	242	20	240	3/30/1967	5.13	254.87	253.09
07S/22E-03D02S	**007S022E03D002S**	**33.60252**	**-114.67107**	260.00	20	18	242	20	240	6/1/1967	4.65	255.35	253.09
07S/22E-03D02S	**007S022E03D002S**	**33.60252**	**-114.67107**	260.00	20	18	242	20	240	6/10/1968	6.87	253.13	253.09
07S/22E-03D02S	**007S022E03D002S**	**33.60252**	**-114.67107**	260.00	20	18	242	20	240	8/2/1972	11.00	249.00	253.09
07S/22E-03H01S	**007S022E03H001S**	**33.59558**	**-114.65774**	255.00	118	114	141	118	137	3/30/1967	9.20	245.80	244.96
07S/22E-03H01S	**007S022E03H001S**	**33.59558**	**-114.65774**	255.00	118	114	141	118	137	6/1/1967	9.13	245.87	244.96
07S/22E-03H01S	**007S022E03H001S**	**33.59558**	**-114.65774**	255.00	118	114	141	118	137	6/10/1968	11.35	243.65	244.96
07S/22E-03H01S	**007S022E03H001S**	**33.59558**	**-114.65774**	255.00	118	114	141	118	137	8/2/1972	10.50	244.50	244.96
07S/22E-03H02S	**007S022E03H002S**	**33.59558**	**-114.65774**	255.00	22	20	235	22	233	3/30/1967	9.80	245.20	244.37
07S/22E-03H02S	**007S022E03H002S**	**33.59558**	**-114.65774**	255.00	22	20	235	22	233	6/1/1967	9.69	245.31	244.37
07S/22E-03H02S	**007S022E03H002S**	**33.59558**	**-114.65774**	255.00	22	20	235	22	233	6/10/1968	12.05	242.95	244.37
07S/22E-03H02S	**007S022E03H002S**	**33.59558**	**-114.65774**	255.00	22	20	235	22	233	8/2/1972	11.00	244.00	244.37
07S/22E-03L01S	**007S022E03L001S**	**33.59558029**	**-114.6705142**	257.00						7/1/1971	10.00	247.00	247.00
07S/22E-03N01S	**007S022E03N001S**	**33.588636**	**-114.6744031**	254.00						7/1/1971	9.00	245.00	245.00
07S/22E-04H01S	**007S022E04H001S**	**33.59558028**	**-114.6752366**	256.00						7/1/1971	11.00	245.00	245.00
07S/22E-04H02S	**007S022E04H002S**	**33.59585805**	**-114.677181**	256.00						7/1/1971	10.00	246.00	246.00
07S/22E-04P01S	**007S022E04P001S**	**33.5894693**	**-114.6844034**	310.00	156	118	192	136	174	9/25/1961	58.57	251.43	244.85
07S/22E-04P01S	**007S022E04P001S**	**33.5894693**	**-114.6844034**	310.00	156	118	192	136	174	10/18/1961	58.53	251.47	244.85
07S/22E-04P01S	**007S022E04P001S**	**33.5894693**	**-114.6844034**	310.00	156	118	192	136	174	11/21/1961	57.55	252.45	244.85
07S/22E-04P01S	**007S022E04P001S**	**33.5894693**	**-114.6844034**	310.00	156	118	192	136	174	12/20/1961	57.90	252.10	244.85
07S/22E-04P01S	**007S022E04P001S**	**33.5894693**	**-114.6844034**	310.00	156	118	192	136	174	1/22/1962	59.22	250.78	244.85
07S/22E-04P01S	**007S022E04P001S**	**33.5894693**	**-114.6844034**	310.00	156	118	192	136	174	2/19/1962	59.75	250.25	244.85
07S/22E-04P01S	**007S022E04P001S**	**33.5894693**	**-114.6844034**	310.00	156	118	192	136	174	3/26/1962	59.42	250.58	244.85
07S/22E-04P01S	**007S022E04P001S**	**33.5894693**	**-114.6844034**	310.00	156	118	192	136	174	4/23/1962	59.87	250.13	244.85

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
07S/22E-04P01S	007S022E04P001S	33.5894693	-114.6844034	310.00	156	118	192	136	174	5/25/1962	59.88	250.12	244.85
07S/22E-04P01S	007S022E04P001S	33.5894693	-114.6844034	310.00	156	118	192	136	174	6/21/1962	60.00	250.00	244.85
07S/22E-04P01S	007S022E04P001S	33.5894693	-114.6844034	310.00	156	118	192	136	174	7/19/1962	59.65	250.35	244.85
07S/22E-04P01S	007S022E04P001S	33.5894693	-114.6844034	310.00	156	118	192	136	174	8/16/1962	59.53	250.47	244.85
07S/22E-04P01S	007S022E04P001S	33.5894693	-114.6844034	310.00	156	118	192	136	174	9/17/1962	59.41	250.59	244.85
07S/22E-04P01S	007S022E04P001S	33.5894693	-114.6844034	310.00	156	118	192	136	174	10/11/1962	59.86	250.14	244.85
07S/22E-04P01S	007S022E04P001S	33.5894693	-114.6844034	310.00	156	118	192	136	174	11/8/1962	60.02	249.98	244.85
07S/22E-04P01S	007S022E04P001S	33.5894693	-114.6844034	310.00	156	118	192	136	174	12/13/1962	60.03	249.97	244.85
07S/22E-04P01S	007S022E04P001S	33.5894693	-114.6844034	310.00	156	118	192	136	174	1/9/1963	58.61	251.39	244.85
07S/22E-04P01S	007S022E04P001S	33.5895082	-114.684509	306.70	156					4/6/2006	63.17	243.53	244.85
07S/22E-04P01S	007S022E04P001S	33.5895082	-114.684509	306.70	156					4/7/2006	63.10	243.60	244.85
07S/22E-04P01S	007S022E04P001S	33.5895082	-114.684509	306.70	156					4/21/2010	63.40	243.30	244.85
07S/22E-04P01S	007S022E04P001S	33.5895082	-114.684509	306.70	156					4/21/2010	72.98	233.72	244.85
07S/22E-04P01S	007S022E04P001S	33.5895082	-114.684509	306.70	156					4/21/2010	74.12	232.58	244.85
07S/22E-04P01S	007S022E04P001S	33.5895082	-114.684509	306.70	156					4/21/2010	75.03	231.67	244.85
07S/22E-04P01S	007S022E04P001S	33.5895082	-114.684509	306.70	156					4/21/2010	75.97	230.73	244.85
07S/22E-04P01S	007S022E04P001S	33.5895082	-114.684509	306.70	156					4/21/2010	76.48	230.22	244.85
07S/22E-04P01S	007S022E04P001S	33.5895082	-114.684509	306.70	156					4/21/2010	76.93	229.77	244.85
07S/22E-04P01S	007S022E04P001S	33.5895082	-114.684509	306.70	156					4/21/2010	77.20	229.50	244.85
07S/22E-04Q01S	007S022E04Q001S	33.58891378	-114.6830145	275.00						5/1/1961	22.00	253.00	252.43
07S/22E-04Q01S	007S022E04Q001S	33.58891378	-114.6830145	275.00						5/25/1961	22.44	252.56	252.43
07S/22E-04Q01S	007S022E04Q001S	33.58891378	-114.6830145	275.00						7/6/1961	22.68	252.32	252.43
07S/22E-04Q01S	007S022E04Q001S	33.58891378	-114.6830145	275.00						7/28/1961	22.65	252.35	252.43
07S/22E-04Q01S	007S022E04Q001S	33.58891378	-114.6830145	275.00						8/24/1961	22.63	252.37	252.43
07S/22E-04Q01S	007S022E04Q001S	33.58891378	-114.6830145	275.00						9/25/1961	21.76	253.24	252.43
07S/22E-04Q01S	007S022E04Q001S	33.58891378	-114.6830145	275.00						10/18/1961	23.26	251.74	252.43
07S/22E-04Q01S	007S022E04Q001S	33.58891378	-114.6830145	275.00						11/21/1961	22.12	252.88	252.43
07S/22E-04Q01S	007S022E04Q001S	33.58891378	-114.6830145	275.00						12/20/1961	22.45	252.55	252.43

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
07S/22E-04Q01S	007S022E04Q001S	33.58891378	-114.6830145	275.00						1/22/1962	22.68	252.32	252.43
07S/22E-04Q01S	007S022E04Q001S	33.58891378	-114.6830145	275.00						2/19/1962	22.54	252.46	252.43
07S/22E-04Q01S	007S022E04Q001S	33.58891378	-114.6830145	275.00						3/26/1962	22.32	252.68	252.43
07S/22E-04Q01S	007S022E04Q001S	33.58891378	-114.6830145	275.00						4/23/1962	23.09	251.91	252.43
07S/22E-04Q01S	007S022E04Q001S	33.58891378	-114.6830145	275.00						5/25/1962	23.03	251.97	252.43
07S/22E-04Q01S	007S022E04Q001S	33.58891378	-114.6830145	275.00						6/21/1962	22.60	252.40	252.43
07S/22E-04Q01S	007S022E04Q001S	33.58891378	-114.6830145	275.00						7/19/1962	22.78	252.22	252.43
07S/22E-04Q01S	007S022E04Q001S	33.58891378	-114.6830145	275.00						8/16/1962	22.66	252.34	252.43
07S/22E-04Q01S	007S022E04Q001S	33.58891378	-114.6830145	275.00						9/17/1962	22.62	252.38	252.43
07S/22E-04Q02S	007S022E04Q002S	33.5889137	-114.7480164	255.00						7/1/1971	10.00	245.00	245.00
07S/22E-05R02S	007S022E05R002S	33.5886082	-114.6946204	330.20	600					5/20/1996	88.00	242.20	243.06
07S/22E-05R02S	007S022E05R002S	33.5886082	-114.6946204	330.20	600					2/15/2000	86.28	243.92	243.06
07S/22E-06L01S	007S022E06L001S	33.59533856	-114.718974	389.90						9/23/1990	147.57	242.33	242.33
07S/22E-08A01S	007S022E08A01S	33.58585829	-114.6932925	323.00						9/22/1990	88.33	234.67	234.67
07S/22E-08K01S	007S022E08K001S	33.58113619	-114.7005149	250.00						7/1/1971	8.00	242.00	242.00
07S/22E-08M01S	007S022E08M001S	33.58113618	-114.7052373	254.00						7/1/1971	12.00	242.00	242.00
07S/22E-09D01S	007S022E09D001S	33.5847472	-114.6916258	254.00						7/1/1971	10.00	244.00	244.00
07S/22E-09D02S	007S022E09D002S	33.58799157	-114.6906175	332.20						9/24/1990	95.25	236.95	236.95
07S/22E-09N01S	007S022E09N001S	33.57419194	-114.6913479	252.00						7/1/1971	9.00	243.00	243.00
07S/22E-10A01S	007S022E10A001S	33.58766384	-114.658986	255.00	25					4/6/1995	10.00	245.00	245.00
07S/22E-10R01S	007S022E10R001S	33.57419198	-114.657458	254.00						7/1/1971	7.00	247.00	247.00
07S/22E-11D01S	007S022E11D001S	33.5880805	-114.6569026	256.00						7/1/1971	10.00	246.00	246.00
07S/22E-11Q01S	007S022E11Q001S	33.57446976	-114.6480133	256.00	460					2/14/1961	7.72	248.28	248.28
07S/22E-11Q01S	007S022E11Q001S	33.57446976	-114.6480133	256.00	460					2/14/1962	7.72	248.28	248.28
07S/22E-12R01S	007S022E12R001S	33.57363648	-114.6227348	256.00						7/1/1971	5.00	251.00	251.00
07S/22E-13E01S	007S022E13E001S	33.57002545	-114.6355129	256.00						7/1/1971	7.00	249.00	249.00
07S/22E-13E02S	007S022E13E002S	33.56863659	-114.639124	253.00						7/1/1971	5.00	248.00	248.00
07S/22E-13E03S	007S022E13E003S	33.56669219	-114.6399574	256.00						7/1/1971	7.00	249.00	249.00

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
07S/22E-13F01S	007S022E13F001S	33.5666922	-114.635235	257.00						7/1/1971	8.00	249.00	249.00
07S/22E-13G01S	007S022E13G001S	33.56696998	-114.6302349	256.00						7/1/1971	9.00	247.00	247.00
07S/22E-13H01S	007S022E13H001S	33.5666922	-114.6269015	259.00						7/1/1971	10.00	249.00	249.00
07S/22E-13H02S	007S022E13H002S	33.57002546	-114.6269015	259.00						7/1/1971	10.00	249.00	249.00
07S/22E-13J02S	007S022E13J002S	33.56447005	-114.6263459	259.00						8/1/1971	9.00	250.00	250.00
07S/22E-13J03S	007S022E13J003S	33.56308119	-114.626068	259.00						8/1/1971	9.00	250.00	250.00
07S/22E-13J04S	007S022E13J004S	33.56447005	-114.622179	255.00						7/1/1971	11.00	244.00	244.00
07S/22E-13K01S	007S022E13K001S	33.5647478	-114.6302349	257.00						8/1/1971	10.00	247.00	247.00
07S/22E-13L01S	007S022E13L001S	33.5647478	-114.6349572	257.00						8/1/1971	10.00	247.00	247.00
07S/22E-13M01S	007S022E13M001S	33.5647478	-114.6399574	255.00						7/1/1971	8.00	247.00	247.00
07S/22E-13P01S	007S022E13P001S	33.56308118	-114.6349572	257.00						8/1/1971	10.00	247.00	247.00
07S/22E-13R01S	007S022E13R001S	33.56122013	-114.6226513	255.00	183					6/30/1978	5.00	250.00	250.00
07S/22E-14A01S	007S022E14A001S	33.57363646	-114.6402353	257.00						7/1/1971	7.00	250.00	250.00
07S/22E-14E01S	007S022E14E001S	33.56696994	-114.6566246	255.00						7/1/1971	10.00	245.00	245.00
07S/22E-14E02S	007S022E14E002S	33.5683588	-114.6571801	253.00						8/1/1971	6.00	247.00	247.00
07S/22E-14F01S	007S022E14F001S	33.56696995	-114.6524578	253.00						7/1/1971	8.00	245.00	245.00
07S/22E-14G01S	007S022E14G001S	33.56696996	-114.6480132	256.00						7/1/1971	12.00	244.00	244.00
07S/22E-14G02S	007S022E14G002S	33.56808104	-114.6480132	256.00						8/1/1971	9.00	247.00	247.00
07S/22E-14H01S	007S022E14H001S	33.56696996	-114.6441242	256.00						7/1/1971	7.00	249.00	249.00
07S/22E-14H02S	007S022E14H002S	33.5691921	-114.6438464	254.00						8/1/1971	6.00	248.00	248.00
07S/22E-14H03S	007S022E14H003S	33.56808104	-114.6438464	254.00						8/1/1971	7.00	247.00	247.00
07S/22E-14J01S	007S022E14J001S	33.5647478	-114.6441242	255.00						8/1/1971	8.00	247.00	247.00
07S/22E-14K01S	007S022E14K001S	33.56474779	-114.6485687	252.00						8/1/1971	12.00	240.00	240.00
07S/22E-14M01S	007S022E14M001S	33.5653033	-114.6566245	253.00						7/1/1971	8.00	245.00	245.00
07S/22E-14N01S	007S022E14N001S	33.5605812	-114.6566245	252.00						7/1/1971	6.00	246.00	246.00
07S/22E-14P01S	007S022E14P001S	33.56308116	-114.6524577	254.00						8/1/1971	9.00	245.00	245.00
07S/22E-14P02S	007S022E14P002S	33.56308117	-114.649402	253.00						8/1/1971	8.00	245.00	245.00
07S/22E-14P03S	007S022E14P003S	33.56308117	-114.6505132	253.00						8/1/1971	9.00	244.00	244.00

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
07S/22E-14Q01S	007S022E14Q001S	33.5628034	-114.6452353	255.00						8/1/1971	10.00	245.00	245.00
07S/22E-14Q02S	007S022E14Q002S	33.5628034	-114.6466242	255.00						8/1/1971	10.00	245.00	245.00
07S/22E-14Q03S	007S022E14Q003S	33.5628034	-114.6477354	255.00						8/1/1971	11.00	244.00	244.00
07S/22E-14Q04S	007S022E14Q004S	33.56308117	-114.6485687	254.00						8/1/1971	9.00	245.00	245.00
07S/22E-14R01S	007S022E14R001S	33.5628034	-114.6441241	255.00						8/1/1971	10.00	245.00	245.00
07S/22E-15B01S	007S022E15B001S	33.57030318	-114.6619025	254.00						8/1/1971	10.00	244.00	244.00
07S/22E-15D01S	007S022E15D001S	33.57391419	-114.6741252	252.00						7/1/1971	8.00	244.00	244.00
07S/22E-15E01S	007S022E15E001S	33.5669699	-114.6746806	253.00						8/1/1971	10.00	243.00	243.00
07S/22E-15E02S	007S022E15E002S	33.56863655	-114.6746807	252.00						8/1/1971	9.00	243.00	243.00
07S/22E-15F01S	007S022E15F001S	33.56696993	-114.6660693	253.00						8/1/1971	12.00	241.00	241.00
07S/22E-15F02S	007S022E15F002S	33.56835879	-114.6660693	254.00						8/1/1971	14.00	240.00	240.00
07S/22E-15H01S	007S022E15H001S	33.56696994	-114.6613469	255.00						8/1/1971	11.00	244.00	244.00
07S/22E-15H02S	007S022E15H002S	33.56835879	-114.6610691	254.00						8/1/1971	11.00	243.00	243.00
07S/22E-15J01S	007S022E15J001S	33.56308115	-114.661069	255.00						8/1/1971	11.00	244.00	244.00
07S/22E-15J02S	007S022E15J002S	33.56447	-114.661069	253.00						8/1/1971	9.00	244.00	244.00
07S/22E-15M02S	007S022E15M002S	33.56446999	-114.6710694	252.00						8/1/1971	10.00	242.00	242.00
07S/22E-15N01S	007S022E15N001S	33.5597479	-114.6710693	252.00						8/1/1971	10.00	242.00	242.00
07S/22E-15N02S	007S022E15N002S	33.56446999	-114.6707916	251.00						8/1/1971	10.00	241.00	241.00
07S/22E-16G01S	007S022E16G001S	33.5669699	-114.6791252	255.00						8/1/1971	10.00	245.00	245.00
07S/22E-16G02S	007S022E16G002S	33.5669699	-114.6827364	254.00						8/1/1971	11.00	243.00	243.00
07S/22E-16G03S	007S022E16G003S	33.56835877	-114.6830142	255.00						8/1/1971	11.00	244.00	244.00
07S/22E-16H01S	007S022E16H001S	33.56863654	-114.6785697	254.00						8/1/1971	10.00	244.00	244.00
07S/22E-16J01S	007S022E16J001S	33.5650255	-114.675514	250.00						8/1/1971	10.00	240.00	240.00
07S/22E-16J02S	007S022E16J002S	33.56280336	-114.6791252	254.00						8/1/1971	10.00	244.00	244.00
07S/22E-16J03S	007S022E16J003S	33.56446998	-114.6791252	253.00						8/1/1971	10.00	243.00	243.00
07S/22E-16K01S	007S022E16K001S	33.56446998	-114.6827364	253.00						8/1/1971	10.00	243.00	243.00
07S/22E-16L01S	007S022E16L001S	33.56580328	-114.683542	257.00	24.35					3/8/2001	11.31	245.69	245.69
07S/22E-16M01S	007S022E16M001S	33.56299779	-114.6902644	250.00	24.56					3/6/2001	11.04	238.96	238.96

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
07S/22E-17C01S	007S022E17C001S	33.57363638	-114.7010704	252.00						7/1/1971	10.00	242.00	242.00
07S/22E-17P01S	007S022E17P001S	33.55974786	-114.7044036	250.00						1/24/1961	6.85	243.15	242.58
07S/22E-17P01S	007S022E17P001S	33.55974786	-114.7044036	250.00						8/1/1972	8.00	242.00	242.58
07S/22E-18A01S	007S022E18A001S	33.57363637	-114.7110707	251.00						7/1/1971	9.00	242.00	242.00
07S/22E-18J01S	007S022E18J001S	33.56641434	-114.7135707	251.00						7/1/1971	10.00	241.00	241.00
07S/22E-18K01S	007S022E18K001S	33.56335886	-114.7138484	249.00						7/1/1971	8.00	241.00	241.00
07S/22E-18Q01S	007S022E18Q001S	33.55947007	-114.716904	248.00						7/1/1971	7.00	241.00	241.00
07S/22E-18R01S	007S022E18R001S	33.55966729	-114.7137011	251.50	17.81					1/1/2000	13.00	238.50	237.73
07S/22E-18R01S	007S022E18R001S	33.55966729	-114.7137011	251.50	17.81					3/1/2000	13.83	237.67	237.73
07S/22E-18R01S	007S022E18R001S	33.55966729	-114.7137011	251.50	17.81					4/1/2000	14.30	237.20	237.73
07S/22E-18R01S	007S022E18R001S	33.55966729	-114.7137011	251.50	17.81					4/26/2000	13.57	237.93	237.73
07S/22E-18R01S	007S022E18R001S	33.55966729	-114.7137011	251.50	17.81					5/1/2000	13.70	237.80	237.73
07S/22E-18R01S	007S022E18R001S	33.55966729	-114.7137011	251.50	17.81					6/1/2000	13.30	238.20	237.73
07S/22E-18R01S	007S022E18R001S	33.55966729	-114.7137011	251.50	17.81					7/1/2000	13.45	238.05	237.73
07S/22E-18R01S	007S022E18R001S	33.55966729	-114.7137011	251.50	17.81					8/1/2000	12.79	238.71	237.73
07S/22E-18R01S	007S022E18R001S	33.55966729	-114.7137011	251.50	17.81					9/1/2000	13.18	238.32	237.73
07S/22E-18R01S	007S022E18R001S	33.55966729	-114.7137011	251.50	17.81					2/1/2006	14.52	236.98	237.73
07S/22E-18R01S	007S022E18R001S	33.55966729	-114.7137011	251.50	17.81					3/1/2006	14.52	236.98	237.73
07S/22E-18R01S	007S022E18R001S	33.55966729	-114.7137011	251.50	17.81					4/1/2006	14.57	236.93	237.73
07S/22E-18R01S	007S022E18R001S	33.55966729	-114.7137011	251.50	17.81					5/1/2006	14.22	237.28	237.73
07S/22E-19A01S	007S022E19A001S	33.54530379	-114.7138482	248.00						7/1/1971	7.00	241.00	241.00
07S/22E-19K01S	007S022E19K001S	33.54875925	-114.7181456	247.70	14.35					1/1/2000	9.52	238.18	238.09
07S/22E-19K01S	007S022E19K001S	33.54875925	-114.7181456	247.70	14.35					3/1/2000	10.00	237.70	238.09
07S/22E-19K01S	007S022E19K001S	33.54875925	-114.7181456	247.70	14.35					4/1/2000	10.00	237.70	238.09
07S/22E-19K01S	007S022E19K001S	33.54875925	-114.7181456	247.70	14.35					5/1/2000	9.44	238.26	238.09
07S/22E-19K01S	007S022E19K001S	33.54875925	-114.7181456	247.70	14.35					5/9/2000	9.20	238.50	238.09
07S/22E-19K01S	007S022E19K001S	33.54875925	-114.7181456	247.70	14.35					6/1/2000	9.00	238.70	238.09
07S/22E-19K01S	007S022E19K001S	33.54875925	-114.7181456	247.70	14.35					7/1/2000	8.73	238.97	238.09

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
07S/22E-19K01S	007S022E19K001S	33.54875925	-114.7181456	247.70	14.35					8/1/2000	8.82	238.88	238.09
07S/22E-19K01S	007S022E19K001S	33.54875925	-114.7181456	247.70	14.35					9/1/2000	9.56	238.14	238.09
07S/22E-19K01S	007S022E19K001S	33.54875925	-114.7181456	247.70	14.35					10/1/2000	6.63	241.07	238.09
07S/22E-19K01S	007S022E19K001S	33.54875925	-114.7181456	247.70	14.35					1/1/2006	10.65	237.05	238.09
07S/22E-19K01S	007S022E19K001S	33.54875925	-114.7181456	247.70	14.35					2/1/2006	11.14	236.56	238.09
07S/22E-19K01S	007S022E19K001S	33.54875925	-114.7181456	247.70	14.35					4/1/2006	11.01	236.69	238.09
07S/22E-19K01S	007S022E19K001S	33.54875925	-114.7181456	247.70	14.35					5/1/2006	10.83	236.87	238.09
07S/22E-19N01S	007S022E19N001S	33.54578987	-114.7240735	253.50	22.58					1/1/2006	15.30	238.20	238.04
07S/22E-19N01S	007S022E19N001S	33.54578987	-114.7240735	253.50	22.58					2/1/2006	15.72	237.78	238.04
07S/22E-19N01S	007S022E19N001S	33.54578987	-114.7240735	253.50	22.58					4/1/2006	15.69	237.81	238.04
07S/22E-19N01S	007S022E19N001S	33.54578987	-114.7240735	253.50	22.58					5/1/2006	15.46	238.04	238.04
07S/22E-19N01S	007S022E19N001S	33.54578987	-114.7240735	253.50	22.58					5/18/2006	15.32	238.18	238.04
07S/22E-19N01S	007S022E19N001S	33.54578987	-114.7240735	253.50	22.58					5/19/2006	15.30	238.20	238.04
07S/22E-19Q01S	007S022E19Q001S	33.5456482	-114.7181372	248.90	11.45					1/1/2000	10.75	238.15	237.71
07S/22E-19Q01S	007S022E19Q001S	33.5456482	-114.7181372	248.90	11.45					3/1/2000	11.02	237.88	237.71
07S/22E-19Q01S	007S022E19Q001S	33.5456482	-114.7181372	248.90	11.45					4/1/2000	11.20	237.70	237.71
07S/22E-19Q01S	007S022E19Q001S	33.5456482	-114.7181372	248.90	11.45					4/26/2000	10.77	238.13	237.71
07S/22E-19Q01S	007S022E19Q001S	33.5456482	-114.7181372	248.90	11.45					4/26/2000	10.78	238.12	237.71
07S/22E-19Q01S	007S022E19Q001S	33.5456482	-114.7181372	248.90	11.45					6/1/2000	10.34	238.56	237.71
07S/22E-19Q01S	007S022E19Q001S	33.5456482	-114.7181372	248.90	11.45					7/1/2000	9.90	239.00	237.71
07S/22E-19Q01S	007S022E19Q001S	33.5456482	-114.7181372	248.90	11.45					8/1/2000	10.28	238.62	237.71
07S/22E-19Q01S	007S022E19Q001S	33.5456482	-114.7181372	248.90	11.45					9/1/2000	10.84	238.06	237.71
07S/22E-19Q01S	007S022E19Q001S	33.5456482	-114.7181372	248.90	11.45					1/1/2006	11.92	236.98	237.71
07S/22E-19Q01S	007S022E19Q001S	33.5456482	-114.7181372	248.90	11.45					2/1/2006	12.30	236.60	237.71
07S/22E-19Q01S	007S022E19Q001S	33.5456482	-114.7181372	248.90	11.45					3/1/2006	12.42	236.48	237.71
07S/22E-19Q01S	007S022E19Q001S	33.5456482	-114.7181372	248.90	11.45					4/1/2006	12.19	236.71	237.71
07S/22E-19Q01S	007S022E19Q001S	33.5456482	-114.7181372	248.90	11.45					5/1/2006	11.97	236.93	237.71
07S/22E-19R01S	007S022E19R001S	33.55947008	-114.7135706	250.00						8/1/1971	9.00	241.00	241.00

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
07S/22E-20Q01S	007S022E20Q001S	33.545026	-114.7005144	249.00						8/1/1971	9.00	240.00	240.00
07S/22E-21B01S	007S022E21B001S	33.55919235	-114.6788473	252.00						8/1/1971	8.00	244.00	244.00
07S/22E-21D01S	007S022E21D001S	33.55891456	-114.6913477	250.00						7/1/1971	9.00	241.00	241.00
07S/22E-21J01S	007S022E21J001S	33.55141477	-114.6771805	253.00						8/1/1971	10.00	243.00	243.00
07S/22E-21P03S	007S022E21P003S	33.54780375	-114.6827362	253.00						9/1/1971	11.00	242.00	242.00
07S/22E-21P04S	007S022E21P004S	33.54502604	-114.6863474	248.00						8/1/1971	5.00	243.00	243.00
07S/22E-21R01S	007S022E21R001S	33.5480815	-114.6782916	251.00						8/1/1971	10.00	241.00	241.00
07S/22E-22M01S	007S022E22M001S	33.5519703	-114.6741249	250.00						8/1/1971	9.00	241.00	241.00
07S/22E-22N01S	007S022E22N001S	33.54502606	-114.6741248	251.00						8/1/1971	11.00	240.00	240.00
07S/22E-22P01S	007S022E22P001S	33.5483593	-114.6702358	249.00						8/1/1971	9.00	240.00	240.00
07S/22E-23D05S	007S022E23D005S	33.55741464	-114.6570967	253.00	19.29					4/22/2003	11.05	241.95	241.95
07S/22E-24D01S	007S022E24D001S	33.55919239	-114.639124	252.00						7/1/1971	6.00	246.00	246.00
07S/22E-25A01S	007S022E25A001S	33.5441928	-114.621901	252.00						9/1/1971	7.00	245.00	245.00
07S/22E-27B01S	007S022E27B001S	33.5447483	-114.656902	251.00						8/1/1971	15.00	236.00	236.00
07S/22E-27C01S	007S022E27C001S	33.54474829	-114.6696802	250.00						8/1/1971	12.00	238.00	238.00
07S/22E-27L01S	007S022E27L001S	33.53752626	-114.6696801	246.00						8/1/1971	12.00	234.00	234.00
07S/22E-27L02S	007S022E27L002S	33.53752626	-114.6680134	245.00						8/1/1971	11.00	234.00	234.00
07S/22E-28D01S	007S022E28D001S	33.5444705	-114.6910697	248.00						8/1/1971	6.00	242.00	242.00
07S/22E-29H01S	007S022E29H001S	33.54002617	-114.6938475	249.00						8/1/1971	11.00	238.00	238.00
07S/22E-29R01S	007S022E29R001S	33.53058197	-114.6955141	246.00						8/1/1971	6.00	240.00	240.00
07S/22E-30B01S	007S022E30B001S	33.541415	-114.7177371	249.00						8/1/1971	10.00	239.00	239.00
07S/22E-30G01S	007S022E30G001S	33.53808175	-114.717737	248.00						8/1/1971	7.00	241.00	241.00
07S/22E-30P01S	007S022E30P001S	33.53058195	-114.7188481	245.00						8/1/1971	8.00	237.00	237.00
07S/22E-31Q01S	007S022E31Q001S	33.5158601	-114.717459	244.00						8/1/1971	8.00	236.00	236.00
07S/22E-33D01S	007S022E33D001S	33.53002643	-114.6919029	248.00						8/1/1971	7.00	241.00	241.00
07S/22E-33N01S	007S022E33N001S	33.5161379	-114.6910694	246.00						8/1/1971	10.00	236.00	236.00
07S/22E-34C01S	007S022E34C001S	33.53002646	-114.66968	243.00						8/1/1971	12.00	231.00	231.00
07S/22E-34H02S	007S022E34H002S	33.52530437	-114.6574574	245.00	101					8/1/1972	10.00	235.00	235.00

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
07S/22E-34H03S	007S022E34H003S	33.5248877	-114.6619853	243.00	1000					2/3/2000	13.00	230.00	230.00
07S/22E-34P01S	007S022E34P001S	33.51558239	-114.6691243	244.00						8/1/1971	16.00	228.00	228.00
07S/22E-35D01S	007S022E35D001S	33.53030424	-114.6560685	245.00						8/1/1971	11.00	234.00	234.00
07S/22E-35D03S	007S022E35D003S	33.5297209	-114.6534018	247.00	23.04					6/7/2002	12.56	234.44	234.44
07S/22E-35E10S	007S022E35E010S	33.52352664	-114.6536795	246.00	21.41					6/4/2002	13.91	232.09	232.09
07S/22E-35F01S	007S022E35F001S	33.5240266	-114.6531795	247.00	700					2/3/2000	13.00	234.00	234.00
07S/22E-35J01S	007S022E35J001S	33.52252668	-114.6432903	247.00						8/1/1971	12.00	235.00	235.00
07S/22E-35M03S	007S022E35M003S	33.52205446	-114.6574851	246.00	23.7					6/6/2002	12.28	233.72	233.72
07S/22E-36A01S	007S022E36A001S	33.53030427	-114.621623	253.00						9/1/1971	12.00	241.00	241.00
07S/22E-36D02S	007S022E36D002S	33.53002649	-114.6352346	249.00						8/1/1971	11.00	238.00	238.00
07S/22E-36F01S	007S022E36F001S	33.52280446	-114.6307899	250.00						8/1/1971	11.00	239.00	239.00
07S/22E-36F02S	007S022E36F002S	33.52522106	-114.6302622	249.00						4/17/2003	13.94	235.06	235.06
07S/23E-01D01S	007S023E01D001S	33.60221918	-114.5348714	272.20	32.9					9/19/1996	21.00	251.20	251.20
07S/23E-01D04S	007S023E01D004S	33.60258028	-114.5360937	274.00	33.2					9/19/1996	19.79	254.21	254.21
07S/23E-01D05S	007S023E01D005S	33.60258028	-114.5360937	272.50	87.2					9/19/1996	19.72	252.78	252.78
07S/23E-01D06S	007S023E01D006S	33.60258028	-114.5360937	272.30	136.2					9/19/1996	19.46	252.84	252.84
07S/23E-01D07S	007S023E01D007S	33.60069144	-114.5356492	270.00	60					3/21/2002	21.09	248.91	248.91
07S/23E-02H01S	007S023E02H001S	33.59935814	-114.5373714	275.00	53					5/24/1993	16.00	259.00	255.09
07S/23E-02H01S	007S023E02H001S	33.59935814	-114.5373714	275.00	53					9/13/2000	21.18	253.82	255.09
07S/23E-02H01S	007S023E02H001S	33.59935814	-114.5373714	275.00	53					9/13/2000	21.22	253.78	255.09
07S/23E-02H01S	007S023E02H001S	33.59935814	-114.5373714	275.00	53					9/13/2000	21.26	253.74	255.09
07S/23E-03C01S	007S023E03C001S	33.60085807	-114.5641222	265.00	24					4/12/1990	7.00	258.00	258.00
07S/23E-03D01S	007S023E03D001S	33.6030802	-114.5705114	260.00	24					4/12/1990	4.00	256.00	256.00
07S/23E-03D02S	007S023E03D002S	33.6003025	-114.5671779	265.00	24					4/12/1990	7.00	258.00	258.00
07S/23E-03N01S	007S023E03N001S	33.58919169	-114.5702334	262.00						7/1/1971	8.00	254.00	254.00
07S/23E-03R01S	007S023E03R001S	33.5891917	-114.555233	267.00						7/1/1971	11.00	256.00	256.00
07S/23E-04D01S	007S023E04D001S	33.60241356	-114.5836784	268.00	500					5/9/1973	13.00	255.00	255.65
07S/23E-04D01S	007S023E04D001S	33.60241356	-114.5836784	268.00	500					7/26/1979	11.50	256.50	255.65

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
07S/23E-04D01S	007S023E04D001S	33.60241356	-114.5836784	268.00	500					7/23/1980	12.24	255.76	255.65
07S/23E-04D01S	007S023E04D001S	33.60241356	-114.5836784	268.00	500					1/22/1981	13.43	254.57	255.65
07S/23E-04D01S	007S023E04D001S	33.60241356	-114.5836784	268.00	500					8/27/1981	11.34	256.66	255.65
07S/23E-04D01S	007S023E04D001S	33.60241356	-114.5836784	268.00	500					2/3/1982	12.99	255.01	255.65
07S/23E-04D01S	007S023E04D001S	33.60241356	-114.5836784	268.00	500					12/10/1982	12.52	255.48	255.65
07S/23E-04D01S	007S023E04D001S	33.60241356	-114.5836784	268.00	500					9/20/1983	12.54	255.46	255.65
07S/23E-04D01S	007S023E04D001S	33.60241356	-114.5836784	268.00	500					9/18/1984	11.79	256.21	255.65
07S/23E-04D01S	007S023E04D001S	33.60241356	-114.5836784	268.00	500					2/27/1985	12.39	255.61	255.65
07S/23E-04D01S	007S023E04D001S	33.60241356	-114.5836784	268.00	500					6/12/1985	12.16	255.84	255.65
07S/23E-05C01S	007S023E05C001S	33.60071914	-114.5991233	265.00	340					11/9/1978	12.00	253.00	253.00
07S/23E-05D01S	007S023E05D001S	33.6000247	-114.6019011	265.00	200					3/16/1955	8.00	257.00	257.07
07S/23E-05D01S	007S023E05D001S	33.6000247	-114.6019011	265.00	200					7/1/1972	8.00	257.00	257.07
07S/23E-05D01S	007S023E05D001S	33.6000247	-114.6019011	265.00	200					7/25/1972	7.80	257.20	257.07
07S/23E-05D02S	007S023E05D002S	33.6000247	-114.6019011	265.00	142					2/7/1962	8.00	257.00	257.00
07S/23E-05E01S	007S023E05E001S	33.59502484	-114.6021789	265.00						2/15/1962	14.00	251.00	251.00
07S/23E-05F01S	007S023E05F001S	33.59863586	-114.5996788	267.00	109					6/13/1951	7.00	260.00	260.00
07S/23E-05M03S	007S023E05M003S	33.59524705	-114.6020955	265.00						10/19/2000	11.91	253.09	253.09
07S/23E-05N02S	007S023E05N002S	33.58994163	-114.6023732	265.00	60					5/28/1993	11.00	254.00	254.46
07S/23E-05N02S	007S023E05N002S	33.58994163	-114.6023732	265.00	60					9/12/2000	10.08	254.92	254.46
07S/23E-05R01S	007S023E05R001S	33.5889139	-114.5880117	262.00	11.9					7/16/1971	9.45	252.55	252.55
07S/23E-06A01S	007S023E06A001S	33.6028024	-114.6057902	262.00						7/1/1971	8.00	254.00	254.00
07S/23E-06N01S	007S023E06N001S	33.5883583	-114.6224571	259.36	8.3					7/16/1971	6.82	252.54	252.54
07S/23E-06Q05S	007S023E06Q005S	33.5887194	-114.6125402	263.00	10.47					5/26/2004	4.06	258.94	258.93
07S/23E-06Q05S	007S023E06Q005S	33.5887194	-114.6125402	263.00	10.47					5/26/2004	4.08	258.92	258.93
07S/23E-06R01S	007S023E06R001S	33.5886361	-114.6055122	258.00						7/1/1971	8.00	250.00	250.00
07S/23E-08C01S	007S023E08C001S	33.58655284	-114.5965397	262.00	194					4/7/1977	10.00	252.00	252.00
07S/23E-08E01S	007S023E08E001S	33.584414	-114.6025399	265.00	140					3/26/1993	11.00	254.00	254.00
07S/23E-08R01S	007S023E08R001S	33.5744698	-114.587456	257.62	9					7/9/1971	8.65	248.97	248.97

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
07S/23E-08R03S	007S023E08R003S	33.5761642	-114.5892616	260.00	53					10/15/1992	10.00	250.00	250.00
07S/23E-09D01S	007S023E09D001S	33.58838614	-114.5859283	260.00	10.31					5/25/2004	8.24	251.76	251.75
07S/23E-09D01S	007S023E09D001S	33.58838614	-114.5859283	260.00	10.31					5/25/2004	8.25	251.75	251.75
07S/23E-09D01S	007S023E09D001S	33.58838614	-114.5859283	260.00	10.31					5/25/2004	8.26	251.74	251.75
07S/23E-11K02S	007S023E11K002S	33.5803586	-114.5428714	260.00	32.2					6/11/2002	11.61	248.39	248.39
07S/23E-11K03S	007S023E11K003S	33.58005307	-114.543927	259.00	36.15					6/11/2002	13.25	245.75	245.75
07S/23E-11P01S	007S023E11P001S	33.5771087	-114.5443992	260.00	33.7					5/14/2002	11.43	248.57	248.57
07S/23E-11P02S	007S023E11P002S	33.57508098	-114.546927	265.00	43.72					5/14/2002	14.67	250.33	250.33
07S/23E-14B03S	007S023E14B003S	33.57252549	-114.5436213	260.00	28.61					4/17/2002	11.02	248.98	248.98
07S/23E-14C04S	007S023E14C004S	33.57135885	-114.5442324	265.00	85					4/17/2002	16.08	248.92	248.92
07S/23E-14C07S	007S023E14C007S	33.5723866	-114.5448436	264.00	21.85					4/17/2002	12.44	251.56	251.56
07S/23E-14C08S	007S023E14C008S	33.5723866	-114.5448436	264.00						4/17/2002	11.72	252.28	252.28
07S/23E-14C11S	007S023E14C011S	33.57255327	-114.5448714	263.00	35.65					4/17/2002	11.72	251.28	251.28
07S/23E-14C12S	007S023E14C012S	33.57255327	-114.5448714	263.00	25.63					4/17/2002	11.62	251.38	251.38
07S/23E-14C14S	007S023E14C014S	33.5740532	-114.5443158	261.00	23.97					4/18/2002	12.42	248.58	248.58
07S/23E-14C16S	007S023E14C016S	33.5729977	-114.5448714	263.00	35.05					4/18/2002	11.96	251.04	251.04
07S/23E-14C19S	007S023E14C019S	33.573331	-114.545038	263.00	24.54					4/18/2002	12.37	250.63	250.63
07S/23E-14C19S	007S023E14C019S	33.573331	-114.545038	263.00	24.54					4/18/2002	12.38	250.62	250.63
07S/23E-14C21S	007S023E14C021S	33.57338658	-114.5454547	263.00	25.75					4/18/2002	11.86	251.14	251.14
07S/23E-14C22S	007S023E14C022S	33.57338658	-114.5454547	263.00	35.1					4/18/2002	11.74	251.26	251.26
07S/23E-14C28S	007S023E14C028S	33.57374768	-114.5463714	265.00	24.7					5/14/2002	13.55	251.45	251.45
07S/23E-14F03S	007S023E14F003S	33.57010888	-114.544149	264.00	43.1					4/16/2002	16.09	247.91	247.91
07S/23E-14F05S	007S023E14F005S	33.5703311	-114.5441213	265.00	35.17					4/16/2002	15.57	249.43	249.43
07S/23E-14F08S	007S023E14F008S	33.5705533	-114.5440935	266.00	34.17					4/16/2002	15.69	250.31	250.31
07S/23E-14F10S	007S023E14F010S	33.57077553	-114.544038	266.00	35.3					4/6/2002	24.16	241.84	241.84
07S/23E-14F11S	007S023E14F011S	33.5709422	-114.5441213	266.00	24.15					4/16/2002	18.29	247.71	247.71
07S/23E-14F12S	007S023E14F012S	33.5709422	-114.5441213	266.00	38.15					4/16/2002	16.05	249.95	249.95
07S/23E-14G08S	007S023E14G008S	33.57121997	-114.5428713	261.00	22.68					5/13/2002	9.90	251.10	251.10

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
07S/23E-14G10S	007S023E14G010S	33.57121997	-114.5428713	261.00	24.49					5/13/2002	9.52	251.48	251.48
07S/23E-15A01S	007S023E15A001S	33.57446987	-114.5557884	264.75	13.3					7/9/1971	12.35	252.40	252.40
07S/23E-15N01S	007S023E15N001S	33.56002578	-114.5693997	258.24	11.6					7/20/1971	10.82	247.42	247.42
07S/23E-16A01S	007S023E16A001S	33.57419208	-114.573011	258.93	11					7/9/1971	9.12	249.81	249.81
07S/23E-16C01S	007S023E16C001S	33.5735532	-114.5792335	260.00	120					9/12/1973	5.00	255.00	255.00
07S/23E-17D01S	007S023E17D001S	33.57163655	-114.6044286	255.00	176					8/20/1951	7.00	248.00	248.00
07S/23E-17D02S	007S023E17D002S	33.57391427	-114.6046787	256.00						7/1/1971	8.00	248.00	248.00
07S/23E-17N01S	007S023E17N001S	33.55974797	-114.6041229	255.00						7/1/1971	7.00	248.00	248.00
07S/23E-17R01S	007S023E17R001S	33.56002576	-114.587178	256.00						7/1/1971	9.00	247.00	247.00
07S/23E-18E01S	007S023E18E001S	33.5678033	-114.6219013	254.00						7/1/1971	4.00	250.00	250.00
07S/23E-18F01S	007S023E18F001S	33.56696999	-114.617179	256.00						7/1/1971	7.00	249.00	249.00
07S/23E-18M01S	007S023E18M001S	33.56613667	-114.6219013	260.00						7/1/1971	10.00	250.00	250.00
07S/23E-18N01S	007S023E18N001S	33.560859	-114.6219012	253.00						9/1/1971	5.00	248.00	248.00
07S/23E-21H01S	007S023E21H001S	33.5519704	-114.5705108	260.00	400					2/15/1962	12.00	248.00	248.00
07S/23E-21N01S	007S023E21N001S	33.5455817	-114.5824555	259.80	16.3					9/1/1971	13.32	246.48	246.48
07S/23E-22N01S	007S023E22N001S	33.5455817	-114.5691218	260.00						9/1/1971	7.00	253.00	253.00
07S/23E-27A01S	007S023E27A001S	33.5455817	-114.5521768	264.00						9/1/1971	13.00	251.00	251.00
07S/23E-27N01S	007S023E27N001S	33.53113764	-114.5688438	257.00						9/1/1971	7.00	250.00	250.00
07S/23E-29D01S	007S023E29D001S	33.54474836	-114.6035672	255.00	353					5/25/1961	10.00	245.00	245.00
07S/23E-29N01S	007S023E29N001S	33.53058206	-114.6032892	255.42	16.8					9/1/1971	14.70	240.72	240.72
07S/23E-30A01S	007S023E30A001S	33.54474836	-114.6041228	255.00						9/1/1971	10.00	245.00	245.00
07S/23E-30M01S	007S023E30M001S	33.536193	-114.6207342	252.00						4/16/2003	14.92	237.08	237.08
07S/23E-31N01S	007S023E31N001S	33.51558244	-114.6166228	253.00						9/1/1971	15.00	238.00	238.00
07S/23E-33D01S	007S023E33D001S	33.53058208	-114.5821775	259.00						9/1/1971	11.00	248.00	248.00
07S/23E-34P01S	007S023E34P001S	33.51633247	-114.564399	256.00	438					9/27/1990	16.98	239.02	239.01
07S/23E-34P01S	007S023E34P001S	33.51633247	-114.564399	256.00	438					3/30/2000	17.00	239.00	239.01
08S/21E-01Q01S	008S021E01Q001S	33.50780476	-114.7346816	244.00						8/1/1971	13.00	231.00	231.00
08S/21E-01Q02S	008S021E01Q002S	33.5080992	-114.735251	244.30	16.73					1/1/2006	12.67	231.63	231.44

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
08S/21E-01Q02S	008S021E01Q002S	33.5080992	-114.735251	244.30	16.73					2/1/2006	13.16	231.14	231.44
08S/21E-01Q02S	008S021E01Q002S	33.5080992	-114.735251	244.30	16.73					3/1/2006	13.21	231.09	231.44
08S/21E-01Q02S	008S021E01Q002S	33.5080992	-114.735251	244.30	16.73					4/1/2006	13.14	231.16	231.44
08S/21E-01Q02S	008S021E01Q002S	33.5080992	-114.735251	244.30	16.73					5/1/2006	12.77	231.53	231.44
08S/21E-01Q02S	008S021E01Q002S	33.5080992	-114.735251	244.30	16.73					5/18/2006	12.63	231.67	231.44
08S/21E-01Q02S	008S021E01Q002S	33.5080992	-114.735251	244.30	16.73					5/19/2006	12.45	231.85	231.44
08S/21E-12E01S	008S021E12E001S	33.50002719	-114.7360705	241.44	15					11/25/1980	11.54	229.90	230.33
08S/21E-12E01S	008S021E12E001S	33.50002719	-114.7360705	241.44	15					12/19/1980	10.99	230.45	230.33
08S/21E-12E01S	008S021E12E001S	33.50002719	-114.7360705	241.44	15					1/5/1981	11.00	230.44	230.33
08S/21E-12E01S	008S021E12E001S	33.50002719	-114.7360705	241.44	15					1/12/1981	11.09	230.35	230.33
08S/21E-12E01S	008S021E12E001S	33.50002719	-114.7360705	241.44	15					2/2/1981	11.70	229.74	230.33
08S/21E-12E01S	008S021E12E001S	33.50002719	-114.7360705	241.44	15					2/4/1981	11.52	229.92	230.33
08S/21E-12E01S	008S021E12E001S	33.50002719	-114.7360705	241.44	15					2/11/1981	11.85	229.59	230.33
08S/21E-12E01S	008S021E12E001S	33.50002719	-114.7360705	241.44	15					2/13/1981	11.80	229.64	230.33
08S/21E-12E01S	008S021E12E001S	33.50002719	-114.7360705	241.44	15					2/18/1981	11.20	230.24	230.33
08S/21E-12E01S	008S021E12E001S	33.50002719	-114.7360705	241.44	15					2/25/1981	10.32	231.12	230.33
08S/21E-12E01S	008S021E12E001S	33.50002719	-114.7360705	241.44	15					3/31/1981	10.03	231.41	230.33
08S/21E-12E01S	008S021E12E001S	33.50002719	-114.7360705	241.44	15					5/21/1981	10.28	231.16	230.33
08S/21E-12E02S	008S021E12E002S	33.50002719	-114.7360705	241.69	25					11/25/1980	11.77	229.92	230.26
08S/21E-12E02S	008S021E12E002S	33.50002719	-114.7360705	241.69	25					12/19/1980	11.24	230.45	230.26
08S/21E-12E02S	008S021E12E002S	33.50002719	-114.7360705	241.69	25					1/5/1981	12.00	229.69	230.26
08S/21E-12E02S	008S021E12E002S	33.50002719	-114.7360705	241.69	25					1/12/1981	11.34	230.35	230.26
08S/21E-12E02S	008S021E12E002S	33.50002719	-114.7360705	241.69	25					2/2/1981	11.25	230.44	230.26
08S/21E-12E02S	008S021E12E002S	33.50002719	-114.7360705	241.69	25					2/4/1981	11.78	229.91	230.26
08S/21E-12E02S	008S021E12E002S	33.50002719	-114.7360705	241.69	25					2/11/1981	12.15	229.54	230.26
08S/21E-12E02S	008S021E12E002S	33.50002719	-114.7360705	241.69	25					2/13/1981	12.15	229.54	230.26
08S/21E-12E02S	008S021E12E002S	33.50002719	-114.7360705	241.69	25					2/18/1981	11.50	230.19	230.26
08S/21E-12E02S	008S021E12E002S	33.50002719	-114.7360705	241.69	25					2/25/1981	10.62	231.07	230.26

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
08S/21E-12E02S	008S021E12E002S	33.50002719	-114.7360705	241.69	25					3/31/1981	10.34	231.35	230.26
08S/21E-12E02S	008S021E12E002S	33.50002719	-114.7360705	241.69	25					5/21/1981	10.97	230.72	230.26
08S/21E-12E03S	008S021E12E003S	33.50002719	-114.7360705	241.92	40					11/25/1980	11.73	230.19	230.29
08S/21E-12E03S	008S021E12E003S	33.50002719	-114.7360705	241.92	40					12/19/1980	11.48	230.44	230.29
08S/21E-12E03S	008S021E12E003S	33.50002719	-114.7360705	241.92	40					1/5/1981	11.50	230.42	230.29
08S/21E-12E03S	008S021E12E003S	33.50002719	-114.7360705	241.92	40					1/12/1981	11.57	230.35	230.29
08S/21E-12E03S	008S021E12E003S	33.50002719	-114.7360705	241.92	40					2/2/1981	12.20	229.72	230.29
08S/21E-12E03S	008S021E12E003S	33.50002719	-114.7360705	241.92	40					2/4/1981	12.03	229.89	230.29
08S/21E-12E03S	008S021E12E003S	33.50002719	-114.7360705	241.92	40					2/11/1981	12.40	229.52	230.29
08S/21E-12E03S	008S021E12E003S	33.50002719	-114.7360705	241.92	40					2/13/1981	12.35	229.57	230.29
08S/21E-12E03S	008S021E12E003S	33.50002719	-114.7360705	241.92	40					2/18/1981	11.70	230.22	230.29
08S/21E-12E03S	008S021E12E003S	33.50002719	-114.7360705	241.92	40					2/25/1981	10.85	231.07	230.29
08S/21E-12E03S	008S021E12E003S	33.50002719	-114.7360705	241.92	40					3/31/1981	10.58	231.34	230.29
08S/21E-12E03S	008S021E12E003S	33.50002719	-114.7360705	241.92	40					5/21/1981	11.21	230.71	230.29
08S/21E-12E04S	008S021E12E004S	33.50002719	-114.7360705	241.41	100					11/25/1980	11.54	229.87	230.16
08S/21E-12E04S	008S021E12E004S	33.50002719	-114.7360705	241.41	100					12/19/1980	10.82	230.59	230.16
08S/21E-12E04S	008S021E12E004S	33.50002719	-114.7360705	241.41	100					1/5/1981	10.95	230.46	230.16
08S/21E-12E04S	008S021E12E004S	33.50002719	-114.7360705	241.41	100					1/12/1981	11.22	230.19	230.16
08S/21E-12E04S	008S021E12E004S	33.50002719	-114.7360705	241.41	100					2/2/1981	11.75	229.66	230.16
08S/21E-12E04S	008S021E12E004S	33.50002719	-114.7360705	241.41	100					2/4/1981	11.51	229.90	230.16
08S/21E-12E04S	008S021E12E004S	33.50002719	-114.7360705	241.41	100					2/11/1981	11.70	229.71	230.16
08S/21E-12E04S	008S021E12E004S	33.50002719	-114.7360705	241.41	100					2/13/1981	11.70	229.71	230.16
08S/21E-12E04S	008S021E12E004S	33.50002719	-114.7360705	241.41	100					2/18/1981	11.50	229.91	230.16
08S/21E-12E04S	008S021E12E004S	33.50002719	-114.7360705	241.41	100					2/25/1981	10.82	230.59	230.16
08S/21E-12E04S	008S021E12E004S	33.50002719	-114.7360705	241.41	100					3/31/1981	10.74	230.67	230.16
08S/21E-12E04S	008S021E12E004S	33.50002719	-114.7360705	241.41	100					5/21/1981	10.79	230.62	230.16
08S/22E-04E01S	008S022E04E001S	33.5153046	-114.6910694	246.00						9/1/1971	8.00	238.00	238.00
08S/22E-04M01S	008S022E04M001S	33.51363798	-114.6910693	244.00						9/1/1971	10.00	234.00	234.00

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
08S/22E-04N01S	**008S022E04N001S**	**33.5105825**	**-114.6910693**	242.00						9/1/1971	10.00	232.00	232.00
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					10/5/1923	7.71	234.29	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					11/20/1923	7.81	234.19	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					1/29/1924	8.71	233.29	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					9/5/1924	8.21	233.79	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					3/3/1925	8.31	233.69	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					10/23/1925	8.61	233.39	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					1/13/1926	8.71	233.29	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					2/28/1926	8.91	233.09	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					11/20/1936	9.04	232.96	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					1/4/1937	8.84	233.16	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					9/12/1937	8.09	233.91	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					1/12/1948	7.03	234.97	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					9/8/1948	6.38	235.62	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					1/5/1949	7.58	234.42	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					9/9/1949	6.35	235.65	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					1/5/1950	6.59	235.41	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					9/13/1950	5.72	236.28	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					1/24/1951	6.87	235.13	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					9/12/1951	6.22	235.78	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					1/31/1952	7.65	234.35	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					10/2/1952	5.55	236.45	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					1/7/1953	7.25	234.75	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					9/28/1953	4.65	237.35	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					1/15/1954	7.25	234.75	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					10/1/1954	4.65	237.35	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					1/2/1955	6.35	235.65	234.22
08S/22E-04N02S	**008S022E04N002S**	**33.50836034**	**-114.6910693**	242.00	13.6					9/29/1955	5.25	236.75	234.22

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					1/28/1956	5.15	236.85	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					10/2/1956	4.95	237.05	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					1/9/1957	6.18	235.82	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					9/10/1957	4.64	237.36	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					1/14/1958	6.49	235.51	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					9/18/1958	4.41	237.59	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					1/8/1959	7.01	234.99	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					9/10/1959	4.11	237.89	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					1/6/1960	7.51	234.49	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					9/15/1960	6.21	235.79	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					1/4/1961	5.61	236.39	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					9/9/1961	5.81	236.19	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					1/18/1962	5.71	236.29	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					9/20/1962	5.81	236.19	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					1/19/1963	6.21	235.79	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					9/20/1963	5.61	236.39	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					1/10/1964	5.51	236.49	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					9/10/1964	4.46	237.54	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					1/11/1965	7.41	234.59	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					9/11/1965	4.76	237.24	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					1/13/1966	7.81	234.19	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					9/16/1966	7.31	234.69	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					1/14/1967	10.11	231.89	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					9/19/1967	9.61	232.39	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					9/17/1968	9.15	232.85	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					1/21/1969	12.15	229.85	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					9/20/1969	8.00	234.00	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					1/21/1970	12.75	229.25	234.22

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					1/19/1971	12.65	229.35	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					8/31/1971	8.83	233.17	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					4/24/1979	11.35	230.65	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					7/23/1980	10.40	231.60	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					1/22/1981	12.62	229.38	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					8/27/1981	10.11	231.89	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					2/3/1982	12.82	229.18	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					12/10/1982	11.49	230.51	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					9/20/1983	11.28	230.72	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					9/18/1984	10.56	231.44	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					2/28/1985	12.40	229.60	234.22
08S/22E-04N02S	008S022E04N002S	33.50836034	-114.6910693	242.00	13.6					6/13/1985	12.00	230.00	234.22
08S/22E-04P01S	008S022E04P001S	33.5105825	-114.6869025	244.00						9/1/1971	11.00	233.00	233.00
08S/22E-05G01S	008S022E05G001S	33.51558236	-114.6996807	245.00						8/1/1971	10.00	235.00	235.00
08S/22E-06N01S	008S022E06N001S	33.50780477	-114.7219035	243.00						8/1/1971	9.00	234.00	234.00
08S/22E-08D02S	008S022E08D002S	33.5066937	-114.708292	244.00						8/1/1971	11.00	233.00	233.00
08S/22E-10B01S	008S022E10B001S	33.5069715	-114.6646796	242.00						8/1/1971	13.00	229.00	229.00
08S/22E-10D01S	008S022E10D001S	33.5069715	-114.6735687	242.00						8/1/1971	13.00	229.00	229.00
08S/22E-11D01S	008S022E11D001S	33.5069715	-114.6557905	242.00						8/1/1971	12.00	230.00	230.00
08S/22E-12D01S	008S022E12D001S	33.50669376	-114.6385677	247.00						8/1/1971	12.00	235.00	235.00
08S/23E-03E01S	008S023E03E001S	33.5153047	-114.5685658	257.71	16.5					9/1/1971	13.01	244.70	244.70
08S/23E-04E01S	008S023E04E001S	33.5153047	-114.5860663	256.00	9.7					9/3/1971	7.41	248.59	248.59
08S/23E-05C01S	008S023E05C001S	33.51519358	-114.5973444	255.00	21.9					5/6/2004	14.59	240.41	240.41
08S/23E-05E01S	008S023E05E001S	33.51530468	-114.6010668	256.00	13.5					9/3/1971	10.88	245.12	245.12
08S/23E-06P01S	008S023E06P001S	33.5072493	-114.6144559	253.00	390	362	-109	370	-117	2/8/1962	10.32	242.68	241.94
08S/23E-06P01S	008S023E06P001S	33.5072493	-114.6144559	253.00	390	362	-109	370	-117	8/1/1972	11.80	241.20	241.94
08S/23E-07B01S	008S023E07B001S	33.50586047	-114.6119003	254.00	390	370	-116	382	-128	2/13/1962	15.00	239.00	239.00
08S/23E-07D01S	008S023E07D001S	33.50669378	-114.6194005	251.37	16.9					8/31/1971	14.36	237.01	237.01

WELL DATA[1]				WELL COMPLETION DATA						GROUNDWATER LEVELS			
STATE WELL NUMBER (DWR)	STATE WELL NUMBER (USGS)	LATITUDE	LONGTUDE	Ground Surface Elevation	Total Depth	Depth to Top of Sample Interval	Elevation of the Top of Sample Interval	Depth to Bottom of Sample Interval	Elevation of the Bottom of Sample Interval	Depth to Groundwater		Groundwater Surface Elevation	Average Water Level
		NAD83	NAD83	feet-msl	feet-bgs	feet-bgs	feet-msl	feet-bgs	feet-msl	Date	feet-bgs	feet-msl	feet-msl
08S/23E-08D01S	**008S023E08D001S**	**33.50697156**	**-114.6030112**	256.75	18					8/31/1971	13.33	243.42	243.42

APPENDIX C
DESERT QUARTZITE SOLAR PROJECT GROUNDWATER MODELING FILES

This appendix presents the groundwater modeling files for the Desert Quartzite Solar Project. The electronic files presented herein are Groundwater Modeling System (GMS) version 10.1 files. For reference, GMS is groundwater modeling software utilized to create groundwater and subsurface simulations in a 3D environment.

APPENDIX Y

WATER SUPPLY ASSESSMENT

WATER SUPPLY ASSESSMENT

FOR THE
DESERT QUARTZITE SOLAR PROJECT

RIVERSIDE COUNTY, CALIFORNIA

PURCHASE ORDER 4800019091

Prepared for:

Desert Quartzite, LLC
135 Main Street, 6th Floor
San Francisco, California 94105

Prepared by:

URS *(an AECOM company)*
130 Robin Hill Road, Suite 100
Santa Barbara, California 93117
(805) 692-0600 ◆ Fax: (805) 964-0259

Job No. 60486157

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TABLE OF CONTENTS

Section **Page**

1.0 INTRODUCTION 1-1
2.0 PROJECT DESCRIPTION 2-1

2.1 PROJECT OVERVIEW 2-1
2.2 WATER REQUIREMENTS 2-1

3.0 PROJECT WATER SUPPLY SOURCES 3-1

3.1 INTRODUCTION 3-1
3.2 GROUNDWATER RESOURCES 3-1

3.2.1 Description of the Palo Verde Mesa Groundwater Basin 3-1
3.2.2 Regional Hydrogeologic Setting 3-2
3.2.3 Groundwater Levels and Flow 3-3
3.2.4 Groundwater Quality 3-4
3.2.5 Groundwater Budget 3-4
3.2.6 Groundwater Modeling 3-6
3.2.7 Groundwater Rights and Management Plans 3-9
3.2.8 Palo Verde Groundwater Basin Overdraft Assessment 3-10

3.3 PALO VERDE IRRIGATION DISTRICT (SURFACE WATER) 3-12

4.0 WATER SUPPLY PLANNING UNDER SENATE BILL 610 4-1

4.1 SUMMARY 4-1
4.2 PROJECT AND NON-PROJECT WATER DEMANDS 4-4

4.2.1 Project Demands (Groundwater) 4-4
4.2.2 Project Demands (Surface Water) 4-4

5.0 CONCLUSIONS 5-1

5.1 WATER SUPPLY BASIS 5-1
5.2 ON-SITE GROUNDWATER SUPPLY 5-1
5.3 PVID SURFACE WATER 5-2

6.0 REFERENCES 6-1

Tables **Page**

Table 3-1 Summary Palo Verde Valley Water Balance, Palo Verde Groundwater Model 3-7
Table 3-2 Cumulative Assessment of Proposed Energy Project Groundwater Use, Palo Verde Mesa, Riverside County, California (Desert Quartzite 700 AFY Construction Scenario).......... 3-13
Table 3-3 Cumulative Assessment of Proposed Energy Project Groundwater Use, Palo Verde Mesa, Riverside County, California (Desert Quartzite 450 AFY Construction Scenario).......... 3-16
Table 4-1 Twenty-year Comparison of Groundwater Basin Inflows and Outflows with Construction of Desert Quartzite and Other Proposed Energy Projects… 4-5

Figures

Figure 1 Regional Vicinity Map
Figure 2 Groundwater Basins and Wells in the Project Vicinity
Figure 3a Regional Geologic Map
Figure 3b Regional Geologic Map Legend
Figure 4 Bottom Elevation Map for Palo Verde Mesa and Valley Groundwater Basins
Figure 5 Groundwater Flow in the Palo Verde Mesa and Valley
Figure 6a Representative Predicted Drawdown for 700 AFY Construction Scenario (Private Well) – End of Construction and Operation
Figure 6b Representative Predicted Drawdown for 700 AFY Construction Scenario (Private Well) – End of Construction and Operation
Figure 7 Cumulative Energy Projects Map

Appendices

Appendix A DWR Guidebook for Implementation of Sentate Bill 610 and Senate Bill 221
Appendix B Palo Verde Valley Water Balance
Appendix C Palo Verde Irrigation District Water Supply Letter

SECTION 1.0
INTRODUCTION

Senate Bill 610 (SB 610) became effective on January 1, 2002, amending the California Water Code to require detailed analysis of water supply availability for certain types of development projects. The primary purpose of SB 610 is to improve the linkage between water and land use planning by ensuring greater communication between water providers and local planning agencies, and ensuring that land use decisions for certain large development projects are fully informed as to whether sufficient water supplies are available to meet project demands. SB 610 requires the preparation of a Water Supply Assessment (WSA) for a project that is subject to the California Environmental Quality Act (CEQA) and meets certain requirements, each of which is discussed in detail in Section 4.0 of this WSA.

When a WSA is required per SB 610, it must examine the availability of an identified water supply under normal-year, single-dry-year, and multiple-dry-year conditions over a 20-year projection, accounting for the projected water demand of the proposed project in addition to other existing and planned future uses of the identified water supply, including agricultural and manufacturing uses.

The County of Riverside (as Lead Agency under CEQA) has determined that a WSA shall be prepared to provide full disclosure of potential water resources impacts. Therefore, this WSA for the proposed Desert Quartzite Solar Project has been prepared in compliance with the California Water Code as amended by SB 610. The steps followed to ensure compliance of this WSA with the California Water Code are described in Appendix A (DWR Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 [DWR 2003]).

SECTION 2.0
PROJECT DESCRIPTION

2.1 PROJECT OVERVIEW

Desert Quartzite, LLC (Applicant) proposes to develop and construct a 300-megawatt (MW) alternating current photovoltaic solar facility known as the Desert Quartzite Solar Project (Project). The overall Project includes the solar generation facility, an on-site substation, and the generation-tie (gen-tie) line. The proposed Project is located in eastern Riverside County approximately 2.75 miles southwest of the City of Blythe, California.

The proposed solar facility and the approximately 3-mile-long, 230-kilovolt (kV) gen-tie line interconnection to the existing Southern California Edison (SCE) Colorado River Substation (CRSS) are located primarily on lands administered by the U.S. Department of the Interior, Bureau of Land Management (BLM) (BLM CACA# 04937; 5,115 acres). The Project site also includes 160 acres of private land (APN 879-110-001) subject to the County of Riverside jurisdiction. The overall Project site encompasses approximately 5,275 acres. The proposed solar facility would be constructed within an approximately 3,714-acre fenced portion of the overall Project site. The gen-tie line study corridor encompasses approximately 445 acres of BLM lands within the overall Project site. A regional vicinity map of the proposed Project (i.e., including BLM and privately-owned lands) is presented on Figure 1.

Site access will be via Interstate 10 (I-10) at the State Route (SR)-78 to SR-78 (south)/ Neighbours Boulevard to 16th Avenue/Seeley Avenue (west). Project construction is currently anticipated to start in 2017.

2.2 WATER REQUIREMENTS

The construction period for the Project is estimated to vary from 25 to 48 months. Assuming a 25-month construction period, water usage for construction is estimated at 1,400 acre-feet (AF) maximum (i.e., approximately 700 acre-feet per year [AFY] on average). Assuming a 48-month construction period, water usage for construction is estimated at 1,800 AF maximum (i.e., 450 AFY on average). For reference, there are 325,851 gallons per acre foot of water. During construction, water will be needed primarily for dust control and soil compaction, with small quantities used for sanitary and other purposes. It is currently estimated that up to approximately 1.5 million gallons per day of water may be needed during the construction phase of the Project. The operational phase of the Project is expected to require up to 38 AFY of water. Of this volume, approximately 20 AFY would be used for process water, fire protection, dust control, vegetation management, and at the operations and maintenance (O&M) building, and 18 AFY would be used for up to two annual panel washings. Over the planned 30-year life of the Project, approximately 1,140 AF of water would be utilized for operational needs.

Total water usage for construction and operation of the Project is estimated to range from 2,540 to 2,940 AF for the 25-month and 48-month construction scenarios, respectively, including 30 years of operation.

The water supply sources considered in this WSA are based on the Project Plan of Development (POD) prepared for the BLM (May 23, 2014, as amended) for CACA #049397, the Conditional Use Permit application package submitted to the Riverside County Planning Department (February 25, 2015) for Assessor’s Parcel Number 879-110-001, and an assessment of potentially feasible water supply sources capable of meeting the Project’s water needs. The primary water sources evaluated in this WSA consist of groundwater via installation of on-site groundwater wells, and/or surface water supplied from the Palo Verde Irrigation District (PVID).

If one or more groundwater wells are installed on the portion of the Project site under BLM jurisdiction, they would require BLM approvals and compliance with conditions to be stipulated by the BLM to protect the environment, including biological and cultural resources. If one or more groundwater wells are installed on the portion of the Project site under Riverside County jurisdiction, they would require County approvals and compliance with conditions to be stipulated by the County. In addition, installation of groundwater wells anywhere on the Project site would require compliance with applicable Riverside County ordinances and reporting requirements. The Project is currently being evaluated in a joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) being prepared by the BLM and Riverside County to comply with the National Environmental Policy Act and the California Environmental Quality Act, respectively.

SECTION 3.0
PROJECT WATER SUPPLY SOURCES

3.1 INTRODUCTION

As discussed in Section 2.2, the primary water sources evaluated in this WSA consist of groundwater via installation of on-site groundwater wells, and/or surface water supplied from the Palo Verde Irrigation District (PVID). Data and assessments for both of these supply sources follow.

3.2 GROUNDWATER RESOURCES

3.2.1 Description of the Palo Verde Mesa Groundwater Basin

The Project site is located on the Palo Verde Mesa in the northwestern Colorado Desert, which is part of the greater Colorado Desert Geomorphic Province. This Province is characterized by isolated mountain ranges separated by broad alluvial-filled basins of Cenozoic-age sedimentary and volcanic materials overlying older rocks. The Palo Verde Mesa is bounded by non-water-bearing rocks of the Big Maria and Little Maria Mountains on the north, the McCoy and Mule Mountains on the west, the Palo Verde Mountains to the south, and the Palo Verde Valley on the east (refer to Figure 2). Surface water drains from the surrounding mountains toward the Colorado River.

East of the Project eastern site boundary, a break in the slope forms the boundary between the Palo Verde Mesa and the Palo Verde Valley, which is 80 to 130 feet below the mesa. In this region, the Palo Verde Valley is roughly equivalent to the recent historic floodplain of the Colorado River (CEC 2010). Regionally, the ground surface slopes gently downward in a southeast direction at a gradient of less than 1 percent (CEC 2010).

The groundwater basin upon which the Project is located is the Palo Verde Mesa Groundwater Basin (PVMGB). Groundwater in the basin is found in alluvial deposits of Quarternary age. Such alluvium generally consists of lenticular beds of sand, gravel, silt, and clay, except near the mountains where it consists primarily of coarse-grained angular rock detritus (DWR 2004a) (refer to Figures 3a and 3b).

The PVMGB covers about 226,000 acres (353 square miles) and abuts the Chuckwalla Valley Groundwater Basin (CVBG) on the west. The California Department of Water Resources (DWR) (2004a) estimates that there is 6,840,000 AF of water storage capacity in the PVMGB. The city of Blythe is on the eastern edge of Palo Verde Mesa.

Figure 4 presents a generalized interpretation of the distribution and thickness of the Colorado River sediments, inclusive of the younger and older alluvium within the Palo Verde Mesa and Valley (AECOM 2011). The map was developed from the interpretation of boring logs and the east-west and north-south cross-sections contained in early investigations by the U.S. Geological Survey (USGS) and additional lithologic data gathered from the investigation of the Palo Verde Mesa by other renewable energy projects (AECOM 2011). The bottom elevation map shows these sediments are an elongate deposit coincident with the north-south axis of the Colorado River and are the deepest along the central axis of the valley, thinning in the direction of the mesa and toward the bedrock outcrops. The younger alluvium is only found in the floodplain and thins south in the direction of Cibola toward the southern gap in the Palo Verde Valley.

The groundwater below the Project site occurs under apparently semi-confined to unconfined conditions in the older alluvium at a depth of approximately 140 to 150 feet below ground surface (bgs). Along the mesa, there is a convergence of flow as water traveling out of McCoy Wash and from the Chuckwalla Valley flowing southeast and east, respectively, interact with water on the flood plain flowing south parallel to the Colorado River (refer to Figure 5). This convergence of flow is supported by water quality data showing distinct differences in the sources of groundwater below the mesa and below the floodplain. According to historical measurements, water levels have remained generally stable on the mesa following a period of agricultural development that ended in 1980 (AECOM 2011).

3.2.2 Regional Hydrogeologic Setting

The Project is located within the Colorado River Hydrologic Region, which is subdivided into 28 groundwater basins. The Project overlies the PVMGB (DWR Basin Number 7-39), which encompasses an area of about 353 square miles (approximately 226,000 acres) (refer to Figure 2), and is east of the CVGB (DWR Basin Number 7-5) and directly west of the Palo Verde Valley Groundwater Basin (PVVGB) (DWR Basin Number 7-38). The PVVGB underlies the Colorado River and surrounding areas, and functions as the river's historic flood plain. The PVVGB is tributary to the lower Colorado River, and is part of the Colorado River aquifer. The PVMGB contains higher ground surface levels that are outside of the Colorado River's historic flood plain. The location of the boundary between the PVMGB and the PVVGB does not include a barrier to groundwater flow (DWR 1979, 2003). The total storage capacity of the PVMGB is estimated to be 6.84 million AF; however, the volume of groundwater in storage is unknown (DWR 2004a). Subsurface outflow from the PVMGB to PVVGB is estimated to be 9,500 AFY (Owen-Joyce 1984).

The PVID drains located at the foot of the Palo Verde Mesa form a discharge boundary, and a groundwater mound exists within the PVVGB between the Colorado River and the PVMGB as a result of many decades of applied irrigation water that forms a groundwater divide.

The Colorado River, which is the boundary between Arizona and California, is located about 8 to 10 miles east of the Project site. The Colorado River has an average flow of approximately 10,000 cubic feet per second (cfs) (USGS 2011). PVID is the senior water rights holder in California on the lower Colorado River and is allocated sufficient Colorado River water to irrigate 104,500 acres of agricultural land in the Palo Verde Valley, and additional acreage on the Palo Verde Mesa. Irrigation water diversions to meet this need have historically averaged 950,000 AFY, but in more recent years have ranged from approximately 650,000 to 950,000 AFY as a result of implementation of a water transfer program between PVID and the Metropolitan Water District of Southern California (MWD) (Smith 2005; PVID 2004). Water is diverted by PVID at the Palo Verde Diversion Dam near the northern end of the Palo Verde Valley and distributed by a series of canals totaling over 244 miles in length (Worley-Parsons 2011). It is unclear whether the outflow estimate of Owen-Joyce accounts for these features, as the PVID drains would appear to present barriers to the subsurface inflow of groundwater from the PVMGB into the PVVGB Surface and groundwater from the Palo Verde Valley drain to the Colorado River near the southern margin of the PVVGB (DWR 2004b).

3.2.3 Groundwater Levels and Flow

The Palo Verde Mesa is characterized by the nearly level morphology of the mesa and gently to moderately sloping alluvial fans. Fluvial erosion and deposition are the major geomorphic processes in the immediate area. As shown on Figures 3a and 3b, the predominant geologic units on the Project site are alluvium, ranging from the Pleistocene (2.6 million years ago [Ma] to 11,700 years before present [BP]) to Holocene (11,700 BP to present) ages. The alluvial deposits compose the shallow floodplain aquifer, and are the principal source of groundwater in the PVMGB (Owen-Joyce 1984). The alluvium is composed of sand, silt, and clay with lenses of gravel, and ranges in thickness from 160 to 600 feet. Most wells in the PVMGB are screened in the coarser grained deposits and have moderate to high yields (Metzger 1973).

Four inactive suspect water supply wells have been identified on the Project site, consisting of one well located on the northeast corner of the privately-owned parcel (APN 879-110-001) and three suspect wells on BLM land (refer to Figures 2 through 4 showing the locations of these inactive wells). These wells are classified herein as “suspect” water supply wells based on the appearance of the exposed metal casings, however, these are not active wells and are incapable of producing water in their current condition. In addition, no evidence has been found that would indicate that these wells have been utilized to supply water in the past.

Groundwater monitoring records are available, to a limited extent, for two of the on-site, inactive suspect water supply wells located on the BLM-administered lands. Groundwater levels were monitored primarily during the 1960s, and depth to groundwater averaged from 134 to 139 feet-bgs. It should be noted that groundwater depths and levels are influenced by variations in topography and soil and rock types as well as seasonal variations in precipitation, irrigation practices, and groundwater pumping all of which can result in fluctuations.

USGS groundwater measurements collected during the year 2000 provided the most complete areal data set for the PVMGB. As shown on Figure 5, the data suggest that groundwater flows in a southeasterly direction to the north of the Project site and that the groundwater flow direction changes to a southwesterly direction at the Project site roughly parallel to the Palo Verde Valley trend.

3.2.4 Groundwater Quality

In general, groundwater quality in the PVMGB is calcium-sodium chloride or calcium-sodium sulfate in character, and is impaired by arsenic, selenium, fluoride, chloride, boron, sulfate, and total dissolved solids (TDS) content (DWR 2004a). These constituents are consistently observed and reported in the environmental review documents prepared for nearby projects. DWR (1979) reports total dissolved solids (TDS) content of shallow groundwater in the basin ranges from 730 to 3,100 milligrams per liter (mg/L); however, water from one deep well in the southwest portion of the basin had a TDS content of 4,500 mg/L (Metzger 1973). Data from nearby projects show that TDS and sulfate concentrations were generally higher with increasing distance from the Colorado River, with the highest concentrations occurring in the area of McCoy Wash and the gap between the PVMGB and the CVGB. Fluoride, chloride, and boron concentrations were generally lower in the eastern portions of the PVMGB (closer to the Colorado River) and increased westward. The much higher TDS concentrations below the Palo Verde Mesa reflect recharge of high TDS water to the PVMGB from percolation along the mountain front and underflow from the Rice and Chuckwalla valleys (AECOM 2012).

No groundwater quality data are available for the Project site. Based on water quality characteristics reported for nearby projects, groundwater below the Project site may not meet drinking water quality primary or secondary standards for domestic supply without treatment, and would likely contain elevated levels of TDS and high concentrations of fluoride, chloride, boron, and sulfate. Site-specific groundwater sampling and testing would be required to assess water quality and possible limitations on uses and/or treatment requirements.

3.2.5 Groundwater Budget

3.2.5.1 Overview

The Project site is located on the Palo Verde Mesa which overlies the PVMGB (DWR Basin No. 7-39). Groundwater in the Palo Verde Mesa area provides a source of water for domestic, industrial, and agricultural water supply. Natural groundwater recharge to the PVMGB includes recharge from percolation of runoff from surrounding mountains, percolation of precipitation, and subsurface inflow from the CVGB (DWR 2004a). Estimates of subsurface inflow to the PVMGB from the CVGB vary by source and include estimates of 400 AFY (DWR 2004a) to 1,000 AFY (AECOM 2011). Other sources of recharge to the basin include agricultural return flow. The PVMGB is bounded upgradient by the CVGB (DWR Basin No. 7-5) and downgradient by the PVVGB (DWR Basin No. 7-38). Brief overviews of these two adjoining basins follow.

Chuckwalla Valley (7-5). This groundwater basin underlies the Chuckwalla Valley in northern Riverside County. The basin is bounded by consolidated rocks of the Chuckwalla, Little Chuckwalla, and Mule Mountains on the south, of the Eagle Mountains on the west, and of the Mule and McCoy Mountains on the east. Rocks of the Coxcomb, Granite, Palen, and Little Maria Mountains bound the valley on the north and extend ridges into the valley. The smaller intervening valleys are contiguous with and tributary to the main part of Chuckwalla Valley (DWR 1963). There are no perennial streams in the Chuckwalla Valley. Palen, Ford, and several smaller dry lakes are found in topographic low-points. Average annual precipitation in the basin ranges to four inches (DWR 2004c). The CVGB is recharged by subsurface inflow from the Pinto Valley and Cadiz Valley groundwater basins, and by percolation of runoff from the surrounding mountains and of precipitation to the valley floor (DWR 2004c).

Palo Verde Valley (7-38). The PVVGB is located in the southeastern part of California along the state border with Arizona. The eastern boundary of the basin is the Colorado River, which also defines the state border. The Palo Verde Dam and the Big Maria Mountains bound the basin on the north. The Palo Verde Mesa abuts the western boundary and the Palo Verde Mountains bound the southern part of the basin. Surface and groundwater drain to the Colorado River (DWR 2004b). According to DWR, the PVVGB encompasses 128,000 acres (200 square miles) and has a total basin storage capacity estimated at 4,960,000 AF (DWR 2004b). The principal water bearing units in the PVVGB are alluvium, the Bouse Formation, and a fanglomerate deposit (Metzger 1973).

The significant recharge from the Colorado River underflow is the primary mechanism for recharge to the PVVGB along with infiltration of precipitation (mountain front recharge). To a lesser extent, inflow from the CVGB via the PVMGB and irrigation return water provide inputs to overall basin recharge. The actual discharge from the PVMGB is not known. According to Owens-Joyce (1984), groundwater levels in the PVVGB have tended to remain relatively stable.

3.2.5.2 Groundwater Balance – Palo Verde Valley

In order to develop a numerical groundwater model to assess potential effects on groundwater levels from groundwater withdrawals, it is necessary to establish a water balance for the area of the model domain. In this case, the model domain is the entire geographic area of the Palo Verde Valley, which for the purposes of the model encompasses the PVMGB (DWR Basin No. 7-39) and the PVVGB (DWR Basin No. 7-38) aquifers in entirety. A water balance is an account of all the groundwater recharge and discharge elements within a groundwater basin. The groundwater balance accounting utilized for the Desert Quartzite Solar Project groundwater modelling is essentially the same as utilized as part of the groundwater modeling effort conducted for the development of the McCoy Solar Energy Project (MSEP), which in turn was developed from prior investigations and the USGS. For a detailed discussion of the groundwater balance evaluation, the reader is referred to the numerical groundwater modeling report prepared for the MSEP (AECOM 2011). A general discussion of this accounting of groundwater balance for the Palo Verde Valley is summarized herein.

In the development of the water balance, the relative stability of the groundwater levels since the mid- to late-1980s is significant. This relative stability is a reflection of the management of the diverted water from the Colorado River through its application for irrigation and return of groundwater through the PVID drains. As water levels have fluctuated only a few feet and locally in response to irrigation, this would indicate a balance between inflow and outflow of groundwater within the Palo Verde Valley. As such, the groundwater balance was evaluated to achieve unity in the difference between the estimates of inflow and outflow. In preparation of the MSEP numerical groundwater modeling analysis and evaluation of the balance of inflow and outflow of groundwater through the Palo Verde Valley was evaluated and a tabulation of these parameters was prepared as part of the report (AECOM 2011). The complete Palo Verde Valley Water Balance from the MSEP is presented in Appendix B of this report. A summary of the MSEP Palo Verde Valley Water Balance is presented in Table 3-1, below. As depicted in Table 3-1, a water balance of approximately 426,600 AFY is estimated from a balance of the recharge and discharge elements (i.e., estimated average inflow and outflow of 426,600 AF).

3.2.6 Groundwater Modeling

3.2.6.1 Introduction

In order to provide an indication of the potential effects of on-site groundwater pumping at the Project site, numerical groundwater modeling was performed. The groundwater modeling is based on the assumption that the Project's water demand would be met solely by pumping on-site groundwater (i.e., versus surface water supplied by PVID). The results of the numerical groundwater modeling performed for this Project are summarized herein. Refer to the full report – *Proposed Groundwater Use – Numerical Groundwater Modeling Report for the Desert Quartzite Solar Project* (URS 2016) for more information.

The groundwater model utilized for the analysis was first developed by the USGS (Lieke 2008) and then updated with Project-specific site information and modeling for subsequent solar development projects such as the Blythe Solar Power Project (BSPP) and then the McCoy Solar Energy Project (MSEP). For detailed discussion of the development of the groundwater model utilized in this numerical analysis, the reader is referred to the USGS report (Lieke 2008) on development of the groundwater model, as well as the numerical groundwater monitoring reports prepared for the BSPP and MSEP (AECOM 2010, 2011). The groundwater model developed and utilized for evaluating groundwater use for the previously permitted and approved BSPP, and then the MSEP, was utilized for evaluating potential impacts of groundwater use for the construction and operational phases of this Project. The Palo Verde Groundwater Model prepared for the BSPP was submitted for review on October 15, 2010, under the CEC SOIL&WATER Condition 16 requirement, and was accepted with minor comments by the California Energy Commission (CEC) and BLM on December 17, 2010. The model was constructed as a single-layer (two dimensional) numerical groundwater flow model in MODFLOW2000 (Groundwater Modeling System [GMS] platform) (AECOM 2010). The model domain encompassed the entire Palo Verde Valley, inclusive of the mesa and floodplain, and the base of the model was established at the bottom of the younger and older Colorado River alluvium, as these are the productive aquifers in the valley. A variety of boundary conditions were employed to simulate inflow and outflow of water from the model following the basin water balance. The Colorado River formed the eastern boundary of the model and was simulated using depth profiles provided by the U.S. Bureau of Reclamation (USBR) along selected locations of the river reach through the Palo Verde Valley. The river bottom elevation was linearly interpolated from these data for all river cells along the eastern boundary of the model domain. As part of the calibration of the Palo Verde Valley model in previous modeling efforts performed by others, the hydraulic conductivity distribution was initially homogeneous and additional hydraulic conductivity zones were added as necessary to match the observed water levels and changes in hydraulic gradient in the floodplain and on the mesa. For the purposes of the numerical modeling performed to date for this Project, no additional calibration has been conducted pending availability of site-specific aquifer test data.

3.2.6.2 Modeling Results

The goals of the numerical modeling were to simulate the proposed Project pumping using possible on-site well locations (see Figures 2 through 4) to assess the pumping influence on water levels in adjacent water supply wells, assess the impacts to groundwater basin storage, and to assess the potential for impacting groundwater levels in the PVID drains located in the floodplain that recharge the Colorado river aquifer. The Palo Verde Groundwater Model was used to assess the Project-only effects of groundwater pumping necessary for the construction and operation of the Desert Quartzite Solar Project.

Representative predicted groundwater drawdown contours for the end of construction and operation based on the numerical groundwater modeling are presented on Figures 6a and 6b. The calculated drawdown contours presented on Figure 6a are based on the 25-month, 1,400

TABLE 3-1
SUMMARY PALO VERDE VALLEY WATER BALANCE PALO VERDE GROUNDWATER MODEL[1,2,3]

Recharge (inflow)[4]	Volume (AFY)
Underflow from Chuckwalla Valley	1,000
Underflow from Parker Valley	3,500
Percolation	
Agriculture return – mesa	3,500
Agriculture return – valley	67,000
POTW return	750
Mountain front	5,000
Irrigation canal leakage (less evaporation)	120,000
River discharge to groundwater (losing condition)	225,850
Bedrock	0
Total inflow	426,600
Discharge (outflow)	**Volume (AFY)**
Underflow out of the Palo Verde and Cibola Valley Aquifer	0
Groundwater pumping	
Agriculture – mesa	3,600
Municipal and domestic	7,500
Unmeasured return (gaining condition)	50,000
Consumptive use (native vegetation)	8,500
Groundwater discharge	357,000
Total (outflow)	426,600
Water balance (inflow-outflow)	0

[1] Note: The Palo Verde Valley as defined in the Palo Verde Groundwater Model encompasses both the PVMBG and the PVVGB,

[2] Sources: (1) Assessment of Proposed Groundwater Use, Results of Numerical Groundwater Modeling, McCoy Solar Energy Project, Palo Verde Mesa, Riverside County, California (AECOM 2011); (2) Numerical Groundwater Flow Model of the Palo Verde Valley and Palo Verde Mesa (CEC Soil and Water Condition 16): Blythe Solar Power Project (09-AFC-6C), Riverside County, California (AECOM 2010).

[3] Note: the data presented in this table is a summary excerpt from a portion of Table 1 in Appendix B of this report which presents the complete Palo Verde Valley Water Balance, Palo Verde Groundwater Model, McCoy Solar Energy Project. Refer to Table 1 in Appendix B and the source documents for more information including the various references used to develop the water balance as well as the basis for individual inflow/outflow estimates.

[4] Precipitation recharge onto the Palo Verde Mesa floor is assumed to be negligible. It is assumed that all water transpires or evaporates and that no return to groundwater occurs from direct precipitation.

AF construction water demand scenario (plus 30 years of operation at 38 AFY) with pumping at the well on the private parcel. Figure 6b presents calculated drawdown contours based on the 48-month, 1,800 AF construction water demand scenario (plus 30 years of operation at 38 AFY) with pumping at the well on the private parcel. Refer to the groundwater modeling report (URS 2016) for more information. The following conclusions are drawn from the modeling results for all scenarios and pumping locations considered:

- Based on the results of the numerical groundwater simulations performed, the proposed Project pumping would not significantly impact adjacent water supply wells or the groundwater basin storage.
- The drawdown outside the Project site boundary was not predicted to exceed one foot at any of the existing identified off-site well locations, including the well immediately north of the Project site, for any of the four on-site well locations evaluated.
- The model predicted the radius of influence would not extend off the Palo Verde Mesa for pumping associated at the Private Parcel Well location. All other well locations had only approximately 0.01 foot of drawdown at the western edge of the valley either at the end of construction or at the end of operation, which is an insignificant amount of drawdown.
- Model predicted drawdowns for all of the well scenarios indicate that there would not be any significant impact (less than 0.01 feet) to the PVID drains, and therefore would not impact recharge to the Colorado River.

3.2.7 Groundwater Rights and Management Plans

The proposed Project is located in unincorporated Riverside County. There is no public water system with the distribution facilities and/or capacity to serve the Project, nor is there a groundwater basin management plan or Urban Water Management Plan (UWMP) (City of Blythe 2011) covering the Project area. Furthermore, groundwater in the PVMGB and the PVVGB is not adjudicated.

The Colorado River Compact divided the Colorado River Hydrologic Basin into the Upper Basin and the Lower Basin. The division point is Lees Ferry, a point in the mainstem of the Colorado River about 30 river miles south of the Utah-Arizona boundary, just downstream of Glen Canyon Dam. The Lower Colorado River Basin includes those parts of the states of Arizona, California, Nevada, New Mexico, and Utah within and from which waters naturally drain into the Colorado River system below Lees Ferry, and all parts of these States that are not part of the river's drainage system but may benefit from water diverted from the system below Lees Ferry (USBR 2016).

Users within the Lower Colorado River Basin, which includes the Project site, can divert tributary flow before it reaches the Colorado River (Consolidated Decree of the United States Supreme Court in Arizona v. California, 1964 [547 U.S. 150]).

The Colorado River Board of California, which is comprised of members from PVID, Imperial Irrigation District, Coachella Valley Water District, Metropolitan Water District of Southern California, the City of Los Angeles Department of Water and Power, and the San Diego County Water Authority, is responsible for applying for water on behalf of entities in California seeking Colorado River water entitlements. To administer this water, the USBR entered into a contract with the City of Needles, California, to monitor and act as a contracting agent for entities the USBR determines are eligible for this water.

3.2.8 Palo Verde Groundwater Basin Overdraft Assessment

3.2.8.1 Basin Capacity Assessment

DWR (2004) estimates the total groundwater storage capacity in the PVMGB is 6,840,000 AF. Natural recharge in the PVMGB is estimated to be 800 AFY according to the DWR (2004a) with recharge by underflow from Chuckwalla Valley estimated to be about 400 (DWR 2004a) to 1,000 (AECOM 2011) AFY depending on the source. Inflow and outflow estimates for the PVMGB vary substantially by source.

An important element in assessing the potential impacts of Project groundwater withdrawals is to establish a water balance. A water balance is an account of all the groundwater recharge and discharge elements within a defined groundwater basin area. A water balance was developed for the Palo Verde Valley (AECOM 2011) which, as defined, encompasses both the PVMGB and the PVVGB. The water balance is based on numerous sources of information including the following:

- Results from prior investigations and stream flow data for the Colorado River
- Stream flow data for the Colorado River
- An update using recent PVID diversion and return data
- An estimate of discharge from recent groundwater pumping estimates for municipal, industrial, and agricultural supply

Significant components to the assessment of recharge and discharge within the Palo Verde Valley are the diversion and return of water for the PVID and the gain or loss of water from the Colorado River. These water volumes are several orders of magnitude more than mountain front recharge, underflow, or discharge from groundwater pumping.

In the development of the water balance, significant consideration is given to the relative stability of the groundwater levels since the mid- to late-1980s. This relative stability is a reflection of the management of the diverted water from the Colorado River through its application for irrigation and return of groundwater through the PVID drains. As water levels have fluctuated only a few feet in response to irrigation, this would indicate a balance between inflow and outflow of groundwater within Palo Verde Valley. As such, the groundwater balance was evaluated to achieve unity in the difference between estimates of inflow and outflow. The balance of these components that relate directly to the groundwater system in the Palo Verde Valley is summarized in Table 3-1. As shown in the table, a water balance of 426,600 AF is estimated from a balance of recharge and discharge elements. Refer to Table 1 in Appendix B for more information, including a summary of water balance estimates reported by others.

3.2.8.2 Basin Cumulative Groundwater Withdrawal Assessment

As part of the environmental review for the Desert Quartzite Solar Project, a cumulative groundwater withdrawal assessment was undertaken to evaluate the effects from groundwater withdrawal by multiple proposed renewable and other energy projects within the PVMGB area. A search for proposed projects was undertaken to identify projected pumping schedules and rates using the following resources:

- BLM. 2015a. Approved Renewable Energy Projects, Solar Projects on BLM Public Lands. Last update August 24, 2015.
- BLM. 2015b. California Desert BLM District Office, Renewable Energy Projects and Utility Corridors Map. Last update June 3, 2015.
- BLM. 2015c. Pending Renewable Energy Applications, Applications Undergoing Environmental Review. Last update October 1, 2015.
- California Energy Commission. 2016. Status of all Projects. Data accessed March 28, 2016.
- California Public Utilities Commission. 2016. Energy. Data accessed March 28, 2016.
- Ludwig. 2016. BLM District Hydrologist. Personal communication. April.
- Russell. 2016. Riverside County Planner. Personal communication. April.

In addition to the Desert Quartzite Solar Project, six renewable energy or other energy projects were identified on the Palo Verde Mesa (refer to Figure 7) with a combined annual operational phase groundwater requirement of about 3,131 AF. The Desert Quartzite Solar Project annual operational water demand of 38 AFY represents about 1.2 percent of the total combined cumulative proposed energy project annual operational groundwater use. The total Desert Quartzite Solar Project maximum estimated combined water demand for construction (1,800 AF for 48-month scenario) and operation (1,140 AF) of 2,940 AF over approximately 34 years represents less than 0.1 percent of the 6,840,000 AF of estimated groundwater storage capacity in the PVMGB. Inclusive of both construction and operational water requirements from 2016 through 2050, the combined cumulative total groundwater use from all of these projects is estimated to be about 109,000 AF (note: the proposed Sonoran Energy Project [natural gas-fired] accounts for 96,120 AF [88%] of this total). This represents less than 2 percent of the 6,840,000 AF of estimated groundwater storage capacity in the PVMGB. The results of the research showing the proposed water use and pumping schedule for each of the proposed projects are summarized in Tables 3-2 and 3-3. Tables 3-2 and 3-3 address the Desert Quartzite Solar Project 700 AFY (25-month) and 450 AFY (48-month) construction scenarios plus the 30-year operational phase (38 AFY) for the cumulative energy project assessments, respectively. Under both construction scenarios considered for the Desert Quartzite Solar Project, the Project-specific contribution and the cumulative energy project withdrawals from the underlying groundwater basin are negligible relative to the storage capacity of the PVMGB.

3.3 PALO VERDE IRRIGATION DISTRICT (SURFACE WATER)

The PVID water supply is derived from its Colorado River contract. The PVID holds the Priority 1 rights to California's share of Colorado River water, and a shared portion of the Priority 3 rights, and their rights are not quantified by volume. Rather, the PVID's water use is defined by the irrigation water needed to serve a total of 104,500 acres in the Palo Verde Valley, and an additional 16,000 acres on the Palo Verde Mesa. The City of Blythe is within the PVID boundary and is using the PVID water rights to Colorado River water. Surface water from the Colorado River, through the PVID, is the primary source of water for agriculture in the area. In 2010, the PVID supplied about 270,000 AF of water for agricultural use (USBR 2011), wherein PVID's service area includes a portion of the PVMGB.

PVID is overseen by the U.S. Bureau of Reclamation (USBR), and the District's right to use water from the Colorado River in California dates from 1877 when Thomas Blythe started making water filings to develop land in the Palo Verde Valley, and was reinforced by the California agencies that signed the August 18, 1931 Seven Party apportionment agreement. PVID does not hold a "water right" as that term is commonly used. Instead, PVID is a party to a 1933 Water Delivery Contract with the United States, and has Priority 1 and Priority 3 water rights from the Colorado River. PVID Priority 1 rights are first rights and are delivered by gravity flow in the Valley and then returned to the river downstream (Henning 2000). Priority 3 water rights are rights that are shared with Imperial Irrigation District and the Coachella Valley Water District (Henning 2000) and apply to a total of 16,000 acres in the PVID on the Mesa (PVID 2004). Economic factors govern the amount of acreage in agricultural production at any one time; therefore, the actual amount of acreage receiving irrigation water from PVID varies. Approximately 2,500 acres were receiving irrigation water from PVID on the Mesa in the year 2000 (Henning 2000). Since PVID's contract does

TABLE 3-2
CUMULATIVE ASSESSMENT OF PROPOSED ENERGY PROJECT GROUNDWATER USE, PALO VERDE MESA, RIVERSIDE COUNTY, CALIFORNIA
(DESERT QUARTZITE 700 AFY CONSTRUCTION SCENARIO)

Project[1]	Proponent	BLM Serial ID/ CEC Docket #	Technology	Source	Phase	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2050	Comments
Desert Quartzite Solar Project	Desert Quartzite, LLC (First Solar)	CACA 49377	Photovoltaic, (300 MW)	On-site groundwater (and/or surface water trucked in from an offsite source)	Construction (2 scenarios; not additive)	-	700	700	-	-	-	-	-	-	-	-	-	-	-	Construction planned to occur over 25 to 48 months; 25-month scenario assumed to require 1,400 AF (700 AFY average) and 48-month scenario assumed to require 1,800 AF (450 AFY average). For purposes of the cumulative water assessment herein, all water assumed to be supplied by new on-site groundwater well(s) installed in the Palo Verde Mesa Groundwater Basin. In addition, for the purposes of calculating cumulative water use herein, the 25-month construction scenario water usage estimate is used instead of the 48-month construction scenario. Refer to Table 3-3 for the 48-month construction scenario assessment.
Desert Quartzite Solar Project	Desert Quartzite, LLC (First Solar)	CACA 49377	Photovoltaic, (300 MW)	On-site groundwater (and/or surface water trucked in from an offsite source)	Operation (2 scenarios; not additive)	-	-	-	38	38	38	38	38	38	38	38	38	38	38	-
Blythe Solar Power Project	NextEra (formerly Solar Millennium LLC)	CACA 48811/2009-AFC-06C	Photovoltaic (485 MW)	Groundwater	Construction	620	-	-	-	-	-	-	-	-	-	-	-	-	-	Construction started in March 2015 and is planned to be completed in August 2016 (according to CEC, Energy Facility Status, March 28, 2016). The modified project is now limited to 40 AFY of groundwater extraction during the operational phase as per CEC Condition SOIL & WATER-4. The listed construction water need of 620 AF in 2016 is assumed worst case based on previous estimates.
Blythe Solar Power Project	NextEra (formerly Solar Millennium LLC)	CACA 48811/2009-AFC-06C	Photovoltaic (485 MW)	Groundwater	Operation	40	40	40	40	40	40	40	40	40	40	40	40	40	40	-
McCoy Solar Energy Project	NextEra LLC	CACA 48728	Photovoltaic (up to 750 MW)	Groundwater	Construction	250	-	-	-	-	-	-	-	-	-	-	-	-	-	Construction water use is based on assumed 3-year construction period utilizing 750 AF and calculated average of 250 AFY. Construction planned to be completed in August 2016.
McCoy Solar Energy Project	NextEra LLC	CACA 48728	Photovoltaic (up to 750 MW)	Groundwater	Operation	30	30	30	30	30	30	30	30	30	30	30	30	30	30	-
Blythe Mesa Solar Project	Renewable Resources Group	CACA 53213	Photovoltaic (up to 750 MW)	Surface Water and Groundwater (only groundwater portion is shown)	Construction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	The Blythe Mesa Solar Project proposes to use 1,354 AF of surface water (451 AFY) over the planned 3-year construction period followed by limited groundwater extraction and potable demand during the operational phase (Power Engineers, Water Supply Assessment [WSA] for Blythe Mesa Solar Project, February 2013). The surface water is to be provided by the PVID and the potable water is to be supplied by Riverside County Community Service Area #122. The project would involve fallowing a substantial acreage of irrigated agricultural land with water savings well in excess of the Project's water needs. Operational phase groundwater needs are estimated at less than 1 AFY. Operation start date as per 2013 WSA.
Blythe Mesa Solar Project	Renewable Resources Group	CACA 53213	Photovoltaic (up to 750 MW)	Surface Water and Groundwater (only groundwater portion is shown)	Operation	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-

TABLE 3-2
CUMULATIVE ASSESSMENT OF PROPOSED ENERGY PROJECT GROUNDWATER USE, PALO VERDE MESA, RIVERSIDE COUNTY, CALIFORNIA
(DESERT QUARTZITE 700 AFY CONSTRUCTION SCENARIO)

Project [1]	Proponent	BLM Serial ID/ CEC Docket #	Technology	Source	Phase	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2050	Comments
Sonoran Energy Project (formerly Blythe Energy Project Phase II)	AltaGas Sonoran Energy, Inc. (formerly Blythe Energy, LLC)	2002-AFC-01	Combined/ Cycle (569 MW)	Groundwater	Construction	-	60	60	-	-	-	-	-	-	-	-	-	-	-	Petition to Amend CEC License was filed by applicant on August 7, 2015. As of March 2016, the applicant is still in the process of responding to CEC Data Requests. The construction start and end dates are currently not known but have been assumed as shown in the table. The Project includes a voluntary Water Conservation Offset Program involving proposed lining of Palo Verde Irrigation District canals to offset water use to mitigate groundwater usage.
Sonoran Energy Project (formerly Blythe Energy Project Phase II)	AltaGas Sonoran Energy, Inc. (formerly Blythe Energy, LLC)	2002-AFC-01	Combined/ Cycle (569 MW)	Groundwater	Operation	-	-	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	-
Crimson Solar Project	Sonoran West Holdings (subsidiary Recurrent Energy)	CACA 51967	Photovoltaic (450 MW)	Groundwater or Trucked-In Water (groundwater assumed)	Construction	-	1000	1000	1000	-	-	-	-	-	-	-	-	-	-	Only the easternmost portion of the Crimson Project site overlies the Palo Verde Mesa Groundwater Basin. The draft POD for the project (personal communication with Noel Ludwig, BLM [Ludwig 2016]) indicates that water demand would be met be either on-site groundwater, off-site groundwater, or water trucked in to the site. For the purposes of this worst-case assessment, it is assumed water would be supplied by groundwater well(s) installed within the boundaries of the Palo Verde Mesa Groundwater Basin.
Crimson Solar Project	Sonoran West Holdings (subsidiary Recurrent Energy)	CACA 51967	Photovoltaic (450 MW)	Groundwater or Trucked-In Water (groundwater assumed)	Operation	-	-	-	-	22	22	22	22	22	22	22	22	22	22	
Palo Verde Mesa Solar Project	Renewable Resources Group, Inc.	–	Photovoltaic (up to 486 MW)	Surface Water	Construction	-	0	0	0	-	-	-	-	-	-	-	-	-	-	The Water Supply Assessment prepared for the project (Power Engineers 2012) assumed a 3-year construction phase utilizing 500 AFY of surface water followed by a water use of 302 AFY for the operational phase. All water is to be provided by the PVID and no groundwater would be utilized. The project would involve conversion of agricultural land that has historically been irrigated with about 3,403 AFY that will no longer occur once the project is implemented (i.e., will result in a net reduction in water use). Based on information provided by the Riverside County Planning Department (Brady 2016), it is assumed that construction would begin in 2017.
Palo Verde Mesa Solar Project	Renewable Resources Group, Inc.	–	Photovoltaic (up to 486 MW)	Surface Water	Operation	-	-	-	-	0	0	0	0	0	0	0	0	0	0	
Total Water Use - Energy Projects (AF)[2]						941	1,831	4,831	4,109	3,131	3,131	3,131	3,131	3,131	3,131	3,131	3,131	3,131	3,131	
Cumulative Change (AF)[3]						941	2,772	7,603	11,712	14,843	17,974	21,105	24,236	27,367	30,498	33,629	36,760	39,891	108,773	
Basin-wide Change in Regional Water level (assuming no recharge and a storage coefficient of 0.20) (inches)[4]						0	-1	-2	-3	-4	-5	-6	-6	-7	-8	-9	-10	-11	-29	
Percentage of Proposed Energy Project Cumulative Water Use Compared to Estimated Total Storage (6.84M AF)						0.01%	0.04%	0.11%	0.17%	0.22%	0.26%	0.31%	0.35%	0.40%	0.45%	0.49%	0.54%	0.58%	1.59%	
Percent Desert Quartzite Solar Project Usage Compared to Yearly Total Energy Project Usage						0%	38%	14%	0.90%	1.20%	1.20%	1.20%	1.20%	1.20%	1.20%	1.20%	1.20%	1.20%	1.20%	

TABLE 3-2
CUMULATIVE ASSESSMENT OF PROPOSED ENERGY PROJECT GROUNDWATER USE, PALO VERDE MESA, RIVERSIDE COUNTY, CALIFORNIA
(DESERT QUARTZITE 450 AFY CONSTRUCTION SCENARIO)

NOTES

[1] Project updates were provided through research of the following:
Bureau of Land Management (BLM), California, 2015 (last update August 24, 2015). Approved Renewable Energy Projects, Solar Projects on BLM Public Lands. Accessed at: http://www.blm.gov/ca/st/en/prog/energy/approved_projects.
BLM, 2015 (last update October 1, 2015). Pending Renewable Energy Applications, Applications Undergoing Environmental Review. Accessed at: http;//www.blm.gov.ca/st/en/prog/energy/pendingapps.html.
BLM, 2015 (last update June 3, 2015). California Desert BLM District Offices, Renewable Energy Projects and Utility Corridors Map. California Desert District.
California Energy Commission, 2016. Status of all Projects. Accessed March 28, 2016 at: http://www.energy.ca.gov/siting cases/all_projects.html.
California Public Utilities Commission, 2016. Energy. Accessed March 28, 2016 at: http://www.cpuc.ca.gov/PUC/energy/.
Ludwig, 2016. BLM District Hydrologist. Personal communication with R. Ray (URS). April 4.

[2] Sum of renewable project water use by year based on current information through the references cited above through April 4, 2016.

[3] Cumulative change is a sum adding the prior years water use to the current water year for each year beginning in 2016 and ending in 2050.

[4] Estimated change in the regional water level following the equation shown below (Fetter 1988). Negative values indicate a decline in water levels. It is important to note that this analysis does not take into account recharge to the groundwater basin (i.e., conservative).

DEFINITIONS

AFY	acre feet per year.
AF	acre feet – (325,851 gallons).
BLM	Bureau of Land Management.
CEC	California Energy Commission.
LLC	Limited Liability Corporation.
MW	Megawatts.
POD	Plan of Development.
PVID	Palo Verde Irrigation District.
–	Not applicable.

ESTIMATE OF BASIN-WIDE WATER LEVEL CHANGE

$V = A*S*dh$ V – volume of water released or taken into storage (acre-feet).
A – area of the aquifer (acres).
S – aquifer storage coefficient.
dh – change in water level (inches).

TABLE 3-3
CUMULATIVE ASSESSMENT OF PROPOSED ENERGY PROJECT GROUNDWATER USE, PALO VERDE MESA, RIVERSIDE COUNTY, CALIFORNIA
(DESERT QUARTZITE 450 AFY CONSTRUCTION SCENARIO)

Project [1]	Proponent	BLM Serial ID/ CEC Docket #	Technology	Source	Phase	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2050	Comments
Desert Quartzite Solar Project	Desert Quartzite, LLC (First Solar)	CACA 49377	Photovoltaic, (300 MW)	On-site groundwater (and/or surface water trucked in from an offsite source)	Construction (2 scenarios; not additive)	-	450	450	450	450	-	-	-	-	-	-	-	-	-	Construction planned to occur over 25 to 48 months; 25-month scenario assumed to require 1,400 AF (700 AFY average) and 48-month scenario assumed to require 1,800 AF (450 AFY average). For purposes of the cumulative water assessment herein, all water assumed to be supplied by new on-site groundwater well(s) installed in the Palo Verde Mesa Groundwater Basin. In addition, for the purposes of calculating cumulative water use herein, the 48-month construction scenario water usage estimate is used instead of the 25-month construction scenario. Refer to Table 3-2 for the 25-month construction scenario assessment.
Desert Quartzite Solar Project	Desert Quartzite, LLC (First Solar)	CACA 49377	Photovoltaic, (300 MW)	On-site groundwater (and/or surface water trucked in from an offsite source)	Operation (2 scenarios; not additive)	-	-	-	-	-	38	38	38	38	38	38	38	38	38	-
Blythe Solar Power Project	NextEra (formerly Solar Millennium LLC)	CACA 48811/2009-AFC-06C	Photovoltaic (485 MW)	Groundwater	Construction	620	-	-	-	-	-	-	-	-	-	-	-	-	-	Construction started in March 2015 and is planned to be completed in August 2016 (according to CEC, Energy Facility Status, March 28, 2016). The modified project is now limited to 40 AFY of groundwater extraction during the operational phase as per CEC Condition SOIL & WATER-4. The listed construction water need of 620 AF in 2016 is assumed worst case based on previous estimates.
Blythe Solar Power Project	NextEra (formerly Solar Millennium LLC)	CACA 48811/2009-AFC-06C	Photovoltaic (485 MW)	Groundwater	Operation	40	40	40	40	40	40	40	40	40	40	40	40	40	40	-
McCoy Solar Energy Project	NextEra LLC	CACA 48728	Photovoltaic (up to 750 MW)	Groundwater	Construction	250	-	-	-	-	-	-	-	-	-	-	-	-	-	Construction water use is based on assumed 3-year construction period utilizing 750 AF and calculated average of 250 AFY. Construction planned to be completed in August 2016.
McCoy Solar Energy Project	NextEra LLC	CACA 48728	Photovoltaic (up to 750 MW)	Groundwater	Operation	30	30	30	30	30	30	30	30	30	30	30	30	30	30	-
Blythe Mesa Solar Project	Renewable Resources Group	CACA 53213	Photovoltaic (up to 750 MW)	Surface Water and Groundwater (only groundwater portion is shown)	Construction	-	-	-	-	-	-	-	-	-	-	-	-	-	-	The Blythe Mesa Solar Project proposes to use 1,354 AF of surface water (451 AFY) over the planned 3-year construction period followed by limited groundwater extraction and potable demand during the operational phase (Power Engineers, Water Supply Assessment [WSA] for Blythe Mesa Solar Project, February 2013). The surface water is to be provided by the PVID and the potable water is to be supplied by Riverside County Community Service Area #122. The project would involve fallowing a substantial acreage of irrigated agricultural land with water savings well in excess of the Project's water needs. Operational phase groundwater needs are estimated at less than 1 AFY. Operation start date as per 2013 WSA.
Blythe Mesa Solar Project	Renewable Resources Group	CACA 53213	Photovoltaic (up to 750 MW)	Surface Water and Groundwater (only groundwater portion is shown)	Operation	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	-

TABLE 3-3
CUMULATIVE ASSESSMENT OF PROPOSED ENERGY PROJECT GROUNDWATER USE, PALO VERDE MESA, RIVERSIDE COUNTY, CALIFORNIA
(DESERT QUARTZITE 450 AFY CONSTRUCTION SCENARIO)

Project [1]	Proponent	BLM Serial ID/ CEC Docket #	Technology	Source	Phase	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2050	Comments
Sonoran Energy Project (formerly Blythe Energy Project Phase II)	AltaGas Sonoran Energy, Inc. (formerly Blythe Energy, LLC)	2002-AFC-01	Combined/ Cycle (569 MW)	Groundwater	Construction	-	60	60	-	-	-	-	-	-	-	-	-	-	-	Petition to Amend CEC License was filed by applicant on August 7, 2015. As of March 2016, the applicant is still in the process of responding to CEC Data Requests. The construction start and end dates are currently not known but have been assumed as shown in the table. The Project includes a voluntary Water Conservation Offset Program involving proposed lining of Palo Verde Irrigation District canals to offset water use to mitigate groundwater usage.
Sonoran Energy Project (formerly Blythe Energy Project Phase II)	AltaGas Sonoran Energy, Inc. (formerly Blythe Energy, LLC)	2002-AFC-01	Combined/ Cycle (569 MW)	Groundwater	Operation	-	-	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	-
Crimson Solar Project	Sonoran West Holdings (subsidiary Recurrent Energy)	CACA 51967	Photovoltaic (450 MW)	Groundwater or Trucked-In Water (groundwater assumed)	Construction	-	1000	1000	1000	-	-	-	-	-	-	-	-	-	-	Only the easternmost portion of the Crimson Project site overlies the Palo Verde Mesa Groundwater Basin. The draft POD for the project (personal communication with Noel Ludwig, BLM [Ludwig 2016]) indicates that water demand would be met be either on-site groundwater, off-site groundwater, or water trucked in to the site. For the purposes of this worst-case assessment, it is assumed water would be supplied by groundwater well(s) installed within the boundaries of the Palo Verde Mesa Groundwater Basin.
Crimson Solar Project	Sonoran West Holdings (subsidiary Recurrent Energy)	CACA 51967	Photovoltaic (450 MW)	Groundwater or Trucked-In Water (groundwater assumed)	Operation	-	-	-	-	22	22	22	22	22	22	22	22	22	22	
Palo Verde Mesa Solar Project	Renewable Resources Group, Inc.	–	Photovoltaic (up to 486 MW)	Surface Water	Construction	-	0	0	0	-	-	-	-	-	-	-	-	-	-	The Water Supply Assessment prepared for the project (Power Engineers 2012) assumed a 3-year construction phase utilizing 500 AFY of surface water followed by a water use of 302 AFY for the operational phase. All water is to be provided by the PVID and no groundwater would be utilized. The project would involve conversion of agricultural land that has historically been irrigated with about 3,403 AFY that will no longer occur once the project is implemented (i.e., will result in a net reduction in water use). Based on information provided by the Riverside County Planning Department (Brady 2016), it is assumed that construction would begin in 2017.
Palo Verde Mesa Solar Project	Renewable Resources Group, Inc.	–	Photovoltaic (up to 486 MW)	Surface Water	Operation	-	-	-	-	0	0	0	0	0	0	0	0	0	0	
Total Water Use - Energy Projects (AF)[2]	-	-	-	-	-	941	1,581	4,581	4,521	3,543	3,131	3,131	3,131	3,131	3,131	3,131	3,131	3,131	3,131	
Cumulative Change (AF) [3]	-	-	-	-	-	941	2,522	7,103	11,624	15,167	18,298	21,429	24,560	27,691	30,822	33,953	37,084	40,215	109,097	
Basin-wide Change in Regional Water level (assuming no recharge and a storage coefficient of 0.20) (inches) [4]			-	-	-	0	-1	-2	-3	-4	-5	-6	-7	-7	-8	-9	-10	-11	-29	
Percentage of Proposed Energy Project Cumulative Water Use Compared to Estimated Total Storage (6.84M AF)			-	-	-	0.01%	0.04%	0.10%	0.17%	0.22%	0.27%	0.31%	0.36%	0.40%	0.45%	0.50%	0.54%	0.59%	1.59%	
Percent Desert Quartzite Solar Project Usage Compared to Yearly Total Energy Project Usage			-	-	-	0%	28%	10%	10%	13%	1.20%	1.20%	1.20%	1.20%	1.20%	1.20%	1.20%	1.20%	1.20%	

TABLE 3-3
CUMULATIVE ASSESSMENT OF PROPOSED ENERGY PROJECT GROUNDWATER USE, PALO VERDE MESA, RIVERSIDE COUNTY, CALIFORNIA
(DESERT QUARTZITE 450 AFY CONSTRUCTION SCENARIO)

NOTES

[1] Project updates were provided through research of the following:
Bureau of Land Management (BLM), California, 2015 (last update August 24, 2015). Approved Renewable Energy Projects, Solar Projects on BLM Public Lands. Accessed at: http://www.blm.gov/ca/st/en/prog/energy/approved_projects.
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BLM, 2015 (last update June 3, 2015). California Desert BLM District Offices, Renewable Energy Projects and Utility Corridors Map. California Desert District.
California Energy Commission, 2016. Status of all Projects. Accessed March 28, 2016 at: http://www.energy.ca.gov/siting cases/all_projects.html.
California Public Utilities Commission, 2016. Energy. Accessed March 28, 2016 at: http://www.cpuc.ca.gov/PUC/energy/.
Ludwig, 2016. BLM District Hydrologist. Personal communication with R. Ray (URS). April 4.

[2] Sum of renewable project water use by year based on current information through the references cited above through April 4, 2016.

[3] Cumulative change is a sum adding the prior years water use to the current water year for each year beginning in 2016 and ending in 2050.

[4] Estimated change in the regional water level following the equation shown below (Fetter 1988). Negative values indicate a decline in water levels. It is important to note that this analysis does not take into account recharge to the groundwater basin (i.e., conservative).

DEFINITIONS

AFY	acre feet per year.
AF	acre feet – (325,851 gallons).
BLM	Bureau of Land Management.
CEC	California Energy Commission.
LLC	Limited Liability Corporation.
MW	Megawatts.
POD	Plan of Development.
PVID	Palo Verde Irrigation District.
–	Not applicable.

ESTIMATE OF BASIN-WIDE WATER LEVEL CHANGE

V = A*S*dh V – volume of water released or taken into storage (acre-feet).
A – area of the aquifer (acres).
S – aquifer storage coefficient.
dh – change in water level (inches).

not specifically pertain to groundwater, PVID has no obligation to restrict or regulate non-agricultural wells, including those wells operated by the City of Blythe.

Other legislation, contracts, compacts, and court rulings known collectively as the “Law of the River” confirm the rights of various states and agencies, including PVID, to the waters of the Colorado River.

The majority of the Project site is located within the PVID service boundaries. Based on discussions in February, 2016 with the PVID Assistant Manager, Mr. Richard Gilmore, PVID may supply water to areas within PVID’s service boundary for beneficial uses, including supplies required for the Project (Gilmore 2015). PVID’s closest sources of water for the Project to access via truck would be a pump station located along Neighbours Boulevard, just north of West 11th Street, where water trucks may be loaded. Alternatively, PVID operates canals to the east of the Project site. For this latter option, the Project would likely be required to build infrastructure to obtain and convey water from a canal. The details and logistics for accessing PVID’s water supply have not yet been developed.

PVID’s ability and willingness to provide surface water to meet the Project’s construction and operational water supply needs are indicated in a Water Supply letter presented in Appendix C.

SECTION 4.0

WATER SUPPLY PLANNING UNDER SENATE BILL 610

4.1 SUMMARY

SB 610 became effective in January 2002 and amended the California Water Code by requiring a WSA to be completed for certain projects subject to CEQA, as discussed below in Sections 4.2 and 4.3. California Water Code, as amended by SB 610, requires that when a WSA is required it must address the following questions:

- Is there a public water system that will service the proposed project;
- Is there a current UWMP that accounts for the project demand;
- Is groundwater a component of the supplies for the project; and
- Are there sufficient supplies to serve the project over the next twenty years?

The primary question to be answered in a WSA is:

> *Will the total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection meet the projected water demand of the proposed project, in addition to existing and planned future uses of the identified water supplies, including agricultural and manufacturing uses?*

The following sections address the SB 610 WSA questions as they relate to the proposed Project.

Is the proposed Project subject to CEQA?

California Water Code Section 10910(a) states that any city or county that determines that a project, as defined in Section 10912, is subject to CEQA, which applies to projects requiring an issuance of a permit by a public agency, projects undertaken by a public agency, or projects funded by a public agency.

> The proposed Project requires issuance of permits by Riverside County and is, therefore, subject to CEQA. An EIR is in progress.

Is the proposed project a “Project” under SB 610?

California Water Code Section 10912(a) states that any proposed action that meets the definition of “Project” under SB 610 is required to prepare a WSA to demonstrate whether sufficient water supplies are available to meet requirements of the proposed project under normal and drought conditions. SB 610 defines a “Project” as any one of six different development types with certain water use requirements, as specified in the Water Code revised by SB 610. Each identified development type and associated water requirement are addressed below. Any mixed-use project that incorporates one of the six development types described below is also defined as a "Project" under SB 610.

Residential Development

A proposed residential development of more than 500 dwelling units is defined as a "Project" under SB 610.

> The proposed Project is not a residential development.

Shopping Center or Business Establishment

A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space is defined as a "Project" under SB 610.

> The proposed Project is not a shopping center or residential development.

Commercial Office Building

A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space is defined as a "Project" under SB 610.

> The proposed Project is not a commercial office building.

Hotel or Motel

A proposed hotel or motel, or both, having more than 500 rooms is defined as a "Project" under SB 610.

> The proposed Project is not a hotel or motel.

Industrial, Manufacturing, or Processing Plant or Industrial Park

A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area, is defined as a "Project" under SB 610. Additionally, PV solar and wind energy projects are exempt from preparation of a WSA if they are less than 75 acres in size.

> Based on the definition of "Project" as presented above, the proposed solar Project is both larger than 40 acres and meets the intent of the definition, and is greater than 75 acres and would not qualify for a SB 267 exemption. Consequently, the County of

> Riverside, as the CEQA Lead Agency for the proposed Project, has directed that a WSA for the proposed Project be prepared.

Equivalent Water Use

A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling-unit project is defined as a “Project” under SB 610. Assuming that an average household of 3.5 people requires 1.2 AFY (AVEK 2008), a 500-dwelling-unit project would require approximately 600 AFY.

> As described in Section 2.2 (Water Requirements), the proposed Project would require approximately 2,540 to 2,940 AF of non-potable water for the 25-month and 48-month construction scenarios, respectively, including 30 years of operation. This equates to an average annual use of approximately 79 to 87 AFY over the combined 32- to 34-year construction/operations period.

Is there a public water system that will service the proposed project?

No; the Project would not be served by a public water system or using public water system connections. The proposed Project would use either on-site groundwater resources via installation of new on-site wells, PVID supplied water (via Project access to existing water infrastructure that currently delivers irrigation water from the PVID), and/or a combination thereof. Potable water needs would be minimal and would be met through deliveries of bottled water to the site.

Is there a current UWMP that accounts for the project demand?

No; the City of Blythe, California has a UWMP, but this plan is not applicable to the Project since the Project site lies well outside the city limits.

Is groundwater a component of the supplies for the project?

Yes; groundwater is a proposed component of the supplies for the Project. In addition, the Project may use water supplied by the PVID water system. Groundwater would be pumped via on-site wells extending into the PVMGB below the site.

Are there sufficient supplies to serve the project over the next twenty years?

Yes; as demonstrated through the data and discussions provided in this section, sufficient water supplies are expected to be available to serve the Project over a 20-year future projection, including with consideration of average-year, single-dry year, and multiple-dry year (drought) conditions.

4.2 PROJECT AND NON-PROJECT WATER DEMANDS

Water demands of the proposed Project assuming the Project would utilize on-site groundwater resources or PVID surface water are summarized in the following sections along with information on other proposed energy projects to characterize water supply availability.

4.2.1 Project Demands (Groundwater)

This groundwater analysis considers the construction and operational phase groundwater demand assuming that the Project's water supply needs would be met solely from on-site groundwater well(s). The pre-project estimated inflows and outflows for the Palo Verde Valley (in accordance with the Palo Verde Groundwater Model) are compared to the proposed Project use and other proposed energy projects that propose to use groundwater from the PVMGB for a 20-year period. A more detailed water balance is presented in Table 3-1 (and Table 1 in Appendix B). Refer to Tables 3-2 and 3-3 for a more detailed summary of cumulative water demand for the proposed Project and other proposed energy projects that would utilize groundwater supplies from the PVMGB.

The recharge (inflow) component of the groundwater basin balance presented in Table 4-1 would not be affected by consideration of normal/dry year/extended dry years since the water balance already assumes that groundwater recharge associated with precipitation that falls on the Palo Verde Mesa and Valley floors is negligible. The inflow variables considered in the water balance used for numerical groundwater modeling purposes are not affected by consideration of drought conditions such as those the Project area is currently experiencing. There is ample groundwater supply to reliably meet the Project's water demand with minimal impact on the PVMGB as indicated by the current groundwater basin balance for the PVMGB and the PVVGB, the Project's minimal demand compared to the basin storage, and the numerical groundwater modeling results for the Project.

4.2.2 Project Demands (Surface Water)

This surface water analysis assumes that the Project's water supply needs would be met solely from surface water supplied by the PVID versus on-site groundwater wells. PVID's ability and willingness to provide surface water to meet the Project's construction and operational water supply needs are indicated in a Water Supply letter presented in Appendix C. This letter indicates that PVID is capable and willing to supply the Project's water needs from its existing allocations for the Palo Verde Mesa during the construction phase and over the 30-year life of the Project, and that the PVID's water supply and other customers would not be negatively impacted. PVID has indicated that their surface water supply is not subject to curtailment or rationing due to drought conditions. Given the relatively insignificant quantity of water required to meet the Project's construction and operational water needs

TABLE 4-1
TWENTY-YEAR COMPARISON OF GROUNDWATER BASIN INFLOWS AND OUTFLOWS WITH CONSTRUCTION OF DESERT QUARTZITE AND OTHER PROPOSED ENERGY PROJECTS

Parameter	2016[1]	2017	2018	2019	2020	2021–2036 Annually
Pre-project groundwater basin balance[2]						
Palo Verde Valley total inflow (AF)	426,600	426,600	426,600	426,600	426,600	426,600
Palo Verde Valley total outflow (AF)	426,600	426,600	426,600	426,600	426,600	426,600
Balance (inflow-outflow)	0	0	0	0	0	0
Proposed Energy Projects Demand (AF)[3]						
Desert Quartzite Solar Project[4]	0	700	700	38	38	38
Other proposed energy projects	941	1,131	4,131	4,071	3,093	3,093
Total yearly demand	941	1,831	4,831	4,109	3,131	3,131
Supply/demand difference (inflow-outflow)[5]	-941	-1,831	-4,831[6]	-4,109[6]	-3,131[6]	-3,131[6]

[1] Groundwater inflow-outflow prior to start of Desert Quartzite Solar Project.

[2] The groundwater basin balance numbers presented are for the Palo Verde Valley as defined in Table 3-1 for the groundwater model which encompasses both the PVMGB and the PVVGB.

[3] Refer to Table 3-2 for basis.

[4] The water demand numbers presented for the Desert Quartzite Solar Project are for the 25-month construction scenario.

[5] For reference purposes, the Palo Verde Mesa Groundwater Basin is estimated to have a basin storage capacity of 6,840,000 AF.

[6] The Sonoran Energy Project (natural gas; formerly Blythe Energy Project II) accounts for 3,000 AFY of the listed demand beginning in 2018. The Sonoran Energy Project includes mitigation (PVID canal lining) that is not accounted for in this table.

relative to PVID’s overall water supply, no significant effects on PVID’s water supply would be expected associated with the proposed Project’s water supply demand.

Other proposed energy projects that plan to use surface water supplied from the PVID include the Blythe Mesa Solar Project and the Palo Verde Mesa Solar Project. In addition, the Crimson Solar Project may pursue use of trucked-in water (Ludwig 2016); however, no publically available plans or details are available regarding the source of trucked-in water. For the purposes of this analysis, the Crimson Solar Project is assumed to use groundwater extracted from the PVMGB and the groundwater analyses presented in this report account for the Crimson Solar Project.

The Blythe Mesa Solar Project proposes to use 1,354 AF of surface water (451 AFY) over the planned 3-year construction period followed by limited groundwater extraction and potable demand during the operational phase (Power Engineers 2013). The surface water is to be provided by the PVID and the potable water is to be supplied by Riverside County Community

Community Service Area #122. The project would involve fallowing a substantial acreage of irrigated agricultural land with water savings well in excess of the Project’s water needs. Operational phase groundwater needs are estimated at less than 1 AFY and are accounted for in the groundwater analyses included in this report.

The proposed Palo Verde Mesa Solar Project is assumed to involve a 3-year construction phase utilizing 500 AFY of surface water followed by a water use of 302 AFY for the operational phase (Power Engineers 2012). All water is to be provided by the PVID and no groundwater would be utilized. The project would involve conversion of agricultural land that has historically been irrigated with about 3,403 AFY that will no longer occur once the project is implemented (i.e., will result in a net reduction in water use). Based on information provided by the Riverside County Planning Department (Brady 2016), it is assumed that construction would begin in 2017.

The Blythe Mesa Solar Project and the Palo Vere Mesa Solar Project would both involve fallowing substantial acreages of agricultural land on the solar sites and are expected to result in reduced water usage relative to the historical water use on the project sites. Therefore, these projects would not be expected to contribute to cumulative water demand on the Palo Verde Mesa.

SECTION 5.0
CONCLUSIONS

5.1 WATER SUPPLY BASIS

The Desert Quartzite Solar Project proposes to use a total of approximately 2,540 - 2,940 AF of water over the term of construction (1,400 AF over 25 months or 1,800 AF over 48 months) and operation (38 AFY for 30 years or 1,140 AF). The Project proposes to obtain the needed water supply either from development of on-site groundwater resources and/or via purchase of surface water from the PVID. In order to perform a worst-case assessment, it is currently assumed for the purposes of this WSA that the entire amount of water would be secured by one or the other source – i.e., not combined source. However, the Project may utilize both sources, as appropriate, for a combined total of 2,540 - 2,940 AF. As discussed in the following sections, Project use of either water supply source would be expected to be more than sufficient to meet the Project water demand, reliable for the life of the Project, and to have negligible effects on groundwater and/or surface water supplies in the Project region.

5.2 ON-SITE GROUNDWATER SUPPLY

The Project’s maximum total construction and operation water needs (2,940 AF for 48-month construction scenario and 30 years of operation) are approximately 0.04 percent of the groundwater storage capacity (6.84 million AF) reported by the DWR for the PVMGB, which includes the Project site and is the proposed groundwater supply source.

Based on the numerical groundwater modeling performed for the Project, pumping from on-site wells would not significantly impact adjacent water supply wells or the groundwater basin storage in the Palo Verde Valley (inclusive of the PVMGB and the PVVGB). The relatively low steady-state pumping volumes over the 32- to 34-year period (e.g., average of approximately 434 gpm over the 25-month construction period [700 AFY] or approximately 279 gpm over the alternate 48-month construction period [450 AFY], and 23.5 gpm over the 30-year operational period [38 AFY]) are small compared to the rate at which the Palo Verde Valley (inclusive of the PVMGB and the PVVGB) is recharged (estimated at 426,000 AFY or 263,928 gpm).

The results of the numerical groundwater simulations (URS 2016) indicate that the proposed Project pumping would not significantly impact nearby water supply wells or the groundwater basin storage. As discussed in Section 3.2.6, the drawdown associated with the on-site groundwater well(s) was not predicted to exceed one foot at any off-site well locations. The low pumping volume combined with the fact that the closest PVID irrigation drains are at least one mile from the eastern Project site boundary (and several miles farther from the currently envisioned on-site well location[s]) would render the influence from the Project pumping on the PVID drains and associated groundwater recharge insignificant.

Given its fractional contribution to the total extractions from the PVMGB, the Project does not represent a cumulatively considerable contribution to the water resource impacts on the basin.

The water balance developed for the Palo Verde Groundwater Model (AECOM 2010, 2011) and utilized for the numerical groundwater modeling performed for the proposed Desert Quartzite Solar Project is not influenced by consideration of variations in annual precipitation (i.e., normal, single dry, and multiple dry years) as the model assumes that precipitation recharge onto the Palo Verde Mesa floor is negligible and that there is no return to groundwater from direct precipitation.

5.3 PVID SURFACE WATER

Based on the Water Supply letter provided by PVID (refer to Appendix C) and the information presented in this report, PVID’s surface water supply is sufficient to meet the non-potable requirements of the proposed Project for both the construction and operational phases, including consideration of extended drought conditions such as the area is currently experiencing. The Project’s water supply requirements represent a very small fraction of PVID’s available and secure allocation for the Palo Verde Mesa.

This Water Supply Assessment was prepared in compliance with the requirements of the California Water Code, as amended by Senate Bill 610.

SECTION 6.0
REFERENCES

AECOM. 2012. McCoy Solar Energy Project (Final/Draft) Proposed Plan Amendment and Environmental Impact Statement. December.

2011. Assessment of Proposed Groundwater Use, Results of Numerical Groundwater Modeling, McCoy Solar Energy Project, Palo Verde Mesa, Riverside County, California. August.

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2015b. California Desert BLM District Office, Renewable Energy Projects and Utility Corridors Map. Last update June 3, 2015.

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1979. Bulletin 91-24, Sources of Powerplant Cooling Water in the Desert Area of Southern California – Reconnaissance Study.

1963. Data on Water Wells and Springs in the Chuckwalla Valley Area, Riverside County, California. Bulletin No. 91-7.

TABLE 3-1
SUMMARY PALO VERDE VALLEY WATER BALANCE PALO VERDE GROUNDWATER MODEL[1,2,3]

Recharge (inflow)[4]	Volume (AFY)
Underflow from Chuckwalla Valley	1,000
Underflow from Parker Valley	3,500
Percolation	
Agriculture return – mesa	3,500
Agriculture return – valley	67,000
POTW return	750
Mountain front	5,000
Irrigation canal leakage (less evaporation)	120,000
River discharge to groundwater (losing condition)	225,850
Bedrock	0
Total inflow	426,600
Discharge (outflow)	**Volume (AFY)**
Underflow out of the Palo Verde and Cibola Valley Aquifer	0
Groundwater pumping	
Agriculture – mesa	3,600
Municipal and domestic	7,500
Unmeasured return (gaining condition)	50,000
Consumptive use (native vegetation)	8,500
Groundwater discharge	357,000
Total (outflow)	426,600
Water balance (inflow-outflow)	0

[1] Note: The Palo Verde Valley as defined in the Palo Verde Groundwater Model encompasses both the PVMBG and the PVVGB,

[2] Sources: (1) Assessment of Proposed Groundwater Use, Results of Numerical Groundwater Modeling, McCoy Solar Energy Project, Palo Verde Mesa, Riverside County, California (AECOM 2011); (2) Numerical Groundwater Flow Model of the Palo Verde Valley and Palo Verde Mesa (CEC Soil and Water Condition 16): Blythe Solar Power Project (09-AFC-6C), Riverside County, California (AECOM 2010).

[3] Note: the data presented in this table is a summary excerpt from a portion of Table 1 in Appendix B of this report which presents the complete Palo Verde Valley Water Balance, Palo Verde Groundwater Model, McCoy Solar Energy Project. Refer to Table 1 in Appendix B and the source documents for more information including the various references used to develop the water balance as well as the basis for individual inflow/outflow estimates.

[4] Precipitation recharge onto the Palo Verde Mesa floor is assumed to be negligible. It is assumed that all water transpires or evaporates and that no return to groundwater occurs from direct precipitation.

URS. 2016. Proposed Groundwater Use – Numerical Groundwater Modeling for the Desert Quartzite Solar Project. Prepared for Desert Quartzite, LLC.

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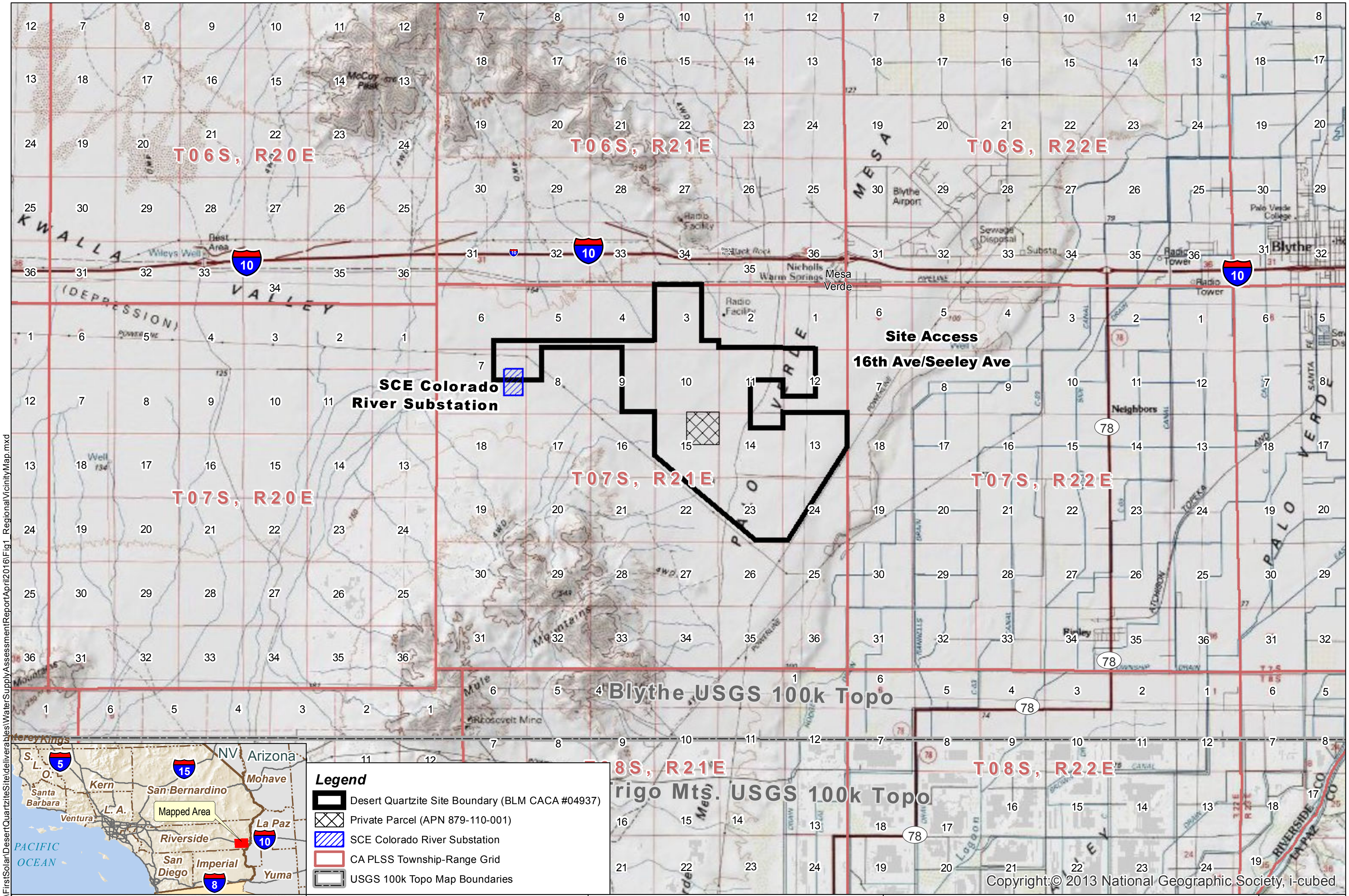
FIGURES


T06S, R20E
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T07S, R20E
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T07S, R22E
T08S, R21E
T08S, R22E
KWALLA VALLEY (DEPRESSION)
McCoy Peak
Wileys Well
Rest Area
Radio Facility
Blythe Airport
Sewage Disposal
Substa
Black Rock
Nicholls Warm Springs
Mesa Verde
MESA
Radio Facility
Palo Verde College
Blythe
Radio Tower
Site Access
16th Ave/Seeley Ave
SCE Colorado River Substation
PALO VERDE
Neighbors
Well
Mountains
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PACIFIC OCEAN
Riverside
San Diego
Imperial
Yuma
5
15
10
8
Legend
Desert Quartzite Site Boundary (BLM CACA #04937)
Private Parcel (APN 879-110-001)
SCE Colorado River Substation
CA PLSS Township-Range Grid
USGS 100k Topo Map Boundaries

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Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

N

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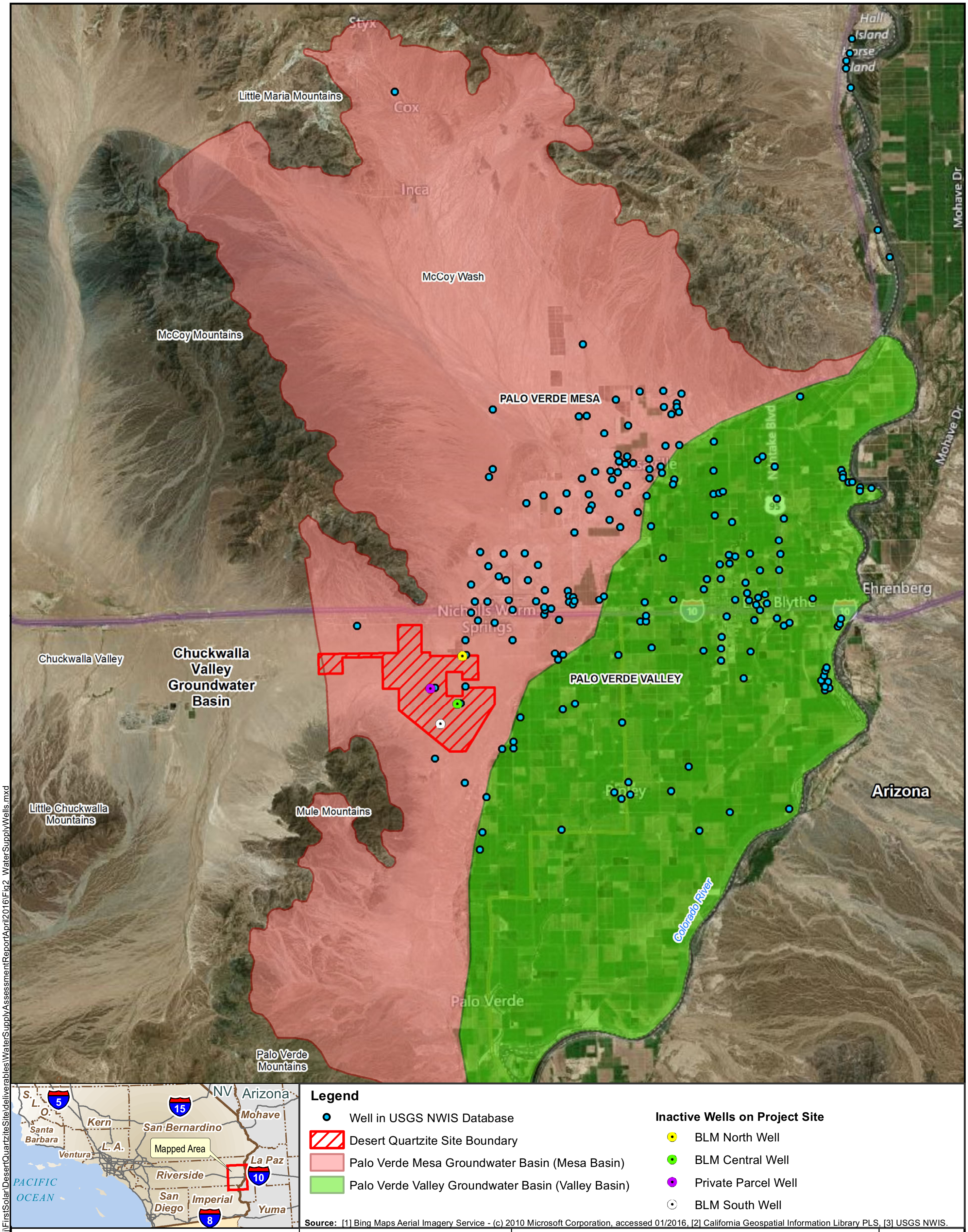
0 5,000 10,000 Feet

Source: [1] Bing Maps Aerial Imagery Web Mapping Service - (c) 2010 Microsoft Corporation and its datas upplier (Image Date: 3/13/2011), [2] California Geospatial Information Library PLS, [3] ESRI StreetMap USA (2007).

Figure 1. Regional Vicinity Map

2016


Styx
Little Maria Mountains
Cox
Hall Island
Horse Island
Inca
Mohave Dr
McCoy Wash
McCoy Mountains
PALO VERDE MESA
Neighbors Blvd
95
Ehrenberg
Blythe
10
Nicholls Warm Springs
Chuckwalla Valley
Chuckwalla Valley Groundwater Basin
PALO VERDE VALLEY
Arizona
Ripley
Little Chuckwalla Mountains
Mule Mountains
Colorado River
Palo Verde
Palo Verde Mountains
S. L. O.
Santa Barbara
Kern
Ventura
L. A.
San Bernardino
Riverside
San Diego
Imperial
Mapped Area
NV
Arizona
Mohave
La Paz
Yuma
PACIFIC OCEAN
5
15
10
8

Legend

- ● Well in USGS NWIS Database
- ▨ Desert Quartzite Site Boundary
- 🟥 Palo Verde Mesa Groundwater Basin (Mesa Basin)
- 🟩 Palo Verde Valley Groundwater Basin (Valley Basin)

Inactive Wells on Project Site

- ● BLM North Well
- ● BLM Central Well
- ● Private Parcel Well
- ⊙ BLM South Well

Source: [1] Bing Maps Aerial Imagery Service - (c) 2010 Microsoft Corporation, accessed 01/2016, [2] California Geospatial Information Library PLS, [3] USGS NWIS.

Desert Quartzite Solar Project
Riverside County, CA

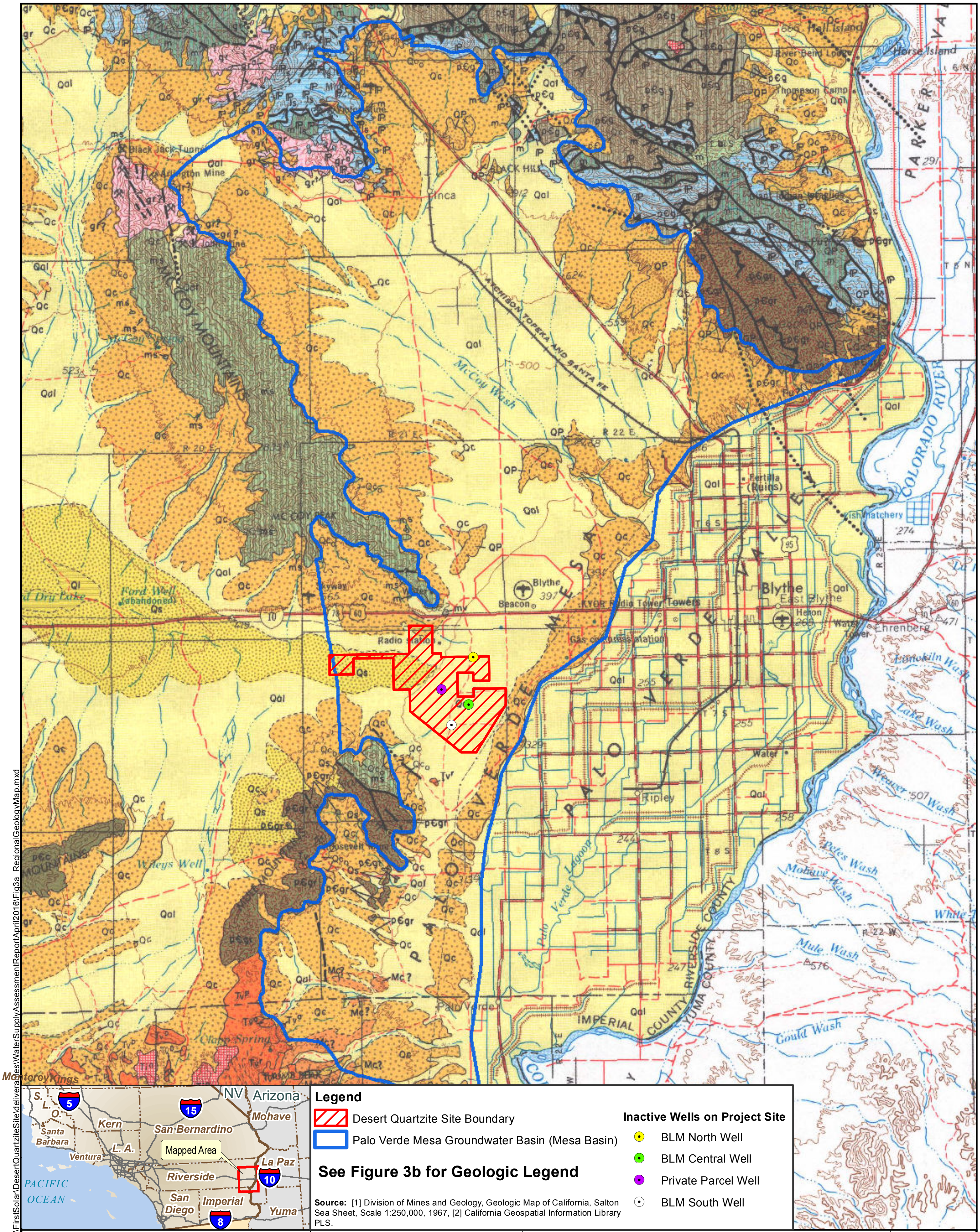
URS Corporation

N
0 2 4 Miles
1 in = 4 miles

Figure 2. Groundwater Basins and Wells in the Project Vicinity

2016

V:\Projects\GIS_Proj\FirstSolar\DesertQuartziteSite\deliverables\WaterSupplyAssessmentReportApril2016\Fig2_WaterSupplyWells.mxd


Hall Island
Horse Island
River Bend Lodge
Thompson Camp
PARKER VALLEY
Black Jack Tunnel
Arlington Mine
BLACK HILLS
Inca
ATCHISON TOPEKA AND SANTA FE
McCOY MOUNTAINS
McCoy Wash
MC COY PEAK
Ford Dry Lake
Ford Well (abandoned)
Wileys Well
Fertilla (Ruins)
Fish Hatchery
COLORADO RIVER
Blythe
Beacon
East Blythe
KYOR Radio Tower
Towers
Gas Compressor Station
Radio Station
Ehrenberg
Water Tower
PALO VERDE MESA
PALO VERDE VALLEY
Ripley
Palo Verde Lagoon
Palo Verde
Clapp Spring
RIVERSIDE COUNTY
YUMA COUNTY
IMPERIAL COUNTY
Lake Wash
Weaver Wash
Peters Wash
Mohave Wash
Mule Wash
Gould Wash
R 20 E
R 21 E
R 22 E
T 6 S
T 7 S
T 8 S
Monterey
Kings
S.L.O.
Santa Barbara
Kern
San Bernardino
Ventura
L.A.
Mapped Area
NV
Arizona
Mohave
La Paz
Riverside
PACIFIC OCEAN
San Diego
Imperial
Yuma
5
15
10
8

Legend

▨ Desert Quartzite Site Boundary

☐ Palo Verde Mesa Groundwater Basin (Mesa Basin)

Inactive Wells on Project Site

● BLM North Well

● BLM Central Well

● Private Parcel Well

⊙ BLM South Well

See Figure 3b for Geologic Legend

Source: [1] Division of Mines and Geology, Geologic Map of California, Salton Sea Sheet, Scale 1:250,000, 1967, [2] California Geospatial Information Library PLS.

Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

N

0 2 4 Miles

1 in = 4 miles

Figure 3a. Regional Geologic Map

2016

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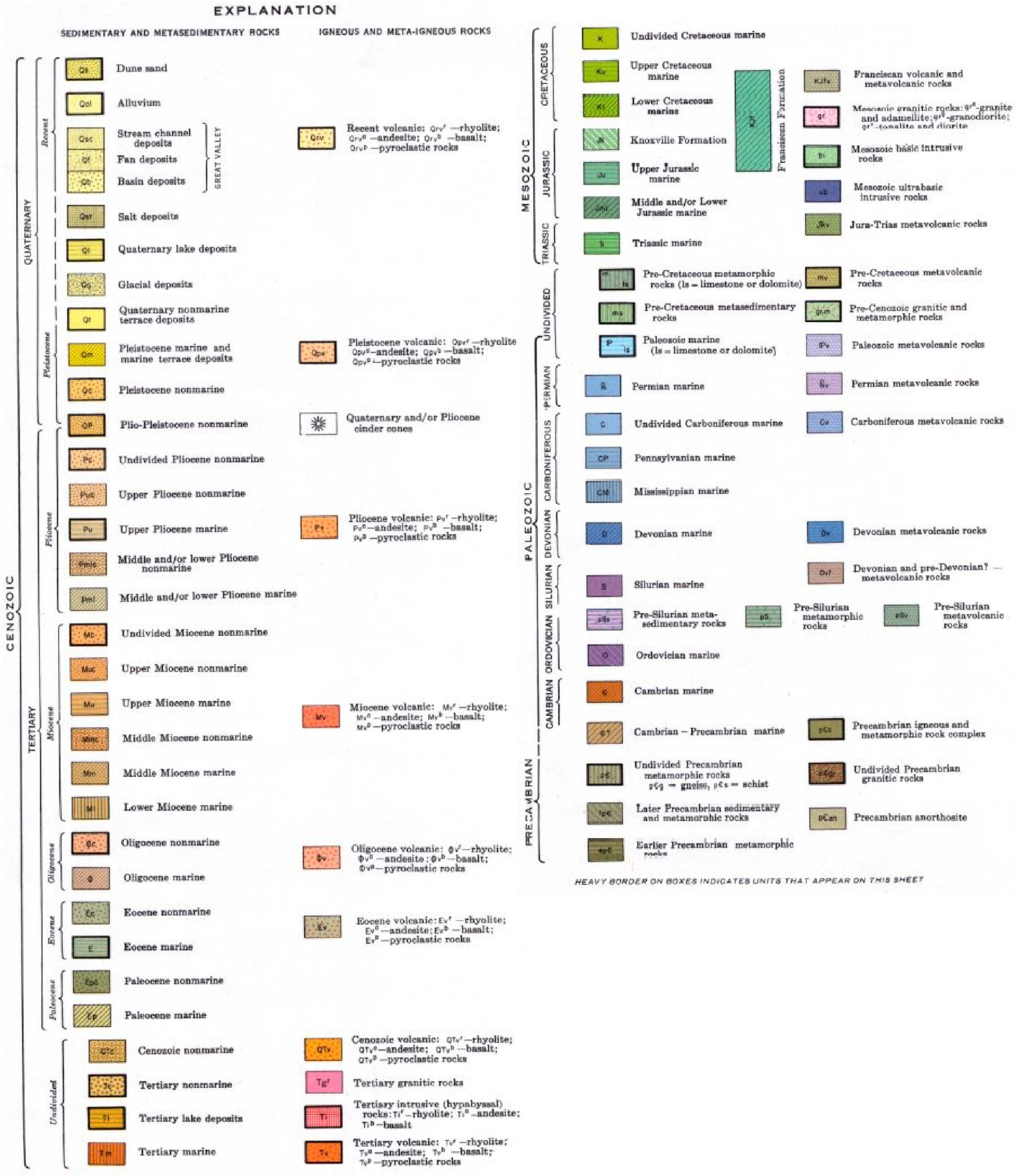
EXPLANATION
SEDIMENTARY AND METASEDIMENTARY ROCKS
IGNEOUS AND META-IGNEOUS ROCKS
CENOZOIC
QUATERNARY
Recent
Qs Dune sand
Qal Alluvium
Qsc Stream channel deposits
Qf Fan deposits
Qb Basin deposits
GREAT VALLEY
Qst Salt deposits
Ql Quaternary lake deposits
Qg Glacial deposits
Qt Quaternary nonmarine terrace deposits
Pleistocene
Qm Pleistocene marine and marine terrace deposits
Qc Pleistocene nonmarine
QP Plio-Pleistocene nonmarine
Qrv Recent volcanic: Qrvʳ —rhyolite; Qrvᵃ —andesite; Qrvᵇ —basalt; Qrvᵖ —pyroclastic rocks
Qpv Pleistocene volcanic: Qpvʳ —rhyolite; Qpvᵃ—andesite; Qpvᵇ —basalt; Qpvᵖ —pyroclastic rocks
Quaternary and/or Pliocene cinder cones
TERTIARY
Pliocene
Pc Undivided Pliocene nonmarine
Puc Upper Pliocene nonmarine
Pu Upper Pliocene marine
Pmlc Middle and/or lower Pliocene nonmarine
Pml Middle and/or lower Pliocene marine
Pv Pliocene volcanic: Pvʳ —rhyolite; Pvᵃ—andesite; Pvᵇ —basalt; Pvᵖ —pyroclastic rocks
Miocene
Mc Undivided Miocene nonmarine
Muc Upper Miocene nonmarine
Mu Upper Miocene marine
Mmc Middle Miocene nonmarine
Mm Middle Miocene marine
Ml Lower Miocene marine
Mv Miocene volcanic: Mvʳ —rhyolite; Mvᵃ —andesite; Mvᵇ —basalt; Mvᵖ —pyroclastic rocks
Oligocene
Φc Oligocene nonmarine
Φ Oligocene marine
Φv Oligocene volcanic: Φvʳ—rhyolite; Φvᵃ —andesite; Φvᵇ—basalt; Φvᵖ—pyroclastic rocks
Eocene
Ec Eocene nonmarine
E Eocene marine
Ev Eocene volcanic: Evʳ —rhyolite; Evᵃ —andesite; Evᵇ —basalt; Evᵖ —pyroclastic rocks
Paleocene
Epc Paleocene nonmarine
Ep Paleocene marine
Undivided
QTc Cenozoic nonmarine
Tc Tertiary nonmarine
Tl Tertiary lake deposits
Tm Tertiary marine
QTv Cenozoic volcanic: QTvʳ—rhyolite; QTvᵃ—andesite; QTvᵇ —basalt; QTvᵖ —pyroclastic rocks
Tgʳ Tertiary granitic rocks
Ti Tertiary intrusive (hypabyssal) rocks: Tiʳ —rhyolite; Tiᵃ —andesite; Tiᵇ —basalt
Tv Tertiary volcanic: Tvʳ —rhyolite; Tvᵃ —andesite; Tvᵇ —basalt; Tvᵖ —pyroclastic rocks
MESOZOIC
CRETACEOUS
K Undivided Cretaceous marine
Ku Upper Cretaceous marine
Kl Lower Cretaceous marine
JURASSIC
Jk Knoxville Formation
Ju Upper Jurassic marine
Jml Middle and/or Lower Jurassic marine
TRIASSIC
Ti Triassic marine
KJf Franciscan Formation
KJfv Franciscan volcanic and metavolcanic rocks
gr Mesozoic granitic rocks: grᵍ-granite and adamellite; grᵍᵈ-granodiorite; grᵗ-tonalite and diorite
bi Mesozoic basic intrusive rocks
ub Mesozoic ultrabasic intrusive rocks
JTrv Jura-Trias metavolcanic rocks
UNDIVIDED
m ls Pre-Cretaceous metamorphic rocks (ls = limestone or dolomite)
ms Pre-Cretaceous metasedimentary rocks
P ls Paleozoic marine (ls = limestone or dolomite)
mv Pre-Cretaceous metavolcanic rocks
gr-m Pre-Cenozoic granitic and metamorphic rocks
Pv Paleozoic metavolcanic rocks
PALEOZOIC
PERMIAN
P Permian marine
Pv Permian metavolcanic rocks
CARBONIFEROUS
C Undivided Carboniferous marine
Cv Carboniferous metavolcanic rocks
CP Pennsylvanian marine
CM Mississippian marine
DEVONIAN
D Devonian marine
Dv Devonian metavolcanic rocks
Dv? Devonian and pre-Devonian? — metavolcanic rocks
SILURIAN
S Silurian marine
pSs Pre-Silurian metasedimentary rocks
pS Pre-Silurian metamorphic rocks
pSv Pre-Silurian metavolcanic rocks
ORDOVICIAN
O Ordovician marine
CAMBRIAN
Є Cambrian marine
PRECAMBRIAN
Є? Cambrian – Precambrian marine
pЄ Undivided Precambrian metamorphic rocks pЄg = gneiss, pЄs = schist
lpЄ Later Precambrian sedimentary and metamorphic rocks
epЄ Earlier Precambrian metamorphic rocks
pЄc Precambrian igneous and metamorphic rock complex
pЄgr Undivided Precambrian granitic rocks
pЄan Precambrian anorthosite
HEAVY BORDER ON BOXES INDICATES UNITS THAT APPEAR ON THIS SHEET

Desert Quartzite Solar Project **Riverside County, CA** **URS Corporation**	**Source:** [1] Division of Mines and Geology, Geologic Map of California, Salton Sea Sheet, Scale 1:250,000, 1967.	**Figure 3b.** Regional Geologic Map Legend	2016

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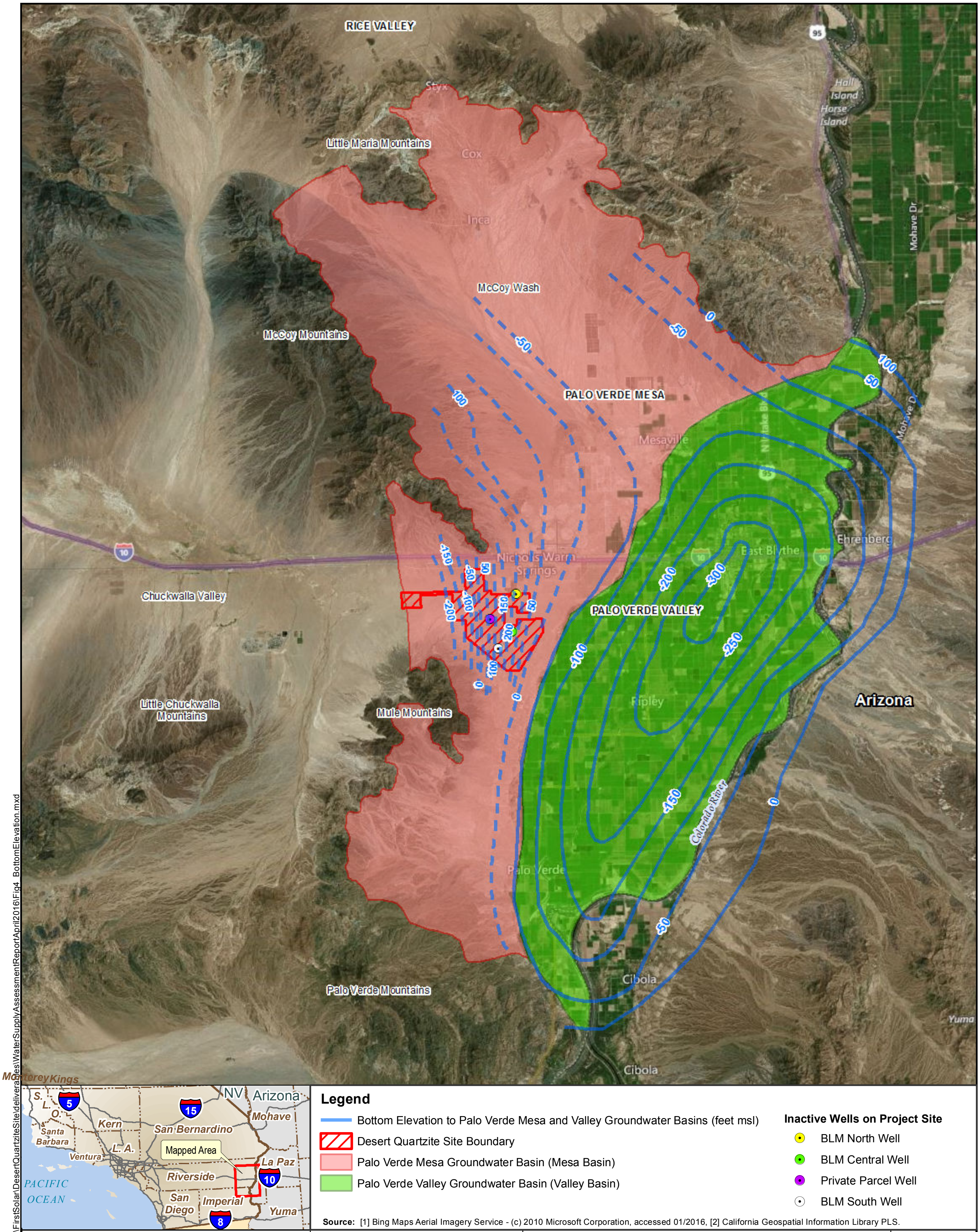
RICE VALLEY
95
Styx
Hall
Island
Horse
Island
Little Maria Mountains
Cox
Inca
Mohave Dr
McCoy Wash
McCoy Mountains
0
-50
-50
100
50
100
PALO VERDE MESA
Mohave Dr
Mesaville
N Intake Blvd
95
10
10
10
Ehrenberg
Nicholls Warm Springs
East Blythe
-150
-50
50
-200
-100
150
50
200
-100
0
0
Chuckwalla Valley
-200
-300
PALO VERDE VALLEY
-250
-100
Arizona
Little Chuckwalla Mountains
Mule Mountains
Ripley
-150
Colorado River
0
Palo Verde
-50
Cibola
Palo Verde Mountains
Yuma
Cibola
Monterey
Kings
S. L. O.
5
15
NV
Arizona
Mohave
Kern
San Bernardino
Santa Barbara
L. A.
Mapped Area
Ventura
La Paz
Riverside
10
PACIFIC OCEAN
San Diego
Imperial
8
Yuma

Legend

━	Bottom Elevation to Palo Verde Mesa and Valley Groundwater Basins (feet msl)
▨	Desert Quartzite Site Boundary
🟥	Palo Verde Mesa Groundwater Basin (Mesa Basin)
🟩	Palo Verde Valley Groundwater Basin (Valley Basin)

Inactive Wells on Project Site

●	BLM North Well
●	BLM Central Well
●	Private Parcel Well
⊙	BLM South Well

Source: [1] Bing Maps Aerial Imagery Service - (c) 2010 Microsoft Corporation, accessed 01/2016, [2] California Geospatial Information Library PLS.

Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

N

0 2.5 5 Miles

1 in = 5 miles

Figure 4. Bottom Elevation Map for Palo Verde Mesa and Valley Groundwater Basins

2016

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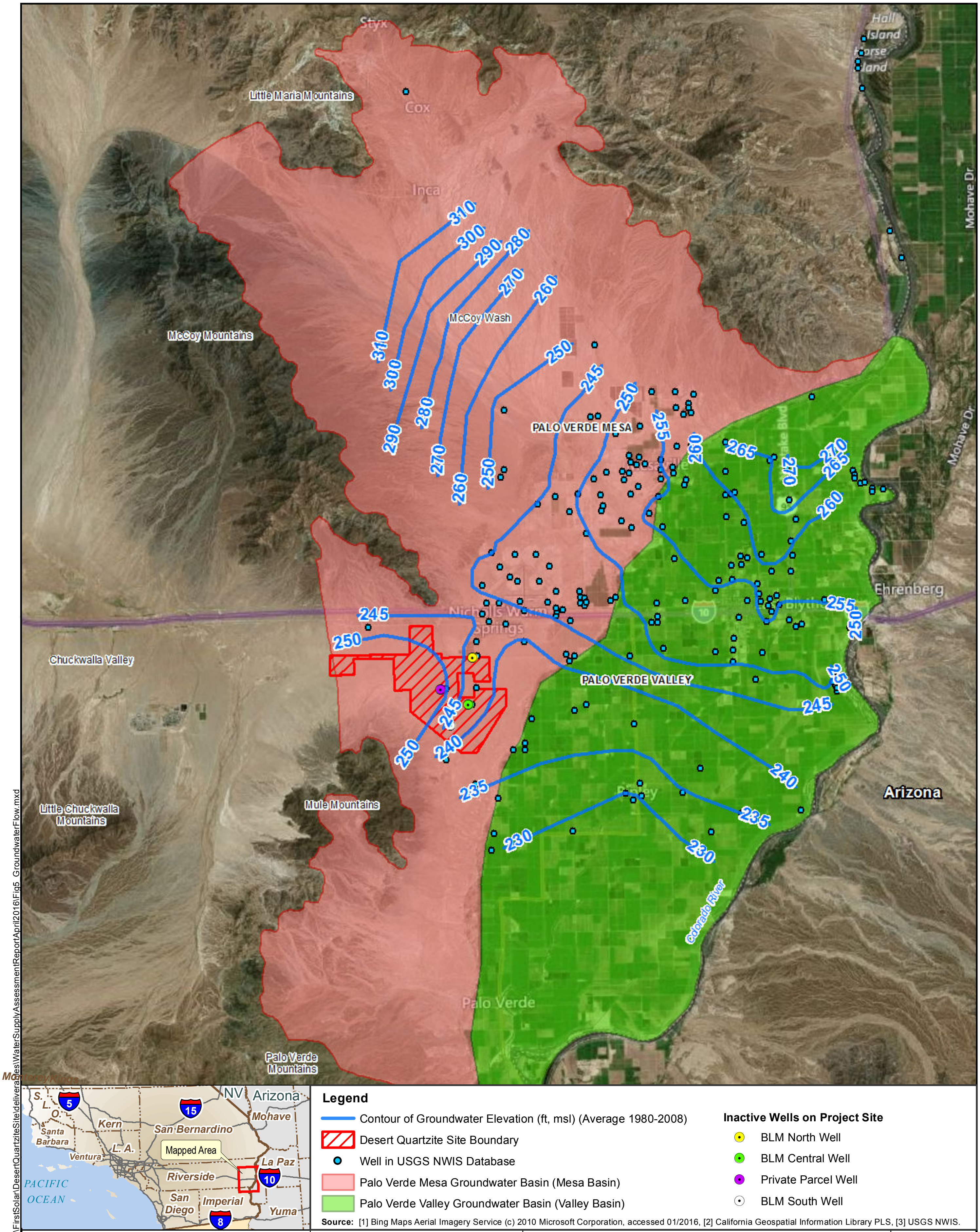
Styx
Hall Island
Horse Island
Little Maria Mountains
Cox
Inca
Mohave Dr
McCoy Wash
McCoy Mountains
310
300
290
280
270
260
250
245
255
265
PALO VERDE MESA
Ehrenberg
Nicholls Warm Springs
Blythe
10
Chuckwalla Valley
PALO VERDE VALLEY
240
235
230
Arizona
Little Chuckwalla Mountains
Mule Mountains
Ripley
Colorado River
Palo Verde
Palo Verde Mountains
S. L. O.
Santa Barbara
Kern
San Bernardino
NV
Arizona
Mohave
Ventura
L. A.
Mapped Area
La Paz
Riverside
PACIFIC OCEAN
San Diego
Imperial
Yuma
5
15
10
8
Legend
Contour of Groundwater Elevation (ft, msl) (Average 1980-2008)
Desert Quartzite Site Boundary
● Well in USGS NWIS Database
🟥 Palo Verde Mesa Groundwater Basin (Mesa Basin)
🟩 Palo Verde Valley Groundwater Basin (Valley Basin)
Inactive Wells on Project Site
● BLM North Well
● BLM Central Well
● Private Parcel Well
⊙ BLM South Well

Source: [1] Bing Maps Aerial Imagery Service (c) 2010 Microsoft Corporation, accessed 01/2016, [2] California Geospatial Information Library PLS, [3] USGS NWIS.

Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

0 2 4 Miles
1 in = 4 miles
N

Figure 5. Groundwater Flow in the Palo Verde Mesa and Valley

2016

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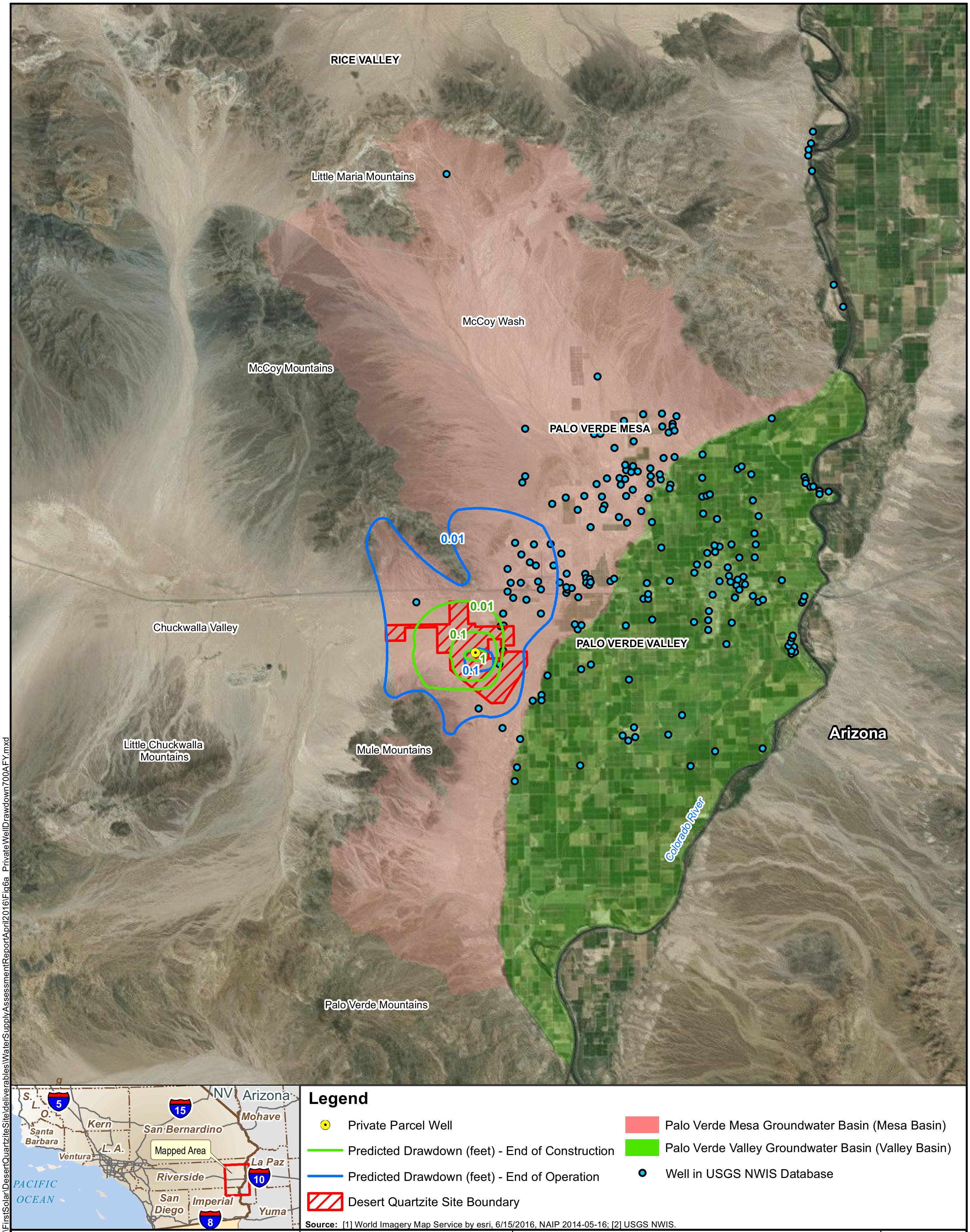
RICE VALLEY
Little Maria Mountains
McCoy Wash
McCoy Mountains
PALO VERDE MESA
0.01
0.01
0.1
1
0.1
Chuckwalla Valley
PALO VERDE VALLEY
Little Chuckwalla Mountains
Mule Mountains
Arizona
Colorado River
Palo Verde Mountains
S. L. O.
5
15
NV
Arizona
Mohave
Kern
San Bernardino
Santa Barbara
L. A.
Mapped Area
Ventura
La Paz
10
Riverside
PACIFIC OCEAN
San Diego
Imperial
8
Yuma
Legend
Private Parcel Well
Predicted Drawdown (feet) - End of Construction
Predicted Drawdown (feet) - End of Operation
Desert Quartzite Site Boundary
Palo Verde Mesa Groundwater Basin (Mesa Basin)
Palo Verde Valley Groundwater Basin (Valley Basin)
Well in USGS NWIS Database

Source: [1] World Imagery Map Service by esri, 6/15/2016, NAIP 2014-05-16; [2] USGS NWIS.

Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

N

0 2.5 5
Miles
1 in = 5 miles

Figure 6a. Representative Predicted Drawdown for 700 AFY Construction Scenario (Private Well) – End of Construction and Operation

2016

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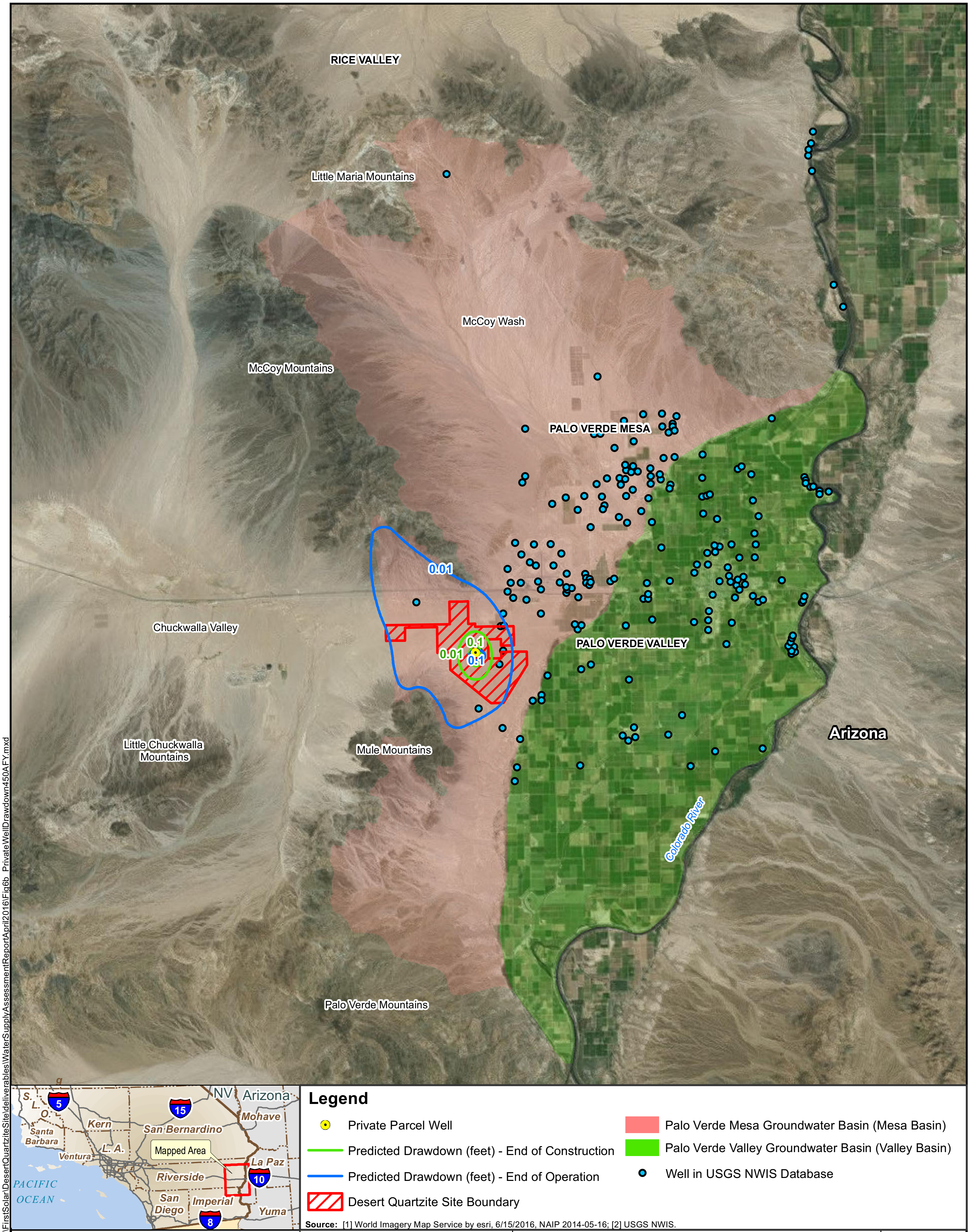
RICE VALLEY
Little Maria Mountains
McCoy Wash
McCoy Mountains
PALO VERDE MESA
0.01
Chuckwalla Valley
0.1
0.01
0.1
PALO VERDE VALLEY
Little Chuckwalla Mountains
Mule Mountains
Arizona
Colorado River
Palo Verde Mountains
S. L. O.
5
15
NV
Arizona
Mohave
Santa Barbara
Kern
San Bernardino
Ventura
L. A.
Mapped Area
La Paz
10
PACIFIC OCEAN
Riverside
San Diego
Imperial
8
Yuma
Legend
Private Parcel Well
Predicted Drawdown (feet) - End of Construction
Predicted Drawdown (feet) - End of Operation
Desert Quartzite Site Boundary
Palo Verde Mesa Groundwater Basin (Mesa Basin)
Palo Verde Valley Groundwater Basin (Valley Basin)
Well in USGS NWIS Database

Source: [1] World Imagery Map Service by esri, 6/15/2016, NAIP 2014-05-16; [2] USGS NWIS.

Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

N

0 2.5 5 Miles

1 in = 5 miles

Figure 6b. Representative Predicted Drawdown for 450 AFY Construction Scenario (Private Well) – End of Construction and Operation

2016

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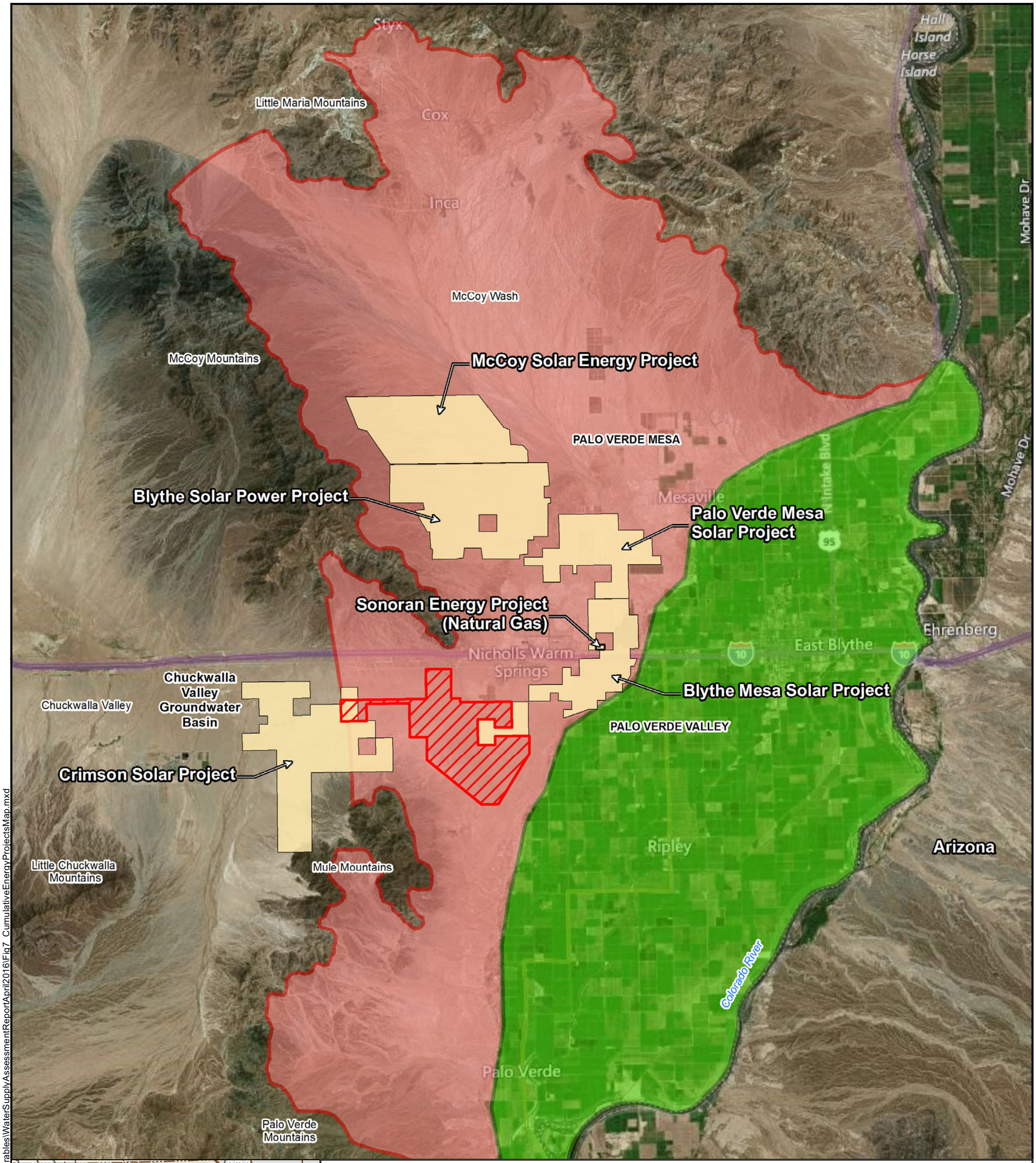
Styx
Hall Island
Horse Island
Little Maria Mountains
Cox
Inca
Mohave Dr
McCoy Wash
McCoy Mountains
McCoy Solar Energy Project
PALO VERDE MESA
Blythe Solar Power Project
Mesaville
Palo Verde Mesa Solar Project
Intake Blvd
95
Mohave Dr
Sonoran Energy Project (Natural Gas)
Ehrenberg
East Blythe
10
10
Nicholls Warm Springs
Chuckwalla Valley Groundwater Basin
Blythe Mesa Solar Project
Chuckwalla Valley
PALO VERDE VALLEY
Crimson Solar Project
Ripley
Arizona
Little Chuckwalla Mountains
Mule Mountains
Colorado River
Palo Verde
Palo Verde Mountains

S. L. O.
5
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NV
Arizona
Mohave
Kern
San Bernardino
Santa Barbara
L. A.
Mapped Area
Ventura
La Paz
PACIFIC OCEAN
Riverside
10
San Diego
Imperial
Yuma
8

Legend

▨ Desert Quartzite Site Boundary
🟨 Proposed or Under Construction Cumulative Energy Project
🟥 Palo Verde Mesa Groundwater Basin (Mesa Basin)
🟩 Palo Verde Valley Groundwater Basin (Valley Basin)

Source: [1] Bing Maps Aerial Hybrid accessed April, 2016, [2] California Geospatial Information Library PLS, [3] BLM Renewable Energy Project Applications, 3/17/2016, [4] CEC, Sonoran Energy Project (2002-AFC-01, as amended).

Desert Quartzite Solar Project
Riverside County, CA

URS Corporation

N

0 2 4 Miles

1 in = 4 miles

Figure 7. Cumulative Energy Projects Map

2016

V:\Projects\GIS_Proj\FirstSolar\DesertQuartziteSite\deliverables\WaterSupplyAssessmentReportApril2016\Fig7_CumulativeEnergyProjectsMap.mxd

APPENDIX A
DWR GUIDEBOOK FOR IMPLEMENTATION OF SENATE BILL 610 AND SENATE BILL 221

This appendix presents the guidebook prepared by the California Department of Water Resources (DWR) for implementation of Senate Bills 610 and 221. This guidebook was followed in the preparation of the water supply assessment for the Desert Quartzite Solar Project, as applicable.

Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001

to assist water suppliers, cities, and counties in integrating water and land use planning

Prepared by the California Department of Water Resources

Note: the Department of Water Resources has no regulatory, permitting or any other approval authority concerning water assessments or verifications of sufficient water supply. This Guidebook is provided only as an assistance tool for land-use agencies and public water systems affected by the legal requirement to prepare water assessments and verifications of sufficient water supply. The information provided in this guidebook is not all-inclusive and is not required to be used. In case of any conflict between suggestions contained in the guidebook, and any applicable laws, those laws shall have precedence.

The California Department of Water Resources (http://wwwdwr.water.ca.gov/) provides assistance to water agencies in implementing the Urban Water Management Planning Act, which is one of the statutes amended by **SB 610.** The Urban Water Management Plan and Urban Water Shortage Contingency Analysis, are also referenced in **SB 221**. As part of its assistance responsibility, DWR has prepared this guidance to assist water suppliers to prepare the water assessments and the written verification of water supply availability required by **SB 610** and **SB 221** respectively.

This material was circulated for comment among all interested parties. Groups that indicated their interest in reviewing materials included:

Association of California Water Agencies
Building Industry Legal Defense Foundation
California Building Industry Association
California Business Properties Association
California Chapter American Planning Association
California Department of Real Estate
California State Association of Counties
California State Attorney General's Office
California Urban Water Agencies
Castaic Lake Water Agency
East Bay Municipal Utility District
Governor's Office of Planning & Research
League of California Cities
Local Government Commission
Metropolitan Water District of Southern California
San Diego County Water Authority
U.S. Bureau of Reclamation

The Department of Water Resources (DWR) plans to revise the guidebook periodically to include new information.

GOVERNOR DAVIS'S MESSAGE UPON SIGNING SB 610 AND SB 221

To the Members of the California Legislature:

I am signing **SB 221** and **SB 610** to advance water supply planning efforts in the State of California. Together, these bills provide an important and necessary foundation for developing comprehensive water policies to prepare California to meet our future water needs.

Most notably, these bills will coordinate local water supply and land use decisions to help provide California's cities, farms and rural communities with adequate water supplies. Additionally, these bills increase requirements and incentives for urban water suppliers to prepare and adopt comprehensive management plans on a timely basis.

While these bills take a significant step toward managing the demand side of California's water equation, more needs to be done to address the need for additional supplies and improved infrastructure.

California's ability to meet its demand for water is further hampered by low rainfall during the past year. It is now necessary to address our water supply and storage needs to ensure that water is not California's next crisis and guarantee our place in the world economy.

Toward that end, I renew my commitment to develop a package of water supply actions to provide reliable and affordable water for California's citizens and the environment. This is why I have recently pledged my support for funding of CALFED programs and activities in the FY 2002 Energy and Water Appropriations bill currently before Congress. Specifically, I re-emphasize the need to aggressively pursue infrastructure projects throughout California including immediate progress on in-Delta storage, expanded Central Valley Project storage in Lake Shasta, expanded storage in Los Vaqueros and Sites reservoirs, additional storage in the upper San Joaquin River watershed, and continued investment in projects that conjunctively use surface and groundwater supplies. Where appropriate, I am directing the Department of Water Resources to assist local water supply agencies to advance these and other important local projects. I am also directing the Department to identify additional modifications to the Urban Water Management Planning Act to ensure adequate local supply and conservation planning.

Sincerely,
GRAY DAVIS
Governor of California

October 8, 2003

Table of Contents

Introduction........iii
Guidebook structure........iv
Visual representation of guidebook structure........v
SB 610 flow chart........vi
SB 610 flow chart notes........vii
SB 221 flow chart........viii
SB 221 flow chart notes........ix

Section 1 Does **SB 610** or **SB 221** apply to the proposed development?........2

SB 610

Section 2 Who will prepare the **SB 610** assessment?........4
Section 3 Has an assessment already been prepared that includes this project?........6
Section 4 Is there a current Urban Water Management Plan?........8
Section 5 What information should be included in an assessment?........10
 Step One: Documenting wholesale water supplies........12
 Step Two: Documenting supply........14
  If groundwater is a source........16
  If the assessment relies on water supplies never before used........18
 Step Three: Documenting project demand (Project Demand Analysis)........20
  Definitions........22
  Detailing existing and planned future uses........24
 Step Four: Documenting dry-year(s) supply........26
  Documenting dry year(s) supply for water suppliers with multiple sources........28
 Step Five: Documenting dry-year(s) demand........30
Section 6 Is the projected water supply sufficient or insufficient for the proposed project?........32
Section 7 If the projected supply is determined to be insufficient........34
Section 8 Final **SB 610** assessment actions by lead agency........38

SB 221

Section 9 Does **SB 221** apply to this subdivision?........40
Section 10 Is the subdivision exempt from **SB 221**?........42
Section 11 Who will prepare the **SB 221** verification of sufficient water supply?........44
Section 12 Has a verification already been prepared for this subdivision?........46
Section 13 What information should be included in a verification?........48
 Step One: Documenting supply........50
  If groundwater is a source........54
  If verification relies on projected water supplies not currently available........60
 Step Two: Documenting demand........64
  Definitions........66
  Detailing existing and planned future uses........68
 Step Three: Documenting dry-year(s) supply........70
 Step Four: Documenting dry-year(s) demand........72
Section 14 Determining if the projected water supply is sufficient for the subdivision........74
Section 15 If the projected supply is determined to be insufficient........76
Section 16 Final **SB 221** verification actions by agency........78
Section 17 Special circumstances........80

Appendix A Chapter 643, Statutes of 2001 (Senate Bill 610)........A-1
Appendix B Chapter 642, Statutes of 2001 (Senate Bill No. 221)........B-1
Appendix C Urban Water Management Plan 2003........C-1
Appendix D Other Resources........D-1

STATE OF CALIFORNIA
Gray Davis, Governor

THE RESOURCES AGENCY
Mary D. Nichols, Secretary for Resources

DEPARTMENT OF WATER RESOURCES
Michael J. Spear, Interim Director

L. Lucinda Chipponeri
Deputy Director

Stephen W. Verigin
Acting Chief Deputy Director

Peggy Bernardy
Chief Counsel

Jonas Minton
Deputy Director

Vernon T. Glover
Deputy Director

Peter Garris
Deputy Director

Prepared under the supervision of
Marsha Prillwitz, Chief
Office of Water Use Efficiency

Prepared by
David Todd
Supervising Land and Water Use Analyst
Office of Water Use Efficiency

Editorial review, graphics, and report production

Brenda Main
Supervisor of Technical Publications

Marilee Talley
Research Writer

Nikki Blomquist
Research Writer

Alice Dyer
Research Writer

Additional Support

Linda Cooper
Executive Assistant

Pat Separovich
Executive Assistant

Guyla McCurry
Office Assistant

October 8, 2003

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Naser Bateni, former Chief, Division of Planning and Local Assistance, Department of Water Resources
Peggy Bernardy, Chief Counsel, Chief Counsel Office, Department of Water Resources
Lucile Billingsley, Water Conservation Team Leader, Mid-Pacific Region, Bureau of Reclamation, U.S. Department of the Interior
Karen Buckner, Executive Assistant, Department of Water Resources
Grace Chan, Section Manager, Metropolitan Water District of Southern California Resource Planning & Development
Lucinda Chipponeri, Assistant Director for Legislation, Department of Water Resources
Judy Corbett, Executive Director, Local Government Commission
Mary Lou Cotton, Assistant to the General Manager, Castaic Lake Water District
Mary Ann Dickinson, Executive Director, California Urban Water Conservation Council
Glenn Farrel, Legislative Representative, Legislative Affairs Office , East Bay Municipal Utility District
Larry Farwell, Consultant
Dana Friehauf, Principal Water Resources Specialist, San Diego County Water Authority
Natasha Hagaman, former Legislative Analyst, Association of California Water Agencies
Steve Hall, Executive Director, Association of California Water Agencies
Scott Harvey, Executive Director of California Association of Local Agency Formation Commission Organizations
Carl Hauge, Supervising Engineering Geologist, Division of Planning and Local Assistance, Department of Water Resources
Dan Hentschke, General Counsel, San Diego County Water Authority
Bill Higgins, Staff Attorney, League of California Cities
Katie Shulte Juong, Project Manager, California Urban Water Conservation Council
Randy Kanouse, Special Assistant to the General Manager, Legislative Affairs Office, East Bay Municipal Utility District
Karen Keene, Legislative Representative, Agriculture and Natural Resources Federal Legislative Coordinator, California State Association of Counties
Katherine Kelly, Chief, Bay-Delta Office, Department of Water Resources
Luana Kiger, former Chief, Office of Water Use Efficiency, Department of Water Resources
John Kramer, former Staff Counsel III, Chief Counsel Office, Department of Water Resources
Debra Man, Vice President of the Department of Water Transfers and Exchanges, Metropolitan Water District of Southern California
Sue McClurg, Program Director, Water Education Foundation
Jerry Meral, former Executive Director, Planning and Conservation League
Clifford Moriyama, Senior Vice President of Governmental Affairs, California Business Properties Association
Aaron Naldoza, former Legislative Representative, Carpi & Clay
Pankaj Parekh, Assistant Director/Manager of Water Quality Compliance, Water Quality and Operations, Los Angeles Department of Water and Power
Sam Perrotti, former Assistant Commissioner, Subdivisions, Department of Real Estate
Walt Pettit**,** former Executive Director, California Urban Water Agencies
Marsha Prillwitz, Chief, Office of Water Use Efficiency, Department of Water Resources
Tim Ramirez, Assistant Secretary, Water and Policy and Science, Resources Agency
Dirk Reed, Program Manager, Metropolitan Water District of Southern California
Terry Roberts, State Clearinghouse Director, Governor's Office of Planning and Research
Christine Sproul, Deputy Attorney General, Department of Justice*
Jan Stevens, Special Counsel to the California Attorney General, Department of Justice*

October 8, 2003

Joanne Struebing, Water Rights Specialist, Mid-Pacific Region, Bureau of Reclamation, U.S. Department of the Interior
Rita Schmidt-Sudman, Executive Director, Water Education Foundation
David Smith, General Counsel, Vice President Government Affairs, Building Industry Legal Defense Foundation
Warren Teitz, Resource Specialist, Metropolitan Water District of Southern California Resource Analysis Unit
Chris Tooker, Commissioner, Sacramento Local Agency Formation Commission
Jolena Voorhis, Senior Legislative Analyst, California State Association of Counties Legislative Services
Carl Werder, Project Manager for Battle Creek Salmon and Steelhead Restoration Project, Mid-Pacific Region, Bureau of Reclamation, U.S. Department of the Interior
Brian White, Legislative Advocate, Governmental Affairs Department, California Building Industry Association

* Ms. Sproul and Mr. Stevens participated in the focus group in response to the Department's request and for the purpose of providing information. Their participation does not represent legal advice from the Attorney General in his separate role as counsel to the Department; nor does the Attorney General's Office necessarily advocate any of the recommendations discussed by the focus group.

Introduction

Senate Bills 610 (Chapter 643, Statutes of 2001) and Senate Bill 221 (Chapter 642, Statutes of 2001) amended state law, effective January 1, 2002, to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610 and SB 221 are companion measures which seek to promote more collaborative planning between local water suppliers and cities and counties. Both statutes require detailed information regarding water availability to be provided to the city and county decision-makers prior to approval of specified large development projects. Both statutes also require this detailed information be included in the administrative record that serves as the evidentiary basis for an approval action by the city or county on such projects. Both measures recognize local control and decision making regarding the availability of water for projects and the approval of projects.

Under **SB 610**, water assessments must be furnished to local governments for inclusion in any environmental documentation for certain projects (as defined in Water Code 10912 [a]) subject to the California Environmental Quality Act. Under **SB 221**, approval by a city or county of certain residential subdivisions requires an affirmative written verification of sufficient water supply.

If coordinated and comprehensive water supply planning is underway at the time that the **SB 610**-water assessment is prepared, compliance with **SB 221** will be greatly facilitated. **SB 221** is intended as a 'fail safe' mechanism to ensure that collaboration on finding the needed water supplies to serve a new large subdivision occurs when it should – before construction begins.

Not every project that is subject to the requirements of **SB 610** would also require the mandatory water verification of **SB 221** (e.g. if there is no subdivision map approval). Conversely, not every project that is subject to the requirements of **SB 221** would also require the environmental document to contain an **SB 610** water supply assessment. Projects approved before January 1, 2002 were not subject to the requirements of **SB 610** or **SB 221**; however, some projects may have been subject to the requirement to prepare a water supply assessment as set forth in Senate Bill 901 of 1995 (Chapter 881, Statues of 1995).

A foundational document for compliance with both **SB 610** and **SB 221** is the Urban Water Management Plan (UWMP). Both of these statutes repeatedly identify the UWMP as a planning document that, if properly prepared, can be used by a water supplier to meet the standards set forth in both statutes. Thorough and complete UWMPs will allow water suppliers to use UWMPs as a foundation to fulfill the specific requirements of these two statutes. Cities, counties, water districts, property owners, and developers will all be able to utilize this document when planning for and proposing new projects.

UWMPs serve as important source documents for cities and counties as they update their General Plan. Conversely General Plans are source documents as water suppliers update their UWMPs. These planning documents are linked and their accuracy and usefulness are interdependent. It is crucial that cities /counties and water suppliers work closely when developing and updating these planning documents.

Special Recommendations

Because water suppliers face statutory time limits within which to provide water supply information, it is recommended that they check with planning staff from the cities and counties that the suppliers serve to see if the planning staff plan to process project permits requiring either water supply assessments or verifications of sufficient water supply.

It is also recommended that city and county planning staff immediately identify water suppliers serving their land-use planning area and determine the availability of water supply information to facilitate timely compliance with **SB 610** and **SB 221**.

Both **SB 610** and **SB 221** suggest that UWMPs may be a good source of information for developing water assessments and verifications. Therefore, it is recommended that each water supplier review its adopted UWMP to determine if the supply and demand analysis meets the requirements of these two laws, including the substantial evidence required by **SB 221**.

Guidebook Structure

The guidebook is designed to provide step-by-step suggestions for completing an **SB 610** water assessment and an **SB 221** verification of sufficient water supply. It includes commonly accepted definitions and examples of various supply and demand scenarios.

The organization of the guidebook roughly follows the flow charts (see pages iii to vii) that reflect the procedural steps that would need to be undertaken to comply with **SB 610** and **SB 221**.

The guidebook can be printed from a PDF document or viewed on a computer screen. It is recommended that the guidebook be printed and placed in a three-ring binder so the reader can see two pages at once. The layout of the guidebook allows the user to read through the preparation directions on the right-hand page and view the related citations from the statute on the left-hand page.

Throughout the guidebook the term:

- Agency is used to refer to city and county governments for SB221.
- Lead agency is used to refer to city and county governments for **SB 610** .
- Water supplier is used to refer to water agencies, water districts, and other water providers.
- UWMP is used to refer to an Urban Water Management Plan
- Assessment is used to refer to an **SB 610** Water Supply Assessment
- Verification is used to refer to an **SB 221** Verification of Sufficient Water Supply

Italicized text indicates the actual wording of the identified law or statute.

Text surrounded by a border signifies information deserving special attention.

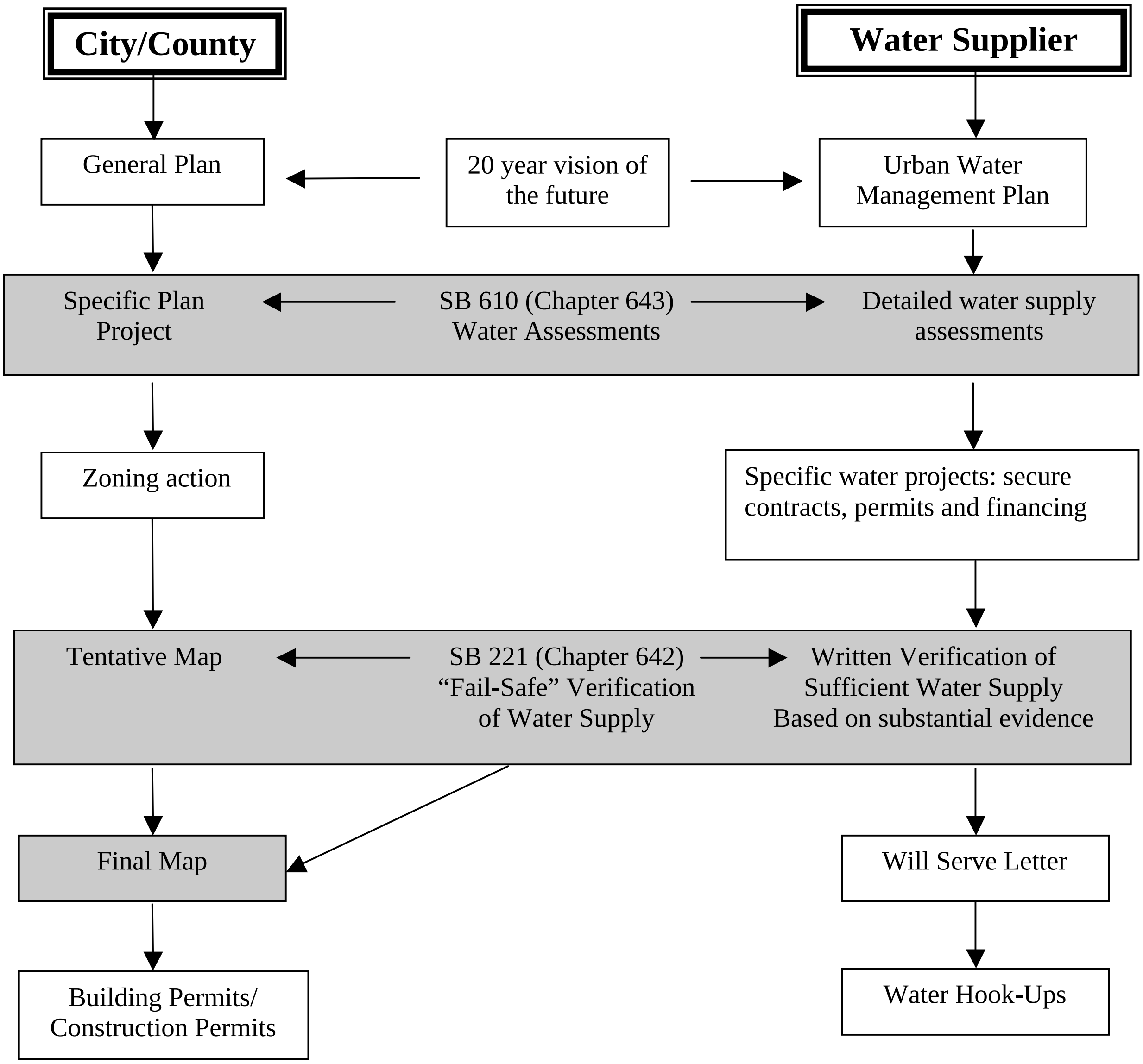
The full texts of **SB 221** and **SB 610** are included as attachments to this document and are available at the web site as either PDF or Microsoft Word documents

Frequently asked questions and responses are located on the Department of Water Resources, Office of Water Use Efficiency web site at: http://www.owue/

Please provide your suggestions for modifications to these planning tools so that this process continues to improve California's water management and planning capabilities. For assistance and to provide suggestions, please contact the Department of Water Resources, Office of Water Use Efficiency at dtodd@water.ca.gov.

Two laws that integrate land use and water planning

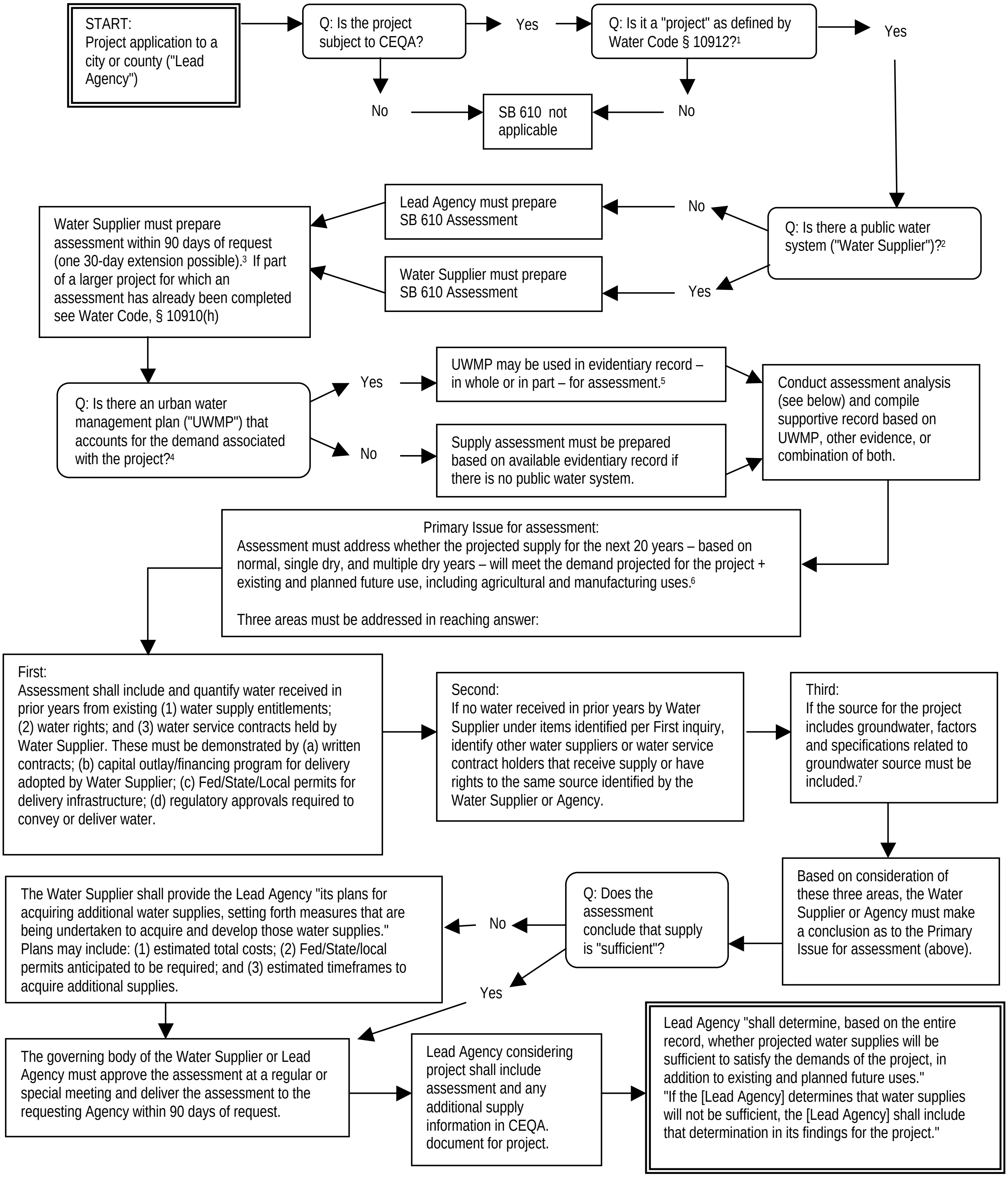
The following chart illustrates the relationship between a local land use agency and a water supplier in their planning processes. The General Plan, prepared by a City or County Planning Department, and the Urban Water Management Plan prepared by a Water Supplier are the critical source documents used to substantiate the information required by **SB 610** and **SB 221** at the local level.


City/County
Water Supplier
General Plan
20 year vision of the future
Urban Water Management Plan
Specific Plan Project
SB 610 (Chapter 643) Water Assessments
Detailed water supply assessments
Zoning action
Specific water projects: secure contracts, permits and financing
Tentative Map
SB 221 (Chapter 642) "Fail-Safe" Verification of Water Supply
Written Verification of Sufficient Water Supply Based on substantial evidence
Final Map
Will Serve Letter
Building Permits/ Construction Permits
Water Hook-Ups

For additional information on either the *California Environmental Quality Act* or General Plan Guidelines, please refer to the publications available from the Governor's Office of Planning and Research at: www.opr.ca.gov.

For information and guidance related to the *Urban Water Management Planning Act*, please refer to the Department of Water Resources, Office of Water Use Efficiency available at: http://www.owue/.

SB 610 Flowchart



START:
Project application to a city or county ("Lead Agency")

Q: Is the project subject to CEQA?

Q: Is it a "project" as defined by Water Code § 10912?[1]

SB 610 not applicable

Q: Is there a public water system ("Water Supplier")?[2]

Lead Agency must prepare SB 610 Assessment

Water Supplier must prepare SB 610 Assessment

Water Supplier must prepare assessment within 90 days of request (one 30-day extension possible).[3] If part of a larger project for which an assessment has already been completed see Water Code, § 10910(h)

Q: Is there an urban water management plan ("UWMP") that accounts for the demand associated with the project?[4]

UWMP may be used in evidentiary record – in whole or in part – for assessment.[5]

Supply assessment must be prepared based on available evidentiary record if there is no public water system.

Conduct assessment analysis (see below) and compile supportive record based on UWMP, other evidence, or combination of both.

Primary Issue for assessment:
Assessment must address whether the projected supply for the next 20 years – based on normal, single dry, and multiple dry years – will meet the demand projected for the project + existing and planned future use, including agricultural and manufacturing uses.[6]

Three areas must be addressed in reaching answer:

First:
Assessment shall include and quantify water received in prior years from existing (1) water supply entitlements; (2) water rights; and (3) water service contracts held by Water Supplier. These must be demonstrated by (a) written contracts; (b) capital outlay/financing program for delivery adopted by Water Supplier; (c) Fed/State/Local permits for delivery infrastructure; (d) regulatory approvals required to convey or deliver water.

Second:
If no water received in prior years by Water Supplier under items identified per First inquiry, identify other water suppliers or water service contract holders that receive supply or have rights to the same source identified by the Water Supplier or Agency.

Third:
If the source for the project includes groundwater, factors and specifications related to groundwater source must be included.[7]

Based on consideration of these three areas, the Water Supplier or Agency must make a conclusion as to the Primary Issue for assessment (above).

Q: Does the assessment conclude that supply is "sufficient"?

The Water Supplier shall provide the Lead Agency "its plans for acquiring additional water supplies, setting forth measures that are being undertaken to acquire and develop those water supplies." Plans may include: (1) estimated total costs; (2) Fed/State/local permits anticipated to be required; and (3) estimated timeframes to acquire additional supplies.

The governing body of the Water Supplier or Lead Agency must approve the assessment at a regular or special meeting and deliver the assessment to the requesting Agency within 90 days of request.

Lead Agency considering project shall include assessment and any additional supply information in CEQA. document for project.

Lead Agency "shall determine, based on the entire record, whether projected water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses."
"If the [Lead Agency] determines that water supplies will not be sufficient, the [Lead Agency] shall include that determination in its findings for the project."

The Lead Agency will approve or disapprove the project based on a number of factors, including, but not limited to, the water assessment.

Chart Courtesy of the
The Building Industry Legal Defense
Foundation

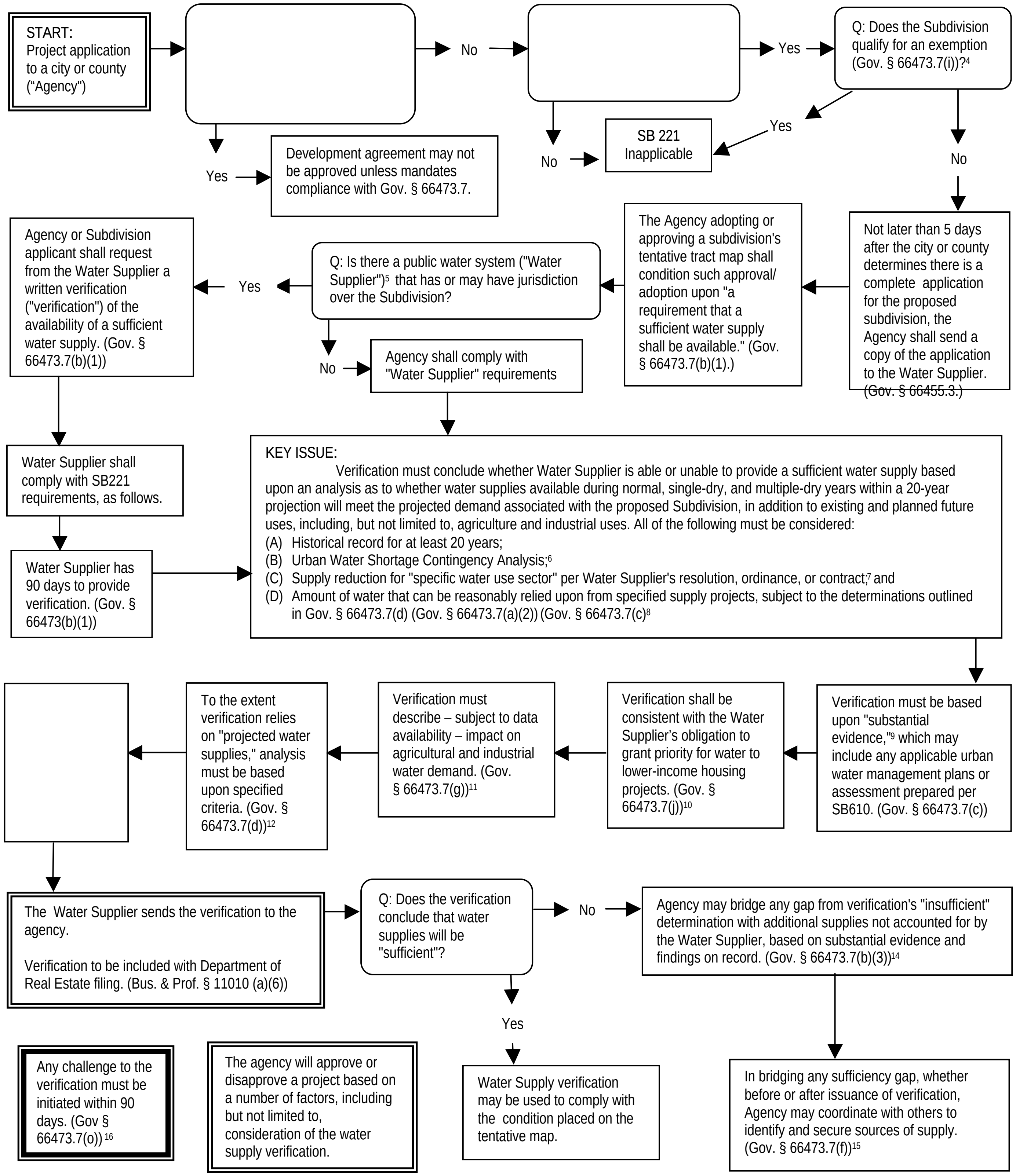
Notes for SB 610 Flowchart

Footnote 1:
California Water Code section 10912.
For the purposes of this part, the following terms have the following meanings:
(a) "Project" means any of the following:
(1) A proposed residential development of more than 500 dwelling units.
(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.
(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.
(4) A proposed hotel or motel, or both, having more than 500 rooms.
(5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.
(6) A mixed-use project that includes one or more of the projects specified in this subdivision.
(7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.
(b) If a public water system has fewer than 5,000 service connections, then "project" means any proposed residential, business, commercial, hotel or motel, or industrial development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections, or a mixed-use project that would demand an amount of water equivalent to, or greater than, the amount of water required by residential development that would represent an increase of 10 percent or more in the number of the public water system's existing service connections.

Footnote 2:
California Water Code section 10912.
(c) "Public water system" means a system for the provision of piped water to the public for human consumption that has 3,000 or more service connections. A public water system includes all of the following:
(1) Any collection, treatment, storage, and distribution facility under control of the operator of the system which is used primarily in connection with the system.
(2) Any collection or pretreatment storage facility not under the control of the operator that is used primarily in connection with the system.
(3) Any person who treats water on behalf of one or more public water systems for the purpose of rendering it safe for human consumption. It also means a system that will become a public water supplier if the project puts it over 3,000 service connections.

Footnote 3:
California Water Code section 10910, subdivision (g)(1).
Footnote 4:
The requirement for and contents of an urban water management plan are provided in California Water Code section 10631, as amended by SB 610 in 2001.
Footnote 5:
California Water Code section 10910, subdivision (c)(2) provides that the UWMP may be used, but it may or may not provide all of the information needed.
Footnote 6:
See California Water Code section 10910, subdivisions (c)(3) & (4); see also Government Code section 66473.7, subdivision (a)(2) [SB 221]
Footnote 7:
California Water Code section 10910, subdivision (f):
(f) If a water supply for a proposed project includes groundwater, the following additional information shall be included in the water assessment:
(1) A review of any information contained in urban water management plan relevant to the identified water supply for proposed project.
(2) A description of any groundwater basin or basins from which the proposed project will be supplied. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current bulletin of the department that characterizes the condition of the groundwater basin, and a detailed description by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), of the efforts being undertaken in the basin or basins to eliminate the long-term overdraft condition.
(3) A detailed description and analysis of the amount and location of groundwater pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), for the past five years from any groundwater basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.
(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), from any basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.
(5) An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project. A water assessment shall not be required to include the information required by this paragraph if the public water system determines, as part of the review required by paragraph (1), that the sufficiency of groundwater necessary to meet the initial and projected water demand associated with the project was addressed in the description and analysis required by paragraph (4) of subdivision (b) of Section 10631.

SB 221 Flowchart



START:
Project application to a city or county (“Agency”)

Development agreement may not be approved unless mandates compliance with Gov. § 66473.7.

SB 221 Inapplicable

Q: Does the Subdivision qualify for an exemption (Gov. § 66473.7(i))?[4]

Not later than 5 days after the city or county determines there is a complete application for the proposed subdivision, the Agency shall send a copy of the application to the Water Supplier. (Gov. § 66455.3.)

The Agency adopting or approving a subdivision's tentative tract map shall condition such approval/ adoption upon "a requirement that a sufficient water supply shall be available." (Gov. § 66473.7(b)(1).)

Q: Is there a public water system ("Water Supplier")[5] that has or may have jurisdiction over the Subdivision?

Agency or Subdivision applicant shall request from the Water Supplier a written verification ("verification") of the availability of a sufficient water supply. (Gov. § 66473.7(b)(1))

Agency shall comply with "Water Supplier" requirements

Water Supplier shall comply with SB221 requirements, as follows.

Water Supplier has 90 days to provide verification. (Gov. § 66473(b)(1))

KEY ISSUE:
Verification must conclude whether Water Supplier is able or unable to provide a sufficient water supply based upon an analysis as to whether water supplies available during normal, single-dry, and multiple-dry years within a 20-year projection will meet the projected demand associated with the proposed Subdivision, in addition to existing and planned future uses, including, but not limited to, agriculture and industrial uses. All of the following must be considered:

(A) Historical record for at least 20 years;
(B) Urban Water Shortage Contingency Analysis;[6]
(C) Supply reduction for "specific water use sector" per Water Supplier's resolution, ordinance, or contract;[7] and
(D) Amount of water that can be reasonably relied upon from specified supply projects, subject to the determinations outlined in Gov. § 66473.7(d) (Gov. § 66473.7(a)(2)) (Gov. § 66473.7(c)[8]

Verification must be based upon "substantial evidence,"[9] which may include any applicable urban water management plans or assessment prepared per SB610. (Gov. § 66473.7(c))

Verification shall be consistent with the Water Supplier’s obligation to grant priority for water to lower-income housing projects. (Gov. § 66473.7(j))[10]

Verification must describe – subject to data availability – impact on agricultural and industrial water demand. (Gov. § 66473.7(g))[11]

To the extent verification relies on "projected water supplies," analysis must be based upon specified criteria. (Gov. § 66473.7(d))[12]

The Water Supplier sends the verification to the agency.

Verification to be included with Department of Real Estate filing. (Bus. & Prof. § 11010 (a)(6))

Q: Does the verification conclude that water supplies will be "sufficient"?

Agency may bridge any gap from verification's "insufficient" determination with additional supplies not accounted for by the Water Supplier, based on substantial evidence and findings on record. (Gov. § 66473.7(b)(3))[14]

Water Supply verification may be used to comply with the condition placed on the tentative map.

In bridging any sufficiency gap, whether before or after issuance of verification, Agency may coordinate with others to identify and secure sources of supply. (Gov. § 66473.7(f))[15]

Any challenge to the verification must be initiated within 90 days. (Gov § 66473.7(o))[16]

The agency will approve or disapprove a project based on a number of factors, including but not limited to, consideration of the water supply verification.

Chart Courtesy of the
The Building Industry Legal Defense Foundation

Notes for SB 221 Flowchart

Footnote 1: Gov. Code § 65867.5

Footnote 2: "Subdivision" is defined as follows per Government Code § 66473.7(a)(1): " 'Subdivision" means a proposed residential development of more than 500 dwelling units, except that for a public water system that has fewer than 5,000 service connections, "subdivision" means any proposed residential development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections." See Government Code § 65867.5(c). (development agreements)

Footnote 3: See note 2.

Footnote 4: Gov. Code § 66473.7(i) provides an exemption for "infill" or "low-income or very-low-income" housing subdivisions as follows: "This section shall not apply to any residential project proposed for a site that is within an urbanized area and has been previously developed for urban uses, or where the immediate contiguous properties surrounding the residential project site are, or previously have been, developed for urban uses, or housing projects that are exclusively for very low and low-income households."

Footnote 5: " 'Public water system' means the water supplier that is, or may become as a result of servicing the subdivision included in a tentative map pursuant to subdivision (b), a public water system, as defined in Section 10912 of the Water Code, that may supply water for a subdivision." (Gov. Code §66473.7(a)(3).) There may be one water supplier for a given project. For example there may be different providers for potable water versus reclaimed water versus groundwater.

Footnote 6: The Urban Water Shortage Contingency Analysis may be prepared pursuant to Water Code § 10632.

Footnote 7: Supply reduction resolution, ordinance, or contract may not conflict with Water Code § 354.

Footnote 8: Specifically, "The amount of water that the water supplier can reasonably rely on receiving from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer, including programs identified under federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, to the extent that these water supplies meet the criteria of subdivision (d)." (Gov. Code § 66473.7(a)(2)(D).) Subdivision (d) addresses evidentiary requirements for "projected" water supplies, and these requirements are listed in note 13.

Footnote 9: "The applicable public water system's written verification of its ability or inability to provide a sufficient water supply that will meet the projected demand associated with the proposed subdivision as required by subdivision (b) shall be supported by substantial evidence. The substantial evidence may include, but is not limited to, any of the following:

(1) The public water system's most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610) of Division 6 of the Water Code.
(2) A water assessment that was completed pursuant to Part 2.10 (commencing with Section 10910) of Division 6 of the Water Code.
(3) Other information relating to the sufficiency of the water supply that contains analytical information that is substantially similar to the assessment required by Section 10635 of the Water Code." (Gov. Code § 66473.7(c).)

Footnote 10: "The determinations made pursuant to this section shall be consistent with the obligation of a public water system to grant a priority for the provision of available and future water resources or services to proposed housing developments that help meet the city's or county's share of the regional housing needs for lower income households, pursuant to Section 65589.7." (Gov. Code § 66473.7(j).)

Footnote 11: "The written verification prepared under this section shall also include a description, to the extent that data is reasonably available based on published records maintained by federal and state agencies, and public records of local agencies, of the reasonably foreseeable impacts of the proposed subdivision on the availability of water resources for agricultural and industrial uses within the public water system's service area that are not currently receiving water from the public water system but are utilizing the same sources of water. To the extent that those reasonably foreseeable impacts have previously been evaluated in a document prepared pursuant to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) or the National Environmental Policy Act (Public Law 91-190) for the proposed subdivision, the public water system may utilize that information in preparing the written verification." (Gov. Code § 66473.7(g).)

Footnote 12: "When the written verification pursuant to subdivision (b) relies on projected water supplies that are not currently available to the public water system, to provide a sufficient water supply to the subdivision, the written verification as to those projected water supplies shall be based on all of the following elements, to the extent each is applicable:

(1) Written contracts or other proof of valid rights to the identified water supply that identify the terms and conditions under which the water will be available to serve the proposed subdivision.
(2) Copies of a capital outlay program for financing the delivery of a sufficient water supply that has been adopted by the applicable governing body.
(3) Securing of applicable federal, state, and local permits for construction of necessary infrastructure associated with supplying a sufficient water supply.
(4) Any necessary regulatory approvals that are required in order to be able to convey or deliver a sufficient water supply to the subdivision." (Gov. Code § 66473.7(d).)

Footnote 13: "Where a water supply for a proposed subdivision includes groundwater, the public water system serving the proposed subdivision shall evaluate, based on substantial evidence, the extent to which it or the landowner has the right to extract the additional groundwater needed to supply the proposed subdivision. Nothing in this subdivision is intended to modify state law with regard to groundwater rights." (Gov. Code § 66473.7(h).)

Footnote 14: "If the written verification provided by the applicable public water system indicates that the public water system is unable to provide a sufficient water supply that will meet the projected demand associated with the proposed subdivision, then the local agency may make a finding, after consideration of the written verification by the applicable public water system, that additional water supplies not accounted for by the public water system are, or will be, available prior to completion of the subdivision that will satisfy the requirements of this section. This finding shall be made on the record and supported by substantial evidence."(Gov. Code. § 66473.7(b)(3).)

Footnote 15: "In making any findings or determinations under this section, a local agency, or designated advisory agency, may work in conjunction with the project applicant and the public water system to secure water supplies sufficient to satisfy the demands of the proposed subdivision. If the local agency secures water supplies pursuant to this subdivision, which supplies are acceptable to and approved by the governing body of the public water system as suitable for delivery to customers, it shall work in conjunction with the public water system to implement a plan to deliver that water supply to satisfy the long-term demands of the proposed subdivision." (Gov. Code § 66473.7(f).)

Footnote 16: "Any action challenging the sufficiency of the public water system's written verification of a sufficient water supply shall be governed by Section 66499.37." (Gov. § 66473.7(o).) Government Section 66499.37 states: "Any action or proceeding to attack, review, set aside, void or annul the decision of an advisory agency, appeal board or legislative body concerning a subdivision, or of any of the proceedings, acts or determinations taken, done or made prior to such decision, or to determine the reasonableness, legality or validity of any condition attached thereto, shall not be maintained by any person unless such action or proceeding is commenced and service of summons effected within 90 days after the date of such decision. Thereafter all persons are barred from any such action or proceeding or any defense of invalidity or unreasonableness of such decision or of such proceedings, acts or determinations. Any such proceeding shall take precedence over all matters of the calendar of the court except criminal.

Main Section

Section 1 - Code citations Does SB 610 or SB 221 apply to the proposed development?

SB 610

Water Code section 10910

(a) Any city or county that determines that a project, as defined in Section 10912, is subject to the California Environmental Quality Act Division 13 (commencing with Section 21000) of the Public Resources Code, under Section 21080 of the Public Resources Code shall comply with this part.

Water Code section 10912

For the purposes of this part, the following terms have the following meanings:

(a) ''Project'' means any of the following:

- *(1) A proposed residential development of more than 500 dwelling units.*
- *(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.*
- *(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.*
- *(4) A proposed hotel or motel, or both, having more than 500 rooms.*
- *(5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.*
- *(6) A mixed-use project that includes one or more of the projects specified in this subdivision.*
- *(7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.*

(b) If a public water system has fewer than 5,000 service connections, then ''project'' means any proposed residential, business, commercial, hotel or motel, or industrial development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections, or a mixed-use project that would demand an amount of water equivalent to, or greater than, the amount of water required by residential development that would represent an increase of 10 percent or more in the number of the public water system's existing service connections.

SB 221

Government Code section 65867.5

(c) A development agreement that includes a subdivision, as defined in section 66473.7, shall not be approved unless the agreement provides that any tentative map prepared for the subdivision will comply with the provisions of section 66473.7.

Government Code section 66473.7

(a) For the purposes of this section, the following definitions apply:

- *(1) ''Subdivision'' means a proposed residential development of more than 500 dwelling units, except that for a public water system that has fewer than 5,000 service connections, ''subdivision'' means any proposed residential development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections.*

(b) (1) The legislative body of a city or county or the advisory agency, to the extent that it is authorized by local ordinance to approve, conditionally approve, or disapprove the tentative map, shall include as a condition in any tentative map that includes a subdivision a requirement that a sufficient water supply shall be available. Proof of the availability of a sufficient water supply shall be requested by the subdivision applicant or local agency, at the discretion of the local agency, and shall be based on written verification from the applicable public water system within 90 days of a request.

(i) This section shall not apply to any residential project proposed for a site that is within an urbanized area and has been previously developed for urban uses, or where the immediate contiguous properties surrounding the residential project site are, or previously have been, developed for urban uses, or housing projects that are exclusively for very low and low-income households.

Section 1 Does SB 610 or SB 221 apply to the proposed development?

Lead Agency (City or County) receives project application or complete application for a proposed subdivision.

Is the project subject to **SB 610**?

1-1 Is the project subject to CEQA? Water Code § 10910(a) Yes No

If no, see **SB 221** question 1-3, below
If yes, continue

1-2 Is it a "project" as defined by Water Code § 10912(a) or (b)? Yes No

If yes, to comply with **SB 610 go to Section 2, page 4** (**SB 221** may also apply – see below)
If no, see **SB 221** question 1-3 below

Note: In determining whether a project would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project, it is generally acknowledged that one acre-foot of water can serve two to three households on an annual basis; therefore, one dwelling unit typically consumes .3 to .5 acre-feet of water per year, depending upon several factors, including the regional climate. An agency should contact its local water supplier to obtain its advice on the annual water demand for a development within the local community in order to determine whether the water demand for the development under consideration is equivalent to the water demand of a 500 dwelling unit project. Water Code § 10912 (a)(7)

While Water Code § 10912(a) provides that a "project" may include a residential development of 500 or more dwelling units, Water Code § 10912(b) provides a "sliding scale" for determining the size of a project to which **SB 610** would apply, below 500 dwelling units. Since Section 10912(b) provides that a "project" is a proposed development that would increase the number of service connections for a public water system (which currently has fewer than 5,000 service connections) by 10 percent or more, a "project" could be as few as 300 dwelling units. For example, a water utility that has 3,000 service connections would experience an increase in the number of service connections by 10% if it were required to serve a proposed residential development of 300 units, thus making the 300-unit development a "project" under **SB 610**. Similarly, for water utilities that have more than 3,000 service connections, but fewer than 5,000 service connections, the "10 percent test" in Water Code § 10912(b) would apply in determining whether a proposed development is a "project" under **SB 610**.

Is the project subject to **SB 221**?

1-3 Does the tentative map include a "subdivision" as defined by Government Code § 66473.7(a)(1)?
Yes No

If yes, continue, go to **Section 9**, **Page 40**
If no, stop

Note: Government Code § 66473.7(a) provides that a "subdivision" consists of 500 or more dwelling units in order to be subject to **SB 221**, except that for a public water system that has fewer than 5,000 service connections, Government Code § 66473.7(a) provides a "sliding scale" for determining the number of dwelling units that would constitute a "subdivision," below 500 dwelling units. Because Government Code § 66473.7(a) provides that a "subdivision" for a public water system with fewer than 5,000 service connections is a proposed development that would increase the number of service connections for a public water system by 10 percent or more, a "subdivision" could be as few as 300 dwelling units. For example a water utility that has 3,000 service connections would experience an increase in the number of service connections by 10 percent if it were required to serve a proposed residential development of 300 units, thus making the 300-unit development a "subdivision" under **SB 221**. Similarly, for water utilities that have more than 3,000 service connections, but fewer than 5,000 service connections, the "10% test" in Government Code § 66473.7(a) would apply in determining whether a proposed development is a "subdivision" under **SB 221**.

If neither **SB 610** nor **SB 221** applies, **Stop** – no further action required by **SB 610** or **SB 221**

Note: Special Provisions apply for San Diego County agencies and water suppliers. See Section 17, page 80 for more information. Government Code § 66473.7(k)

Section 2 - Code citations Who will prepare the SB 610 assessment?

Water Code section 10910
(b) The city or county, at the time that it determines whether an environmental impact report, a negative declaration, or a mitigated negative declaration is required for any project subject to the California Environmental Quality Act pursuant to Section 21080.1 of the Public Resources Code, shall identify any water system that is, or may become as a result of supplying water to the project identified pursuant to this subdivision, a public water system, as defined in Section 10912, that may supply water for the project. If the city or county is not able to identify any public water system that may supply water for the project, the city or county shall prepare the water assessment required by this part after consulting with any entity serving domestic water supplies whose service area includes the project site, the local agency formation commission, and any public water system adjacent to the project site.

Water Code section 10912
(c) "Public water system" means a system for the provision of piped water to the public for human consumption that has 3,000 or more service connections. A public water system includes all of the following:

(1) Any collection, treatment, storage, and distribution facility under control of the operator of the system which is used primarily in connection with the system.

(2) Any collection or pretreatment storage facility not under the control of the operator that is used primarily in connection with the system.

(3) Any person who treats water on behalf of one or more public water systems for the purpose of rendering it safe for human consumption.

Water Code section 10910
(c) (1) The city or county, at the time it makes the determination required under Section 21080.1 of the Public Resources Code, shall request each public water system identified pursuant to subdivision (b) to determine whether the projected water demand associated with a proposed project was included as part of the most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610).

(2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

Water Code section 10910
(g) (1) Subject to paragraph (2), the governing body of each public water system shall submit the assessment to the city or county not later than 90 days from the date on which the request was received. The governing body of each public water system, or the city or county if either is required to comply with this act pursuant to subdivision (b), shall approve the assessment prepared pursuant to this section at a regular or special meeting.

(2) Prior to the expiration of the 90 day period, if the public water system intends to request an extension of time to prepare and adopt the assessment, the public water system shall meet with the city or county to request an extension of time, which shall not exceed 30 days, to prepare and adopt the assessment.

(3) If the public water system fails to request an extension of time, or fails to submit the assessment notwithstanding the extension of time granted pursuant to paragraph (2), the city or county may seek a writ of mandamus to compel the governing body of the public water system to comply with the requirements of this part relating to the submission of the water assessment.

Section 2 Who will prepare the SB 610 assessment?

2-1 Is there a public water system ("water supplier") for the project? Water Code § 10910(b)

Yes No

A public water system that currently has fewer than 3,000, but would have 3,000 or more service connections as a result of providing water to the proposed project is required to prepare an assessment (Water Code § 10910(b), 10912((b), 10912(c)). Close attention will need to be paid to the number of existing service connections and the number of proposed service connections as a result of serving the proposed development, as well as the percentage increase in the number of service connections, in order to determine whether the water utility is a "public water system" and whether the proposed development is a "project" under **SB 610**. For example, a water utility with fewer than 3,000 service connections may become a "public water system" as a result of supplying water to the proposed development. In other words, a water utility with 2,700 existing service connections would become a "public water system" if it were to serve a proposed development of 400 dwelling units, and an increase in the number of service connections by 400 would also represent a greater than 10% increase in service connections for the water utility, thus making the proposed development subject to an **SB 610** water supply assessment by the water utility.

A public water system is defined in the Water Code as a system that has 3,000 or more service connections and provides piped water to the public for human consumption. Water Code § 10912(c)

SB 610 (Water Code § 10912(c)) defines "public water system" as a water utility with 3,000 or more service connections. In addition, **SB 610** requires the city or county to identify the water system that is, or may become as a result of supplying water to the project, a public water system (Water Code § 10910(b)). This provision suggests that a water utility with fewer than 3,000 service connections currently could become a "public water system" if the number of service connections associated with the new development would increase the number of service connections served by the water utility to more than 3,000.

If no, the lead agency must prepare an **SB 610** assessment. Water Code § 10910(b) – **go to Section 3, page 6**

If the lead agency is unable to identify a water supplier (public water system as defined in **SB 610**), the lead agency is responsible for compliance with the requirements of **SB 610**. Prior to preparing the assessment, the lead agency is required to consult with the following:

- Any entity serving domestic water supplies whose service area includes the project site
- The Local Agency Formation Commission
- Any public water system adjacent to the project site

Even though a water supplier may not be a "public water system" or become a "public water system" as a result of serving the proposed project, it will still be involved, in a consultation role, in the preparation of the assessment. Similarly, even though the water supplier's service area may not include the project site, as long as its service area is adjacent to the project site, it will still be involved, in a consultation role, in the preparation of the assessment.

If yes, lead agency shall request each water supplier to determine whether the projected water demand associated with the proposed project was accounted for in the most recently adopted Urban Water Management Plan. If not, or if the water supplier has no Urban Water Management Plan, the lead agency shall request the water supplier to prepare an **SB 610** assessment. Water Code § 10910(c)

Go to Section 3, page 6

The water supplier must prepare the assessment within 90 days of request. The water supplier may request the lead agency to grant one 30-day extension. Water Code § 10910(g)

a) The statute does not specify a time limit on the preparation of an assessment by the lead agency, if the lead agency is undertaking the assessment because there is no identified water supplier.

b) If the assessment is not received from the water supplier within the prescribed 90-day period, and any requested time extension, the lead agency may seek legal relief. Water Code § 10910(g)(1)(2)(3)

Section 3 - Code citations Has an assessment already been prepared that includes this project?

Water Code section 10910

(h) Notwithstanding any other provision of this part, if a project has been the subject of a water assessment that complies with the requirements of this part, no additional water assessment shall be required for subsequent projects that were part of a larger project for which a water assessment was completed and that has complied with the requirements of this part and for which the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has concluded that its water supplies are sufficient to meet the projected water demand associated with the proposed project, in addition to the existing and planned future uses, including, but not limited to, agricultural and industrial uses, unless one or more of the following changes occurs:

- *(1) Changes in the project that result in a substantial increase in water demand for the project.*
- *(2) Changes in the circumstances or conditions substantially affecting the ability of the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), to provide a sufficient supply of water for the project.*
- *(3) Significant new information becomes available which was not known and could not have been known at the time when the assessment was prepared.*

Section 3 Has an assessment already been prepared that includes this project?

3-1 Has this project already been the subject of an assessment? Water Code § 10910(h) Yes No

If no, water supplier or lead agency must prepare **SB 610** assessment. Water Code § 10910(b)
go to Section 4, page 8

If yes, and ALL of the five factors listed below apply:

- the preparer of the assessment determines that it complies with the requirements of **SB 610**
- the assessment determined that sufficient water was available for the project
- there has been no change to the project that would result in a substantial increase in demand
- there has been no change in the circumstances or conditions which substantially affect the ability of the water supplier to provide a sufficient supply of water for the project
- no new information which might affect the assessment has becomes available

then, no additional assessment is required for this project for which the original assessment was prepared.

Assessment is complete – Stop

Note: The completed assessment is ready for inclusion in the environmental documentation for the project.

Otherwise, if any of the five factors do not apply, then an assessment is required.

Continue, go to Section 4, page 8

The preparer of the verification or the assessment may be a water suppler, city or county. Wherever the term “water supplier” appears, the term “preparer” of the verification or assessment also applies.

Section 4 - Code citations Is there a current Urban Water Management Plan?

Water Code section 10910

(c) (1) The city or county, at the time it makes the determination required under Section 21080.1 of the Public Resources Code, shall request each public water system identified pursuant to subdivision (b) to determine whether the projected water demand associated with a proposed project was included as part of the most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610).

(2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

(3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

(4) If the city or county is required to comply with this part pursuant to subdivision (b), the water assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

Section 4 Is there a current Urban Water Management Plan?

4-1 Is there an adopted urban water management plan (UWMP)? Water Code § 10910(c)

Yes No

If no, assessment must be prepared based on available information. Water Code § 10910(c)(3)
Read following note and **go to Section 5, page 10**

If the water supplier will prepare the **SB 610** assessment (Water Code § 10910(c)(3), without the benefit of a UWMP, the assessment shall include a determination as to whether the water supplier's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

If the lead agency will prepare the **SB 610** assessment (Water Code § 10910(c)(4), the assessment shall include a discussion as to whether the total projected water supplies, determined to be available during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

If yes, continue

4-2 Is the projected water demand for the project accounted for in the most recent UWMP?
Water Code § 10910(c)(2)

Yes No

If yes, information from the UWMP related to the projected water demand for the project may also be used for carrying out Section 5, Steps 1 and 2, and Section 7, as outlined in this guidance manual.
Go to Section 5, page 10

If no, assessment must be prepared based on either information contained within the UWMP and/or information available from other sources and reports. Water Code § 10910(c)(3)
Go to Section 5, page 10

Section 5 - Code citations What information should be included in an assessment?

Water Code section 10910

(c) (2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

(3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

(4) If the city or county is required to comply with this part pursuant to subdivision (b), the water assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

(d)(1) The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts.

(2) An identification of existing water supply entitlements, water rights, or water service contracts held by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall be demonstrated by providing information related to all of the following:

- *(A) Written contracts or other proof of entitlement to an identified water supply.*
- *(B) Copies of a capital outlay program for financing the delivery of a water supply that has been adopted by the public water system.*
- *(C) Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply.*
- *(D) Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.*

(e) If no water has been received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts, the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall also include in its water assessment pursuant to subdivision (c), an identification of the other public water systems or water service contract holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts, to the same source of water as the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has identified as a source of water supply within its water assessments.

Section 5 What information should be included in an assessment?

This section is written as if the water supplier is preparing the water assessment. If a lead agency is preparing the assessment, the same approach is used but the water supplies are those identified by the lead agency as available to meet the project's water demands. (Examples will be provided of how a lead agency assessment will differ from a water supplier assessment.)

The question to be answered is:
Will the water supplier's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection meet the projected water demand of the proposed project, in addition to the water supplier's existing and planned future uses, including agricultural and manufacturing uses?

If the water demand for the proposed project was accounted for in the most recently adopted UWMP, information from the UWMP related to the projected water demand for the project may also be used for carrying out Section 5, Steps 1 and 2, and Section 7, as outlined in this guidance manual. Water Code § 10910(c)(2)

The Urban Water Management Planning Act (Water Code § 10631 – see Appendix C) requires the supplier to document water supplies available during normal, single dry, and multiple dry water years during a 20-year projection and the existing and projected future water demand during a 20-year projection. The Act requires that the projected supplies and demands be presented in 5-year increments for the 20-year projection.

If the water demand for the proposed project was **NOT** accounted for in the most recently adopted UWMP,

- The water supplier must prepare an assessment that includes a discussion of whether the total projected water supplies determined to be available for the project during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the water supplier's existing and planned future uses, including agricultural and manufacturing uses.
- A city or county, if not able to identify a public water system that may supply water for the project, must prepare an assessment that includes a discussion of whether the total projected water supplies determined to be available for the project during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses. Water Code § 10910 subdivisions (b) and (c)(3) and (4)

Supplies from all sources, including wholesaler supplies, require documentation. This documentation includes identifying and quantifying water rights, contracts, and/or entitlements to the supply; associated capital outlay programs; federal, state and local permits for constructing infrastructure for conveying the supply; and any necessary regulatory approvals required for conveyance.

Section 5 - Code Citations

Step One: Documenting wholesale water supplies

Water Code section 10910

(d)(1) The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts.

(2) An identification of existing water supply entitlements, water rights, or water service contracts held by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall be demonstrated by providing information related to all of the following:

(A) Written contracts or other proof of entitlement to an identified water supply.

(B) Copies of a capital outlay program for financing the delivery of a water supply that has been adopted by the public water system.

(C) Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply.

(D) Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.

(e) If no water has been received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts, the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall also include in its water assessment pursuant to subdivision (c), an identification of the other public water systems or water service contract holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts, to the same source of water as the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has identified as a source of water supply within its water assessments.

Section 5

Step One: Documenting wholesale water supplies

This section describes the documentation necessary for wholesale water supplies in **SB 610** water assessments.

Many retail water suppliers in California receive supplies from one or more water wholesalers. Under **SB 610**, retail water suppliers are responsible for providing the water assessment to the local agencies. In most cases, the retail water supplier will have better information on the supply availability and system constraints for a particular development project.

Under the requirements of Water Code § 10910 (d), retail water suppliers must document wholesale supplies by:

1) Describing the quantities of water received from each wholesaler in prior years.
2) Identifying any existing entitlements, water rights, and water service contracts held by the retail water supplier for the wholesale supply.
3) Providing written contracts or other proof of entitlements, water rights and service contracts for the wholesaler's supplies; copies of relevant capital outlay programs; federal, state and local permits for construction of necessary infrastructure associated with delivering the wholesale supplies, if any, and; regulatory approvals required in order to convey or deliver the wholesale supply.

If the retail water supplier has not received water supplies from the wholesaler in prior years, then Water Code § 10910 (e), Section 5, Step 2, page 16, may apply.

The retail water supplier should coordinate with the wholesaler in assembling the information necessary to meet the provisions for documenting wholesale supplies. Wholesalers may take varying roles in assisting retail agencies. One possible role is for the wholesaler to fully document its own supplies and demands for the wholesale supplies relied upon in the assessment. In some cases the wholesale supplier's most recent UWMP and related documents may provide valuable information in assembling the information required for the water assessment. Whatever the level of assistance, information provided by a wholesaler will only form one part of the retail water supplier's overall supply assessment.

In situations where one wholesaler sells water to another wholesaler, (sometimes referred to as a "sub-wholesaler"), the retail water supplier should coordinate gathering the necessary information on its wholesale supply with the sub-wholesaler. This may include gathering documentation from both wholesalers' Urban Water Management Plans and/or supplemental reports.

Documentation for groundwater supply is discussed below, see Section 5, Step 2. page 18.

Section 5 - Code Citations

Step Two: Documenting supply

See previous Code citations page

Section 5

Step Two: Documenting supply

Identify and quantify the existing and planned sources of water available to the water supplier in 5-year increments for the 20-year projection. For each identified supply detail the quantity available and whether it is a:

1. water supply entitlement
2. water right
3. water service contract

If any of the listed water sources have never have been used by the water supplier, demonstrate that the source is available by identifying other water suppliers or contract holders that receive and have rights, entitlements, or contracts to the same source. In addition, provide detailed information relating to the following:

- (a) written contracts or other proof of entitlement to the source
- (b) capital outlay/financing program for delivery adopted by the water supplier
- (c) federal/state/local permits for delivery infrastructure
- (d) regulatory approvals required to convey or deliver water

Sample Table 1 is an example of how supply source information might be summarized. It will be important to provide a detailed description of each source.

Table 1 Annual amount under each right, entitlement, and/or contract

Supply	AFY	Entitlement	Right	Contract	Ever used
Local Surface	9,300	X			Yes
Wholesaler 1	No limit			X	Yes
Wholesaler 2	4,900			X	No
Groundwater	2,300		X		Yes

Sample Table 2 is an example of how an assessment might summarize the past, current and projected deliveries from each supply source. It is important to develop realistic delivery projections. The entitlement, right or contract amount might overstate or understate the quantity of water that can actually be delivered during normal years. For instance, a contract may be for 5,000 acre feet per year but an additional 2,000 acre feet per year may be available until 2015 due to other contractors not needing full deliveries until that time.

Table 2 Quantify water received in normal year – actual and projected (not maximum possible)

Water Supply Sources	1980	1985	1990	1995	2000	2005	2010	2015	2020
Wholesaler (identify)									
Wholesaler (identify)									
Groundwater									
Local surface water									
Transfers									
Exchanges (in or out)									
Reclaimed Water									
Other (identify)									
Total									

Step Two: Documenting supply

If groundwater is a source

Water Code section 10910

(f) If a water supply for a proposed project includes groundwater, the following additional information shall be included in the water assessment:

(1) A review of any information contained in the urban water management plan relevant to the identified water supply for the proposed project.

(2) A description of any groundwater basin or basins from which the proposed project will be supplied. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current bulletin of the department that characterizes the condition of the groundwater basin, and a detailed description by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), of the efforts being undertaken in the basin or basins to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the amount and location of groundwater pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), for the past five years from any groundwater basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), from any basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(5) An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project. A water assessment shall not be required to include the information required by this paragraph if the public water system determines, as part of the review required by paragraph (1), that the sufficiency of groundwater necessary to meet the initial and projected water demand associated with the project was addressed in the description and analysis required by paragraph (4) of subdivision (b) of Section 10631.

Section 5

Step Two: Documenting Supply

If groundwater is a source

If the water sources that will serve the project include groundwater, specific groundwater information must be included in the assessment. Amendments to the Urban Water Management Planning Act (Water Code § 10631 effective January 1, 2002) specify the data necessary to document available groundwater supplies. Water Code § 10631 and Water Code § 10910, effective January 1, 2002, require similar information, Water Code § 10910 limits the groundwater discussion to the basin or basins that will serve the proposed project. Groundwater information provided in response to Water Code § 10631 will generally also meet the groundwater requirements contained in Water Code § 10910 if the same basin(s) is (are) addressed. Water Code § 10631 adds a further requirement: "A detailed description and analysis of the location, amount, and sufficiency of groundwater that is projected to be pumped by the urban water supplier." In addition, a parallel reference to the "sufficiency analysis" is also found in Water Code § 10910(f)(5): "An analysis of the sufficiency of the groundwater from the basin…to meet the projected water demand associated with the proposed project." It is recognized that many suppliers updated their UWMPs before January 1, 2002. Therefore, the plans may not include the groundwater information needed for the assessment. Suppliers can update the UWMP to include the groundwater information, or prepare a separate groundwater assessment for the water supply assessment that could also be a basis for a subsequent update to the UWMP.

Groundwater details (for the basin or basins which will provide water for the proposed project) required to be included in the UWMP include:

(a) Specify if a groundwater management plan or any other specific authorization for groundwater management for the basin has been adopted and how it affects the water supplier's use of the basin.

(b) The description of the groundwater basin may be excerpted from the groundwater management plan, from DWR Bulletin 118, California's Ground Water, or from some other document that has been published and that discusses the basin boundaries, type of rock that constitutes the aquifer, variability of the aquifer material, and total groundwater in storage (average specific yield times the volume of the aquifer).

(c) In an adjudicated basin the amount of water the urban supplier has the legal right to pump should be enumerated in the court decision - attach a copy of the order or decree.

(d) The Department of Water Resources has projected estimates of overdraft, or "water shortage," based on projected amounts of water supply and demand (basin management), at the hydrologic region level in Bulletin 160, California Water Plan Update. Estimates at the basin or subbasin level will be projected for some basins in Bulletin 118. If the basin has not been evaluated by DWR, data that indicate groundwater level trends over a period of time should be collected and evaluated.

(e) If the evaluation indicates an overdraft due to existing groundwater extraction, or projected increases in groundwater extraction, describe actions and/or program designed to eliminate the long term overdraft condition .

(f) If water supplier wells are plotted on a map, or are available from a geographic information system, the amount of water extracted by the water supplier for the past five years can be obtained from the Department of Health Services, Office of Drinking Water and Environmental Management. A useful DHS website is: http://www.dhs.ca.gov/ps/ddwem/technical/dwp.dwpindex.htm.

(g) Description and analysis of the amount and location of groundwater pumped by the water supplier for the past five years. Include information on proposed pumping locations and quantities. . The description and analysis is to be based on information that is reasonably available, including, but not limited to, historic use records from DWR, and from other sources.

(h) Analysis of the location, amount, and sufficiency of groundwater that is projected to be pumped by the water supplier.

SB 610 (Water Code § 10910(f)(5)) requires the water supplier to make a determination of the sufficiency of the groundwater from the basin to be used to supply the proposed project. If a determination that includes the proposed project was included in the Urban Water Management Plan, and that information is included in the assessment, no further data is required.

Section 5 - Code citations

Step Two: Documenting supply

If the assessment relies on water supplies never before used

Water Code section 10910

(e) If no water has been received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts, the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall also include in its water assessment pursuant to subdivision (c), an identification of the other public water systems or water service contract holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts, to the same source of water as the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has identified as a source of water supply within its water assessments.

Section 5

Step Two: Documenting supply

If the assessment relies on water supplies never before used

If a water supplier, city or county identified existing water supply entitlements, rights, or contracts under which no water has been received in prior years, as a source of water supply for the proposed project in its assessment, it will need to identify other public water systems or water service contractors that receive a water supply, have existing entitlements, water rights, or water service contracts to the same source of water.

Section 5 - Code citations

Step Three: Documenting project demand (Project Demand Analysis)

Water Code section 10910

(c) (2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

(3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

Water Code section 10631 (Urban Water Management Plan Requirements)

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:

(A) Single-family residential.
(B) Multifamily.
(C) Commercial.
(D) Industrial.
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.
(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

Section 5

Step Three: Documenting project demand (Project Demand Analysis)

SB 610 requires that an assessment document the water demand for existing uses, planned future uses and the proposed development.

Note:
If the proposed development was included as part of the projected water demand of the current Urban Water Management Plan, the water demand for the proposed development does not need to be separately analyzed as long as water demand for the purpose of the project has remained substantially the same.

The law (Water Code § 10910(c)(2)) states that if the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the water supplier may incorporate the requested information from the urban water management plan in preparing the assessment. The Urban Water Management Planning Act (Water Code § 10631) clearly specifies the data necessary to document the existing and projected future water demand during a -twenty year projection. The code requires that the projected demands be presented in five-year increments for the twenty year projection.

Section 5 - Code citations

Step Three: Documenting project demand (Project Demand Analysis)

Definitions

None

Section 5

Step Three: Documenting project demand (Project Demand Analysis)

Definitions

The following definitions of existing uses, planned future uses, proposed project use and agricultural and industrial uses are provided for your consideration only. Both **SB 610** and **SB 221** emphasize local control and decision-making and the information provided in this guidebook is not intended to infringe upon the planning discretion of the water supplier or lead agency.

Existing uses – demand related to current customers, and system uses/losses, during normal years (uses during single dry and multiple dry years will be discussed in Section 5, Step 4). Usually this projection will take account of historic use (during non-dry) years as well as any recent changes in demand characteristics, i.e., changes in per capita use, percentage of use by customer type, demographic variability, etc.).

Planned future uses – the lead agency, as the land-use agency, has information on planned development. Regular communication between the water supplier and lead agency will be essential to ensuring an accurate determination of sufficiency of water supply for future demand.

Planned future uses may include:

- projects that are expected to be completed during the same time frame as the proposed project. These include all new demands ranging from an individual single-family home to large-scale developments.
- proposed developments that have a reserved (or entitlement to) future water supply and are considered to be moving towards construction. Proposed projects that are included in a general or specific plan need not be included if the lead agency determines that they are not likely to begin construction during the period under consideration.
- projects which are not subject to local planning regulation – for example, US military installations, University of California, reservation lands of federally recognized Indian tribes, or lands held in trust for those tribes, etc.

Neither **SB 610**, nor **SB 221** defines planned future uses. However, it would be a reasonable interpretation that planned future uses are those that would be undertaken within the same time frame as the project under consideration. Each preparer of an assessment will determine what planned future uses it will include in the demand calculation to ensure that it is not identifying the same increment of water for more than one future use.

Section 5 - Code citations

Step Three: Documenting project demand (Project Demand Analysis)

Detailing existing and planned future uses

Water Code section 10910

(c) (2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

(3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

Water Code section 10631

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:

(A) Single-family residential.
(B) Multifamily.
(C) Commercial.
(D) Industrial.
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.
(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

Section 5

Step Three: Documenting project demand (Project Demand Analysis)

Detailing existing and planned future uses

A variety of demographic factors may affect water use. The Urban Water Management Planning Act lists several demographic factors to be detailed including current and projected population, climate, density, and the mix of customer types. The assessment may detail water use per identified water use sector as reported in the Urban Water Management Planning Act. The sectors are single-family residential, multifamily, commercial, industrial, institutional and governmental, landscape, sales to other agencies, agricultural and other (saline water intrusion barriers, groundwater recharge, conjunctive use, etc.). Showing the past, current and projected water use by sector is an effective way to show growth patterns. This allows a water supplier to more accurately predict future demand.

The following tables are provided as an example of how to present this type of data. These tables allow the required five-year increments for the 20-year projection to be clearly presented.

Population projections

Year	2000	2005	2010	2015	2020
Population					

Climate data

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
avg precip													
avg temp													
ETO													

Water-use Sectors – use in acre-feet* per year, actual and projected

Customer type	**1990**	**1995**	**2000**	**2005**	**2010**	**2015**	**2020**
Single Family							
Multifamily							
Commercial							
Industrial							
Institutional / gov.							
Landscape Irrigation							
Wholesale							
Agricultural							
Other (specify)							
TOTAL							

*1 AF = 325,851 gallons/year (often demand in new projects is figured in gallons).
Tables with **bold** column headings represent information required by SB 610.

Water-use Sectors – number of connections, actual and projected (Not required by **SB 610**)

Customer type	1990	1995	2000	2005	2010	2015	2020
Single Family							
Multifamily							
Commercial							
Industrial							
Institutional / gov.							
Landscape Irrigation							
Wholesale							
Agricultural							
Other (specify)							
TOTAL							

Section 5 - Code citations

Step Four: Documenting dry year(s) supply

Water Code section 10910

(c) (2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

Section 5

Step Four: Documenting dry year(s) supply

Section 5 - Code citations
Step Four: Documenting dry year(s) supply
Documenting dry year(s) supply for water suppliers with multiple sources

Water Code section 10910

(c) (2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

Water Code section 10631 (Urban Water Management Plan requirements)

(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:
(1) An average water year.
(2) A single dry water year.
(3) Multiple dry water years.

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

Note: Water Code section 10632 requires that the Urban Water Management Plan include a water shortage contingency analysis.

Water Code section 10632 (Urban Water Management Plan requirements)

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier: (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage. (b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply. (c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster. (d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning. (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply. (f) Penalties or charges for excessive use, where applicable. (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments. (h) A draft water shortage contingency resolution or ordinance. (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

Section 5

Step Four: Documenting dry(s) year supply

Documenting dry year(s) supply for water suppliers with multiple sources

Single dry and multiple dry years are usually based on historic records from the watersheds that determine the water conditions to a particular supply. The information is often presented as a probability of exceedance or probability of occurrence, as discussed in the example below. Many water suppliers have multiple sources. One way to show how the total supply would be affected is to document how each individual supply will be affected by single dry and multiple dry years.

Example

Probability based estimates for Drake Reservoir supplies have been estimated in a similar manner as those for wholesaler supplies. The Drake Reservoir estimates are based on historical District supplies and the County's Big River Model. This model uses hydrologic data for the period of 1917 through 1993 to estimate reservoir water levels and system yields to the Drake Reservoir member agencies. Based on a review of this data, the District can expect to receive a supply of 9,321 acre feet per year during wet and normal years. During dry years (10 percent probability of occurrence) the Drake Reservoir supply is estimated to be 9,200 acre feet per year. During critical dry years (3 percent probability of occurrence) Drake Reservoir supplies are estimated to be 7,000 acre feet per year. The combined effects of Wholesaler and Drake Reservoir cutbacks on District water supplies are summarized below.

Percent Likelihood	Wet Year 30%	Normal Year 60%	Dry Year 10%	Critical Drought Year 3%
Demand (AFY)	15,000	16,000	17,000	17,000
Supply				
Groundwater	1,500	2,100	3,100	2,300
Drake Reservoir	9,421	9,421	9,200	7,000
West Water Project	4,500	4,500	2,500	1,700
Total	15,421	16,021	14,800	11,000

Projected supply (AF) available by source for single-dry and multiple-dry years

Source	**Normal**	**Single Dry**	**Multiple - 2**	**Multiple - 3**	**Multiple - 4**
Local Surface	9,300				
Wholesaler 1	NA				
Wholesaler 2	4,900				
Groundwater	1,100	2,300	2,300		
TOTAL					

Section 5 - Code citations
Step Five: Documenting dry year(s) demand

Water Code section 10910

(c) (2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

Water Code section 10631 (Urban Water Management Plan requirements)

(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(1) An average water year.
(2) A single dry water year.
(3) Multiple dry water years.

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

Note: Water Code section 10632 requires that the Urban Water Management Plan include a water shortage contingency analysis.

Water Code section 10632 (Urban Water Management Plan requirements)

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier: (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage. (b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply. (c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster. (d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning. (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply. (f) Penalties or charges for excessive use, where applicable. (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments. (h) A draft water shortage contingency resolution or ordinance. (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

Section 5

Step Five: Documenting dry year(s) demand

Water use patterns change during dry years. Document expected changes to water demand by sector.

Water-use Sectors – use in acre-feet per year, projected

Customer type	Normal	Single dry	Multiple - 2	Multiple - 3
Single Family				
Multifamily				
Commercial				
Industrial				
Institutional / gov.				
Landscape Irrigation				
Wholesale				
Agricultural				
Other (specify)				
TOTAL				

Section 6 - Code citations Is the projected water supply sufficient or insufficient for the proposed project?

Water Code section 10910

(c) (2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

(3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

Section 6 Is the projected water supply sufficient or insufficient for the proposed project?

Compare current and projected supply and demand for normal, single dry and multiple dry years. Water suppliers may want to make this comparison with and without the proposed project demand so that the impact of the project is clearly articulated. The tables provide examples of format.

Comparison of current supply and demand for normal, single dry and multiple dry years

Current Supply & Demand	Normal	Single dry	Multiple 2	Multiple 3	Multiple 4
Supply total					
Demand total					
Demand total (including proposed project)					
Difference					
Difference (including proposed project)					

Comparison of 20 year projection of supply and demand for normal, single dry and multiple dry years

2025 Supply & Demand	Normal	Single dry	Multiple 2	Multiple 3	Multiple 4
Supply total					
Demand total					
Demand total (including proposed project)					
Difference					
Difference (including proposed project)					

Water Supply and Demand Comparison table presents a comparison of the District's potable and raw water supplies and demands.

Normal Year by source – current and projected water supply and demand comparison (acre feet per year)

Water Demands	2000	2005	2010	2015	2020
Potable Water	13,040	13,680	14,310	14,930	15,540
Raw Water	810	810	810	810	810
Reclaimed Reduction	0	0	-100	-200	-280
Total	13,850	14,490	15,020	15,540	16,070
Total (including proposed project)					
Water Supply					
Drake Reservoir	9,421	9,421	9,421	9,421	9,421
West Water Project	4,500	4,500	4,500	4,500	4,500
Wells	0	2,300	2,300	2,300	2,300
Total	13,921	16,221	16,221	16,221	16,221
Surplus or (Deficiency)	71	1,731	1,201	681	151
Surplus or (Deficiency) (including proposed project)					

Section 7 - Code citations If the projected supply is determined to be insufficient

Water Code section 10910

(g) (1) Subject to paragraph (2), the governing body of each public water system shall submit the assessment to the city or county not later than 90 days from the date on which the request was received. The governing body of each public water system, or the city or county if either is required to comply with this act pursuant to subdivision (b), shall approve the assessment prepared pursuant to this section at a regular or special meeting.

Water Code section 10911

(a) If, as a result of its assessment, the public water system concludes that its water supplies are, or will be, insufficient, the public water system shall provide to the city or county its plans for acquiring additional water supplies, setting forth the measures that are being undertaken to acquire and develop those water supplies. If the city or county, if either is required to comply with this part pursuant to subdivision (b), concludes as a result of its assessment, that water supplies are, or will be, insufficient, the city or county shall include in its water assessment its plans for acquiring additional water supplies, setting forth the measures that are being undertaken to acquire and develop those water supplies. Those plans may include, but are not limited to, information concerning all of the following:

- *(1) The estimated total costs, and the proposed method of financing the costs, associated with acquiring the additional water supplies.*
- *(2) All federal, state, and local permits, approvals, or entitlements that are anticipated to be required in order to acquire and develop the additional water supplies.*
- *(3) Based on the considerations set forth in paragraphs (1) and (2), the estimated timeframes within which the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), expects to be able to acquire additional water supplies.*

Section 7 If the projected supply is determined to be insufficient

7-1 Does the assessment conclude that supply is “sufficient”? Yes No

If yes, water supplier governing body must approve assessment and deliver to lead agency
Water Code § 10910(g)(1) – **go to Section 8, page 38**

The governing body of the water supplier must approve the assessment at a regular or special meeting and deliver the assessment to the requesting lead agency within 90 days of request.

If no, water supplier must include in its assessment its plan to acquire additional water supplies, and the water supplier governing body must approve the assessment and deliver it to the lead agency within 90 days of the request. Water Code § 10911(a)
continue

The water supplier must provide the lead agency “its plans for acquiring additional water supplies, setting forth measures that are being undertaken to acquire and develop those water supplies.” Plans may include (1) estimated total costs; (2) federal/state/local permits anticipated to be required; and (3) estimated timeframes to acquire additional supplies.

Note: Water Code § 10911(a) dealing with a water supplier’s plans to acquire additional supplies, calls for planning information which is similar to the information which must be provided in the assessment for existing supplies. (See Water Code § 10910(d)(2).) However, actions for acquiring new supplies, which are reflected in such plans, may or may not have progressed to the point of detailed planning or to the point at which compliance with CEQA would be required. The water supplier should indicate the status or stage of development of the actions identified in the plans it provides. Identification of a potential future action in such plans does not by itself indicate that a decision to approve, or to proceed with, the action has been made. If projected supplies are included in the water supply assessment and will be relied upon for a subdivision which will be subject to the provisions of **SB 221**, those projected supplies must also meet the requirements of Gov. Code § 6647.7(d). See discussion at Section 13, Step 1, page 55.

Lead agency, **go to Section 8, page 38**

Water supplier**, Stop – SB 610** responsibilities are complete

Example of “Plans for Acquiring Additional Water Supplies”

Gravel Creek Groundwater Storage Project

SOURCE OF SUPPLY
The Gravel Creek Groundwater Storage Project (Gravel Creek Project) is planned to supply up to 500 acre-feet annually during normal and up to 1,500 acre-feet dry year conditions. During wet and/or surplus years, Bayside would replenish the groundwater with Drake Reservoir spill water and, if necessary, water purchases from outside the County.

EXPECTED SUPPLY CAPABILITY
It is estimated that the Gravel Creek aquifer can hold up to 20,000 acre-feet of additional water. This water could be extracted during normal and dry year conditions at a rate between 500 and 1,500 acre-feet per year.

Section 7 - Code citations (continued)

If the projected supply is determined to be insufficient

See previous Code citations page

RATIONALE FOR EXPECTED SUPPLY

As a part of the Bayside supply strategy, the Gravel Creek Project could be used to meet normal year demands and to provide a dry-year buffer to meet demands when other supplies are reduced.

Program Facilities: The Gravel Creek Project would consist of four new injection wells and six new production wells.

Historical Record: Bayside's Board of Directors implemented the Gravel Creek Project in April 1999.

Written Contracts or Other Proof: The Gravel Creek Project has been implemented as a component of Bayside's Supply Reliability Plan. The following Actions have occurred:

- 1998 Memorandum of Understanding (MOU) between Bayside and the U. S. Bureau of Reclamation (USBR). This MOU describes the agreement by USBR to provide Bayside with up to 2,000 acre-feet annually of surplus spill water from Drake Reservoir
- April 1999 Board of Directors Adoption of the CEQA Document (Mitigated Negative Declaration) for the Gravel Creek Project at their regularly scheduled Board of Directors meeting
- June 2000 Board of Directors approved the Gravel Creek Project and appropriated an additional $1.35 million for land acquisition, design, water quality monitoring, additional aquifer testing and other tasks. The Board authorized storage of up to 20,000 acre-feet of water, to begin in 2002

Financing: The capital cost of the Gravel Creek Project is estimated to be $2.7 million. This budget is included in Bayside's ten-year capital budget and would be financed through a combination of bonds and water sales revenue.

Federal, State and Local Permits for Construction: Bayside has applied for the appropriate federal, state and local permits for construction and operation of the project. For example, Bayside is currently conducting long-term water quality baseline monitoring in support of a possible Source Water Permit application from the Department of Health Services. One injection and one production well were completed in accordance with New Albion County permitting procedures. These are examples of permits that might be needed, but for each project a determination needs to be made as to what permits are required for the particular proposal.

Water Code section 10911

(b) The city or county shall include the water assessment provided pursuant to Section 10910, and any information provided pursuant to subdivision (a), in any environmental document prepared for the project pursuant to Division 13 (commencing with Section 21000) of the Public Resources Code.

(c) The city or county may include in any environmental document an evaluation of any information included in that environmental document provided pursuant to subdivision (b). The city or county shall determine, based on the entire record, whether projected water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses. If the city or county determines that water supplies will not be sufficient, the city or county shall include that determination in its findings for the project.

Section 8 Final SB 610 assessment actions by lead agency

The lead agency shall review the water supplier assessment of supply and must decide whether additional water supply information is needed for its consideration of the proposed project.

The lead agency must include the water supply assessment in the Negative Declaration or Draft Environmental Impact Report (environmental document) prepared for the project pursuant to Division 13 (commencing with Section 21000) of the Public Resources Code. The lead agency may include in the environmental documentation the lead agency's evaluation of the assessment, additional supply information and any related documents.

If the lead agency decides that the water supply is insufficient, or the assessment from the water supplier concludes that the water supply for the proposed project is insufficient, the lead agency may still approve the project but it must include that determination, based on the entire record, in the findings for the project. It must include substantial evidence in the record to support its approval of the project.

The lead agency "shall determine, based on the entire record, whether projected water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses." The lead agency will approve or disapprove a project based on a number of factors, including but not limited to the water supply assessment.

Reminder: Environmental Impact Reports and Negative Declarations that contain a water supply assessment pursuant to § 110911(b) of the Water Code must also be sent to the State Clearinghouse in the Governor's Office of Planning and Research at: P.O. Box 3044, Sacramento, CA 95812-3044 pursuant to California Code of Regulations § 15205 and 15206.

Section 9 - Code citations Does SB 221 apply to this subdivision?

Government Code section 65867.5
(a) A development agreement is a legislative act that shall be approved by ordinance and is subject to referendum.

(b) A development agreement shall not be approved unless the legislative body finds that the provisions of the agreement are consistent with the general plan and any applicable specific plan.

(c) A development agreement that includes a subdivision, as defined in Section 66473.7, shall not be approved unless the agreement provides that any tentative map prepared for the subdivision will comply with the provisions of Section 66473.7.

Government Code section 66473.7
(a) For the purposes of this Section, the following definitions apply:

(1) ''Subdivision'' means a proposed residential development of more than 500 dwelling units, except that for a public water system that has fewer than 5,000 service connections, ''subdivision'' means any proposed residential development that would account for an increase of 10 percent or more in the number of the public water system's existing service connections.

Government Code section 66473.7.
(i) This Section shall not apply to any residential project proposed for a site that is within an urbanized area and has been previously developed for urban uses, or where the immediate contiguous properties surrounding the residential project site are, or previously have been, developed for urban uses, or housing projects that are exclusively for very low and low-income households.

Section 9 Does SB 221 apply to this subdivision?

Agency Action

Agency receives a project application for a residential development

Is the project subject to **SB 221**?

9-1 Is there a development agreement for the project that includes a “subdivision” as defined in Government Code § 66473.7 (a)(1) Yes No

If yes, the development agreement shall not be approved unless the agreement provides that any tentative map prepared for the subdivision will comply with the provisions of Government Code § 66473.7, **continue**

If no, **continue**

9-2 Does the project include a “subdivision” as defined by Government Code § 66473.7(a)(1)? Yes No

If no, stop - SB 221 does not apply.

If yes, **continue**

Note: Government Code § 66473.7(a)(3), **SB 221** defines “public water system” as the water supplier that is, **or may become as a result of servicing the subdivision included in the tentative map,** a public water system as defined in Water Code section 10912. A water utility with fewer than 3,000 service connections currently would become a “public water system” if the number of service connections associated with the new subdivision would increase the number of service connections served by the water utility to more than 3,000.

Note: Government Code § 66473.7(a) provides that a “subdivision” consisting of 500 or more dwelling units is subject to **SB 221**, except that for a public water system that has fewer than 5,000 service connections, Government Code § 66473.7(a) provides a “sliding scale” for determining the number of dwelling units below 500 that would constitute a “subdivision,” subject to **SB 221**. Because Government Code § 66473.7(a) provides that a “subdivision” for a public water system with fewer than 5,000 service connections is a proposed development that would increase the number of service connections for a public water system by 10% or more, a “subdivision” could be as few as 300 dwelling units. For example a water utility that has 3,000 service connections would experience an increase in the number of service connections by 10% if it were required to serve a proposed residential development of 300 units, thus making the 300-unit development a “subdivision” under **SB 221**. Similarly, for water utilities that have more than 3,000 service connections, but fewer than 5,000 service connections, the “10% test” in Government Code § 66473.7(a) would apply in determining whether a proposed development is a “subdivision” under **SB 221**.

The agency adopting or approving subdivision’s tentative tract map shall condition such approval/adoption upon “a requirement that a sufficient water supply shall be available.” Government Code § 66473.7(b)(1)

Section 10 - Code citations Is the subdivision exempt from SB 221?

Government Code section 66473.7

(i) This Section shall not apply to any residential project proposed for a site that is within an urbanized area and has been previously developed for urban uses, or where the immediate contiguous properties surrounding the residential project site are, or previously have been, developed for urban uses, or housing projects that are exclusively for very low and low-income households.

Section 10 Is the subdivision exempt from SB 221?

Agency Action

10-1 Is the project in an urbanized area or exclusively for low-income households? Yes No

If no, carefully review the text of subsection (i) and consult with the local land use planning agency. Government Code. § 66473.7(i)

If no, **go to Section 11, page 44**

If yes, substantiate, **continue**

10-2 Is the residential project exempt from **SB 221** because it is within an urbanized area and has been previously developed for urban uses? Government Code § 66473.7(i) Yes No

or

10-3 Is the project proposed for a site where the immediate contiguous properties surrounding the residential project site are, or previously have been, developed for urban uses? Government Code § 66473.7(i) Yes No

SB 221 emphasizes local decision-making regarding these two definitions.

Urbanized area and urban uses

1. The determination as to whether a project would qualify for the exemption will depend on how the agency defines "urbanized area" and "urban uses." Public Resources Code § 21071 contains a definition of "urbanized areas" which the local agencies may choose to use in determining whether or not a project is in an "urbanized area". Water suppliers should contact their local agency to determine how the terms "urbanized area" and "urban uses" are defined within the local community.

Very low and low-income households

2. Local governments define very low and low-income households in their general plan, specifically in the locally adopted Housing Element. The definition of very low and low income households is usually based on definitions established by the U.S. Department of Housing and Urban Development (HUD) and California Health and Safety Code § 50079.5, §50105, and §50093. Please see the California Department of Housing and Community Development (HCD) website for more details (http://www.hcd.ca.gov/). If the entire project falls under the categories as defined by HUD and HCD, then the proposed subdivision is exempt from **SB 221**. (Public Resources Code § 71080.14(b); See also Public Resources Code § 21080.10(c)(3) and § 21080.7(b)(2).)

If yes, document that the exemption criteria are met and **stop -** no further action required by **SB 221**

If no, the agency shall not approve any final map prepared for the subdivision until the agency governing body has received a written verification that satisfies the condition regarding a sufficient water supply that was placed on the tentative map.

Continue

To complete a **SB 221** verification **continue to Section 11, page 44**

Section 11 - Code citations Who will prepare the SB 221 verification of sufficient water supply?

Government Code section 66473.7

(a) (3) ‘‘Public water system’’ means the water supplier that is, or may become as a result of servicing the subdivision included in a tentative map pursuant to subdivision (b), a public water system, as defined in Section 10912 of the Water Code, that may supply water for a subdivision.

Water Code section 10912

(c) “Public water system” means a system for the provision of piped water to the public for human consumption that has 3,000 or more service connections. A public water system includes all of the following:(1)Any collection, treatment, storage, and distribution facility under control of the operator of the system which is used primarily in connection with the system.(2)Any collection or pretreatment storage facility not under the control of the operator that is used primarily in connection with the system.(3)Any person who treats water on behalf of one or more public water systems for the purpose of rendering it safe for human consumption.

Government Code section 66455.3.

Not later than five days after a city or county has determined that a tentative map application for a proposed subdivision, as defined in Section 66473.7, is complete pursuant to Section 65943, the local agency shall send a copy of the application to any water supplier that is, or may become, a public water system, as defined in Section 10912 of the Water Code, that may supply water for the subdivision.

Government Code section 66473.7

(b) (1) The legislative body of a city or county or the advisory agency, to the extent that it is authorized by local ordinance to approve, conditionally approve, or disapprove the tentative map, shall include as a condition in any tentative map that includes a subdivision a requirement that a sufficient water supply shall be available. Proof of the availability of a sufficient water supply shall be requested by the subdivision applicant or local agency, at the discretion of the local agency, and shall be based on written verification from the applicable public water system within 90 days of a request.

(2) If the public water system fails to deliver the written verification as required by this section, the local agency or any other interested party may seek a writ of mandamus to compel the public water system to comply.

(4) If the written verification is not provided by the public water system, notwithstanding the local agency or other interested party securing a writ of mandamus to compel compliance with this section, then the local agency may make a finding that sufficient water supplies are, or will be, available prior to completion of the subdivision that will satisfy the requirements of this section. This finding shall be made on the record and supported by substantial evidence.

(e) If there is no public water system, the local agency shall make a written finding of sufficient water supply based on the evidentiary requirements of subdivisions (c) and (d) and identify the mechanism for providing water to the subdivision.

Section 11 Who will prepare the SB 221 verification of sufficient water supply?

Agency Action

11-1 Is there a water supplier that has or may have jurisdiction over the subdivision? Yes No

A water supplier that currently has fewer than 3,000 connections, but would have 3,000 or more connections as a result of providing water to the proposed project, is required to prepare a verification (Water Code § 10912(b), 10912(c)). Additionally, a water utility with fewer than 3,000 service connections may become a "public water system" as a result of supplying water to the proposed development (Government Code § 66473.7(a)(3). For example, a water utility with 2,700 existing service connections would become a "public water system" if it were to serve a proposed development of 400 dwelling units, and an increase in the number of service connections by 400 would also represent a greater than 10% increase in service connections for the water utility, thus making the proposed development subject to an **SB 221** written verification by the water utility. Close attention will need to be paid to the number of existing service connections and the number of proposed service connections as a result of serving the proposed development, as well as the percentage increase in the number of service connections, in order to determine whether the water utility is a "public water system" and whether the proposed development is a "subdivision" under **SB 221**.

If yes, read the following section and go to Section 12, page 46

Not later than 5 days after receipt of a complete application for a proposed subdivision, the agency shall send a copy of the application to the water supplier or any water supplier that may become a "public water system" that may supply water for the subdivision. (Government Code § 66455.3). This notification does not constitute a request for verification but is meant to provide the water supplier with an early warning that a request for verification is imminent.

Starting on the day that the water supplier receives the request for verification from the lead agency or the project proponent, the water supplier has 90 days to provide the written verification to the agency. Government Code § 66473.7(a)(3) The verification shall comply with **SB 221** requirements.

If the water supplier does not provide the verification to the agency within 90 days of the request, the agency may seek a writ of mandamus to compel the water supplier to prepare and provide verification. (Government Code § 66473(b)(4)). It is recommended that the water supplier and agency communicate regularly during the 90-day preparation period so that the agency can assist the water supplier in case of difficulty.

If the water supplier does not provide the verification within 90 days, the agency may complete a verification that meets the requirements of the law. Government Code § 66473(b)(4)

If no, agency must prepare **SB 221** verification. Government Code § 66473(e) – **go to Section 13, page 48**

Note: If the agency prepares the written verification, even if there is an existing water supplier, whose service area includes the proposed subdivision, because this supplier is unable or fails to do so, the agency must comply with all of the requirements of **SB 221**.

Section 12 - Code citations Has a verification already been prepared for this subdivision?

Government Code section 66473.7

(c) The applicable public water system's written verification of its ability or inability to provide a sufficient water supply that will meet the projected demand associated with the proposed subdivision as required by subdivision (b) shall be supported by substantial evidence. The substantial evidence may include, but is not limited to, any of the following:

- *(1) The public water system's most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610) of Division 6 of the Water Code.*
- *(2) A water assessment that was completed pursuant to Part 2. 10 (commencing with Section 10910) of Division 6 of the Water Code.*
- *(3) Other information relating to the sufficiency of the water supply that contains analytical information that is substantially similar to the assessment required by Section 10635 of the Water Code.*

Government Code § 66473.7(l): Nothing in this section shall preclude the legislative body of a city or county, or the advisory agency, at the request of the applicant from making the determinations required in this section earlier than required pursuant to subdivision (a). Note: The correct cross reference should be **subdivision (b) instead of subdivision (a)**

Section 12 Has a verification already been prepared for this subdivision?

The law does not preclude the preparation of a verification of sufficient water supply at an earlier point in time. Government Code § 66473.7(l) The verification document must be prepared prior to the adoption of the final subdivision map.

The verification can use data from the most recently adopted Urban Water Management Plan and/or an **SB 610** assessment if the water demand for the proposed project was accounted for in these documents.

12-1 Is there an urban water management plan (UWMP)? (Government Code § 66473.7)
Yes No

If yes, the written verification of a sufficient water supply may use the Urban Water Management Plan and provide more information where necessary. **Continue**

If no, the written verification must be based on other information which provides substantial evidence which provides substantial evidence supporting the conclusions in the verification.

SB 221 suggests that an Urban Water Management Plan (Gov. Code § 66473.7(c) may be a good source of information for developing a verification. Therefore, it is recommended that each water supplier review its most recently adopted UWMP to determine if the supply and demand analysis will provide the substantial evidence to satisfy **SB 221**. The written verification must be supported by substantial evidence. That information can come from a variety of sources including an Urban Water Management Plan.

SB 221 also suggests that an **SB 610** assessment may be a good source of information for developing verification. The water supplier should determine if any recently prepared **SB 610** assessments relating to the specific subdivision contain supply and demand analyses that meet the substantial evidence required by **SB 221**.

Water supplier or agency, continue, go to Section 13, page 48

What information should be included in a verification?

Government Code section 66473.7

(a) (2) ‘‘Sufficient water supply’’ means the total water supplies available during normal, single-dry, and multiple-dry years within a 20- year projection that will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses. In determining ‘‘sufficient water supply,’’ all of the following factors shall be considered:

- *(A) The availability of water supplies over a historical record of at least 20 years.*
- *(B) The applicability of an urban water shortage contingency analysis prepared pursuant to Section 10632 of the Water Code that includes actions to be undertaken by the public water system in response to water supply shortages.*
- *(C) The reduction in water supply allocated to a specific water use sector pursuant to a resolution or ordinance adopted, or a contract entered into, by the public water system, as long as that resolution, ordinance, or contract does not conflict with Section 354 of the Water Code.*
- *(D) The amount of water that the water supplier can reasonably rely on receiving from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer, including programs identified under federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, to the extent that these water supplies meet the criteria of subdivision (d)*

(f) In making any findings or determinations under this section, a local agency, or designated advisory agency, may work in conjunction with the project applicant and the public water system to secure water supplies sufficient to satisfy the demands of the proposed subdivision. If the local agency secures water supplies pursuant to this subdivision, which supplies are acceptable to and approved by the governing body of the public water system as suitable for delivery to customers, it shall work in conjunction with the public water system to implement a plan to deliver that water supply to satisfy the long-term demands of the proposed subdivision.

Section 13 What information should be included in a verification?

This section is written ‘as if’ the water supplier is preparing the verification. If an agency is preparing the verification, the same approach is used but the water supplies are those identified by the Agency as available to meet the subdivision’s water demands. (Examples will be provided of how Agency verification will differ from water supplier verification.)

Verification must demonstrate supply sufficiency by showing that water supplies available during normal, single dry, and multiple dry years within a 20-year projection will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agriculture and industrial uses. All of the following must be considered:

- Historical records for at least 20 years;
- Urban Water Shortage Contingency Analysis prepared for Urban Water Management Plan,
- Supply reduction for “specific water use sector” per water supplier’s resolution, ordinance, or contract, and
- Amount of water expected from specified supply projects. (Government Code § 66473.7(a)(2)(A-D).)

Verification must be based upon “substantial evidence,” possibly including relevant portions of an Urban Water Management Plan or **SB 610** assessment. Government Code § 66473.7(c)

The Urban Water Management Planning Act (Water Code § 10631 – see Appendix C) requires the supplier to document water supplies available during normal, single dry, and multiple dry water years during a 20-year projection and the existing and projected future water demand during a 20-year projection. The Act requires that the projected supplies and demands be presented in five-year increments for the 20-year projection.

If the water demand for the proposed subdivision was accounted for in the most recently adopted urban water management plan; the water supplier may incorporate information from the UWMP into the verification. (Government Code § 66473.3)

If the water demand for the proposed subdivision was accounted for in a **SB 610** assessment, the water supplier may incorporate information from the UWMP into the verification. (Government Code § 66473.3)
The next section contains sample tables and data to demonstrate one method to present the required data.

Supplies from all sources including wholesaler’s supplies, require documentation. This documentation includes identifying: water rights and/or contracts to the supply, associated capital outlay programs; federal, state and local permits for constructing infrastructure for conveying the supply, and; any necessary regulatory approvals required for conveyance.

Provisions for documenting groundwater are discussed below.

Continue, go to Section 13, Step 1, page 50

Section 13 - Code citations
Step One: Documenting supply

Government Code section 66473.7

(a) (2) ‘‘Sufficient water supply’’ means the total water supplies available during normal, single-dry, and multiple-dry years within a 20- year projection that will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses. In determining ‘‘sufficient water supply,’’ all of the following factors shall be considered:

- *(A) The availability of water supplies over a historical record of at least 20 years.*
- *(B) The applicability of an urban water shortage contingency analysis prepared pursuant to Section 10632 of the Water Code that includes actions to be undertaken by the public water system in response to water supply shortages.*
- *(C) The reduction in water supply allocated to a specific water use sector pursuant to a resolution or ordinance adopted, or a contract entered into, by the public water system, as long as that resolution, ordinance, or contract does not conflict with Section 354 of the Water Code.*
- *(D) The amount of water that the water supplier can reasonably rely on receiving from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer, including programs identified under federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, to the extent that these water supplies meet the criteria of subdivision (d)*

(d) When the written verification pursuant to subdivision (b) relies on projected water supplies that are not currently available to the public water system, to provide a sufficient water supply to the subdivision, the written verification as to those projected water supplies shall be based on all of the following elements, to the extent each is applicable:

- *(1) Written contracts or other proof of valid rights to the identified water supply that identify the terms and conditions under which the water will be available to serve the proposed subdivision.*
- *(2) Copies of a capital outlay program for financing the delivery of a sufficient water supply that has been adopted by the applicable governing body.*
- *(3) Securing of applicable federal, state, and local permits for construction of necessary infrastructure associated with supplying a sufficient water supply.*
- *(4) Any necessary regulatory approvals that are required in order to be able to convey or deliver a sufficient water supply to the subdivision.*

Section 13

Step One: Documenting supply

Documentation of annual historical deliveries should be provided for the previous 20 years. It would be useful to document deliveries from each supply source. Projected deliveries by source can be provided on a yearly basis or, similar to the UWMP, for years ending in 0 and 5. Projected deliveries should not be based on contract amount, maximum diversions, maximum groundwater extractions or other theoretical quantities but on projected availability and demand balanced with source utilization criteria (i.e., limiting groundwater extractions during wet or normal years to provide additional supply during dry years). For instance, a contract may be for 5,000 acre feet per year but an additional 2,000 acre feet per year may be available until 2015, due to other contractors not needing full deliveries until that time. This supply could be provided by another source after that time, but it would be necessary to document it by providing:

(1) Written contracts or other proof of valid rights to the identified water supply that identifies the terms and conditions under which the water will be available to serve the proposed subdivision.
(2) Copies of a capital outlay program for financing the delivery of a sufficient water supply that has been adopted by the applicable governing body.
(3) Securing of applicable federal, state, and local permits for construction of necessary infrastructure associated with supplying a sufficient water supply.
(4) Any necessary regulatory approvals that are required in order to be able to convey or deliver a sufficient water supply to the subdivision.

When the water supplier is relying on a landowner’s rights to extract groundwater, the water supplier will also need to show (1) that the landowner’s land overlies the particular groundwater basin, and (2) the landowner’s rights to extract groundwater have been, or will be, provided or made available to the water supplier so that it can rely on them to serve the particular subdivision. This will usually be a factor only in an adjudicated basin or in basins where groundwater management plans have been adopted.

Note that Government Code § 66473.7 (g) requires the verification to contain a description of reasonably foreseeable impacts of the proposed subdivision on the availability of water resources for agricultural and industrial uses within the public water system’s service area that are not currently receiving water from the public water system but are utilizing the same sources of water. Agricultural and industrial businesses not using the public water supply may be using groundwater. However, it is important to note that this provision may have broader applicability than groundwater uses. For example, an agricultural user with riparian rights may be using the same surface water source as the water supplier. Each water supplier will need to evaluate the application of this provision given its own water supply situation. This provision requires the verification to review published records maintained by federal and state agencies and public records of local agencies to determine if the water use for the proposed subdivision will have negative impacts on agricultural and industrial users within the public water system’s service area who are using the same source of water. To the extent that any reasonably foreseeable adverse impacts have previously been evaluated in a document prepared pursuant to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) or the National Environmental Policy Act (Public Law 91- 190) relevant to the proposed subdivision, the public water system may utilize that information in preparing the written verification.

Table 13a and 13b are examples of how verification might summarize the past, current and projected deliveries from each source. The text of the verification should specify whether any of the listed sources are projected sources not currently available.

Section 13 - Code citations

Step One: Documenting supply (continued)

See previous Code citations page

Step One: Documenting supply (continued)

Table 13a Actual supply received (acre feet per year)

Water Supply Sources	**1980**	**1985**	**1990**	**1995**	**2000**
Wholesaler (identify)					
Wholesaler (identify)					
Groundwater					
Local surface water					
Transfers					
Exchanges (in or out)					
Reclaimed Water					
Other (identify)					
Total					

Table 13b Projected deliveries to meet projected demand (not maximum possible)

Water Supply Sources	**2005**	**2010**	**2015**	**2020**	**2025**
Wholesaler (identify)					
Wholesaler (identify)					
Groundwater					
Local surface water					
Transfers					
Exchanges (in or out)					
Reclaimed Water					
Other (identify)					
Total					

Tables with bold column headings represent information required by SB 221.

If the water supplier has, or projects, future use of any of the listed supplies - conjunctive use, reclaimed water, water conservation, water transfers, CALFED sources, Colorado River tentative agreements, etc. – the verification should document those supplies as outlined in Government Code § 66473.7(d).

Section 13- Code citations
Step One: Documenting supply
If groundwater is a source

Government Code section 66473.7

(g) The written verification prepared under this section shall also include a description, to the extent that data is reasonably available based on published records maintained by federal and state agencies, and public records of local agencies, of the reasonably foreseeable impacts of the proposed subdivision on the availability of water resources for agricultural and industrial uses within the public water system's service area that are not currently receiving water from the public water system but are utilizing the same sources of water. To the extent that those reasonably foreseeable impacts have previously been evaluated in a document prepared pursuant to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) or the National Environmental Policy Act (Public Law 91- 190) for the proposed subdivision, the public water system may utilize that information in preparing the written verification.

(h) Where a water supply for a proposed subdivision includes groundwater, the public water system serving the proposed subdivision shall evaluate, based on substantial evidence, the extent to which it or the landowner has the right to extract the additional groundwater needed to supply the proposed subdivision. Nothing in this subdivision is intended to modify state law with regard to groundwater rights.

Water Code section 10631

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.

For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

Section 13

Step One: Documenting supply

If groundwater is a source

When a water supply for a proposed subdivision includes groundwater, the water supplier is required to evaluate, based on substantial evidence, the extent to which it or the landowner has the right to extract the additional groundwater needed to supply the proposed subdivision. When the water supplier is relying on a landowner's rights to extract groundwater, the water supplier will need to show that (1) the landowner has a right to extract the groundwater, and (2) it will be available to the supplier to serve the subdivision.

Note that Government Code § 66473.7 (g) requires the verification to contain a description of reasonably foreseeable impacts of the proposed subdivision on the availability of water resources for agricultural and industrial uses within the public water system's service area that are not currently receiving water from the public water system but are utilizing the same sources of water. Agricultural and industrial businesses not using the public water supply may be using groundwater. However, it is important to note that this provision may have broader applicability than groundwater uses. For example, an agricultural user with riparian rights may be using the same surface water source as the water supplier. Each water supplier will need to evaluate the application of this provision given its own water supply situation. This provision requires the verification to review published records maintained by federal and state agencies and public records of local agencies to determine if the water use for the proposed subdivision will have negative impacts on agricultural and industrial users within the public water system's service area who are using the same source of water. To the extent that any reasonably foreseeable adverse impacts have previously been evaluated in a document prepared pursuant to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) or the National Environmental Policy Act (Public Law 91- 190) relevant to the proposed subdivision, the public water system may utilize that information in preparing the written verification.

The verification must include a determination of the water supplier's ability to provide a sufficient water supply for the proposed subdivision and this can be based on substantial evidence from an UWMP, an **SB 610** assessment (Water Code § 10910), or other substantially similar evidence that would be provided to meet the requirements of the Urban Water Management Planning Act (Water Code § 10631-10635). Thus, if the water sources that will serve the project include groundwater, specific groundwater information must be included in the verification.

As amended in 2001 by the enactment of **SB 610**, the Urban Water Management Planning Act (Water Code § 10631) specifies the data generally necessary to document available groundwater supplies for proposed subdivisions subject to **SB 221** Government Code § 66473.7(h) limits the groundwater evaluation to the basin or basins that will serve the proposed subdivision. Information contained in the UWMP regarding groundwater may be useful to comply with this evaluation requirement. (See discussion at page 19)

Groundwater details required to be included in any UWMP adopted after January 1, 2002 include:

a) Specify if a groundwater management plan or other specific authorization for groundwater management for the basin has been adopted and how it affects the water supplier's use of the basin.
b) The description of the groundwater basin may be excerpted from the groundwater management plan, from DWR Bulletin 118, California's Ground Water, or from some other document that has been published and that discusses the basin boundaries, type of rock that constitutes the aquifer, variability of the aquifer material, and total groundwater in storage (average specific yield times the volume of the aquifer).
c) In an adjudicated basin the amount of water the urban supplier has the legal right to pump should be enumerated in the court decision - attach a copy of the order or decree.
d) The Department of Water Resources has projected estimates of overdraft, or "water shortage," based on projected amounts of water supply and demand (basin management), at the hydrologic region level in Bulletin 160, California Water Plan Update. Estimates at the basin or sub-basin level will be projected for some basins in Bulletin 118. If the basin has not been evaluated by DWR, data that indicate groundwater level trends over a period of time should be collected and evaluated.

Section 13 - Code citations

Step One: Documenting supply

If groundwater is a source (continued)

Water Code section 10631

(h) Where a water supply for a proposed subdivision includes groundwater, the public water system serving the proposed subdivision shall evaluate, based on substantial evidence, the extent to which it or the landowner has the right to extract the additional groundwater needed to supply the proposed subdivision. Nothing in this subdivision is intended to modify state law with regard to groundwater rights.

Step One: Documenting supply

If groundwater is a source (continued)

e) If the evaluation indicates an overdraft due to existing groundwater extraction, or projected increases in groundwater extraction, describe actions and/or program designed to mitigate such impacts.

f) If water supplier wells are plotted on a map, or are available from a geographic information system, the amount of water extracted by the water supplier for the past five years can be obtained from the Department of Health Services, Office of Drinking Water and Environmental Management. A useful DHS website is: http://www.dhs.cahwnet.gov/ps/ddwem/dwsap/DWSAPindex.htm

g) Description and analysis of the amount and location of groundwater pumped by the water supplier for the past five years. Include information on proposed pumping locations and quantities. The description and analysis is to be based on information that is reasonably available, including, but not limited to, historic use records from DWR, and from other sources.

h) Description and analysis of the location, amount, and sufficiency of groundwater that is projected to be pumped by the water supplier.

Below is a hypothetical example of how this could be addressed:

Project Description

The Gravel Creek Project includes an office park and a 650 dwelling unit residential development. Estimated use of groundwater to serve the proposed subdivision will be 500 acre-feet per year. The project proponent has identified the American Water District as the water supplier for the proposed subdivision.

Condition of Basin

The proposed subdivision immediately overlies a groundwater basin that is part of an active conjunctive use program by the American water District. The basin is not currently adjudicated. Historical use of the basin has left it 20 feet below its historical average. The average water level has continued to fall over the past 5 years. Extractions from this basin have exceeded safe yield on average over the past 20 years. A basin management plan was established in 2000. The basin management plan describes several programs to reverse the historic overuse of the groundwater basin including voluntary reporting of use by agriculture and industry and an ongoing conjunctive use program implemented by the American Water District.

The attached Urban Water Management Plan by the American Water District provides current and past pumping rates and volumes for all well fields managed by the District, as well as information concerning the importation of surface water supplies as part of the conjunctive use program.

Overlying property owners and current appropriative rights holders are already using water equal to the safe yield of the basin. Any new development, to secure and demonstrate a right as an appropriator, would be required to secure an imported water supply. The imported water supply could then be banked in the basin and be used by the new development.

Proposed Water Supply

Estimated use of groundwater to serve the proposed subdivision will be 500 acre-feet per year. Expansion of existing Well Field A or establishment of a new well field is under evaluation within the Project EIR. The American Water District will be utilizing its existing water service contract to import an additional 700 acre-feet per year of surface water, which will be banked in the groundwater basin as part of the District’s ongoing conjunctive use program.

Section 13 - Code citations

Step One: Documenting supply

If groundwater is a source (continued)

See previous Code citations page

Section 13

Step One: Documenting supply

If groundwater is a source (continued)

Evaluation of water right condition

The American Water District has been using the groundwater basin as a source of water supply to serve its existing customers, and intends to store an additional 700 acre-feet per year of surface water in the groundwater basin as part of its ongoing conjunctive use program. The proposed water demand for the subdivision would be 500 acre-feet of year, resulting in extractions from the groundwater basin, which would result in a net benefit to the groundwater basin of approximately 200 acre-feet per year. The American Water District would appear to have sufficient right to extract the necessary 500 acre-feet per year of water to serve the proposed subdivision, based on the parameters of the existing basin management program, the nature of the existing conjunctive use program implemented by American Water District, and the proposed importation of sufficient quantities of surface water to serve the proposed subdivision without decreasing availability of water supply for its existing customers.

Section 13 - Code citations
Step One: Documenting supply
If verification relies on projected water supplies not currently available

Government Code section 66473.7

(d) When the written Verification pursuant to subdivision (b) relies on projected water supplies that are not currently available to the public water system, to provide a sufficient water supply to the subdivision, the written verification as to those projected water supplies shall be based on all of the following elements, to the extent each is applicable:

- *(1) Written contracts or other proof of valid rights to the identified water supply that identify the terms and conditions under which the water will be available to serve the proposed subdivision.*
- *(2) Copies of a capital outlay program for financing the delivery of a sufficient water supply that has been adopted by the applicable governing body.*
- *(3) Securing of applicable federal, state, and local permits for construction of necessary infrastructure associated with supplying a sufficient water supply.*
- *(4) Any necessary regulatory approvals that are required in order to be able to convey or deliver a sufficient water supply to the subdivision.*

Section 13
Step One: Documenting supply
If verification relies on projected water supplies not currently available

If the verification relies on water supplies that are not currently available to the water supplier the verification must substantiate that those supplies will be available when the water is needed.

For instance, if a water supplier plans to establish a long-term water transfer agreement but the agreement has not been completed, the following data is necessary to establish that the water will actually be available when the subdivision is completed

- The water supplier should indicate if it has a written contract that identifies the terms and conditions under which the water will be available to serve the proposed subdivision, i.e., the amount of water to be transferred per year, any exceptions, etc.

Note: This provision of **SB 221** is different than that in **SB 610** for "written contracts". The duty to provide substantial evidence involves more than simply showing a contract; it requires identification of terms and conditions related to providing service to the proposed subdivision

- If the transfer will require a new or expanded delivery system, the water supplier should indicate if it has formally adopted a capital outlay program for financing the construction.
- The water supplier should indicate if it is securing all applicable federal, state and local permits required to secure and deliver the new water supply.
- The water supplier should indicate if any regulatory approvals are being secured.

If a water supplier receives water from a wholesale water agency, the water supplier will need information and documentation from the wholesaler to satisfy the requirements of **SB 221**.

Below is a hypothetical example of how this could be addressed:

Kanouse Canal Lining Project

Source of supply

The Kanouse Canal Lining Project can provide an annual supply that is delivered to Gotham's service area in the Verde River Aqueduct. In 1988, Public Law 100-675 authorized the Secretary of the Interior to concrete line the Kanouse Canal. The Kanouse Canal Lining Project consists of lining 33 miles of the Kanouse Canal.. The law also authorized the Secretary to enter into a construction or funding agreement with the Kanouse Irrigation District.

Expected supply capacity

The Kanouse Canal Lining Project is expected to yield 76,000 acre-feet per year of supply to Gotham's service area via the Verde River Aqueduct other than when surplus Verde River water is available for California's use when KID elects to use such water and such use does not adversely affect Gotham. Gotham would receive 20,500 acre-feet per year from the Kanouse Canal Lining Project for up to 75 years. The water supply that would be available to Gotham is presented below:

Estimated Water Supplies Available for Gotham's Use Under the Kanouse Lining Project (AFY)

Year	Multiple dry years (1990-1992)	Single dry year (1977 Hydrology)	Average year	Wet year (1985 Hydrology)
2005	20,500	20,500	20,500	20,500
2010	76,700	76,700	76,700	76,700
2015	76,700	76,700	76,700	76,700
2020	76,700	76,700	76,700	76,700

*--Represents expected supply capability for the resource program.

Section 13 - Code citations

Step One: Documenting supply

If verification relies on projected water supplies not currently available (continued)

See previous Code citations page

Section 13

Step One: Documenting supply

If verification relies on projected water supplies not currently available (continued)

Rationale for expected supply

Implementation Status: A Request for Proposal for professional consulting services in the design of canals, project management support and environmental documentation services is scheduled to be issued in February 2003 for the Kanouse Canal Lining Project.

Written Contracts: The following actions have been taken to proceed toward project implementation.

- 1988, Public Law 100-675. Authorized the Department of the Interior to reduce seepage from the existing earthen Kanouse Canal.
- 2002 KID – City of Gotham Transfer Agreement Authorized
- 2001, California Department of Water Resources-Gotham Funding Agreement. Reimburse Gotham for project work necessary to construct the lining of the Kanouse Canal in an amount not to exceed $73 million.

Financing: The construction of the Kanouse Canal is included in Gotham's long range financial plan and capital investment plan. Gotham would initially fund these projects. Up to $200 million of the costs of constructing the projects would be reimbursed by the state of California in accordance with the executed funding agreements.

Federal, state and local Permits for Construction:

- April 2000. The Bureau of Reclamation released the Final EIS/EIR for the Kanouse Canal Lining Project.

Section 13 - Code citations

Step Two: Documenting demand

Government Code section 66473.7

(a) (2) *‘‘Sufficient water supply’’ means the total water supplies available during normal, single-dry, and multiple-dry years within a 20- year projection that will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses. In determining ‘‘sufficient water supply,’’ all of the following factors shall be considered:*

- *(A) The availability of water supplies over a historical record of at least 20 years.*
- *(B) The applicability of an urban water shortage contingency analysis prepared pursuant to Section 10632 of the Water Code that includes actions to be undertaken by the public water system in response to water supply shortages.*
- *(C) The reduction in water supply allocated to a specific water use sector pursuant to a resolution or ordinance adopted, or a contract entered into, by the public water system, as long as that resolution, ordinance, or contract does not conflict with Section 354 of the Water Code.*
- *(D) The amount of water that the water supplier can reasonably rely on receiving from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer, including programs identified under federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, to the extent that these water supplies meet the criteria of subdivision (d)*

Section 13

Step Two: Documenting Demand

SB 221 requires that the verification document the projected 20-year water demand for existing uses, planned future uses and the proposed development, as well as for agricultural, industrial and any other uses the water supplier can identify.

Water suppliers may need to consider the variability of agricultural water use. To document agricultural water use, water suppliers could also consult with the county agricultural commissioner to identify trends in irrigated acreage. To document industrial demand, a water supplier could consult with city and county planners, as well as any economic development agencies.

Note: If the proposed subdivision was included as part of the projected water demand in the current Urban Water Management Plan, the water demand component of the verification may draw from that existing analysis.

Demand during single dry and multiple dry years varies from demand during normal or wet years. Section 13, Step 4 discusses how the verification might deal with this variance.

Section 13 - Code citations

Step Two: Documenting demand

Definitions

Government Code section 66473.7

(a) For the purposes of this section, the following definitions apply:

- *(1) ‘‘Subdivision’’ means a proposed residential development of more than 500 dwelling units, except that for a public water system that has fewer than 5,000 service connections, ‘‘subdivision’’ means any proposed residential development that would account for an increase of 10 percent or more in the number of the public water system’s existing service connections.*
- *(2) ‘‘Sufficient water supply’’ means the total water supplies available during normal, single-dry, and multiple-dry years within a 20- year projection that will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses. In determining ‘‘sufficient water supply,’’ all of the following factors shall be considered:*
  - *(A) The availability of water supplies over a historical record of at least 20 years.*
  - *(B) The applicability of an urban water shortage contingency analysis prepared pursuant to Section 10632 of the Water Code that includes actions to be undertaken by the public water system in response to water supply shortages.*
  - *(C) The reduction in water supply allocated to a specific water use sector pursuant to a resolution or ordinance adopted, or a contract entered into, by the public water system, as long as that resolution, ordinance, or contract does not conflict with Section 354 of the Water Code.*
  - *(D) The amount of water that the water supplier can reasonably rely on receiving from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer, including programs identified under federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, to the extent that these water supplies meet the criteria of subdivision (d).*
- *(3) ‘‘Public water system’’ means the water supplier that is, or may become as a result of servicing the subdivision included in a tentative map pursuant to subdivision (b), a public water system, as defined in Section 10912 of the Water Code, that may supply water for a subdivision.*

Section 13
Step Two: Documenting demand
Definitions

The following definitions of existing uses, planned future uses, proposed project use and agricultural and industrial uses are provided for your consideration only. Both **SB 610** and **SB 221** emphasize local decision making and the information provided in these serves to provide examples. Local agencies may have adopted other definitions and should be consulted.

Existing uses – demand related to current customers, and system uses/losses, during normal years (uses during single dry and multiple dry years will be discussed in Section 5, Step four). Usually this projection will take account of historical use (during non-dry) years as well as any recent changes in demand characteristics, i.e., changes in per capita use, percentage of use by customer type, demographic variability, etc.).

Planned future uses – the agency, as the land-use agency, has information on planned development. Regular communication between the water supplier and agency will be essential to ensuring an accurate determination of sufficiency of water supply for future demand.

Planned future uses may include:

- projects that are expected to be completed during the same time frame as the proposed project. These include all new demands ranging from an individual single-family home to large-scale developments.
- proposed developments that have a reserved (or entitlement to) future water supply and are considered to be moving towards construction. Proposed projects that are included in a general or specific plan need not be included if the agency determines that they are not likely to begin construction during the period under consideration.
- projects which are not subject to local planning regulation – for example, US military installations, University of California, etc.

Neither **SB 610** nor **SB 221** defines planned future uses. However, it would be a reasonable interpretation that planned future uses are those that would be undertaken within the same time frame as the project under consideration. Each preparer of an assessment will determine what planned future uses it will include in the demand calculation to insure that it is not identifying the same increment of water for more than one future use.

Section 13 - Code citations

Step Two: Documenting Demand

Detailing existing and planned future uses

Government Code section 66473.7

(a)(2) ‘‘Sufficient water supply’’ means the total water supplies available during normal, single-dry, and multiple-dry years within a 20- year projection that will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses. In determining ‘‘sufficient water supply,’’ all of the following factors shall be considered:

- *(A) The availability of water supplies over a historical record of at least 20 years.*
- *(B) The applicability of an urban water shortage contingency analysis prepared pursuant to Section 10632 of the Water Code that includes actions to be undertaken by the public water system in response to water supply shortages.*
- *(C) The reduction in water supply allocated to a specific water use sector pursuant to a resolution or ordinance adopted, or a contract entered into, by the public water system, as long as that resolution, ordinance, or contract does not conflict with Section 354 of the Water Code.*
- *(D) The amount of water that the water supplier can reasonably rely on receiving from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer, including programs identified under federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, to the extent that these water supplies meet the criteria of subdivision (d)*

Section 13

Step Two: Documenting demand

Detailing existing and planned future uses

Water-use Sectors – use in acre-feet per year, actual and **projected**

Customer type	1990	1995	2000	**2005**	**2010**	**2015**	**2020**
Single Family							
Multifamily							
Commercial							
Industrial							
Institutional / gov.							
Landscape Irrigation							
Wholesale							
Agricultural							
Other (specify)							
TOTAL							

Water-use Sectors – number of connections, actual and projected (Not required by **SB 221**)

Customer type	1990	1995	2000	2005	2010	2015	2020
Single Family							
Multifamily							
Commercial							
Industrial							
Institutional / gov.							
Landscape Irrigation							
Wholesale							
Agricultural							
Other (specify)							
TOTAL							

Section 13 - Code citations
Step Three: Documenting dry-year(s) supply

Government Code section 66473.7

(a)(2) ‘‘Sufficient water supply’’ means the total water supplies available during normal, single-dry, and multiple-dry years within a 20- year projection that will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses. In determining ‘‘sufficient water supply,’’ all of the following factors shall be considered:

(A) The availability of water supplies over a historical record of at least 20 years.

(B) The applicability of an urban water shortage contingency analysis prepared pursuant to Section 10632 of the Water Code that includes actions to be undertaken by the public water system in response to water supply shortages.

(C) The reduction in water supply allocated to a specific water use sector pursuant to a resolution or ordinance adopted, or a contract entered into, by the public water system, as long as that resolution, ordinance, or contract does not conflict with Section 354 of the Water Code.

(D) The amount of water that the water supplier can reasonably rely on receiving from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer, including programs identified under federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, to the extent that these water supplies meet the criteria of subdivision (d)

Section 13

Step Three: Documenting dry-year(s) supply

"The description of "Sufficient water supply" should provide a clear picture of a public water system's current supply condition under normal, single dry and multiple dry years including any shortfall compared to demand. The definition of "sufficient water supply" allows latitude for water suppliers to use local discretion and planning scenarios when determining necessary supply and demand.

In developing supply projections, water agencies should take into account the latest urban water shortage contingency analysis done pursuant to water code section 10632. This analysis should include an estimate of the minimum water supply available during each of the next three years based on the driest three-year historical sequence for the agency's water supplies. Different sources of water supplies will have different historical dry year sequences and different yields during multiple year drought conditions based on hydrology, available storage, contract entitlements, water right characteristics, etc. In some cases there is not a direct correlation between hydrology and available water supply (e.g., groundwater, recycled water, water transfers, conservation, desalination). Alternative methodologies can be developed for these supplies that would provide an estimate of reasonably available water supplies.

This provision is not intended to preclude projected water supplies that can be reasonably relied upon, so long as there is substantial evidence put on the record that demonstrates that the projected water supplies will likely be available by the time the housing units are ready for construction. The statute does not require that water needed for new development must already be stored and available for delivery, in order for a local agency to approve a final subdivision map. The statute allows for the water supply to be in the planning phase, as long as a demonstration can be made that substantial progress is being made to bring the water supply on-line by the time the subdivision is ready for construction. Therefore, specific projects emerging from long-range planning regarding conjunctive use; reclaimed water; water conservation; water transfers; and federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, can be cited within the written verification as long as the projected water supplies meet the test provided in Section 66473.7(d).

Example

Probability based estimates for Drake Reservoir supplies have been statistically calculated based on the County's Big River Model. This model uses hydrologic data for the period of 1917 through 1993 to estimate Drake reservoir inflow and water levels and projected deliveries to member agencies. Based on a review of this data, the District can expect to receive a full contractual supply of 9,300 acre feet per year during wet and normal years. During dry years (10 percent probability of occurrence) the Drake Reservoir District deliveries are estimated to be 8,400 acre feet per year. During critical dry years (5 percent probability of occurrence) Drake Reservoir District deliveries are estimated to be 4,200 acre feet per year. The combined effects of wholesaler and Drake Reservoir cutbacks on District water supplies are summarized in Table 5-3.

Percent Likelihood	Wet Year 25%	Normal Year 60%	Dry Year 10%	Critical Drought Year 5%
Demand (AFY)	16,900	15,000	15,500	14,000
Supply Groundwater	0	1,500	2,500	3,300
Drake Reservoir	9,400	9,300	8,400	4,200
West Water Project	7,500	4,500	2,500	1,700
Total	16,900	15,300	13,900	9,200

Projected acre feet per year available by source for single dry and multiple dry years

Source	Normal	Single-Dry	Multi-dry 1	Multi-dry 2	Multi-dry 3
Local Surface	9,300	9,300	9,300	8,400	4,200
WWP	4,500	1,700	1,700	2,500	3,200
Groundwater	1,500	2,500	2,500	3,300	3,300
Water bank		1,000	1,000	300	2,500
TOTAL	15,300	14,500	14,500	14,500	13,200

Section 13 - Code citations
Step Four: Documenting dry-year(s) demand

Government Code section 66473.7

(a) (2) ‘‘Sufficient water supply’’ means the total water supplies available during normal, single-dry, and multiple-dry years within a 20- year projection that will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses. In determining ‘‘sufficient water supply,’’ all of the following factors shall be considered:

- *(A) The availability of water supplies over a historical record of at least 20 years.*
- *(B) The applicability of an urban water shortage contingency analysis prepared pursuant to Section 10632 of the Water Code that includes actions to be undertaken by the public water system in response to water supply shortages.*
- *(C) The reduction in water supply allocated to a specific water use sector pursuant to a resolution or ordinance adopted, or a contract entered into, by the public water system, as long as that resolution, ordinance, or contract does not conflict with Section 354 of the Water Code.*
- *(D) The amount of water that the water supplier can reasonably rely on receiving from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer, including programs identified under federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, to the extent that these water supplies meet the criteria of subdivision (d)*

Water Code section 10632 (Urban Water Management Plan requirements)

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier: (a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage. (b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply. (c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster. (d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning. (e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply. (f) Penalties or charges for excessive use, where applicable. (g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments. (h) A draft water shortage contingency resolution or ordinance. (i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

Section 13

Step Four: Documenting dry-year(s) demand

Water use patterns change during dry years. One way to analyze this is to document expected changes to water demand by sector. Calculating the demand component of a ‘sufficient water supply’, a water agency may take into account those planned reductions in water deliveries contemplated by that agency’s water rationing program, if the water agency has one, for responding to water supply shortages associated with droughts. In other words, in determining a ‘sufficient water supply’, a water agency is not required to plan to provide its customers 100 % of what they delivered during a ‘normal’ water supply year. Rather, for the purposes of calculating whether or not the water agency is able to take on additional customers without putting existing customers at risk, a water agency may estimate the reductions in supply that customers can endure during future droughts, without experiencing unnecessary hardships or costs. Water agencies may already have in place policies, ordinances, or contracts stipulating drought year supply allocations by water use sector. To the extent these are consistent with water code section 354 they should be considered when determining sufficient water supply.

The urban water shortage contingency analysis also requires the water supplier to have a plan for catastrophic interruptions of water supplies authorizing reductions of up to 50%. While disaster response planning is important, it is entirely different from long-term water supply planning to accommodate growth. Levels of reduction approaching 50% may be necessary for catastrophe planning, but are entirely inappropriate for long-term water supply planning. This level of reduction, for long-term water supply planning, would not provide protection to the water supply needs of existing users.

Factors that can change water use patterns during dry years include educational efforts and rationing policies established in water shortage contingency plans. An urban water shortage contingency analysis can have both voluntary and mandatory rationing during water supply shortages to help control consumption. Rationing requirements should be reasonably achievable for customers to encourage reductions in consumption. A typical rationing sequence would begin with voluntary rationing. In the second or third year of an extended drought, mandatory rationing might be expected. The 50% rationing limit described in Water Code Section 10632, while achievable over a relatively short time period, should be reserved for disaster planning rather than drought planning as it would put many customers under duress and may hinder the goal of consumption reduction over an extended drought period. **SB 221** is designed to protect existing customers’ water needs while accommodating future development within the means of the water provider.

Water-use Sectors – use in acre-feet per year, projected

Customer type	Normal	Single dry	Multiple 2	Multiple 3	Multiple 4
Single Family					
Multifamily					
Commercial					
Industrial					
Institutional / gov.					
Landscape Irrigation					
Wholesale					
Agricultural					
TOTAL					

Planned water-use reductions by sector – percentage target reduction

Customer type	Normal	Single dry	Multiple 2	Multiple 3	Multiple 4
Single Family					
Multifamily					
Commercial					
Industrial					
Institutional / gov.					
Landscape Irrigation					
Wholesale					
Agricultural					
TOTAL					

Determining if the projected water supply is sufficient for the subdivision

Government Code section 66473.7

(a) (2) ‘‘Sufficient water supply’’ means the total water supplies available during normal, single-dry, and multiple-dry years within a 20- year projection that will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses. In determining ‘‘sufficient water supply,’’ all of the following factors shall be considered:

- *(A) The availability of water supplies over a historical record of at least 20 years.*
- *(B) The applicability of an urban water shortage contingency analysis prepared pursuant to Section 10632 of the Water Code that includes actions to be undertaken by the public water system in response to water supply shortages.*
- *(C) The reduction in water supply allocated to a specific water use sector pursuant to a resolution or ordinance adopted, or a contract entered into, by the public water system, as long as that resolution, ordinance, or contract does not conflict with Section 354 of the Water Code.*
- *(D) The amount of water that the water supplier can reasonably rely on receiving from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer, including programs identified under federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, to the extent that these water supplies meet the criteria of subdivision (d)*

Section 14 Determining if the projected water supply is sufficient for the subdivision

Compare current and projected supply and demand for normal, single dry and multiple dry years. Water suppliers may want to make this comparison with and without the proposed subdivision demand so that the impact of the project is clearly calculated. The tables provide examples of format.

Water Supply and Demand Comparison (acre feet per year) during normal years with proposed subdivision

Water Demands	**2000**	**2005**	**2010**	**2015**	**2020**
Potable Water	13,040	13,980	14,610	15,230	15,840
Reclaimed Reduction*	0	0	100	200	280
Total	13,040	13,980	14,710	15,430	16,120
Water Supply					
Drake Reservoir	9,300	9,300	9,300	9,300	9,300
West Water Project	4,500	4,500	4,500	4,500	4,500
Wells	0	300	1000	1800	2500
Total	13,800	14,100	14,800	15,600	16,300
Surplus or Deficit	760	120	90	170	180

***Potable water not used due to use of reclaimed water.**

Water Supply and Demand Comparison (AFY) during normal years without proposed subdivision

Water Demands	**2000**	**2005**	**2010**	**2015**	**2020**
Potable Water	13,040	13,680	14,310	14,930	15,540
Reclaimed Reduction	0	0	100	200	280
Total	13,040	13,680	14,410	15,130	15,820
Water Supply					
Total	13,800	14,100	14,800	15,600	16,300
Surplus or Deficit	760	420	390	470	480

Water Supply and Demand Comparison (AFY) during single and multiple dry years with proposed subdivison

2025 Supply & Demand	**Normal**	**Single dry**	**Multiple 2**	**Multiple 3**	**Multiple 4**
Supply totals					
Demand totals					
Difference					

Water Supply and Demand Comparison (AFY) during single and multiple dry years without proposed subdivision

2025 Supply & Demand	**Normal**	**Single dry**	**Multiple 2**	**Multiple 3**	**Multiple 4**
Supply totals					
Demand totals					
Difference					

Section 15 - Code citations If the projected supply is determined to be insufficient

Government Code section 66473.7

(b) (3) If the written verification provided by the applicable public water system indicates that the public water system is unable to provide a sufficient water supply that will meet the projected demand associated with the proposed subdivision, then the local agency may make a finding, after consideration of the written verification by the applicable public water system, that additional water supplies not accounted for by the public water system are, or will be, available prior to completion of the subdivision that will satisfy the requirements of this section. This finding shall be made on the record and supported by substantial evidence.

(d) When the written verification pursuant to subdivision (b) relies on projected water supplies that are not currently available to the public water system, to provide a sufficient water supply to the subdivision, the written verification as to those projected water supplies shall be based on all of the following elements, to the extent each is applicable:

- *(1) Written contracts or other proof of valid rights to the identified water supply that identify the terms and conditions under which the water will be available to serve the proposed subdivision.*
- *(2) Copies of a capital outlay program for financing the delivery of a sufficient water supply that has been adopted by the applicable governing body.*
- *(3) Securing of applicable federal, state, and local permits for construction of necessary infrastructure associated with supplying a sufficient water supply.*
- *(4) Any necessary regulatory approvals that are required in order to be able to convey or deliver a sufficient water supply to the subdivision.*

(f) In making any findings or determinations under this section, a local agency, or designated advisory agency, may work in conjunction with the project applicant and the public water system to secure water supplies sufficient to satisfy the demands of the proposed subdivision. If the local agency secures water supplies pursuant to this subdivision, which supplies are acceptable to and approved by the governing body of the public water system as suitable for delivery to customers, it shall work in conjunction with the public water system to implement a plan to deliver that water supply to satisfy the long-term demands of the proposed subdivision.

Section 15 If the projected supply is determined to be insufficient

Agency Action

If the written verification provided by the water supplier, or by the agency, indicates that the water supply is insufficient to meet the projected demand associated with the proposed subdivision, then the agency may make a finding, after consideration of the written verification, that additional water supplies not accounted for in the verification are, or will be, available prior to completion of the subdivision that will meet the demands of the subdivision. This finding must be made on the record and supported by substantial evidence. Generally, if an agency identifies a supply that was not accounted for in the verification it will be a supply that is not currently available or not currently being used. In this situation, the substantial evidence supporting the finding should comply with Government Code 66473.7(d).

That means that the agency would have to provide information relating to:

(1) Written contracts or other proof of valid rights to the identified water supply which identify the terms and conditions under which the water will be available to serve the proposed subdivision.

(2) Copies of a capital outlay program for financing the delivery of a sufficient water supply that has been adopted by the applicable governing body.

(3) Securing of applicable federal, state, and local permits for construction of necessary infrastructure associated with supplying a sufficient water supply.

(4) Any necessary regulatory approvals that are required in order to be able to convey or deliver a sufficient water supply to the subdivision.

Project Applicants, Local Agencies and Public Water Suppliers Working Together to Secure Additional Water Supplies

Section 66473.7 (f) creates the potential for a unique partnership between water suppliers, project applicants and local agencies. The intent of the statute is to encourage close cooperation in acquiring additional water supplies. Although the statute specifically authorizes a local agency to identify and acquire the projected water supplies under several specified circumstances, the statute also clearly states that the water agency will have the final say on the suitability of any such water supplies for delivery. In order for a local agency to successfully secure needed supplies, it is imperative that local agencies, project applicants, and water suppliers work in collaboration, maintaining close communication during the planning process. To this end, any of these agencies are empowered to negotiate for water supplies. Issues to consider include water quality, delivery logistics, cost, and reliability over different water year types.

Section 16 - Code citations Final SB 221 verification actions by agency

Government Code section 66473.7

(b) (1) The legislative body of a city or county or the advisory agency, to the extent that it is authorized by local ordinance to approve, conditionally approve, or disapprove the tentative map, shall include as a condition in any tentative map that includes a subdivision a requirement that a sufficient water supply shall be available. Proof of the availability of a sufficient water supply shall be requested by the subdivision applicant or local agency, at the discretion of the local agency, and shall be based on written verification from the applicable public water system within 90 days of a request.

(2) If the public water system fails to deliver the written verification as required by this section, the local agency or any other interested party may seek a writ of mandamus to compel the public water system to comply.

(4) If the written verification is not provided by the public water system, notwithstanding the local agency or other interested party securing a writ of mandamus to compel compliance with this section, then the local agency may make a finding that sufficient water supplies are, or will be, available prior to completion of the subdivision that will satisfy the requirements of this section. This finding shall be made on the record and supported by substantial evidence.

(e) If there is no public water system, the local agency shall make a written finding of sufficient water supply based on the evidentiary requirements of subdivisions (c) and (d) and identify the mechanism for providing water to the subdivision.

(j) The determinations made pursuant to this section shall be consistent with the obligation of a public water system to grant a priority for the provision of available and future water resources or services to proposed housing developments that help meet the city's or county's share of the regional housing needs for lower income households, pursuant to Section 65589.7.

Section 16 Final SB 221 verification actions by agency

A written verification, supported by substantial evidence, must be provided before a final subdivision map may be approved. This verification may be requested by the local agency or by the applicant at the discretion of the local agency. It must show that there is sufficient water to meet the water demands of the proposed subdivision and existing and planned future uses for the next 20 years.

A verification may be requested at any time and an applicant may wish to secure and include it when a tentative subdivision map is submitted for approval to the city or county decision making body.

If the verification determines the water supply is sufficient, use of the water for the proposed subdivision must be determined to be consistent with the obligation of the water supplier to grant a priority for the provision of available and future water resources or services to proposed housing developments that help meet the city's or county's share of the regional housing needs for lower income households, pursuant to Government Code § 65589.7.

If the verification finds that the water supplier will be unable to provide a sufficient water supply, and the local agency is unable to find that sufficient additional supplies will be available prior to the completion of the subdivision, then the tentative map condition will not be met and the subdivision cannot receive final approval.

Although the water supply verification required by Government Code § 66473.7(b)(1) may be requested at any time, it may be advisable to seek it before a tentative map application is completed. The project proponent should know the parameters of available water supplies before committing to a project of a specific size and configuration.

Any challenge to the verification must be initiated within 90 days of the agency action.

Summary:

1. The Subdivision Map Act now requires local governments to impose on all tentative subdivision maps which are subject to the provisions of **SB 221** the condition that there be sufficient water for the project, along with existing and planned uses.
2. This condition is met by a verification showing the specific items listed in the Government Code, depending on whether or not new water supplies will be required.
3. The verification must in any event be supported by substantial evidence.
4. A final map may not be filed if the condition has not been met.

Section 17 - Code citations Special circumstances

SB 610

Water Code section 10915

The County of San Diego is deemed to comply with this part if the Office of Planning and Research determines that all of the following conditions have been met:

- *(a) Proposition C, as approved by the voters of the County of San Diego in November 1988, requires the development of a regional growth management plan and directs the establishment of a regional planning and growth management review board.*
- *(b) The County of San Diego and the cities in the county, by agreement, designate the San Diego Association of Governments as that review board.*
- *(c) A regional growth management strategy that provides for a comprehensive regional strategy and a coordinated economic development and growth management program has been developed pursuant to Proposition C.*
- *(d) The regional growth management strategy includes a water element to coordinate planning for water that is consistent with the requirements of this part.*
- *(e) The San Diego County Water Authority, by agreement with the San Diego Association of Governments in its capacity as the review board, uses the association's most recent regional growth forecasts for planning purposes and to implement the water element of the strategy.*
- *(f) The procedures established by the review board for the development and approval of the regional growth management strategy, including the water element and any certification process established to ensure that a project is consistent with that element, comply with the requirements of this part.*
- *(g) The environmental documents for a project located in the County of San Diego include information that accomplishes the same purposes as a water assessment that is prepared pursuant to Section 10910.*

SB 221

Government Code section 66473.7

(k) The County of San Diego shall be deemed to comply with this section if the Office of Planning and Research determines that all of the following conditions have been met:

- *(1) A regional growth management strategy that provides for a comprehensive regional strategy and a coordinated economic development and growth management program has been developed pursuant to Proposition C as approved by the voters of the County of San Diego in November 1988, which required the development of a regional growth management plan and directed the establishment of a regional planning and growth management review board.*
- *(2) Each public water system, as defined in Section 10912 of the Water Code, within the County of San Diego has adopted an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) of the Water Code.*
- *(3) The approval or conditional approval of tentative maps for subdivisions, as defined in this section, by the County of San Diego and the cities within the county requires written communications to be made by the public water system to the city or county, in a format and with content that is substantially similar to the requirements contained in this section, with regard to the availability of a sufficient water supply, or the reliance on projected water supplies to provide a sufficient water supply, for a proposed subdivision.*

Section 17 Special circumstances

Lead agencies and water suppliers within the County of San Diego are deemed to comply with **SB 610** if the Governor’s Office of Planning and Research determines that certain conditions have been met. If such a determination is made, lead agencies and water suppliers within the County of San Diego must still include information that accomplishes the same purposes as a water assessment prepared pursuant to Water Code § 10910. Until such a determination is made, agencies and water suppliers within the County of San Diego are subject to all statutory requirements.

Agencies and water suppliers within the County of San Diego are deemed to comply with **SB 221** if the Governor’s Office of Planning and Research determines that conditions have been met. If such a determination is made, agencies and water suppliers within the County of San Diego must still provide written communications to be made by the public water system to the city or county, in a format and with content that is substantially similar to the requirements contained in Government Code § 66473.7, with regard to the availability of a sufficient water supply, or the reliance on projected water supplies to provide a sufficient water supply, for a proposed subdivision. Until such a determination is made, agencies and water suppliers within the County of San Diego are subject to all statutory requirements.

Appendix A

Chapter 643, Statutes of 2001 (Senate Bill 610)

Chapter 643, Statutes of 2001 (Senate Bill 610)

An act to amend Section 21151.9 of the Public Resources Code, and to amend Sections 10631, 10656, 10910, 10911, 10912, and 10915 of, to repeal Section 10913 of, and to add and repeal Section 10657 of, the Water Code, relating to water. Approved by Governor October 9, 2001. Filed with Secretary of State October 9, 2001.

The people of the State of California do enact as follows:

SECTION 1. (a) The Legislature finds and declares all of the following:
(1) The length and severity of droughts in California cannot be predicted with any accuracy.

(2) There are various factors that affect the ability to ensure that adequate water supplies are available to meet all of California's water demands, now and in the future.

(3) Because of these factors, it is not possible to guarantee a permanent water supply for all water users in California in the amounts requested.

(4) Therefore, it is critical that California's water agencies carefully assess the reliability of their water supply and delivery systems.

(5) Furthermore, California's overall water delivery system has become less reliable over the last 20 years because demand for water has continued to grow while new supplies have not been developed in amounts sufficient to meet the increased demand.

(6) There are a variety of measures for developing new water supplies including water reclamation, water conservation, conjunctive use, water transfers, seawater desalination, and surface water and groundwater storage.

(7) With increasing frequency, California's water agencies are required to impose water rationing on their residential and business customers during this state's frequent and severe periods of drought.

(8) The identification and development of water supplies needed during multiple-year droughts is vital to California's business climate, as well as to the health of the agricultural industry, environment, rural communities, and residents who continue to face the possibility of severe water cutbacks during water shortage periods.

(9) A recent study indicates that the water supply and land use planning linkage, established by Part 2.10 (commencing with Section 10910) of Division 6 of the Water Code, has not been implemented in a manner that ensures the appropriate level of communication between water agencies and planning agencies, and this act is intended to remedy that deficiency in communication.

(b) It is the intent of the Legislature to strengthen the process pursuant to which local agencies determine the adequacy of existing and planned future water supplies to meet existing and planned future demands on those water supplies.

SEC. 2. Section 21151.9 of the Public Resources Code is amended to read:
21151.9. Whenever a city or county determines that a project, as defined in Section 10912 of the Water Code, is subject to this division, it shall comply with Part 2.10 (commencing with Section 10910) of Division 6 of the Water Code.

SEC. 3. Section 10631 of the Water Code is amended to read:
10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments as described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the amount and location of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the location, amount, and sufficiency of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(1) An average water year.
(2) A single dry water year.
(3) Multiple dry water years.

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to replace that source with alternative sources or water demand management measures, to the extent practicable.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses:

(A) Single-family residential.
(B) Multifamily.
(C) Commercial
(D) Industrial.
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.
(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.

(2) The water use projections shall be in the same five-year increments as described in subdivision (a). (f) Provide a description of the supplier’s water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:

(A) Water survey programs for single-family residential and multifamily residential customers.
(B) Residential plumbing retrofit.
(C) System water audits, leak detection, and repair.
(D) Metering with commodity rates for all new connections and retrofit of existing connections.
(E) Large landscape conservation programs and incentives.
(F) High-efficiency washing machine rebate programs.
(G) Public information programs.
(H) School education programs.
(I) Conservation programs for commercial, industrial, and institutional accounts.
(J) Wholesale agency programs.
(K) Conservation pricing.
(L) Water conservation coordinator.
(M) Water waste prohibition.
(N) Residential ultra-low-flush toilet replacement programs.

(2) A schedule of implementation for all water demand management measures proposed or described in the plan.

(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

(4) An estimate, if available, of existing conservation savings on water use within the supplier’s service area, and the effect of such savings on the supplier’s ability to further reduce demand.

(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(1) Take into account economic and non-economic factors, including environmental, social, health, customer impact, and technological factors.

(2) Include a cost-benefit analysis, identifying total benefits and total costs.

(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

(4) Include a description of the water supplier’s legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

(h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single dry, and multiple dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

(i) Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to that council in accordance with the ‘‘Memorandum of Understanding Regarding Urban Water Conservation in California,’’ dated September 1991, may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g).

SEC. 3.5. Section 10631 of the Water Code is amended to read:
10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier’s water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments as described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(1) An average water year.

(2) A single dry water year.

(3) Multiple dry water years. For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(e) (1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors, including, but not necessarily limited to, all of the following uses:

(A) Single-family residential.
(B) Multifamily.
(C) Commercial.
(D) Industrial
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.
(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.

(2) The water use projections shall be in the same five-year increments as described in subdivision (a).

(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:

(A) Water survey programs for single-family residential and multifamily residential customers.
(B) Residential plumbing retrofit.
(C) System water audits, leak detection, and repair.
(D) Metering with commodity rates for all new connections and retrofit of existing connections.
(E) Large landscape conservation programs and incentives.
(F) High-efficiency washing machine rebate programs.
(G) Public information programs.
(H) School education programs.
(I) Conservation programs for commercial, industrial, and institutional accounts.
(J) Wholesale agency programs.
(K) Conservation pricing.
(L) Water conservation coordinator.
(M) Water waste prohibition.
(N) Residential ultra-low-flush toilet replacement programs.

(2) A schedule of implementation for all water demand management measures proposed or described in the plan.

(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.

(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.

(2) Include a cost-benefit analysis, identifying total benefits and total costs.

(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

(4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

(h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single dry, and multiple dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

(i) Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to that council in accordance with the ''Memorandum of Understanding Regarding Urban Water Conservation in California,'' dated September 1991, may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g).
SEC. 4. Section 10656 of the Water Code is amended to read:
10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

SEC. 4.3. Section 10657 is added to the Water Code, to read:
10657. (a) The department shall take into consideration whether the urban water supplier has submitted an updated urban water management plan that is consistent with Section 10631, as amended by the act that adds this section, in determining whether the urban water supplier is eligible for funds made available pursuant to any program administered by the department.

(b) This section shall remain in effect only until January 1, 2006, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2006, deletes or extends that date.

SEC. 4.5. Section 10910 of the Water Code is amended to read:
10910. (a) Any city or county that determines that a project, as defined in Section 10912, is subject to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) under Section 21080 of the Public Resources Code shall comply with this part.

(b) The city or county, at the time that it determines whether an environmental impact report, a negative declaration, or a mitigated negative declaration is required for any project subject to the California Environmental Quality Act pursuant to Section 21080.1 of the Public Resources Code, shall identify any water system that is, or may become as a result of supplying water to the project identified pursuant to this subdivision, a public water system, as defined in Section 10912, that may supply water for the project. If the city or county is not able to identify any public water system that may supply water for the project, the city or county shall prepare the water assessment required by this part after consulting with any entity serving domestic water supplies whose service area includes the project site, the local agency formation commission, and any public water system adjacent to the project site.

(c) (1) The city or county, at the time it makes the determination required under Section 21080.1 of the Public Resources Code, shall request each public water system identified pursuant to subdivision (b) to determine whether the projected water demand associated with a proposed project was included as part of the most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610).

(2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

(3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water supply assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

(4) If the city or county is required to comply with this part pursuant to subdivision (b), the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

(d) (1) The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts.

(2) An identification of existing water supply entitlements, water rights, or water service contracts held by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall be demonstrated by providing information related to all of the following:

(A) Written contracts or other proof of entitlement to an identified water supply.

(B) Copies of a capital outlay program for financing the delivery of a water supply that has been adopted by the public water system.

(C) Federal, state, and local permits for construction of necessary infrastructure associated with delivering the water supply.

(D) Any necessary regulatory approvals that are required in order to be able to convey or deliver the water supply.

(e) If no water has been received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts, the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), shall also include in its water supply assessment pursuant to subdivision (c), an identification of the other public water systems or water service contract-holders that receive a water supply or have existing water supply entitlements, water rights, or water service contracts, to the same source of water as the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has identified as a source of water supply within its water supply assessments.

(f) If a water supply for a proposed project includes groundwater, the following additional information shall be included in the water supply assessment:

(1) A review of any information contained in the urban water management plan relevant to the identified water supply for the proposed project.

(2) A description of any groundwater basin or basins from which the proposed project will be supplied. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current bulletin of the department that characterizes the condition of the groundwater basin, and a detailed description by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), of the efforts being undertaken in the basin or basins to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the amount and location of groundwater pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), for the past five years from any groundwater basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), from any basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(5) An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project. A water supply assessment shall not be required to include the information required by this paragraph if the public water system determines, as part of the review required by paragraph (1), that the sufficiency of groundwater necessary to meet the initial and projected water demand associated with the project was addressed in the description and analysis required by paragraph (4) of subdivision (b) of Section 10631.

(g) (1) Subject to paragraph (2), the governing body of each public water system shall submit the assessment to the city or county not later than 90 days from the date on which the request was received. The governing body of each public water system, or the city or county if either is required to comply with this act pursuant to subdivision (b), shall approve the assessment prepared pursuant to this section at a regular or special meeting.

(2) Prior to the expiration of the 90-day period, if the public water system intends to request an extension of time to prepare and adopt the assessment, the public water system shall meet with the city or county to request an extension of time, which shall not exceed 30 days, to prepare and adopt the assessment.

(3) If the public water system fails to request an extension of time, or fails to submit the assessment notwithstanding the extension of time granted pursuant to paragraph (2), the city or county may seek a writ of mandamus to compel the governing body of the public water system to comply with the requirements of this part relating to the submission of the water supply assessment.

(h) Notwithstanding any other provision of this part, if a project has been the subject of a water supply assessment that complies with the requirements of this part, no additional water supply assessment shall be required for subsequent projects that were part of a larger project for which a water supply assessment was completed and that has complied with the requirements of this part and for which the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has concluded that its water supplies are sufficient to meet the projected water demand associated with the proposed project, in addition to the existing and planned future uses, including, but not limited to, agricultural and industrial uses, unless one or more of the following changes occurs:

(1) Changes in the project that result in a substantial increase in water demand for the project.

(2) Changes in the circumstances or conditions substantially affecting the ability of the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), to provide a sufficient supply of water for the project.

(3) Significant new information becomes available which was not known and could not have been known at the time when the assessment was prepared.

SEC. 5. Section 10911 of the Water Code is amended to read:
10911. (a) If, as a result of its assessment, the public water system concludes that its water supplies are, or will be, insufficient, the public water system shall provide to the city or county its plans for acquiring additional water supplies, setting forth the measures that are being undertaken to acquire and develop those water supplies. If the city or county, if either is required to comply with this part pursuant to subdivision (b), concludes as a result of its assessment, that water supplies are, or will be, insufficient, the city or county shall include in its water supply assessment its plans for acquiring additional water supplies, setting forth the measures that are being undertaken to acquire and develop those water supplies. Those plans may include, but are not limited to, information concerning all of the following:

(1) The estimated total costs, and the proposed method of financing the costs, associated with acquiring the additional water supplies.

(2) All federal, state, and local permits, approvals, or entitlements that are anticipated to be required in order to acquire and develop the additional water supplies.

(3) Based on the considerations set forth in paragraphs (1) and (2), the estimated timeframes within which the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), expects to be able to acquire additional water supplies.

(b) The city or county shall include the water supply assessment provided pursuant to Section 10910, and any information provided pursuant to subdivision (a), in any environmental document prepared for the project pursuant to Division 13 (commencing with Section 21000) of the Public Resources Code.

(c) The city or county may include in any environmental document an evaluation of any information included in that environmental document provided pursuant to subdivision (b). The city or county shall determine, based on the entire record, whether projected water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses. If the city or county determines that water supplies will not be sufficient, the city or county shall include that determination in its findings for the project.

SEC. 6. Section 10912 of the Water Code is amended to read:
10912. For the purposes of this part, the following terms have the following meanings:

(a) ‘‘Project’’ means any of the following:

(1) A proposed residential development of more than 500 dwelling units.

(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.

(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.

(4) A proposed hotel or motel, or both, having more than 500 rooms.

(5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.

(6) A mixed-use project that includes one or more of the projects specified in this subdivision.

(7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

(b) If a public water system has fewer than 5,000 service connections, then ‘‘project’’ means any proposed residential, business, commercial, hotel or motel, or industrial development that would account for an increase of 10 percent or more in the number of the public water system’s existing service connections, or a mixed-use project that would demand an amount of water equivalent to, or greater than, the amount of water required by residential development that would represent an increase of 10 percent or more in the number of the public water system’s existing service connections.

(c) ‘‘Public water system’’ means a system for the provision of piped water to the public for human consumption that has 3000 or more service connections. A public water system includes all of the following:

(1) Any collection, treatment, storage, and distribution facility under control of the operator of the system which is used primarily in connection with the system.

(2) Any collection or pretreatment storage facility not under the control of the operator that is used primarily in connection with the system.

(3) Any person who treats water on behalf of one or more public water systems for the purpose of rendering it safe for human consumption.

SEC. 7. Section 10913 of the Water Code is repealed.

SEC. 8. Section 10915 of the Water Code is amended to read:
10915. The County of San Diego is deemed to comply with this part if the Office of Planning and Research determines that all of the following conditions have been met:

(a) Proposition C, as approved by the voters of the County of San Diego in November 1988, requires the development of a regional growth management plan and directs the establishment of a regional planning and growth management review board.

(b) The County of San Diego and the cities in the county, by agreement, designate the San Diego Association of Governments as that review board.

(c) A regional growth management strategy that provides for a comprehensive regional strategy and a coordinated economic development and growth management program has been developed pursuant to Proposition C.

(d) The regional growth management strategy includes a water element to coordinate planning for water that is consistent with the requirements of this part.

(e) The San Diego County Water Authority, by agreement with the San Diego Association of Governments in its capacity as the review board, uses the association’s most recent regional growth forecasts for planning purposes and to implement the water element of the strategy.

(f) The procedures established by the review board for the development and approval of the regional growth management strategy, including the water element and any certification process established to ensure that a project is consistent with that element, comply with the requirements of this part.

(g) The environmental documents for a project located in the County of San Diego include information that accomplishes the same purposes as a water supply assessment that is prepared pursuant to Section 10910.

SEC. 9.
Section 3.5 of this bill incorporates amendments to Section 10631 of the Water Code proposed by both this bill and AB 901. It shall only become operative if (1) both bills are enacted and become effective on or before January 1, 2002, (2) each bill amends Section 10631 of the Water Code, and (3) this bill is enacted after AB 901, in which case Section 3 of this bill shall not become operative.

SEC. 10.
No reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution because a local agency or school district has the authority to levy service charges, fees, or assessments sufficient to pay for the program or level of service mandated by this act, within the meaning of Section 17556 of the Government Code.

Appendix B

Chapter 642, Statutes of 2001 (Senate Bill No. 221)

Chapter 642, Statutes of 2001 (Senate Bill No. 221)

An act to amend Section 11010 of the Business and Professions Code, and to amend Section 65867.5 of, and to add Sections 66455.3 and 66473. 7 to, the Government Code, relating to land use. Approved by Governor October 9, 2001. Filed with Secretary of State October 9, 2001.

The people of the State of California do enact as follows:

SECTION 1. Section 11010 of the Business and Professions Code is amended to read:
11010. (a) Except as otherwise provided pursuant to subdivision (c) or elsewhere in this chapter, any person who intends to offer subdivided lands within this state for sale or lease shall file with the Department of Real Estate an application for a public report consisting of a notice of intention and a completed questionnaire on a form prepared by the department.

(b) The notice of intention shall contain the following information about the subdivided lands and the proposed offering:

(1) The name and address of the owner.
(2) The name and address of the subdivider.
(3) The legal description and area of lands.
(4) A true statement of the condition of the title to the land, particularly including all encumbrances thereon.

(5) A true statement of the terms and conditions on which it is intended to dispose of the land, together with copies of any contracts intended to be used.

(6) A true statement of the provisions, if any, that have been made for public utilities in the proposed subdivision, including water, electricity, gas, telephone, and sewerage facilities. For subdivided lands that were subject to the imposition of a condition pursuant to subdivision (b) of Section 66473.7 of the Government Code, the true statement of the provisions made for water shall be satisfied by submitting a copy of the written verification of the available water supply obtained pursuant to Section 66473.7 of the Government Code.

(7) A true statement of the use or uses for which the proposed subdivision will be offered.

(8) A true statement of the provisions, if any, limiting the use or occupancy of the parcels in the subdivision.

(9) A true statement of the amount of indebtedness that is a lien upon the subdivision or any part thereof, and that was incurred to pay for the construction of any onsite or offsite improvement, or any community or recreational facility.

(10) A true statement or reasonable estimate, if applicable, of the amount of any indebtedness which has been or is proposed to be incurred by an existing or proposed special district, entity, taxing area, assessment district, or community facilities district within the boundaries of which, the subdivision, or any part thereof, is located, and that is to pay for the construction or installation of any improvement or to furnish community or recreational facilities to that subdivision, and which amounts are to be obtained by ad valorem tax or assessment, or by a special assessment or tax upon the subdivision, or any part thereof.

(11) (A) As to each school district serving the subdivision, a statement from the appropriate district that indicates the location of each high school, junior high school, and elementary school serving the subdivision, or documentation that a statement to that effect has been requested from the appropriate school district.

(B) In the event that, as of the date the notice of intention and application for issuance of a public report are otherwise deemed to be qualitatively and substantially complete pursuant to Section 11010.2, the statement described in subparagraph (A) has not been provided by any school district serving the subdivision, the person who filed the notice of intention and application for issuance of a public report immediately shall provide the department with the name, address, and telephone number of that district.

(12) The location of all existing airports, and of all proposed airports shown on the general plan of any city or county, located within two statute miles of the subdivision.

(13) A true statement, if applicable, referencing any soils or geologic report or soils and geologic reports that have been prepared specifically for the subdivision.

(14) A true statement of whether or not fill is used, or is proposed to be used in the subdivision and a statement giving the name and the location of the public agency where information concerning soil conditions in the subdivision is available.

(15) Any other information that the owner, his or her agent, or the subdivider may desire to present.

(c) The commissioner may, by regulation, or on the basis of the particular circumstances of a proposed offering, waive the requirement of the submission of a completed questionnaire if the commissioner determines that prospective purchasers or lessees of the subdivision interests to be offered will be adequately protected through the issuance of a public report based solely upon information contained in the notice of intention.

SEC. 2. Section 65867.5 of the Government Code is amended to read:
65867. 5. (a) A development agreement is a legislative act that shall be approved by ordinance and is subject to referendum.

(b) A development agreement shall not be approved unless the legislative body finds that the provisions of the agreement are consistent with the general plan and any applicable specific plan.

(c) A development agreement that includes a subdivision, as defined in Section 66473.7, shall not be approved unless the agreement provides that any tentative map prepared for the subdivision will comply with the provisions of Section 66473.7.

SEC. 3. Section 66455.3 is added to the Government Code, to read:
66455. 3. Not later than five days after a city or county has determined that a tentative map application for a proposed subdivision, as defined in Section 66473.7, is complete pursuant to Section 65943, the local agency shall send a copy of the application to any water supplier that is, or may become, a public water system, as defined in Section 10912 of the Water Code, that may supply water for the subdivision.

SEC. 4. Section 66473.7 is added to the Government Code, to read:
66473. 7. (a) For the purposes of this section, the following definitions apply:
(1) ‘‘Subdivision’’ means a proposed residential development of more than 500 dwelling units, except that for a public water system that has fewer than 5,000 service connections, ‘‘subdivision’’ means any proposed residential development that would account for an increase of 10 percent or more in the number of the public water system’s existing service connections.

(2) ‘‘Sufficient water supply’’ means the total water supplies available during normal, single-dry, and multiple-dry years within a 20- year projection that will meet the projected demand associated with the proposed subdivision, in addition to existing and planned future uses, including, but not limited to, agricultural and industrial uses. In determining ‘‘sufficient water supply,’’ all of the following factors shall be considered:

(A) The availability of water supplies over a historical record of at least 20 years.

(B) The applicability of an urban water shortage contingency analysis prepared pursuant to Section 10632 of the Water Code that includes actions to be undertaken by the public water system in response to water supply shortages.

(C) The reduction in water supply allocated to a specific water use sector pursuant to a resolution or ordinance adopted, or a contract entered into, by the public water system, as long as that resolution, ordinance, or contract does not conflict with Section 354 of the Water Code.

(D) The amount of water that the water supplier can reasonably rely on receiving from other water supply projects, such as conjunctive use, reclaimed water, water conservation, and water transfer, including programs identified under federal, state, and local water initiatives such as CALFED and Colorado River tentative agreements, to the extent that these water supplies meet the criteria of subdivision (d).

(3) ‘‘Public water system’’ means the water supplier that is, or may become as a result of servicing the subdivision included in a tentative map pursuant to subdivision (b), a public water system, as defined in Section 10912 of the Water Code, that may supply water for a subdivision.

(b) (1) The legislative body of a city or county or the advisory agency, to the extent that it is authorized by local ordinance to approve, conditionally approve, or disapprove the tentative map, shall include as a condition in any tentative map that includes a subdivision a requirement that a sufficient water supply shall be available. Proof of the availability of a sufficient water supply shall be requested by the subdivision applicant or local agency, at the discretion of the local agency, and shall be based on written verification from the applicable public water system within 90 days of a request.

(2) If the public water system fails to deliver the written verification as required by this section, the local agency or any other interested party may seek a writ of mandamus to compel the public water system to comply.

(3) If the written verification provided by the applicable public water system indicates that the public water system is unable to provide a sufficient water supply that will meet the projected demand associated with the proposed subdivision, then the local agency may make a finding, after consideration of the written verification by the applicable public water system, that additional water supplies not accounted for by the public water system are, or will be, available prior to completion of the subdivision that will satisfy the requirements of this section. This finding shall be made on the record and supported by substantial evidence.

(4) If the written verification is not provided by the public water system, notwithstanding the local agency or other interested party securing a writ of mandamus to compel compliance with this section, then the local agency may make a finding that sufficient water supplies are, or will be, available prior to completion of the subdivision that will satisfy the requirements of this section. This finding shall be made on the record and supported by substantial evidence.

(c) The applicable public water system’s written verification of its ability or inability to provide a sufficient water supply that will meet the projected demand associated with the proposed subdivision as required by subdivision (b) shall be supported by substantial evidence. The substantial evidence may include, but is not limited to, any of the following:

(1) The public water system’s most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610) of Division 6 of the Water Code.

(2) A water supply assessment that was completed pursuant to Part 2. 10 (commencing with Section 10910) of Division 6 of the Water Code.

(3) Other information relating to the sufficiency of the water supply that contains analytical information that is substantially similar to the assessment required by Section 10635 of the Water Code.

(d) When the written verification pursuant to subdivision (b) relies on projected water supplies that are not currently available to the public water system, to provide a sufficient water supply to the subdivision, the written verification as to those projected water supplies shall be based on all of the following elements, to the extent each is applicable:

(1) Written contracts or other proof of valid rights to the identified water supply that identify the terms and conditions under which the water will be available to serve the proposed subdivision.

(2) Copies of a capital outlay program for financing the delivery of a sufficient water supply that has been adopted by the applicable governing body.

(3) Securing of applicable federal, state, and local permits for construction of necessary infrastructure associated with supplying a sufficient water supply.

(4) Any necessary regulatory approvals that are required in order to be able to convey or deliver a sufficient water supply to the subdivision.

(e) If there is no public water system, the local agency shall make a written finding of sufficient water supply based on the evidentiary requirements of subdivisions (c) and (d) and identify the mechanism for providing water to the subdivision.

(f) In making any findings or determinations under this section, a local agency, or designated advisory agency, may work in conjunction with the project applicant and the public water system to secure water supplies sufficient to satisfy the demands of the proposed subdivision. If the local agency secures water supplies pursuant to this subdivision, which supplies are acceptable to and approved by the governing body of the public water system as suitable for delivery to customers, it shall work in conjunction with the public water system to implement a plan to deliver that water supply to satisfy the long-term demands of the proposed subdivision.

(g) The written verification prepared under this section shall also include a description, to the extent that data is reasonably available based on published records maintained by federal and state agencies, and public records of local agencies, of the reasonably foreseeable impacts of the proposed subdivision on the availability of water resources for agricultural and industrial uses within the public water system's service area that are not currently receiving water from the public water system but are utilizing the same sources of water. To the extent that those reasonably foreseeable impacts have previously been evaluated in a document prepared pursuant to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) or the National Environmental Policy Act (Public Law 91- 190) for the proposed subdivision, the public water system may utilize that information in preparing the written verification.

(h) Where a water supply for a proposed subdivision includes groundwater, the public water system serving the proposed subdivision shall evaluate, based on substantial evidence, the extent to which it or the landowner has the right to extract the additional groundwater needed to supply the proposed subdivision. Nothing in this subdivision is intended to modify state law with regard to groundwater rights.

(i) This section shall not apply to any residential project proposed for a site that is within an urbanized area and has been previously developed for urban uses, or where the immediate contiguous properties surrounding the residential project site are, or previously have been, developed for urban uses, or housing projects that are exclusively for very low and low-income households.

(j) The determinations made pursuant to this section shall be consistent with the obligation of a public water system to grant a priority for the provision of available and future water resources or services to proposed housing developments that help meet the city's or county's share of the regional housing needs for lower income households, pursuant to Section 65589.7.

(k) The County of San Diego shall be deemed to comply with this section if the Office of Planning and Research determines that all of the following conditions have been met:

(1) A regional growth management strategy that provides for a comprehensive regional strategy and a coordinated economic development and growth management program has been developed pursuant to Proposition C as approved

by the voters of the County of San Diego in November 1988, which required the development of a regional growth management plan and directed the establishment of a regional planning and growth management review board.

(2) Each public water system, as defined in Section 10912 of the Water Code, within the County of San Diego has adopted an urban water management plan pursuant to Part 2.6 (commencing with Section 10610) of the Water Code.

(3) The approval or conditional approval of tentative maps for subdivisions, as defined in this section, by the County of San Diego and the cities within the county requires written communications to be made by the public water system to the city or county, in a format and with content that is substantially similar to the requirements contained in this section, with regard to the availability of a sufficient water supply, or the reliance on projected water supplies to provide a sufficient water supply, for a proposed subdivision.

(l) Nothing in this section shall preclude the legislative body of a city or county, or the designated advisory agency, at the request of the applicant, from making the determinations required in this section earlier than required pursuant to subdivision (a).

(m) Nothing in this section shall be construed to create a right or entitlement to water service or any specific level of water service.

(n) Nothing in this section is intended to change existing law concerning a public water system’s obligation to provide water service to its existing customers or to any potential future customers.

(o) Any action challenging the sufficiency of the public water system’s written verification of a sufficient water supply shall be governed by Section 66499.37.

SEC. 5.
No reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution because a local agency or school district has the authority to levy service charges, fees, or assessments sufficient to pay for the program or level of service mandated by this act, within the meaning of Section 17556 of the Government Code.

Appendix C

Urban Water Management Plan – sample groundwater section

Established: AB 797, Klehs, 1983
Amended: AB 2661, Klehs, 1990
AB 11X, Filante, 1991
AB 1869, Speier, 1991
AB 892, Frazee, 1993
SB 1017, McCorquodale, 1994
AB 2853, Cortese, 1994
AB 1845, Cortese, 1995
SB 1011, Polanco, 1995
AB 2552, Bates, 2000
SB 553, Kelley, 2000
SB 610, Costa, 2001
AB 901, Daucher, 2001
SB 672, Machado, 2001
SB 1348, Brulte, 2002
SB 1384 Costa, 2002
SB 1518 Torlakson, 2002

CALIFORNIA WATER CODE DIVISION 6
PART 2.6. URBAN WATER MANAGEMENT PLANNING
CHAPTER 1. GENERAL DECLARATION AND POLICY

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. (a) The Legislature finds and declares all of the following:
(1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.
(2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.
(3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.
(4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.
(5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.
(6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.
(7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.
(8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.
(9) The quality of source supplies can have a significant impact on water management strategies and supply reliability.
(b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.
10610.4. The Legislature finds and declares that it is the policy of the state as follows:
(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.

(b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.

(c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

CHAPTER 2. DEFINITIONS

10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10611.5. "Demand management" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

10612. "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

10613. "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

10614. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

10616. "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

10616.5. "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

CHAPTER 3. URBAN WATER MANAGEMENT PLANS

Article 1. General Provisions

10620.

(a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).

(b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.

(c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d)

(1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

10621.

(a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero.

(b) Every urban water supplier required to prepare a plan pursuant to this part shall notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

(c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

Article 2. Contents of Plans

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree. For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(1) An average water year.

(2) A single dry water year.
(3) Multiple dry water years.
For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.
(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.
(e)
(1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:
(A) Single-family residential.
(B) Multifamily.
(C) Commercial.
(D) Industrial.
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.
(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.
(2) The water use projections shall be in the same five-year increments described in subdivision (a).
(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:
(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:
(A) Water survey programs for single-family residential and multifamily residential customers.
(B) Residential plumbing retrofit.
(C) System water audits, leak detection, and repair.
(D) Metering with commodity rates for all new connections and retrofit of existing connections.
(E) Large landscape conservation programs and incentives.
(F) High-efficiency washing machine rebate programs.
(G) Public information programs.
(H) School education programs.
(I) Conservation programs for commercial, industrial, and institutional accounts.
(J) Wholesale agency programs.
(K) Conservation pricing.
(L) Water conservation coordinator.
(M) Water waste prohibition.
(N) Residential ultra-low-flush toilet replacement programs.
(2) A schedule of implementation for all water demand management measures proposed or described in the plan.
(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.
(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.
(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.
(2) Include a cost-benefit analysis, identifying total benefits and total costs.
(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.
(4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

(h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

(i) Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to that council in accordance with the "Memorandum of Understanding Regarding Urban Water Conservation in California," dated September 1991, may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g).

(j) Urban water suppliers that rely upon a wholesale agency for a source of water, shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c).

10631.5. The department shall take into consideration whether the urban water supplier is implementing or scheduled for implementation, the water demand management activities that the urban water supplier identified in its urban water management plan, pursuant to Section 10631, in evaluating applications for grants and loans made available pursuant to Section 79163. The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities.

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

(a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

(b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.

(c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

(d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

(e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

(f) Penalties or charges for excessive use, where applicable.

(g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

(h) A draft water shortage contingency resolution or ordinance.

(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

(b) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

(c) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(d) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

(e) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

(f) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

Article 2.5 Water Service Reliability

10635.

(a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.

Articl 3. Adoption and Implementation of Plans

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630). The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644.

(a) An urban water supplier shall file with the department and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be filed with the department and any city or county within which the supplier provides water supplies within 30 days after adoption.

(b) The department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the outstanding elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has filed its plan with the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

10645. Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

CHAPTER 4. MISCELLANEOUS PROVISIONS

10650. Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

10651. In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

10654. An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the "Memorandum of Understanding Regarding Urban Water Conservation in California" is deemed to be reasonable for the purposes of this section.

10655. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

10657.

(a) The department shall take into consideration whether the urban water supplier has submitted an updated urban water management plan that is consistent with Section 10631, as amended by the act that adds this section, in determining whether the urban water supplier is eligible for funds made available pursuant to any program administered by the department.

(b) This section shall remain in effect only until January 1, 2006, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2006, deletes or extends that date.

Appendix D

Other Resources

- California Environmental Quality Act - http://ceres.ca.gov/ceqa/
- Governor's Office of Planning and Research Planning, Zoning and Development Laws 2000 - http://www.opr.ca.gov/publications/PublicationsIndex.shtml#pubs-P
- California Land Use Planning Information Network - http://ceres.ca.gov/planning/
- The Governor's Office of Planning and Research - http://www.opr.ca.gov/
- US Bureau of Reclamation Lower Colorado Regional Office - http://www.usbr.gov/lc/region/
- US Bureau of Reclamation Mid-Pacific Region - http://www.usbr.gov/mp/
- California Department of Water Resources-Bay Delta Office State Water Project Delivery Reliabilty Report - http://swpdelivery.water.ca.gov/
- Metropolitan Water District of Southern California - http://www.mwdh2o.com/
- California Department of Water Resources Division of Planning and Local Assistance-Groundwater Management in California - http://wwwdpla.water.ca.gov/cgi-bin/supply/gw/management/hq/main.pl
- Governors Office of Planning and Research General Plan Guidelines - http://www.opr.ca.gov/

APPENDIX B
PALO VERDE VALLEY WATER BALANCE

This appendix presents the Palo Verde Valley Water Balance, Palo Verde Groundwater Model as presented in the McCoy Solar Energy Project Water Supply Assessment (AECOM 2011).

TABLE 1
PALO VERDE VALLEY WATER BALANCE
PALO VERDE GRONDWATER MODEL
McCOY SOLAR ENERGY PROJECT
RIVERSIDE COUNTY, CALIFORINA

RECHARGE AND DISCHARGE			BASIS FOR ESTIMATE	WATER BALANCE ESTIMATES REPORTED BY OTHERS (acre feet per year)		
RECHARGE (INFLOW)	%	acre-feet per year	BASIS FOR ESTIMATE	Metzger, and others, 1973 USGS Professional Paper 486-G[1]	Owen-Joyce, 1984 USGS 84-4236[2]	Owen-Joyce, 1984 USGS 87-4078[2]
UNDERFLOW from the CHUCKWALLA	0.23%	1,000	Estimate after WorleyParsons (2010), Response to Cure, Water Resources Data Request 1-9, Application for Certification - Genesis Solar Power Project (09-AFC-8), April 2010.	400	400	-
UNDERFLOW from PARKER VALLEY	0.82%	3,500	Underflow calculated using transmissivity of 26,000 ft 2/d (from Leake, 2008), gradient of 0.0003 ft/ft, a 19,000-foot width, and 600 --foot depth (from Metzger et.al.,1973) for the saturated section.	3,000	-	-
PERCOLATION[3] AGRICULTURE RETURN - MESA	0.82%	3,500	There are a total of approximately 2,683 acres of irrigated agricultural land on the Mesa (PVID February 2010). Of the 2,683 acres, approximately 1,862 acres are irrigated with surface water from PVID and the remaining 724 acres are irrigated with groundwater. Agricultural return on the Mesa was calculated for the 2,683 acres using the DWR Water Use Estimates (2001) for water use (4.5 - 5.85 acre-feet/acre) and crop efficiency (70%-75%). The return was the difference between the total applied water less the consumptive use as derived by the efficiency estimates.	-	9,500	9,500
AGRICULTURE RETURN - VALLEY	15.71%	67,000	The estimate is based on the average of PVID diversions to the Valley (1993-2008) (743,000 acre-feet) less the average total spill return (136,000 acre-feet) over the same period,less the seepage (125,000) and evaporation loss (5,000) and less average consumptive use estimates for the PVID (420,000) since 1993.	0	0	0
POTW RETURN	0.18%	750	Estimate of return from the Blythe POTW based on inflormation provided on the daily flow to evaporation/percolration ponds (City of Blythe website), an assumption that the total pond area is aobut 120 acres (estimate dervied from photo review) and an annual evaporation rate of 71 inches.	-	-	-
MOUNTAIN FRONT	1.17	5,000	Estimate derived using the average annual isoheytal contours shown on Figure 6 from Hely and Peck (1964), wherein the average annual precipitation was overlayed onto the topography of the Palo Verde Valley to provide an estimate of total precipitation in acre-feet for the Basin under an assumption that 5% of the total estimate from precipitation would return as deep percolation to the 2,000 2,000 groundwater basin	2,000	2,000	
IRRIGATION CANAL LEAKAGE (LESS EVAPORATION)	28.13%	120,000	After Bookman Edmondson (1976) and Owen-Joyce (1984), 125,000 afy (Canal Leakage) - 5,000 (Evaporation).	-	120,000	120,000
RIVER DISCHARGE TO GROUNDWATER (LOSING CONDITION)	52.94%	225,850	Estimate based on the difference between the measured values of total discharge less the estimate of agricultural return and canal leakage (inflow). The estimate was made under the assumption that groundwater levels have not changed significantly and as such there must be a balance between inflow and outflow in the Palo Verde Valley.	361,000	3,100	-
BEDROCK	0.60%	0	Although recharge from the bedrock is possible there is insufficient well data to determine flux into the Valley or Mesa Groundwater Basins.	-	-	-
TOTAL (INFLOW)	-	426,600	-	366,400	135,00	129,500
DISCHARGE (OUTFLOW)	%	acre-feet per year	BASIS FOR ESTIMATE	Metzger, and others, 1973 USGS Professional Paper 486-G[1]	Owen-Joyce, 1984 USGS 84-4236[2]	Owen-Joyce, 1984 USGS 87-4078[2]
UNDERFLOW OUT of the PALO VERDE and CIBOLA VALLEY AQUIFER	-	0	After Metzger et al (1973).	-	-	-
GROUNDWATER PUMPING AGRICULTURE - MESA	0.84%	3,600	To determine agricultural diversions on the PV Mesa, the "Estimated Water Use" values from DWR (2001) were applied to a total of 724 acres of agricultural land that uses groundwater for irrigation. There are approximately 364 acres of agricultural land inside the PVID boundary that use private wells and approximately 360 acres of agricultural land outside of the PVID boundaries that use ---groundwater for irrigation.	-	-	-
MUNICIPAL and DOMESTIC	1.76%	7,500	Within the City Limits as per the Department of Public Works Department, the City of Blythe pumps the Mesa Ranch Well #3 for domestic use (230 afy) and PVC Well #2 for municipal use at the Palo Verde College (260 AFY), Main System (3700 AFY) and Mesa Well #2 for the Golf Course (560 AFY). The County of Riverside operates one well (Airport Well #7) at the Blythe Airport that serves the Mesa Verde Community (47 afy). This estimate also includes pumping for the Blythe Energy Plant I (3,300 afy). It does not include pumping for BEP II as this well is not yet in operation. Information after City of Blythe Department of Public Works, Kevin Nelson, February 2010.	-	2,000 (1981)	-
UNMEASURED RETURN (GAINING CONDITION)	11.72%	50,000	Average unmeasured return after the USBR, Lower Colorado River Accounting and Water Use Report - Arizona, California, and Nevada - Calendar Year 2003-2009.	-	23,900	2,500-31,700
CONSUMPTIVE USE - NATIVE VEGETATION	1.99%	8,500	Estimate derived from distrubution of riparian vegetation within the PVID area (Figure 3-5 "Land Cover Types in Reach 4", Lower Colorado River Multi-Species Conservation Plan: CDFG 2081-2005-008-06), and the estimate of consumptive use and evaporation loss as provided for these areas and summarized in Table-1 "Agricultural and Riparian Vegetation ET, and Evaporation by Water User, Lower Colorado River, Hoover Dam ot Mexico", Lower Colorado River Accounting System, Evapotranspiration Calculations, 2003-2009.	136,000	-	-
GROUNDWATER DISCHARGE	83.68%	357,000	Average Outfall Drain Return for 1993-2008.	-	419,500	-
TOTAL (OUTFLOW)	**-**	**426,600**	-	-86,000	-	-
WATER BALANCE	**-**	**0**	-	-	-	-

NOTES
1. The consumptive use non-native vegetation estimate provided by Metzger and others includes areas outside the Palo Verde Valley.
2. Owen-Joyce (1984) estimated the inflow to the Palo Verde Mesa (Mesa Basin) at 9,500 afy and correspondingly estimated the outflow to the Palo Verde Valley (Valley Basin) at 4,700 afy.
3. Precipitation recharge onto the Palo Verde Mesa floor assumed to be negligible. It is assumed that all water transpires or evaporates as it falls onto the valley floor. There is no return to the groundwater from direct precipitation.

APPENDIX C
PALO VERDE IRRIGATION DISTRICT WATER SUPPLY LETTER

PALO VERDE IRRIGATION DISTRICT
180 WEST 14TH AVENUE
BLYTHE, CA 92225
Phone: 760-922-3144 Fax: 760-922-8294 pvid.org

March 1, 2016

Mr. James Cook
First Solar
135 Main Street, 6th Floor
San Francisco, CA 94105

Subject: Water Supply for Desert Quartzite Solar Project on the Palo Verde Mesa in Riverside County, California

Dear Mr. Cook:

This letter is to advise you that the Palo Verde Irrigation District (PVID) is willing and able to provide water to meet the construction and operational water supply needs of the proposed Desert Quartzite Solar Project (DQSP) within PVID's service boundary. As we understand your service requirements, the DQSP is currently expected to require approximately 1,400 to 1,800 acre feet of water (total) over the 25 to 48 month construction period and 38 acre feet per year over the planned 30-year operational phase of the Project.

These estimated water supply needs can be readily satisfied using PVID's existing water rights and current water allocations for the Palo Verde Mesa service area without negatively impacting PVID's water supply or customers. PVID understands that the proposed DQSP is currently being evaluated in a joint Environmental Impact Statement /Environmental Impact Report being prepared by the U.S. Bureau of Land Management and Riverside County.

The provision of these water supply services within PVID's service boundary is contingent upon the necessary arrangements for delivery via available PVID pumping and /or canal facilities in accordance with PVID rules and regulations. Fees would include the payment of applicable supply unit rates and charges, including charges for any required PVID facility upgrades for the ongoing needs of the Project.

We anticipate that the terms and conditions of the provision of service to the Desert Quartzite Solar Project would be further clarified in detailed, definitive service agreements.

Sincerely,

Richard Gilmore

Richard Gilmore
Assistant Manager
Palo Verde Irrigation District